Summer 2025 Faculty Opportunities Sorted by Department or Program

Please see below for full position descriptions hyperlinked in the position title.

SPRINT UTRA applications are due by February 2nd, 2025 at 11:59 PM EST.

Department/Program Name	Faculty Name	Project Title
Africana Studies	Patsy Lewis	In the Wake of George Floyd
American Studies	Elena Shih	Weaponizing Femininity on the China-Myanmar Borderlands: Trafficking Development and Bordered Illegality
American Studies	Jessica Fremland	Cultural Safety and Indigenous Performance
American Studies	Kevin Escudero	Decolonization in Oceania: Decolonization Activism in Guåhan and Hawai'i
American Studies / Africana Studies	Matthew Guterl	"The Troubles: Black and Irish Solidarities in the Age of Rights Revolutions"
Annenberg Institute, Economics and Population Studies and Training Center	Margot Jackson	The Undergraduate Research Fellows for Social Science and Public Policy
Archaeology and the Ancient World	Peter van Dommelen	Excavating Everyday Life and Indigenous Communities in Ancient Sardinia (Italy)
Behavioral and Social Sciences	Cara Murphy	Clinical Research Evaluating Smoking Cessation with E-Cigarettes, and Nicotine Therapy (CRESCENT) Study
Behavioral and Social Sciences	Matthew Meisel	ASCEND: A Study of Career Entry and Network Development
Behavioral and Social Sciences	Rachel Cassidy	Project CRISSP (Cessation and Relapse Impacted by Social-Contextual Stressors and Psychopharmacology)
Behavioral and Social Sciences	Rachel Cassidy	Project ONYX (Oral Nicotine

		product use in Young adults: eXamining effects on smoking)
Behavioral and Social Sciences	Shufang Sun	Promoting the mental health of disadvantaged Ukrainian individuals affected by war and conflict
Behavioral and Social Sciences	Shufang Sun	Building a Public Data Repository for Mindfulness-based Interventions
Behavioral and Social Sciences	Tayla von Ash	Sleep promotion research
Behavioral and Social Sciences; Carney Institute; School of Public Health; Watson Institute for International and Public Affairs	Tara White	Dignity Neuroscience in Society IV
BioMed and Global Health Initiative	Ruhul Abid	Study of delivering healthcare to marginalized and refugee populations using portable electronic medical record system
BioMed, Cardiovascular, and Global Health Initiative	Ruhul Abid	Cardiovascular disease study
Biostatistics	Roee Gutman	Bayesian Regression Models for Analysis of Mice Behavioral Patterns
Biostatistics	Roee Gutman	Developing Statistical Software for Primary and Secondary Data Analysis of Linked Datasets
Biostatistics, Center for Computational Molecular Biology	Ying Ma	Mapping Cellular Heterogeneity in the Brain Using Advanced Spatial Transcriptomics
Center For Alcohol & Addiction	Elizabeth Aston	The Behavioral Economic Study of MicroTransitions
Center for Clinical Cancer Informatics and Data Science	Jeremy Warner	HemOnc Knowledge Base
Center for Clinical Cancer Informatics and Data Science	Jeremy Warner	The COVID-19 and Cancer Consortium (CCC19)

Chemistry	Amit Basu	Course Development for Chem 0360
Chemistry	Benjamin McDonald	Developing Bioinspired Approaches to the Fabrication of Tissue-like Nanocomposites
Chemistry	Benjamin McDonald	High Throughput Discovery of Tissue-Like Soft Materials
Chemistry	Eunsuk Kim	Bio-inspired Catalysts for Environmental Pollutant Remediation
Chemistry	Eunsuk Kim	Synthesis of [Fe-S] Clusters Supported by Alpha-Helical Mimics
Chemistry	Jerome Robinson	Elucidating Molecular Pathways of Metal Loss Relevant to Copper Positron Emission Tomography (PET) Agents
Chemistry	Jerome Robinson	Rare-Earth Reactive Oxygen Species – New Opportunities for Green Chemistry & Renewable Energy Applications
Chemistry	Megan Kizer	Bioconjugation of Tumor-Targeting Glycan Binding Proteins for Improved Cancer Therapeutics
Chemistry	Richard Stratt	Applying random matrix perspectives to the ordering and dynamics of liquids
Chemistry and Physics	Brenda Rubenstein	Machine Learning Protein and RNA Conformational Dynamics
Chemistry and Physics	Brenda Rubenstein	Quantum Computing Biology and Catalysis
Classics and History	Graham Oliver	ANCIENT GREEK ATHLETICS
Cognitive and Psychological Sciences	Daphna Buchsbaum	How do children think and learn about the physical and social world around them?
Cognitive and Psychological	Daphna Buchsbaum	How do dogs think and learn

Sciences		about the physical and social world around them?
Cognitive and Psychological Sciences	David Sobel	Children's understanding of play across cultures
Cognitive and Psychological Sciences	David Sobel	Parent-Child Interaction and Children's Scientific Reasoning
Cognitive and Psychological Sciences	Joo-Hyun Song	The role of action preparation in visual perception performance
Cognitive and Psychological Sciences	Joo-Hyun Song	Effects of action requirements on attentional biases with 3D objects
Cognitive and Psychological Sciences	Julia Marshall	How do children think and learn about morality?
Cognitive and Psychological Sciences	Malik Boykin	Investigating the Impact of Professor Identities on College Student STEM Engagement
Cognitive and Psychological Sciences	Malik Boykin	Exploring Race/Ethnicity and Gender Identity in Schools' Psychology Syllabi: Impacts on Diversity, Equity, and Inclusion
Cognitive and Psychological Sciences	Roman Feiman	How do children speak and think?
Cognitive and Psychological Sciences	Ruth Colwill	Assessing behavioral disturbances in development
Cognitive and Psychological Sciences	Ruth Colwill	Actions and Habits
Cognitive and Psychological Sciences	Serra Favila	How do related memories influence one another?
Cognitive and Psychological Sciences	Serra Favila	Understanding interactions between memories with computational models
Comparative Literature	Kenneth Haynes	Reception History of Julius Caesar
Computer Science	Akshay Narayan	Measuring CCA Contention on the Internet

Computer Science	Diana Freed	Navigating Coercion and Care in Digital Spaces (Book and research focused)
Computer Science	James Tompkin	Virtual reality Spot robot teleoperation
Computer Science	Nora Ayanian	Drone development and diagnosis
Computer Science	Shriram Krishnamurthi	Topics in Programming Languages
Computer Science	Srinath Sridhar	Multi-Camera Capture System for 3D Artificial Intelligence - BRown Interaction Capture System (BRICS)
Computer Science	Srinath Sridhar	Radiance Fields for 3D Computer Vision and Artificial Intelligence
Computer Science	Ugur Cetintemel	Augmenting Database Systems with AI
Computer Science	Ugur Cetintemel	Enhancing the "Impact Afghanistan" Web Database
Computer Science and School of Engineering	Nora Ayanian	Learning to Fly Together: Robust Quadrotor Control in Downwash-Enriched Environments
Dermatology	Eunyoung Cho	Epigenetics and psoriasis
Division of Applied Math	Kavita Ramanan	Rigorous Analysis of Interacting Particle Systems and related applications
Earth, Environmental and Planetary Sciences	Eben Hodgin	Isotopic Fingerprinting of Cretaceous Peat on Block Island
Earth, Environmental and Planetary Sciences	Emily Cooperdock	Tracing Fluid-Rock Interactions: O-Isotope Analysis of Ophiolite Rocks and Minerals
Earth, Environmental and Planetary Sciences	Harriet Lau	The Deep Interior of the Moon: is it made of Cheese?
Earth, Environmental and	Harriet Lau	The Ice Age and Volcanism in

Planetary Sciences		North America
Earth, Environmental and Planetary Sciences	Ingrid Daubar	Investigating new impact sites in dusty areas on Mars
Earth, Environmental and Planetary Sciences	James Russell	Tropical climate and ecosystem change
Earth, Environmental and Planetary Sciences	Seda Salap-Ayca	GIS-Driven Environmental Hazard Monitoring: Bridging Scientific Data and Indigenous Knowledge in the Arctic
Earth, Environmental and Planetary Sciences	Seda Salap-Ayca	Spatial Relationships Between Social Vulnerability and Flood Risk Using Advanced Geospatial Techniques
Earth, Environmental and Planetary Sciences	Timothy Herbert	Mediterranean paleo-climate: a window to human evolution
Earth, Environmental and Planetary Sciences	Yongsong Huang	Reconstruction of polar sea ice using novel lipid biomarkers
Earth, Environmental and Planetary Sciences	Yongsong Huang	Redefine the Alaska tephra chronology using the longest lake sediment record from Imuruk Lake, Alaska
Earth, Environmental and Planetary Sciences and Applied Mathematics	Mara Freilich	From extreme storms to ocean carbon: Chemical metabolites and salinity tolerance in marine microorganisms
Earth, Environmental and Planetary Sciences and Applied Mathematics	Mara Freilich	Community Science for Environmental Justice at the Salton Sea
Earth, Environmental and Planetary Sciences, Institute at Brown for Environment and Society	Daniel Ibarra	Analyzing chemical weathering processes using the isotope geochemistry of rivers
Earth, Environmental and Planetary Sciences, Institute at Brown for Environment and Society	Daniel Ibarra	Ecosystem Services in the Concrete Jungle: Understanding the Hydro-Biogeochemistry of Urban Green Spaces for Improved Water Quality

East Asian Studies	Trang Tran	Vietnamese Quest: Gamifying Language Learning (Beginner Level)
East Asian Studies	Hye-Sook Wang	Generation Gap and Other Essays - Readings in Korean Culture
Ecology, Evolution and Organismal Biology	Marc Tatar	Macronutrient regulation of intestinal neuropeptides in Drosophila
Ecology, Evolution, and Organismal Biology	Eleanor Caves	Cleaning Behavior in Cleaner-Client Mutualisms: Examining Individual Behavioral Variation
Ecology, Evolution, and Organismal Biology	Eleanor Caves	The Function of Animal Color Patterns: Quantitative Color Pattern Analysis in Cleaner Shrimps
Ecology, Evolution, and Organismal Biology	Elizabeth Brainerd	High-Speed Video Analysis of Heron Predatory Behavior
Ecology, Evolution, and Organismal Biology	Patrick Green	Predator-prey behavior in mantis shrimp and cleaner shrimp: video coding and behavioral experiments
Ecology, Evolution, and Organismal Biology	Rebecca Kartzinel	Tracking Rhode Island's Rare Plants
Ecology, Evolution, and Organismal Biology	Tyler Kartzinel	Wildlife ecology in Yellowstone National Park.
Education	Katherine Rieser	Brown Summer High School Research and Expansion
Education	Laura Snyder	The Humanities Reimagined Project: Curriculum Development
Education	Matthew Kraft	How Climate Change is Increasing the Risks of K-12 School Closures Due to Extreme Weather Events.
Education	Tricia Kelly	En comunidad: Amplifying the

		voices of Latinx neighbors
Environmental Science / Ecology, Evolution, and Organismal Biology	Meredith Hastings	The Breathe Providence Project
Epidemiology	Allan Just	Reproducible research for public health analyses: assembling concepts and tools
Epidemiology	Hannah Ziobrowski	Stress, trauma, and disordered eating behaviors among young adults
Family Medicine	Melissa Palma	TayoHelp.com: Culturally Tailored Health Education for Filipino Americans
Health Services, Policy & Practice	Elyse Couch	Dyadic perspectives of the caregiving relationship following an amyloid PET scan
Health Services, Policy & Practice	Emily Gadbois	Evaluating The Effectiveness Of Mode Of Meal Delivery On The Ability Of Homebound Older Adults To Remain In The Community
Health Services, Policy & Practice	Eric Jutkowitz	Day Care: Rules and Regulations for Dementia Care.
Health Services, Policy & Practice	Eric Jutkowitz	Memory Care in Assisted Living: Does it Improve Quality Outcomes?
Health Services, Policy & Practice	Fangli Geng	Enhancing Resident Care in Nursing Homes with AI and Electronic Health Record Data
Health Services, Policy & Practice	Momotazur Rahman	Private Equity Expansion in Assisted Living: Implications for Dementia Care
Health Services, Policy & Practice; International Health Institute	Omar Galarraga	Empirical testing of an insurance-based monetary incentive program for exercise: A randomized trial
Health Services, Policy &	Omar Galarraga	Cost-effectiveness of Statins for

Practice; International Health Institute		the Reduction of Major Adverse Cardiovascular Events in Persons Living with HIV in sub-Saharan Africa
History	Faiz Ahmed	Between the Ottoman Empire and USA: Exploring Historical Collections and Connections from the Local to Global
History	Françoise Hamlin	Black Panther Party Health Activism in 1970s New York
History	Holly Case	Summer Seminar in Eastern Europe on the theme of "Attention"
History	Lukas Rieppel	Traditional Knowledge and Settler Colonialism in Lakotan Treaty Lands
History	Nancy Jacobs	Designing a Parrot Museum for Bigodi, Uganda
History	Naoko Shibusawa	US Empire & Archives
History	Seth Rockman	Brown and the Creation of the National Endowment for the Humanities
History	Seth Rockman	Sovereignty and Society in the United States, 1776-1848
History and Classics	Kenneth Sacks	The Abbot Affair: Harvard, Freedom of Speech, and the Making of the Modern American University
History and East Asian Studies	Rebecca Nedostup	Authoritarian Archives and Transitional Justice
History of Art and Architecture	Itohan Osayimwese	Between Barbados and Boston: Histories of Migration and the Built Environment
Institute at Brown for Environment and Society	Alexie Rudman	Community-driven Coastal Climate Research and Solutions (3CRS): Designing & Maintaining a

		Community-Facing Online Hub for Coastal Climate Information
Institute at Brown for Environment and Society	Leslie Acton	ENVS 0110: Humans, Nature, and the Environment course revision
Institute at Brown for Environment and Society, History	Bathsheba Demuth	Law on the Yukon River
John Carter Brown Library and History	Karin Wulf	Brown and the US Bicentennial (1976)
Joukowsky Institute for Archaeology & the Ancient World	Tyler Franconi	Excavations at Antiochia ad Cragum, Türkiye
Judaic Studies	Katharina Galor	Expressions of Innocence: Children's Drawings from Israel-Palestine
Linguistics	Felix Kpogo	Crossing Linguistic Borders: Immigrant Speech and New England Dialects
Linguistics	Pauline Jacobson	research assistant for book: Direct Compositionality and Variable Free Semantics
Linguistics	Scott AnderBois	Making a dictionary of A'ingae, an indigenous language of Amazonia
Linguistics	Scott AnderBois	Describing motion events in A'ingae narratives
Linguistics	Uriel Cohen Priva	Developing a Language of Marketing course
Linguistics	Uriel Cohen Priva	The phonetic and sociophonetic dynamics of Modern Hebrew
Mathematics	Melody Chan	Computations and conjectures in algebraic combinatorics
Medicine	Hongwei Yao	Metabolic dysregulation in right ventricle of pulmonary hypertension

Medicine	Joseph "Greg" Rosen	Evidence to Action: Tools to Translate Evidence-Based Practice and Strategies into Actionable and Sustainable Public Health Programs
Medicine	Ju Park	Harm Reduction Research Dissemination
Molecular Biology, Cell Biology and Biochemistry	Alison DeLong	Does protein phosphatase 2A regulate the unfolded protein response in Arabidopsis?
Molecular Biology, Cell Biology and Biochemistry	Alison DeLong	How and where do protein phosphatase complexes act to regulate leaf size?
Molecular Biology, Cell Biology and Biochemistry	Arthur Salomon	Role of zeta chain in CAR T cell costimulation-independent signaling
Molecular Biology, Cell Biology and Biochemistry	Eric Morrow	Intellectual Disability and Neurodevelopmental Genetics
Molecular Biology, Cell Biology and Biochemistry	Juan Alfonzo	Characterization of the TilS tRNA modification enzyme in Candida
Molecular Biology, Cell Biology and Biochemistry	Mamiko Yajima	Computationally identifying the mechanism of Vasa function in RNA biogenesis
Molecular Biology, Cell Biology and Biochemistry	Mamiko Yajima	Cellular and Developmental biology using the sea urchin embryo
Molecular Biology, Cell Biology and Biochemistry	Erica Larschan	X marks the spot: Defining how the X-chromosome is identified for co-regulation
Molecular Biology, Cell Biology and Biochemistry, Pediatrics	Phyllis Dennery	Developing druggable targets to prevent macrophage senescent in neonatal lung injury
Molecular Biology, Cell Biology and Biochemistry, RNA Center	Shobha Vasudevan	Intra and extracellular regulation of RNA mechanisms in tumor persistence
Molecular Biology, Cell Biology,	Robbert Creton	Calcineurin-dependent

and Biochemistry		behaviors in zebrafish
Molecular Microbiology and Immunology	Amanda Jamieson	Visualizing the cancer microbiome response to metabolic and immune changes in non small cell lung cancer models.
Molecular Microbiology and Immunology	Chris de Graffenried	Morphogenesis in Trypanosomatids
Molecular Microbiology and Immunology	Karthikeyani Chellappa	Validation of Metabolic Pathway Models of Aging in Model Organism
Molecular Microbiology and Immunology	Karthikeyani Chellappa	NAD metabolism at the interface of host-microbiome interactions
Molecular Microbiology and Immunology	Richard Bennett	Analysis of fungal metabolism and its impact on gut colonization
Music	Enongo Lumumba-Kasongo	Research for "Collective Genius: Black Music Collectives from AACM to Odd Future"
Neurology	Liqi Shu	Clinical Neurotechnology: Building Movement Databases and Assessing Diagnostics for Neurological Disorders
Neurology	Liqi Shu	Neurotechnology: Enhancing Medical Care through Machine Learning and Computer Vision
Neurology	Saud Alhusaini	The association between brain imaging phenotypes and genetic risk variants of common neurological conditions
Neuroscience	Justin Fallon	Novel phenotyping and therapeutic testing in Alzheimer's Disease models
Neuroscience	Michael Paradiso	Sensorimotor interactions in human vision
Neurosurgery	Shane Lee	AI to improve outcomes using a multimodal clinical

		neurosciences data
Neurosurgery	Shane Lee	Optimizing deep brain stimulation for Parkinson's disease
Neurosurgery and Neuroscience	Wael Asaad	Research in Neurophysiology & Neuromodulation
Nonfiction Writing Program / English Department	Kate Schapira	Uphill Both Ways: Intergenerational Storytelling for Hard Times
Orthopaedics	Wentian Yang	Deciphering the role of protein kinases and phosphatase in skeletal development and diseases
Pathology and Laboratory Medicine	Daniel Spade	Spatial RNA-seq method development for reproductive toxicity projects
Pathology and Laboratory Medicine	Eric Darling	Macrophage degradation of hyper-compliant MPs
Pathology and Laboratory Medicine and Legorreta Cancer Center	Robert Sobol	Characterization of a novel mouse models of base excision repair deficiency for the study of active gene demethylation at neuronal enhancers and the impact on senescence and neurodegeneration
Pathology and Laboratory Medicine and Legorreta Cancer Center	Robert Sobol	Identification and validation of replication-stress and DNA damage dependent base excision repair protein complexes
Pediatric Endocrinology	Monica Serrano Gonzalez	Dietary Behaviors, The Food Environment and Sleep Duration Changes in Urban Children with Asthma
Pediatric Health Disparities Research Program (Pediatrics and Psychiatry)	Sheryl Kopel	Pediatric Asthma and Health Disparities
Pediatrics	Robin Miller	NNNS-II (NeoNatal

		Neurobehavioral Scale) Database Project
Pediatrics, Adolescent Medicine	Jack Rusley	Helping Trusted Adults and Youth Talk about Sexual Health (The Talk Study)
Pediatrics, Adolescent Medicine	Jack Rusley	Mental health of BIPOC youth in Providence and school resource officers
Pediatrics, Adolescent Medicine	Maayan Leroy-Melamed	Sexual and Reproductive Health in Adolescents and Young Adults with Sickle Cell Disease
Physics	Gaetano Barone	ML Developments for Characterization and Readout Compression of 4D Silicon Tracking Devices with Internal Gain
Physics	Gaetano Barone	Uncovering the Higgs potential without the Higgs
Physics	Greg Landsberg	Anomaly Detection at the Large Hadron Collider Using Machine Learning Techniques
Physics	Ian Dell'Antonio	Dark Matter and Galaxies in small galaxy clusters
Physics	Ian Dell'Antonio	Star Clusters and Star Formation in nearby galaxies
Physics	Jay Tang	Microscopic imaging and tracking of bacteria racing over an agar surface
Physics	Jennifer Roloff	Characterization of silicon detectors for high energy physics applications
Physics	Loukas Gouskos	Development of the Next Generation of Silicon Detectors for Future Particle Colliders
Physics	Loukas Gouskos	AI/ML on FPGA and ASIC
Physics	Matt LeBlanc	Building the Tools for Discovery: Open Source Software

		Developments for Particle Physics
Physics	Matt LeBlanc	Modernising Particle Physics Software: Jet Reconstruction in Julia
Political Science	Deva Woodly	The Politics of Futurity: Phase I - Histories of Futurity
Political Science, Watson Institute for International and Public Affairs	Peter Andreas	History of the Illicit Global Economy
Political Science, Watson Institute for International and Public Affairs	Prerna Singh	Measuring the Cultural and Ideational Components of State Capacity
Political Science, Watson Institute for International and Public Affairs	Robert Blair	Understanding and Combating Democratic Erosion in the US and Beyond
Psychiatry and Human Behavior	Anna Yeo	Dietary Patterns and Asthma Activity in Urban Children
Psychiatry and Human Behavior	Carolina Haass-Koffler	Investigating the Relationship Between Alcohol Use Disorder and Pain Using a Preclinical Model
Psychiatry and Human Behavior	Carolina Haass-Koffler	Alpha-1 receptor blockade for the treatment of alcohol use disorder
Psychiatry and Human Behavior	Gabriela López	Event-level Antecedents of Heavy Drinking Among Bisexual and Heterosexual Women with and without Histories of Sexual Assault
Psychiatry and Human Behavior	Grace Cushman	Developing Prevention and Intervention Strategies to Improve Adolescent Health
Psychiatry and Human Behavior	Laura Korthauer	Investigating neural predictors of risk and resilience to Alzheimer's disease
Psychiatry and Human Behavior	Laura Stroud	Exploring the Impact of Prenatal

		Substance Use on Fetal and Infant Neurobehavioral Development
Psychiatry and Human Behavior	Meghan Sharp	Characterizing stress and resilience in women trying to conceive
Psychiatry and Human Behavior	Meghan Sharp	Primary prevention of posttraumatic stress symptoms following Cesarean section
Psychiatry and Human Behavior, ABMS; Behavioral and Social Sciences, SPH	Tosca Braun	Intersectional Stigma and Multilevel Resilience among Individuals Taking Opioid Agonist Therapy with Chronic Pain
Psychiatry and Human Behavior, ABMS; Behavioral and Social Sciences, SPH	Tosca Braun	Integrative Yoga and Self-Compassion for Survivors of Violence: A Community-Engaged Study
Psychiatry and Human Behavior; Developmental Behavioral Pediatrics	Michelle Pievsky	Increasing the presence of AIML in a multidisciplinary pediatric clinic
School of Engineering	Anita Shukla	Bacteria-responsive microneedles for the treatment of antibiotic-resistant biofilm infections
School of Engineering	Anita Shukla	Development of immunomodulatory nanoparticles for the treatment of biofilm infections
School of Engineering	Ian Wong	Profiling Circulating Tumor Cell Heterogeneity using Computer Vision and Machine Learning
School of Engineering	Kareen Coulombe	Engineering new cardiac conduction pathways for heart regeneration
School of Engineering	Kareen Coulombe	Surgical meshes for Heart Regeneration with Engineered Human Myocardium

School of Engineering	Kenny Breuer	Dynamics of Offshore Wind Turbines
School of Engineering	Kenny Breuer	Fluid-Structure Interactions in Science, Nature and Engineering
School of Engineering	Kimani Toussaint	Exploring biomedical applications of space-time light
School of Engineering	Kurt Pennell	Removal of PFAS from Water Using Foam Fractionation
School of Engineering	Leigh Hochberg	iBCI Research
School of Engineering	Marissa Gray	Increasing the effectiveness of sleep measurements using movement data
School of Engineering	Mauro Rodriguez	Numerical simulations of acoustic wave-soft tissue interface interaction
School of Engineering	Mauro Rodriguez	Bubbles in trees: Fully confined microbubble oscillations in soft materials
School of Engineering	Monica Wilhelmus	Identifying Small-Scale Ocean Features from Very-Sparse Lagrangian Data using Network Science
School of Engineering	Monica Wilhelmus	Producing Comprehensive Arctic Ocean and Sea Ice Data Products from Satellite Imagery
School of Engineering	Rashid Zia	Land Records Public Interest Data Project
School of Engineering	Rick Fleeter	Orbital Multi-Use facility Design and Development through Science Fiction
School of Engineering	Vikas Srivastava	Study of cell migrations
School of Engineering	Vikas Srivastava	Cancer Tumor Growth Modeling
School of Engineering / Biomedical	Theresa Raimondo	Machine-learning driven optimization for siRNA-lipid nanoparticle delivery

School of Engineering / Biomedical	Theresa Raimondo	Lipid Nanoparticle (LNP) optimization for RNA delivery to Monocytes
School of Engineering, Fluids and Thermal Sciences	Nils Tack	Advancing bio inspired propulsion in novel metachronal autonomous underwater vehicles.
School of Engineering, Fluids and Thermal Sciences	Nils Tack	Developing a novel bioinspired metachronal autonomous underwater vehicle .
School of Public Health, Behavioral and Social Sciences	Jane Metrik	Cannabis Use and Driving in Daily Life (the CAR Study)
School of Public Health, Behavioral and Social Sciences	Jane Metrik	Cannabis' Impact on Alcohol Consumption (Project MARS)
School of Public Health, Health Services, Policy & Practice	Andy Ryan	Health Data Science Summer Fellowship
School of Public Health, Pandemic Center	Georgia Lagoudas	A Breath of Fresh Air: Policy Roadmap for Clean Indoor Air
School of Public Health, Pandemic Center	Georgia Lagoudas	Breathe Easy: How the Public Health Community Can Play a Role in Healthy Buildings
Sheridan Center for Teaching and Learning / English	Jenna Morton-Aiken	Leveraging writing best practices to mediate difficult discussions
Sociology	Emily Rauscher	Hidden Funds: Parent-Teacher Associations and Inequality of School Funding
Sociology	John Logan	Mapping segregation and neighborhood inequality
Sociology	Nicole Gonzalez Van Cleve	Race and Wrongful Conviction in the U.S.
Sociology, Population Studies and Training Center	David Lindstrom	Mesoamerican Migration Project
Sociology, Watson Institute for International and Public Affairs	Andrew Schrank	National Laboratories and Regional Development: A Historical Perspective

Sociology, Watson Institute for International and Public Affairs	John Eason	Punishment Beyond Mass Incarceration: Immigrant Detention, Jails, and Prison
Sociology, Watson Institute for International and Public Affairs	Poulami Roychowdhury	Pro-Life to Pro-Family?
Visual Art	Becci Davis	Unpolished Legacies Online
Watson Institute for International and Public Affairs	Kimberly Turner	Evaluating the Outcomes of Protests and Demonstrations
Watson Institute for International and Public Affairs	Kimberly Turner	Polarization and Political Violence in the US
Watson Institute for International and Public Affairs, Political Science	Tyler Jost	Major Power Cooperation in the Modern Era

Faculty Opportunities

Patsy Lewis
Department: Africana Studies
Project Type: Research
Project Title: In the Wake of George Floyd
[This project is cross-listed with the Brown Laidlaw Scholars Program.]

Project Description:
This project documents protests across Rhode Island in the aftermath of the police killing of George Floyd, generating what has been described as one of the largest protests in Providence. Central to our project is to locate Rhode Island within the national protests that occurred in the months following Floyd's death (concentrated in May and June) by documenting public demonstrations across the state. Our project seeks to understand why this event resonated with Rhode Islanders. Specifically, we explore how communities of color in the state experience racism and police violence. So far, we have established a timeline of protest events across the state. We have also conducted interviews with community leaders and completed research that explores the wider Brown university community's response, racial profiling and policing in the state, and locates these protests within social movement theory. We have also created a website that hosts this research, in collaboration with the library's Center for Digital Scholarship. We are now in the process of exploring key issues that arose out of the demands made by protesters, such as calls to defund the policy, increased police accountability, and the removal of resource officers in schools. We are also tracking changes over time in mainstream and other kinds of media discourse around police violence in Rhode Island.

The student will make an original contribution to the research by tracking and collecting data on the current status of policy initiatives in Rhode Island and the New England area on police training reform and police violence. The student will also gather, analyze, and present data on racial and socioeconomic

inequities in Rhode Island in an accessible and engaging format for a public audience on our website. Lastly, the student will expand our archive of interviews with community leaders by interviewing 1-2 people active in local organizations for racial justice and police reform. The student's contribution represents a new element to the project we have not been able to do so far given the limited resources we have been working with. The student will be supervised by Patsy Lewis, Research Professor, Department of Africana Studies and Tarika Sankar, Digital Humanities Librarian, Center for Digital Scholarship.

Required skills: We do not require the student to have any specialized skill but expect a basic familiarity with humanities research methods and issues of racial justice.

Preferred skills: N/A

Is this project for more than one student: Yes

Elena Shih
Department: American Studies
Project Type: Research
Project Title: Weaponizing Femininity on the China-Myanmar Borderlands: Trafficking Development and Bordered Illegality
[This project is cross-listed with the Brown Laidlaw Scholars Program.]

Project Description:
Seeking a summer research assistant who can conduct in-person interviews, newspaper research, policy analysis, and track economic data for a project on the impact of China's Belt and Road initiative on migration and trafficking. On the China-Burma border, abundant promises of economic development built into China's "One Belt One Road Initiative" clash with a decades long history of heroin trafficking from the Golden Triangle, militarized displacement from the Myanmar military junta, and ethnic disenfranchisement of ethnic minority populations via illegal land-grabs, an HIV/AIDS epidemic, and high rates of intravenous drug use. This paper regards each of the former as different kinds of "organized crime"— some state sponsored, others via criminal syndicates. The overwhelming Chinese central government policy has been one of incarceration alongside fortified border policies in an attempt to restrict the movement of people, despite the movement of goods, capital, and infrastructure development in the area. Most contemporary policy concerns focus on men as vectors of crime and disease, while women are only considered worthy of discussion if they are victims needing assistance (see, for instance, the China National Plan of Action to Combat Human Trafficking (2008).

Required skills: Mandarin or Myanmar language required

Preferred skills: Coursework in GNSS, AMST, ETHN, or related that have engaged migration, development, sex work, and or/trafficking

Is this project for more than one student: No

Jessica Fremland
Department: American Studies
Project Type: Research
Project Title: Cultural Safety and Indigenous Performance

Project Description:
Professor Fremland is seeking a research assistant to work with her and Indigenous Performance Productions (IPP) on the organization of quantitative survey data and collection of ethnographic research pertaining to an independent research project. This project focuses on the positioning of Indigenous performing artists (in a variety of fields including dance, music, theater, etc.) and their intercultural experiences of touring, cultural safety, and goals within their field. The summer project is the continuation of Professor Fremland and IPP's collection of survey data from approximately 100 Indigenous artists from across North America gauging their broad experiences and resource needs. Throughout the summer the UTRA and Professor Fremland will interpret the quantitative data and follow up with approximately 20 interviews. The UTRA will help to transcribe these interviews and will receive credit for their work in an independent publication through Indigenous Performance Productions. This data is being collected with the goal of increasing resources and safety for Indigenous performers in creative spaces. Both the quantitative and qualitative data will be used as the foundation for IPP to develop a useful online resource center for Indigenous performers.

Applicants may find more information on Indigenous Performance Productions here:
https://www.indigenousperformance.org/

Required skills: Ability to organize digital data, Basic experience with applications such as Zoom, Word, and Excel. Listening and communications skills.

Preferred skills: Past research experience/course especially with interviewing. I will also give some training on this, especially as it pertains to interviewing in Indigenous communities.

Is this project for more than one student: No

Kevin Escudero
Department: American Studies
Project Type: Research
Project Title: Decolonization in Oceania: Decolonization Activism in Guåhan and Hawai'i
[This project is cross-listed with the Brown Laidlaw Scholars Program.]

Project Description:
The student research assistant will support the development of an online syllabus project co-led by Professor Kevin Escudero and colleague Dr. Makana Kushi on Indigenous Movements for Decolonization in Oceania. This public digital humanities project aims to serve as a publicly-accessible educational resource, created in consultation with the project's advisory board of community leaders and scholar activists from Guam and Hawai'i. It focuses on Indigenous and non-Indigenous folks' participation in decolonization activism and emphasizes the critical role of community education approaches to spreading the word about these issues among all community members. The site currently includes topics such as

decolonization, demilitarization, environmental justice, gender and feminism, health/healing/wellness, and Oceanic relationalities.

Students' responsibilities will include: providing feedback on the site's pages; identifying additional readings and/or visual materials for inclusion as part of the online syllabus project; updating the site's pages; and light copyediting of the entire site.

Required skills: N/A

Preferred skills: Previous coursework in Native Pacific Studies and/or Native American and Indigenous Studies; previous experience in K-12 curriculum development; familiarity with the WordPress platform

Is this project for more than one student: No

Matthew Guterl
Department: American Studies / Africana Studies
Project Type: Research
Project Title: "The Troubles: Black and Irish Solidarities in the Age of Rights Revolutions"

Project Description:
I am looking for a student who is interested in conducting preliminary archival and background newspaper research for "The Troubles," a new project focusing on the connections and disjunctions, the parallels and divergences of Black radical politics in the civil rights era and "The Troubles" in Northern Ireland. The aim of the project is to think about connections between these two movements, and also to chart the ways in which they fell apart. Beyond uncovering the longer historic entanglements of Black/Irish radicalisms, the work will look at the specific conditions of that disastrous decade, illuminating the power of art and culture, and showcasing moments of solidarity, of discovery, and of disillusionment. Some of this work can be done online through ProQuest or Worldcat, but there will also be some local, east coast travel to libraries and archives.

Required skills: Good note-taking and file organization skills. Solid communication skills (email and phone). Very basic skills: how to read newspapers, how to discover and download newspaper articles, how to organize folders and arrange pdfs within them.

Preferred skills: Some historical understanding of post WWII African American and/or Irish history. Comfort with an archival setting and familiarity with Boston and/or NYC might be helpful.

Is this project for more than one student: No

Margot Jackson
Department: Annenberg Institute, Economics and Population Studies and Training Center
Project Type: Research
Project Title: The Undergraduate Research Fellows for Social Science and Public Policy

Project Description:
The Undergraduate Research Fellows for Social Science and Public Policy is an eight-week, paid summer internship that aims to prepare current Brown undergraduates to engage in rigorous empirical research in the social sciences in support of efforts to improve our understanding of public health, the education system, inequality, and population well-being. The program is supported jointly by the Annenberg Institute, the Brown University Economics Department, and the Population Studies and Training Center. For more information, please see: https://annenberg.brown.edu/undergrads

The program is structured in two phases. The first phase is a data science "boot camp" that introduces fellows to skills in statistics, data management and data analysis. The second phase will consist of a mentored research experience that pairs fellows with real world research projects to gain firsthand experience with the process of conducting empirical, social science research. Our approach emphasizes mentorship and peer learning, and allows Fellows to develop relationships with faculty members that may continue during their time at Brown. Throughout the program, fellows will also participate in workshops and panels that will introduce them to cutting edge topics in social science, help them learn additional research skills like survey design, and highlight various career opportunities in empirical social science both inside and outside of academia.

Training Goals Include:
Developing skills in data management and analysis using standard statistical software packages.
Learning to operate as an effective member of a research team.
Building community and connection across different fields and disciplines within Brown University.
We expect that completion of this training will facilitate Fellows' transition to related graduate study programs or professions in social science and policy.

Program Requirements:
Fellowship applicants should have a strong interest in social science, public policy, and motivation to continue to pursue research during their time at Brown.
Selected Fellows are expected to commit to the entire 8-week, residential, full-time (35 hours/week) training program.
Selected fellows will have to complete an I-9 (federal verification of eligibility to work) in order to receive the fellowship stipend.

Eligibility:
The program is open to Brown undergraduate students who are currently in their freshman, sophomore, or junior year.
Undergraduates from all concentrations and backgrounds are welcome to apply.
Prerequisites:
Coursework in introductory statistics (e.g., EDUC 1110, SOC 1100, CLPS 0900, APMA 1650, ECON 1620 or equivalent) is required.
Selected Fellows will receive substantial training in statistical computing software during the program.
Familiarity with statistical computing software (e.g. Stata, R, etc.) is preferred, but not required.

Program Dates:
May 27, 2025 - July 18, 2025.

Required skills: The program is open to Brown undergraduate students who are currently in their first year, sophomore, or junior year. Undergraduates from all concentrations and backgrounds are welcome

to apply. Prerequisites: Coursework in introductory statistics (e.g., EDUC 1110, SOC 1100, CLPS 0900, APMA 1650, ECON 1620 or equivalent) is required. Selected Fellows will receive substantial training in statistical computing software during the program. Familiarity with statistical computing software (e.g. Stata, R, etc.) is preferred, but not required.

Preferred skills: Familiarity with statistical computing software (e.g. Stata, R, etc.) is preferred, but not required.

Is this project for more than one student: Yes

Peter van Dommelen
Department: Archaeology and the Ancient World
Project Type: Research
Project Title: Excavating Everyday Life and Indigenous Communities in Ancient Sardinia (Italy)

Project Description:
This project investigates the Mediterranean island of Sardinia in the first millennium BCE, when it became increasingly frequented from overseas and eventually colonized and occupied by Phoenicians and Carthaginians. The overall project is inspired and guided by the postcolonial ambition to decolonize our pasts and our own time, and it aims to contribute to this goal by investigating how Indigenous Nuragic inhabitants of the Mediterranean island of Sardinia coped with Phoenician and Carthaginian influence and colonization in the earlier and central centuries of the first millennium BCE. Drawing on ongoing excavations at the Indigenous site of S'Urachi, this project focuses on local household contexts and a monumental defensive structure to explore the tensions and entanglements of everyday life of local households between local Nuragic traditions and outside Phoenician and Punic innovations: http://sites.brown.edu/surachi.

The past three field seasons of excavations at S'Urachi (2022-24) have focused on a settlement area at a short distance from the nuraghe that has since been found to include an important older phase of the Indigenous late Iron Age. The evidence in this area thus ranges from the 8th/7th to the 4th century BCE. The 2025 season will aim to expose the connections between the various occupation phases in the area. Everyone will take part in the daily work of excavation as well as cleaning, classifying and documenting finds, with specific tasks depending on the nature of the deposits under excavation and finds encountered – typical tasks range from shoveling to cleaning features in the field and from washing sherds to classifying pottery in the lab. Students will be part of an international and interdisciplinary team of faculty, students and independent scholars and as such gain first-hand and hands-on familiarity with a wide variety of interdisciplinary research, ranging from paleobotanical studies to drone photography and ceramic fabric studies.

Required skills: Prior coursework in Archaeology and some form of relevant fieldwork experience, whether in Archaeology or otherwise, are required.

Preferred skills: Previous fieldwork or museum experience and/or familiarity with the Mediterranean, including its languages, especially Italian and Spanish, would be a great advantage.

Is this project for more than one student: Yes

Cara Murphy
Department: Behavioral and Social Sciences
Project Type: Research
Project Title: Clinical Research Evaluating Smoking Cessation with E-Cigarettes, and Nicotine Therapy (CRESCENT) Study

Project Description:
The Murphy Brown Lab (MBL) in the School of Public Health conducts rigorous research that can offer new insights to understand and address modifiable risks to health such as the use of tobacco and other addictive substances, and the intersection of addictive behaviors and weight-related behaviors that can contribute to obesity.

We have just launched a project through the Brown Center for Addiction & Disease Risk Exacerbation that will examine the effects of various nicotine products on smoking, weight, and other clinical indicators like inflammation and exhaled carbon monoxide. Conducted entirely online, this research will engage individuals with obesity who smoke cigarettes from across the U.S., utilizing Zoom for interactive sessions.

As a student contributor in the MBL, you will gain invaluable human subjects research experience with direct participant contact, including:
1. Conducting Assessments: Interview participants and guide them through key measurements (training provided).
2. Participant Liaison: Build connections with participants throughout their time in the study, communicating regularly to answer questions, provide support and information, and remind them of their upcoming appointments.
3. Research Coordination: Help organize participant appointments, materials, and compensation.
4. Database management: Assist in updating and maintaining essential study databases

Additionally, there may also be opportunities to contribute to another innovative study focused on nicotine pouches and their potential to reduce smoking-related harms.

Students will also participate in lab meetings with the study investigator and collaborate with fellow students and staff dedicated to the project. Motivated students may be invited to contribute to other lab products and projects such as conference presentations.

For more details about our research and team, visit our website: https://sites.brown.edu/murphybrownlab/

For more details about the Center for Addiction & Disease Risk Exacerbation, visit: https://www.brown.edu/academics/public-health/cadre/home

We look forward to welcoming passionate students eager to make a difference in public health!

Required skills: Familiarity with Zoom, Microsoft Suite (Word, Excel), Google Suite (Gmail, Google Calendar, Google Voice, Google Drive), strong communication and interpersonal skills, ability to work independently and as part of a team, ability to develop rapport with research participants.

Preferred skills: Prior research experience with human subjects, at least one course in psychology or public health.

Is this project for more than one student: Yes

Matthew Meisel
Department: Behavioral and Social Sciences
Project Type: Research
Project Title: ASCEND: A Study of Career Entry and Network Development

Project Description:
We are seeking students to join a research project that will examine young adults' transition into the workforce. In Project ASSCEND, we will recruit a national sample of young adults before they enter different high-risk occupations for alcohol misuse and examine how the social contextual characteristics of these occupations influences their own alcohol use. All data collection will occur either via Zoom or online surveys. The student will be supervised by Matthew Meisel, faculty in the Center for Alcohol and Addiction Studies (SPH, Behavioral and Social Sciences).

Tasks will include: 1) participant recruitment (e.g., posting advertisements, social media recruitment, responding to interested contacts); 2) conducting brief Zoom sessions with potential participants verifying eligibility; 3) conducting orientation sessions with participants; 4) helping with participant tracking; 5) promoting study retention via regular contact with participants; and 6) basic data management and analyses. Students will attend weekly lab meetings with the study investigator and the research team.

Required skills: Ability to use Zoom in private locations; knowledge of Microsoft Suite (Word, Excel) and Google Suite (Gmail, google calendar, google voice, google drive); strong communication and interpersonal skills, ability to work independently and as part of a team; comfort working with research participants

Preferred skills: Research experience (especially with human subjects) and psychology or public health coursework.

Is this project for more than one student: No

Rachel Cassidy
Department: Behavioral and Social Sciences
Project Type: Research
Project Title: Project CRISSP (Cessation and Relapse Impacted by Social-Contextual Stressors and Psychopharmacology)

Project Description:
We are seeking a student to join a qualitative research project that is designed to gain an in-depth

understanding of how daily stressors (i.e., stress related to finances, work, education, home, neighborhood, and relationships) are experienced in daily life and serve as barriers to quitting smoking among socioeconomically disadvantaged young adults (SDYA) who smoke cigarettes. The student will be supervised by Dr. Rachel Cassidy, faculty in the Center for Alcohol and Addiction Studies (CAAS; SPH Behavioral and Social Sciences), and Dr. Mariel Bello, postdoctoral research associate and clinical psychologist. Research assistants will also work closely with research staff to assist in a significant number of research tasks involved in completing this qualitative study.

Roles/responsibilities of the research assistant will be tailored to their interests and may include: assisting research staff with qualitative data collection, data management, and other day-to-day activities of this study, such as recruiting and scheduling virtual qualitative interviews, and cleaning and coding of qualitative interview transcripts under direct supervision of mentors, Drs. Cassidy and Bello. Research assistants who are also interested in community-engaged research may also have opportunities to participate and interact with members of a Community Advisory Board during in-person meetings. In addition to gaining hands-on research experiences, research assistants may be provided with other professional development opportunities, such as developing collaborations with other researchers, scientific manuscript writing, scientific presentation skills, and trainings related to the conduct of scientific research focused on diverse populations. Prospective research assistants who are interested in the fields of health equity, addiction science, mental health, public health, and behavioral and social sciences, and/or interested in a career in clinical psychology or medicine are strongly encouraged to apply.

Required skills: Ability to use Zoom in private locations; knowledge of Microsoft Suite (Word, Excel) and Google Suite (Gmail, google calendar, google voice, google drive), strong communication and interpersonal skills, ability to work independently and as part of a team, and comfort working with research participants and discussing substance use.

Preferred skills: Prior research experiences related to data collection with human participants, prior data analysis and/or management experience (especially with SPSS), prior research experiences working with participants from diverse backgrounds, and interests in health disparities and addiction-related research.

Is this project for more than one student: No

Rachel Cassidy
Department: Behavioral and Social Sciences
Project Type: Research
Project Title: Project ONYX (Oral Nicotine product use in Young adults: eXamining effects on smoking)

Project Description:
We are seeking a student to join a research project that investigates how providing oral nicotine products (e.g., oral nicotine pouches such as ZYN) affects combustible cigarette smoking and its associated harms among young adults who smoke cigarettes. The student will be supervised by Dr. Rachel Cassidy, principal investigator (PI) of this project and faculty in the Center for Alcohol and Addiction Studies (CAAS; SPH Behavioral and Social Sciences). Research assistants will work closely with Dr. Cassidy and research staff to assist in a significant number of research tasks involved in completing this study, which will occur in a laboratory setting.

Roles/responsibilities of the research assistant may include: 1) assisting the PI and research staff with recruiting participants (e.g., posting flyers and advertisements, social media recruitment, responding to those who may be interested in the study); 2) phone screening participants for eligibility and scheduling participants for in-person sessions in the laboratory; 3) maintaining study databases and the study website; 4) tracking participants over the course of their participation in the study; 5) promoting study retention via regular contact with participants; and 6) basic data management and analyses. Students with prior research experiences may also have the opportunity to assist with data collection efforts during in-person laboratory sessions. Students will attend weekly lab meetings with the PI and research team contributing to the project. In addition to gaining hands-on research experiences, research assistants may be provided with other professional development opportunities, such as developing collaborations with other researchers, scientific manuscript writing, and scientific presentation skills.

Required skills: Ability to use Zoom in private locations, knowledge of Microsoft Suite (Word, Excel) and Google Suite (Gmail, google calendar, google voice, google drive), strong communication and interpersonal skills, ability to work independently and as part of a team, and comfort working with research participants and discussing substance use.

Preferred skills: Prior research experiences related to data collection with human participants, prior data analysis and/or management experience (especially with SPSS), and currently taking and/or completed psychology or public health coursework.

Is this project for more than one student: No

Shufang Sun
Department: Behavioral and Social Sciences
Project Type: Research
Project Title: Promoting the mental health of disadvantaged Ukrainian individuals affected by war and conflict

Project Description:
Two international, collaborative projects aims to foster collaborative relationships with local investigators and organizations in Ukraine to understand and address the mental health needs of displaced Ukrainians affected by the Russian invasion, with an emphasis of developing mindfulness interventions responsive to experiences of war, violence, grief, and displacement. Two pilot projects are ongoing, including (a) developing a mindfulness-based mobile health program for displaced adolescents in Germany via formative research followed by a randomized controlled trial; and (b) understanding and addressing the needs of internally displaced adult patients on MOUD treatment in methadone clinics within Ukraine via surveys and qualitative interviews. Students will be working on various aspects of both projects, including literature review, assisting with qualitative and quantitative aspects of research, facilitating global team meetings, and writing.

Required skills: Prior relevant coursework in psychology, public health, sociology, or other relevant fields.

Preferred skills: Interest and experience in mental health research and global research are strongly preferred. Ability to speak and understand Ukrainian will be highly desirable, though not required.

Is this project for more than one student: Yes

Shufang Sun
Department: Behavioral and Social Sciences
Project Type: Research
Project Title: Building a Public Data Repository for Mindfulness-based Interventions

Project Description:
This NIH-funded project, MetaCIH Network, aims to create a highly usable and accessible data repository of mindfulness and other complementary and integrative health (CIH) interventions and produce high-quality reviews. Students on this project will be supporting systematic reviews and meta-analyses on mindfulness interventions, including literature search, abstract coding, coding of full-text studies, and preparing tables and figures for publications.

Required skills: Proficiency in Excel is required; good communication skills and task/time management skills are required.

Preferred skills: Experiences conducting literature reviews are preferred

Is this project for more than one student: Yes

Tayla von Ash
Department: Behavioral and Social Sciences
Project Type: Research
Project Title: Sleep promotion research

Project Description:
Sleep is an important lifestyle behavior associated with obesity and various chronic diseases. This opportunity is for students interested in sleep promotion or sleep disparities who would like to gain tangible research skills. Students will work on my ongoing project examining sleep promotion in childcare. Research activities will vary but may include recruitment, transcribing interview data, and conducting field observations. There may also be opportunities to analyze data and contribute as a co-author on a manuscript.

Required skills: Attention to detail

Preferred skills: Strong writing skills

Is this project for more than one student: No

Tara White
Department: Behavioral and Social Sciences; Carney Institute; School of Public Health; Watson Institute for International and Public Affairs
Project Type: Research
Project Title: Dignity Neuroscience in Society IV

Project Description:
Introduction. Universal human rights are defined by international agreements, law, foreign policy, and the concept of inherent human dignity. However, rights defined on this basis can be readily subverted by overt and covert disagreements and can be treated as distant geopolitical events rather than bearing on individuals' everyday lives. A robust case for universal human rights is urgently needed and must meet several disparate requirements: (a) a framework that resolves tautological definitions reached solely by mutual, revocable agreement; (b) a rationale that transcends differences in beliefs, creed, and culture; and (c) a personalization that empowers both individuals and governments to further human rights protections.

Description. Dignity neuroscience proposes that human rights in existing agreements comprise five elemental types: (1) agency, autonomy, and self-determination; (2) freedom from want; (3) freedom from fear; (4) uniqueness; and (5) unconditionality, including protections for vulnerable populations. We further propose these rights and protections are rooted in fundamental properties of the human brain. We provide a robust, empirical foundation for universal rights based on emerging work in the human brain and affective science that we term 'dignity neuroscience'. Dignity neuroscience provides an empirical foundation to support and foster human dignity, universal rights and their active furtherance by individuals, nations, and international law.

UTRA Opportunity. Dignity neuroscience can inform rights and flourishing in people's everyday lives, providing exciting opportunities for multidisciplinary impact and intervention. In this UTRA project, Dr. White and UTRA student(s) will explore and pursue opportunities for dissemination, implementation, and impact within and outside academia. The UTRA will focus on dignity-related innovation in medicine, law, neuroscience, research, outreach/dissemination, and intervention, with focus on biometric prediction of alcohol use, and tailored to the needs and interests of the student(s) and PI.

Required skills: N/A

Preferred skills: N/A

Is this project for more than one student: Yes

Ruhul Abid
Department: BioMed and Global Health Initiative
Project Type: Research
Project Title: Study of delivering healthcare to marginalized and refugee populations using portable electronic medical record system

Project Description:

The students will work with a diverse group of student volunteers at Brown University, Alpert Medical School, and other national and international students (majoring in biology, global health, international relations, humanitarian law, medicine) to study the healthcare delivery models of a Brown-based non-profit healthcare Health and Education for All (HAEFA, www.haefa.org) that provides support to 6 million marginalized and underserved populations including 1.1 million Rohingya refugees from Myanmar. They will extract information from the remote project sites, coordinate with the student volunteers at Brown and abroad, to write the annual reports (2024-2025) and monthly newsletters as well as articles highlighting the humanitarian and clinical activities. They may also prepare documents including video and other media resources about the livelihood, health and educational status of the above populations. Willingness to participate in ongoing research activities, IRB preparation, and contributing to abstracts/Op-Ed/manuscripts are welcome.

Required skills: Must be comfortable in communication and coordination with a group of national and international diverse group students, health workers, and humanitarian workers and volunteers. Proficiency in writing articles and/or data analysis is required.

Preferred skills: Experience in website building or management, preparation or editing photo album/short videos, editorial experience in report writing/newsletter publication, and leadership skills, are a plus but not required.

Is this project for more than one student: Yes

Ruhul Abid
Department: BioMed, Cardiovascular, and Global Health Initiative
Project Type: Research
Project Title: Cardiovascular disease study

Project Description:
Study of coronary artery disease and myocardial ischemia using animal models and cell culture. The student will be engaged in PCR, cell culture, rodent/mouse genotyping and experiments as well as other molecular biological research techniques including in vitro and ex vivo assays for angiogenesis, cell proliferation, migration and oxidant measurement assays. Experience or willingness to work with animals is a must.

Required skills: Either cell culture or molecular biological experience. Experience or willingness to work with animals is a must.

Preferred skills: Either cell culture or molecular biological experience is preferred. Experience or willingness to work with animals is a must.

Is this project for more than one student: Yes

Roee Gutman

Department: Biostatistics
Project Type: Research
Project Title: Bayesian Regression Models for Analysis of Mice Behavioral Patterns

Project Description:
The TAR DNA-binding protein 43 (TDP-43) pathology characterizes the disease spectrum of amyotrophic lateral sclerosis–frontotemporal dementia (ALS-FTD). TDP-43 studies have used mouse models to assess behavioral, motor, and cognitive symptoms. Our study investigates the relationship between mouse behavior and the wild-type (WT) and TDP-43 mutated genotypes. Generally, study results are analyzed using analysis of variance (ANOVA) methods. However, common ANOVA methods are limited in their ability to capture complex relationships within the data. We will investigate the appropriateness of different Bayesian models, including Bayesian ANOVA, Bayesian hierarchical models, Bayesian multivariate hierarchical non-normal models, and Bayesian regression model with cyclic splines to model the relationship between behavioral time and genotype. We will perform checks for the model's performance and the goal is to complete the analysis and prepare for publication.

Required skills: Knowledge of regression models, statistical inference methods

Preferred skills: Knowledge of regression models, statistical inference methods

Is this project for more than one student: No

Roee Gutman
Department: Biostatistics
Project Type: Research
Project Title: Developing Statistical Software for Primary and Secondary Data Analysis of Linked Datasets

Project Description:
Identifying records that represent the same entity in the absence of unique identifiers (e.g. social security number) is important for many social, health and policy applications. This is a growing field, because data is produced by multiple sources, and each includes possibly different information. Probabilistic record linkage methods use partially identifying information available in both files to find records that represent the same entity. Because of the probabilistic nature of the methods, they may lead to false links (define records that represent the same entity when they do not) and missed links (do not define records as representing the same entity when they are). These errors can lead to inaccurate and imprecise estimates. In this project we will implement statistical methods to link data more accurately and address these errors in downstream analysis of the linked data. The goal is to have a software available for researchers who work with linked datasets.

Required skills: Statistical Inference, Computing course

Preferred skills: R,C++,Python

Is this project for more than one student: No

Ying Ma
Department: Biostatistics, Center for Computational Molecular Biology
Project Type: Research
Project Title: Mapping Cellular Heterogeneity in the Brain Using Advanced Spatial Transcriptomics

Project Description:
Recent advances in spatially resolved transcriptomics (SRT) have transformed our understanding of gene expression within the spatial context of tissues, particularly in complex systems such as the brain. These tools offer unparalleled opportunities to explore cellular diversity, spatial organization, and gene regulation in neural tissues. Collaborative efforts between the Ma Lab (CCMB) and the Fleischmann lab (Neuroscience) aim to develop experimental data sets and computational tools to uncover novel insights into the neural microenvironment. This work will provide invaluable tools for the neuroscience and computational biology communities.

The Ma Lab and the Fleischmann Lab @Brown are seeking two student researchers with coding competency to integrate and refine computational methods specifically tailored to SRT datasets from neural tissues. The project involves: (1) Adapting existing algorithms for cell type annotation to brain-specific SRT data, including neurons, astrocytes, and microglia. (2) Developing pipelines for spatial domain mapping in neural tissues, leveraging clustering methods to identify functionally relevant domains. (3) Integrating complementary data modalities from Dr. Fleischmann's lab, such as neural connectivity or functional imaging data, to generate comprehensive models of the neural circuit function. Students will apply the computational methods developed by the Ma Lab to new SRT datasets provided by Dr. Fleischmann's lab. The project also includes opportunities to validate computational insights against biological hypotheses, ensuring robust outcomes. If completed successfully, we plan to publish a scientific journal paper on this project. This project is ideal for students interested in statistics, computational biology, and applying their technical skills to answer neural science problems. Beyond working on the project, students will be expected to attend weekly lab meetings and provide updates to the PIs and other students. For details of our diverse and collaborative lab, please visit our website at https://yingma0107.github.io/ and https://sites.brown.edu/fleischmannlab/

References:
[1] Ying Ma and Xiang Zhou, Spatially informed cell type deconvolution for spatial transcriptomics, Nature Biotechnology 2022
[2] Ying Ma and Xiang Zhou, Integrative and Reference-Informed Spatial Domain Detection for Spatial Transcriptomics, Nature Methods 2024

Required skills: Strong programing language ability (preferably in R and Python, C++ is a plus)
Experience working with Github Basic UNIX/Linux competency Courses: Linear algebra, Statistics

Preferred skills: Experience with building statistical models and computational software, running scripts, and submitting Slurm jobs on OSCAR Grid
Skilled in data visualization, and pipeline design
Courses: Machine Learning, Statistical Inference
Prior experience in single-cell genomics and spatial transcriptomics data analysis

Is this project for more than one student: Yes

Elizabeth Aston
Department: Center For Alcohol & Addiction
Project Type: Research
Project Title: The Behavioral Economic Study of MicroTransitions

Project Description:
Heavy cannabis use among young adults (YA) is related to potential deleterious long-term effects and myriad other cannabis-related problems. Notably, young adulthood is characterized by frequent, smaller-scale transitions (i.e., micro-transitions) and critical life events that can lead to an escalation or reduction in cannabis use, likely depending on their subjective evaluation (i.e., valence). Certain transitions may increase cannabis use frequency (e.g., college entrance), while others may be protective (e.g., marriage). A behavioral economic (BE) framework can help explain how micro-transitions during young adulthood influence prospective changes in cannabis use. BE domains are influenced by internal (e.g., craving) and external (e.g., new employment) influences and include (1) access to and preference for alternative reinforcers (i.e., lack of alternative activities that compete with cannabis), (2) discounting of delayed rewards (i.e., inordinate preference for smaller immediate rewards, such as positive cannabis effects), and (3) relative cannabis value (i.e., demand; willingness to pay prohibitively high prices for cannabis despite limited resources or income). Further, motives for cannabis use (e.g., coping, enhancement) are key variables that likely account for the relation between micro-transitions and changes in cannabis use among YA as well. There is a dearth of prospective data on the association between the experience of micro-transitions and cannabis use, and no data on potential mechanisms, such as BE domains or use motives, that may account for this relationship. In this regard, the proposed research will employ a prospective mixed-methods design with YA who use cannabis to assess micro-transitions, cannabis use behavior, BE domains, and cannabis use motives over time. YA who endorse cannabis use (18-25 years; N = 400) will complete a 3-year observational survey study examining motives and BE mechanisms that underlie micro-transitions and cannabis use changes.

Required skills: Experience with Microsoft programs (e.g., Excel, Word, PowerPoint)

Preferred skills: Experience working with human subjects, data collection, and/or with software to be used in the study (e.g., Qualtrics, NVivo, SPSS). *Not required; all necessary skills can be trained

Is this project for more than one student: Yes

Jeremy Warner
Department: Center for Clinical Cancer Informatics and Data Science
Project Type: Research
Project Title: HemOnc Knowledge Base

Project Description:
HemOnc.org (https://hemonc.org/) is the largest freely available medical wiki of interventions, regimens,

and general information relevant to the fields of hematology and oncology. Some possible goals of the summer project are to explore utilizing HemOnc in real-world data (RWD) studies, development of a regimen browser—a tool that would allow users to select and visualize cancer treatment regimens from a database, and to expand the existing content through automated curation, extracting data from APIs, and through parsing the open access content.

Required skills: Basic programming skills in programs like R and Python.

Preferred skills: Interest in clinical informatics research, understanding of qualitative and quantitative research methodologies, creative and analytic problem-solving skills.

Is this project for more than one student: No

Jeremy Warner
Department: Center for Clinical Cancer Informatics and Data Science
Project Type: Research
Project Title: The COVID-19 and Cancer Consortium (CCC19)

Project Description:
The COVID-19 and Cancer Consortium (https://ccc19.org/) is a consortium of over 120 cancer centers and other organizations who came together in March 2020 to collect data about patients with cancer who were diagnosed with COVID-19. It is the largest such registry, with 19,275 completed records as of March 31, 2023. The CCC19 has recently received NCI U01 funding to (1) Investigate treatment exposures that may modify the short- and long-term outcomes of COVID-19 in people with cancer; (2) Measure the effects of SARS-CoV-2 infection on cancer and end-of-life trajectories; and (3) Develop methods to measure ascertainment and collider biases within the CCC19 registry.

Required skills: Basic programming skills in programs like R and Python.

Preferred skills: Interest in clinical informatics research, basic understanding of qualitative and quantitative research methodologies, creative and analytic problem-solving skills.

Is this project for more than one student: No

Amit Basu
Department: Chemistry
Project Type: Course Development
Project Title: Course Development for Chem 0360

Project Description:
CHEM 0360, the second semester of Introductory Organic Chemistry, introduces many new organic reactions and new modes of using pattern recognition to organize this new information. Over the past several years packets of TA generated practice problems for this course have provided a rich opportunity

for students to assess their mastery of course learning objectives. We are seeking to better curate this rich database of TA packets to improve the utility of these practice problems for future students in the course. We (Profs Basu and Zimmt) seek a team of 2-3 students to help systematically annotate and organize existing TA packets to help instructors and TAs design and use packets more effectively in future semesters.

Required skills: Completion of CHEM 0360 and a good mastery of the material covered in this course. Good organizational skills.

Preferred skills: N/A

Is this project for more than one student: Yes

Benjamin McDonald
Department: Chemistry
Project Type: Research
Project Title: Developing Bioinspired Approaches to the Fabrication of Tissue-like Nanocomposites

Project Description:
Sessile marine organisms, such as barnacles and mussels, use cationic proteins as cement to adhere to surfaces. Such proteins are salt responsive, meaning they only form cement materials when exposed to seawater. Cationic polymers are also used as cohesive materials in the paper making process, as they stick to the negatively charged cellulose. This project seeks to design salt responsive cationic polymers that adhere to natural and synthetic nanomaterials, such as nanocellulose and carbon nanotubes, to enable their salt triggered assembly into tissue-like composite materials with electrical, thermal, and ion conductive properties. Such materials are sought for next generation energy storage and management applications that are high performance and sustainable.

Required skills: Chem 360L

Preferred skills: N/A

Is this project for more than one student: Yes

Benjamin McDonald
Department: Chemistry
Project Type: Research
Project Title: High Throughput Discovery of Tissue-Like Soft Materials

Project Description:
Living materials can be regarded as composite macromolecular networks permeated by fluid and cells, i.e. cell-laden hydrogels. This network is characterized by a complex and heterogeneous spatial

organization that spans nanometer to macroscopic length scales, from individual cells with local biomacromolecular networks to tissues and organs. It is well recognized that the surrounding three-dimensional microenvironment provides a diverse array of signals that influence individual cellular processes and enable their collective functioning as coordinated living materials. Therefore, the ability to construct macromolecular networks that replicate specific combinations of physicochemical, biochemical, and mechanical stimuli is crucial to advancing the fundamental biology of healthy and diseased states and ultimately enabling therapeutic intervention. However, the exquisite and specific tailoring of these native macromolecular networks far exceed the capabilities of traditional hydrogel fabrication methods.

The McDonald lab addresses this unresolved challenge through a molecular engineering approach, investigating the relationships between macromolecular structure and assembly, and macroscopic material function. Our research focuses on translating the hierarchical features of protein structure into simplified synthetic polymers. Specifically, we seek to elucidate how chemical composition (primary structure) and shape (tertiary structure) can be modulated to mimic the stimuli-responsive assembly mechanisms and mechanical properties of structural proteins such as tropocollagen and tropoelastin, for the fabrication of hydrogels with features tailorable to a given tissue of interest. Towards these ends, we are developing a unified high throughput platform that combines the identification of candidate polymer structures for thermal gelation into structured hydrogels with parallel in vitro cellular characterization methods to develop new model S-ECMs for the characterization of breast cancer biology. Students involved in this project will work on the synthesis of polymers as well as their characterization using automated microscopy methods.

Required skills: Chem360L,

Preferred skills: MATLAB experience

Is this project for more than one student: Yes

Eunsuk Kim
Department: Chemistry
Project Type: Research
Project Title: Bio-inspired Catalysts for Environmental Pollutant Remediation

Project Description:
Nature leverages high-valent metal oxo species for key transformations, including reducing harmful contaminants like nitrate and carbon dioxide. Oxotransferase enzymes in the DMSOR family use molybdenum (Mo) and tungsten (W) centers to efficiently catalyze oxygen atom transfer (OAT) reactions. Our lab focuses on designing molybdenum-based catalysts for O- and S-atom transfer reactions. Students working on this project will synthesize Mo-containing catalysts capable of activating and converting CO2, nitrate, or sulfur species (Sx) into value-added products.

Required skills: CHEM 330 and CHEM 350

Preferred skills: Strong work ethic

Is this project for more than one student: No

Eunsuk Kim
Department: Chemistry
Project Type: Research
Project Title: Synthesis of [Fe-S] Clusters Supported by Alpha-Helical Mimics

Project Description:
Proteins with [Fe-S] clusters play key roles in biological processes, including gene regulation. These clusters interact with small molecule oxidants (e.g., NO, O_2, H_2O_2) to monitor cellular stress environments. Their disruption influences gene expression or activates protective protein functions. This project examines the reactivity of [Fe-S] clusters using synthetic models. Over the summer, students will synthesize organic compounds mimicking alpha-helical structures hosting [Fe-S] cofactors, exploring their reactivity with NO and O_2 to better understand biological redox signaling pathways.

Required skills: CHEM 330 and CHEM 350

Preferred skills: Strong work ethic

Is this project for more than one student: No

Jerome Robinson
Department: Chemistry
Project Type: Research
Project Title: Elucidating Molecular Pathways of Metal Loss Relevant to Copper Positron Emission Tomography (PET) Agents

Project Description:
64Cu has received increasing attention due to its excellent decay characteristics and early-stage imaging sensitivity in positron-emission tomography (PET); however, these agents often suffer from significant Cu loss in vivo. This includes the only FDA approved 64Cu therapeutic, DetectnetTM (Cu DOTATATE). The species and pathways involved with Cu loss of these species are poorly understood, and our fundamental understanding of such processes would unlock new design strategies for safe and effective radiotherapies. In this project, we will synthesize a family of copper chelators designed to systematically interrogate the influence of complex charge, hydrophilicity, and coordination environment on the in vivo behavior of 64Cu agents. In collaboration with the Bartnikas lab, biochemical transport pathways of these compounds will be further to generate a detailed molecular picture of the relevant mechanisms of metal loss and provide a clear targets for improved imaging agent design.

The participating student will gain expertise in the synthesis and characterization of organic ligands (chelators) and copper complexes. Characterization techniques will include NMR, vibrational, and electronic absorption spectroscopy, electrochemistry, as well as single-crystal X-ray diffraction. Additional opportunities to learn biochemical and radiochemical techniques will also be possible. Opportunities to learn modern computational methods to model and predict molecular structure and reactivity will also be

available. The student will develop strong qualitative and quantitative chemistry skills, while they will also hone a variety of ‘soft-skills’, including scientific communication with technical and non-technical audiences.

Required skills: CHEM 0330, 0350. Prior research experience is not a requirement. Excitement, enthusiasm, and a willingness to learn new things!

Preferred skills: Enrollment or completion of CHEM 0400/0500, 0360, or 1450 or courses in biology would be great, but not required. Interest in (synthetic) chemistry!

Is this project for more than one student: Yes

Jerome Robinson
Department: Chemistry
Project Type: Research
Project Title: Rare-Earth Reactive Oxygen Species – New Opportunities for Green Chemistry & Renewable Energy Applications

Project Description:
The specific interactions between metal centers and oxygen are essential to many key biological and synthetic. For example, reversible oxygen binding is critical for cellular respiration and batteries, while highly reactive metal-oxygen species are pivotal to discovering new green chemistry and renewable energy processes. The “rare-earth elements” (group III and the lanthanides), are a group of 17 elements which co-occur in nature that are critical components in many technological applications – including a crucial oxygen storage material in every automobile’s catalytic converter. Despite their unique electronic properties and being characterized as “oxophilic” (oxygen-loving), very little is known about the interaction of rare-earth elements with oxygen and its reduction products (i.e., rare-earth reactive oxygen species). Recently, the Robinson group has isolated novel rare-earth reactive oxygen species and found they display properties and reactivity that are not possible using other elements of the periodic table. This includes the discovery of catalysts for chemical and electrochemical reduction of oxygen to peroxide, and new chemical reactivity that occurs under mild conditions (room temperature and pressure). In this project, we will examine the impact of rare-earth structure on the resulting properties and reactivity of these materials and their applications in green chemical synthesis and renewable energy applications.

The participating student(s) will gain expertise in organic and inorganic synthesis (including air-sensitive compounds), and an array of characterization techniques (e.g., NMR, UV-Visible & vibrational spectroscopy, single-crystal X-ray diffraction, electrochemistry…). There are also additional opportunities to examine different applications of these materials in (electro)catalysis and modern computational methods to model and predict molecular structure. The student(s) will develop strong qualitative and quantitative chemistry skills, while they will also hone a variety of ‘soft-skills’, including scientific communication with technical and non-technical audiences.

Required skills: CHEM 0330. Prior research experience is not a requirement. Excitement, enthusiasm, and a willingness to learn new things!

Preferred skills: Enrollment or completion of inorganic (CHEM 0400/0500) or organic (CHEM 0350, 0360,

or 1450) would be great, but not required. Interest in (synthetic) chemistry!

Is this project for more than one student: Yes

Megan Kizer
Department: Chemistry
Project Type: Research
Project Title: Bioconjugation of Tumor-Targeting Glycan Binding Proteins for Improved Cancer Therapeutics

Project Description:
Complex carbohydrates (glycans) are biomolecules implicated in human health and disease. Glycans and glycoconjugates are critical players in cell development, tumorigenesis, infection and beyond. Driven by the low efficacy and large side effects of many cancer therapeutics, this project aims to develop novel targeted therapeutics for improved cancer treatment. We leverage glycan binding protein (GBPs) as our targeting ligand, which interacts with a mucin-associated disaccharide (the TF antigen) overexpressed in over 80% of tumors. Applications of these GBP-targeted therapeutics in vitro and in vivo will demonstrate tissue selectivity and therapeutic efficacy of these new biomaterials, ultimately guiding rational design of novel glycan therapeutics for cancer.
This project expands upon previous work in the group, towards generating improved cancer therapeutics through targeting aberrant glycan epitopes upregulated on the surface of tumors. Specifically, we are now focusing on the bioconjugation of our TF-targeting GBP to drug-loaded lipid nanoparticles and theranostic inorganic (Fe-Au) nanoparticles. The student working on this project will optimize bioconjugation procedures and test different GBP densities on the cell surface to determine optimal targeting ligand density for cell uptake. The targeted therapeutics will be characterized using electrophoretic mobility shift assay (EMSA), dynamic light scattering (DLS), and scanning electron microscopy (SEM). Should time permit, students will be able to apply the synthesized therapeutic materials to in vitro cell culture models to determine nanoparticle uptake. Students working on this project will obtain exposure to a broad skill set including, bioconjugation, protein purification, nanoparticle analysis, and appropriate analytical and characterization techniques as needed. Overall, students will gain interdisciplinary experience across molecular biology, biochemistry, and chemistry. Students are encouraged to look at the group webpage (sites.brown.edu/glycotech) for more project information.

Required skills: Students must be willing to do lab-based experimental research, work well in a team environment, and have taken introductory biology and/or chemistry courses.

Preferred skills: Prior lab experiences are a plus (lab courses or research lab experience), but not required.

Is this project for more than one student: Yes

Richard Stratt
Department: Chemistry

Project Type: Research
Project Title: Applying random matrix perspectives to the ordering and dynamics of liquids

Project Description:
Our group looks at molecular behavior in liquids. One project of ours is about learning how something as disordered as a liquid can develop significant local order. Liquid crystals, for example, can form small-direction-biased domains that appear ordered to the relatively few molecules within them, yet never confer that order to the liquid as a whole; each domain keeps its own private preferred directions. We are interested in discovering the nature of these domains.

Yet another project deals with liquids with extraordinarily slow motion. These liquids never manage to crystallize into an ordered solid on cooling, they simply freeze into a glass with the liquid disorder in place. Enroute to becoming glasses, though, the "supercooled" liquids display molecular motion orders of magnitude slower than one would expect. We want to understand the fundamental origins of these dynamics.

Common to both projects is that they can be described by matrices filled with disordered sets of elements. With liquid crystals, there is a 3 x 3 matrix whose eigenvalues and eigenvectors imply the directional order. In the supercooled liquid situation, the connection is more indirect. One can envision the slowing down of liquid dynamics as a hopping from site to site on a lattice with randomly missing links. As the fraction of missing links increases, the conductivity of the lattice slows until it disappears entirely at some critical fraction of missing links. But the conductivity of an N-site lattice is determined by the eigenvalues and eigenvectors of an N x N matrix encoding the randomly arranged connections.

We are looking for a student to apply probability ideas and numerical simulation methods to the random matrices associated with liquid crystals and supercooled liquids. The goal is for the student to learn how the matrix statistics leads to the puzzling liquid-state behaviors we observe.

Required skills: Students must have some comfort level with linear algebra and basic probability ideas along with some experience with carrying out scientific calculations on a computer.

Preferred skills: Students who have taken, or at least read about, statistical mechanics will be able to get into their project more quickly than those who have not. However, any students concentrating in chemistry, physics, mathematics, applied mathematics, computer science, or engineering could be welcome, regardless of what stage they are at in their undergraduate careers. I am mainly looking for students willing to take the time to acquire the necessary mathematical and computational background; I am not expecting students to walk in the door knowing everything!

Is this project for more than one student: No

Brenda Rubenstein
Department: Chemistry and Physics
Project Type: Research
Project Title: Machine Learning Protein and RNA Conformational Dynamics

Project Description:

The dynamics of proteins and RNA are critical to their functions, yet many AI-based structure prediction tools focus on predicting their static ground states. In this project, we will leverage our own recently-developed codes to rapidly predict and analyze the dynamics of cancer-causing proteins, including kinases, by subsampling AlphaFold. These studies will reveal how proteins and RNAs function, including their inactivation pathways, while also developing new ML techniques that better predict their functions. Students will learn protein and RNA biochemistry, machine learning methods, and physical simulation methods. Students interested in our work can set up a meeting with me or other members in our group, or visit our website (rubenstein.group).

Required skills: Knowledge of biochemistry or biophysics; fluency with Python or other forms of computing/scripting

Preferred skills: Coursework through our Intro Biochemistry course, Courses in Python or C-based programming, Courses in statistical mechanics or biophysics

Is this project for more than one student: Yes

Brenda Rubenstein
Department: Chemistry and Physics
Project Type: Research
Project Title: Quantum Computing Biology and Catalysis

Project Description:
Understanding the interactions between biomolecules and chemical compounds is crucial for developing new disease therapeutics, exploiting bio-inspired energy transport in photosynthesis, and harnessing the power of correlated electron chemistries in enzymes. Doing so requires modeling the dynamics of complex biological systems in aqueous solution. A crucial technological gap that prevents us from achieving this goal is that currently available molecular dynamics simulations employ coarse and often inaccurate force fields. Indeed, gaining access to information about bond breaking, bond formation, and the subtle manifold of energy states involved in enzymatic catalysis requires bridging molecular motions with a sufficiently accurate description of the electronic degrees of freedom at play. However, this can be highly computationally demanding on classical computers, and even beyond the reach of the largest supercomputers available. Utilizing the advantages of quantum computers presents a promising opportunity to significantly reduce the cost while significantly increasing the accuracy of electronic calculations for increasingly large systems. As part of this project, we will develop a combination of machine learning, classical electronic structure, and quantum algorithms to model biomolecular systems in atomistic detail on quantum computers for the first time. Students involved with this project will either be involved with studying specific biochemical systems (e.g., RNAs, kinases, covalent inhibitors), developing the neural networks needed to integrate quantum computed results into classical force fields, applying electronic structure algorithms, or developing novel quantum computing algorithms to best model these systems on currently available hardware. Students interested in this project can find more information at the Wellcome Leap Quantum4Biology website or on our group website (rubenstein.group). We are happy to invite any interested students to meet with us or attend our weekly group meetings.

Required skills: Knowledge of Biochemistry, Knowledge of quantum physics or chemistry, knowledge of computing (Python, etc.)

Preferred skills: Coursework including Biochemistry, Coursework including either Quantum Mechanics in the Physics Department or Physical Chemistry in the Chemistry Department; knowledge of Python programming; knowledge of machine learning; willingness to learn quantum computation and quantum algorithms

Is this project for more than one student: Yes

Graham Oliver
Department: Classics and History
Project Type: Course Development
Project Title: ANCIENT GREEK ATHLETICS

Project Description:
The Faculty/Student collaboration will develop a new lecture course in Classics. The course (Ancient Greek Athletics) explores the social and cultural phenomena of agonistic culture in the ancient Greek world, and in particular the role of sports and athletics. The course will incorporate materials that include both literary and non-literary evidence (coins, inscriptions, material culture). The chronological limits of the course will cover the Archaic period (esp. 8th century BCE onward), Classical, Hellenistic, and Roman Imperial eras, but the course will also pay attention to the reception(s) of ancient Greek athletics in the centuries after Antiquity up to, and including, current times.
The student will assist the course organizer in gathering and assessing materials for use in the classes, suggest activities and assignments, assist in designing specific modules and materials for sections. The student will deepen and broaden their understanding of the ancient Mediterranean world and its history and culture. The student will become familiar with the scholarship written about Ancient Greek Athletics as well as relevant ancient sources of evidence.

Required skills: At least two courses in areas related to ancient Greek culture.

Preferred skills: Knowledge of an ancient language an advantage but not necessary; previous research experience on an ancient topic desirable.

Is this project for more than one student: No

Daphna Buchsbaum
Department: Cognitive and Psychological Sciences
Project Type: Research
Project Title: How do children think and learn about the physical and social world around them?

Project Description:
Our lab conducts cognitive development research on a variety of topics within children's thinking and learning, with a particular focus on how young children learn about categories such as colors and animals, how they understand cause and effect relationships, and on how they learn socially (both from

and about other people). As an undergraduate researcher, you will have the opportunity to participate in all aspects of research in the lab. This includes assisting with conducting in-person and online behavioral experiments with children, coding and transcribing data, updating lab materials, contributing to participant newsletter and lab social media, and recruitment and scheduling of child participants (aged 17 months - 9 years), in person and over phone and email. Our research takes the form of short, interactive games that are designed to be fun and engaging to children. We record children's actions when interacting with others, toys and puzzles, and the choices they make, to learn more about their understanding of the world. This opportunity will require the student(s) to commit about 30 hours/week to the lab. Regular weekend hours are required, as this is when children are most often available to participate. You can learn more about our research at https://sites.brown.edu/cocodevlab/. For brief meetings with the lab manager to discuss our research, please email manager-buchsbaum@brown.edu with the subject [SPRINT Research Opportunity].

Required skills: Commitment to work in the lab for at least 2 semesters/terms. This is necessary due to the training and learning curve necessary to assist with research with child participants; Be able to commit some regular weekend and some evening hours (this is when children are most often available to participate); Previous experience working with children (in a research or non-research capacity); Previous coursework in psychology, development, and/or cognition.

Preferred skills: Previous recruiting or customer service experience (either formal or informal); Previous research experience; Experience with statistics, programming or web design; Access to a computer and stable internet access capable of running online experiments via Zoom.

Is this project for more than one student: No

Daphna Buchsbaum
Department: Cognitive and Psychological Sciences
Project Type: Research
Project Title: How do dogs think and learn about the physical and social world around them?

Project Description:
Our canine cognition research explores dogs' learning and reasoning abilities. We investigate dogs' learning in a variety of contexts including dogs' physical problem-solving abilities (e.g., how to get treats out of puzzles) and their understanding of social information (e.g., following a pointing gesture or learning from a demonstration). Our research takes the form of short, interactive games and training exercises that are designed to be fun and engaging to dogs. We record dogs' actions when interacting with people, toys, and puzzles, and the choices they make, to learn more about their understanding of the world. As a research assistant, you will have the opportunity to help with conducting online and in-person behavioral experiments with dogs, coding of behavioral experiments, inputting and assisting with data collection, and recruitment of canine participants and their owners. This opportunity will require the student(s) to commit about 30 hours/week to the lab (including some weekend and evening hours as this is when owners and their dogs are most often available to participate). You can learn more about our research at sites.brown.edu/browndoglab. For brief meetings with the lab manager to discuss our research, please email manager-buchsbaum@brown.edu with the subject [SPRINT/UTRA Research Opportunity].

Required skills: Commitment to work in the lab for at least 2 semesters/terms. This is necessary due to

the training and learning curve necessary to assist with research with dogs; Be able to commit some regular weekend and evening hours (this is when owners and dogs are most often available to participate); Previous experience interacting with dogs (either formally or informally); Previous coursework in psychology, animal behavior and/or comparative cognition.

Preferred skills: Previous experience working with dogs (in a research or non-research setting) is highly desirable; Previous recruiting or customer service experience (either formal or informal); Previous research experience; Statistics, programming or web design experience (a bonus but not required); Access to a computer and stable internet access capable of running online experiments via Zoom.

Is this project for more than one student: No

David Sobel
Department: Cognitive and Psychological Sciences
Project Type: Research
Project Title: Children's understanding of play across cultures

Project Description:
The present study investigates children's understanding of play across cultures, in particular comparing Chinese and American cultures. Students will analyze a set of transcripts of (already collected) conversations between parents and children in China and the United States to consider how children talk about play and how parents talk to children about play. Fundamentally, we are asking whether parents talk to their children about play differently between the cultures, and whether, across cultures, parental talk relates to the way children talk about and conceptualize their activities as play. Students participating in this UTRA will be introduced to the basics of language coding and will engage in such coding throughout the semester, both in terms of developing coding and analysis schemes, as well as engaging in and learning about reliability coding and analysis. At the end of this project, students will have a better understanding of how language coding is designed and such research is conducted, but also will engage in the act of coding and analyzing such data.

Required skills: Students must be fluent in Mandarin Chinese, as the majority of the coding for this project will be in this language. Students must also have an interest in child development.

Preferred skills: Excel and/or other computer skills

Is this project for more than one student: Yes

David Sobel
Department: Cognitive and Psychological Sciences
Project Type: Research
Project Title: Parent-Child Interaction and Children's Scientific Reasoning

Project Description:

Previous studies in our laboratory have shown that when parents and children engage in exploratory play together, there are various behaviors on the part of parents that support children's learning, but other behaviors that impede their learning. This research has mostly focused on STEM content – how children learn about various kinds of physical systems, like gears or electric circuits. The present study builds on this work by engaging in novel data collection and analysis related to how children learn about the process of scientific investigation. Parents and their 4- to 7-year-old child will be asked to explore a novel causal system, designed to measure their scientific reasoning capacities. We will investigate how parents scaffold their children's reasoning through the nature of the exploration the dyad engages in, the types of explanations they produce, and how parents set goals for the interaction – all based on coding systems we have used previously in other investigations. We will compare this baseline parent-child interaction with other dyads in which the parent is first given either the answer to the problem, without any knowledge of how one might reason to achieve that answer, or is first given a guide to successful scientific reasoning, which will guarantee to lead them to the correct answer. Across these conditions, we will also consider whether children's reasoning generalizes to other problems. UTRA students will be involved in data collection, coding, and analysis of the data collected from the dyads. UTRA students will need to be able to work weekends to collect data from parents and children at our testing sites at Roger Williams Zoo and other locations around Providence. Interested students should examine https://sites.brown.edu/causalityandmindlab/ for more information about the lab.

Required skills: Experience working with children. Coursework in developmental psychology, particularly in the Cognitive and Psychological Sciences department.. Interest in scientific reasoning.

Preferred skills: N.A.

Is this project for more than one student: Yes

Joo-Hyun Song
Department: Cognitive and Psychological Sciences
Project Type: Research
Project Title: The role of action preparation in visual perception performance

Project Description:
Many everyday behaviors emanate from a close interrelation between perception, action and cognition. When sitting at a breakfast table and wanting to drink coffee, you will need to perceive the coffee mug and encode its location, shape and orientation in order to grasp it correctly. The same mechanisms apply for climbing stairs or aiming to score a goal in a soccer game. These examples illustrate how perception will enhance action. However, the reverse phenomenon – how action influences perception - remains largely unexplored. Therefore, the aim of the present project is to investigate whether action preparation can enhance the perception of a visual target and if so, how? We aim to understand 1) if all type of action preparation (e.g., reach and grasp actions, pointing action, button presses…) will enhance target perception and 2) if action preparation will specifically enhance the perception of action-relevant features (e.g., target orientation) or will it also enhance action-irrelevant features (e.g., target color). In the experiment conducted, participants will see different visual targets and will perform different actions toward them. We will use continuous action tracking, a cutting-edge method which will allow us to record many different action parameters over time. This technique is a much more precise and ecological approach to action than traditional behavioral methods. Overall, this research project offers an

outstanding opportunity for undergraduate researchers to gain experience with mechanisms supporting the interaction of perception, action and cognition. They will gain experience with different aspects of research that are fundamental in the cognitive neuroscience field, such as experiment programming, human participant testing and data analysis. of behavioral and action tracking data.

Required skills: A minimum of 1 semester research or course experience in psychology/biomedical sciences is required.

Preferred skills: : Prior experience working with human research participants is preferred. Introductory knowledge of statistics and/or programming is a plus but not required.

Is this project for more than one student: No

Joo-Hyun Song
Department: Cognitive and Psychological Sciences
Project Type: Research
Project Title: Effects of action requirements on attentional biases with 3D objects

Project Description:
Action plays a crucial role in perception and cognition. Crossing a busy intersection successfully requires coordination of visual and auditory information, knowledge of movement patterns between pedestrians and vehicles, and one's own movement capability. Recent findings have highlighted the effects of moving and acting on a variety of cognitive processes, from perception of time and orientation to memory and learning. In this project, we extend this line of research to study the effect of action on attentional regulation. Specifically, we will explore whether movement constraint or training can bias attention towards salient actionable targets. Participants will perform simple reach and grasp motions in a variety of contexts. Their ability to appropriately allocation attentional resources will be tested before and after performing actions. The project will involve comprehensive analysis of a multivariate dataset containing motion capture data, priming effect, visual and object popout effect, and attentional cognitive test. Future projects will explore the action effect on decision making and human-robot interaction. Overall, the project will provide a foundational understanding of the ecological perspective in psychology as well as processes and mechanisms that enable coordination between perception, cognition, and action.

Required skills: N/A

Preferred skills: Prior experience working with human research participants is preferred. Introductory knowledge of statistics and/or programming is a plus but not required.

Is this project for more than one student: No

Julia Marshall
Department: Cognitive and Psychological Sciences
Project Type: Research

Project Title: **How do children think and learn about morality?**

Project Description:
The Mind & Morality Lab is a new developmental psychology lab at Brown whose research focuses on understanding the psychological roots of human morality. As adults, we hold strong convictions about what is right and what is wrong. In the lab, we hope to understand the extent to which certain moral beliefs and behaviors can be traced back to early emerging tendencies in childhood. To do so, we conduct psychological research studies with both children and adults. We approach our research questions through an interdisciplinary lens, drawing on philosophical, legal, and psychological perspectives. Undergraduate researchers in the M&M lab will have the opportunity to participate in all aspects of the research process, including but not limited to: attending regular lab meetings (Tuesdays 12-1 PM), assisting with conducting in-person and online experiments with children, coding and transcribing data, updating lab materials, contributing to lab social media, recruiting and scheduling child participants (aged 5 - 12) in person and over phone and email, and brainstorming new approaches to developmental social psychology research. This opportunity will require the student(s) to commit about 8 hours/week to the lab. Regular weekend hours are required, as this is when children are most often available to participate. You can learn more about our research at https://sites.brown.edu/mindmoralitylab/. For brief meetings with the lab manager to discuss our research, please email mindmoralitylab-manager@brown.edu with the subject [UTRA Research Opportunity].

Required skills: Prospective research assistants students must have completed at least one course in psychology, development, and/or cognition by the start of the semester for which they are applying to work in the lab. RAs must have some regular weekend and evening availability (this is when children are most often available to participate), but any time spent working outside of normal working hours will count towards the weekly hour commitment. RAs must also possess a genuine interest in the lab's research areas.

Preferred skills: Previous recruiting or customer service experience (either formal or informal); Familiarity with developmental psychology research methods; Experience with statistics, programming or web design; Access to a computer and stable internet access capable of running online experiments via Zoom.

Is this project for more than one student: Yes

Malik Boykin
Department: Cognitive and Psychological Sciences
Project Type: Research
Project Title: **Investigating the Impact of Professor Identities on College Student STEM Engagement**

Project Description:
The RISE Lab at Brown University's Department of Cognitive, Linguistic, and Psychological Sciences intends to explore how the identities and narratives within professor background narratives influence college students' perceptions and engagement in STEM fields. This investigation addresses the persistent gender gap in STEM, where women and non-binary individuals are significantly underrepresented and face disparities in career advancement and pay. The project leverages role model

theory to examine how professor stories of overcoming obstacles and achieving success in STEM might inspire students, particularly women and underrepresented minorities, to pursue and persist in STEM careers.

Utilizing a comprehensive approach that includes demographic surveys, modified measures of interest in STEM versus non-STEM fields, and analysis of perceived identity compatibility, this study aims to uncover how narratives of success and failure impact student identity formation, role model outcomes, and overall engagement with STEM. The research seeks to highlight the critical role of professors' visibility and relatability in bridging the gender gap in STEM by fostering an environment where diverse students feel a sense of belonging and resilience against stereotypes.

*The RISE Lab values diversity and equality and is committed to creating an inclusive environment for all members. We strongly encourage applications from individuals of diverse backgrounds, particularly those who are underrepresented in STEM fields.
Enrollment in an undergraduate program in psychology, sociology, or a related discipline.; Demonstrated interest in developmental psychology, STEM education, and diversity in academic contexts.; Experience with or willingness to learn data collection and analysis software, including Qualtrics.

Required skills: Enrollment in an undergraduate program in psychology, sociology, or a related discipline.; Demonstrated interest in developmental psychology, STEM education, and diversity in academic contexts.; Experience with or willingness to learn data collection and analysis software, including Qualtrics.

Preferred skills: Strong organizational, communication, and teamwork skills.; Ability to commit to the project's timeline and participate in lab activities, including a regular weekly schedule.; Knowledgeable in R and/or SPSS.

Is this project for more than one student: No

Malik Boykin
Department: Cognitive and Psychological Sciences
Project Type: Research
Project Title: Exploring Race/Ethnicity and Gender Identity in Schools' Psychology Syllabi: Impacts on Diversity, Equity, and Inclusion

Project Description:
The RISE Lab at Brown University's Department of Cognitive, Linguistic, and Psychological Sciences investigates how race/ethnicity and gender identities are represented in school curricula and how these representations affect diversity, equity, and inclusion within academic environments. This project examines the syllabi from various educational institutions to assess the diversity of readings and materials and explore their influence on fostering an inclusive atmosphere conducive to engagement in STEM and psychological fields.

Significant research indicates a persistent gender gap in STEM, where women and non-binary individuals, especially those of color, are markedly underrepresented. This project incorporates principles from role model theory and the stereotype inoculation model. We aim to understand how the visibility of

diverse role models within educational materials can enhance feelings of social belonging, build resilience against prevailing stereotypes, and ultimately encourage more women and non-binary individuals to pursue and remain in STEM careers.

By conducting comprehensive literature reviews, engaging in rigorous data collection and analysis, and fostering thoughtful discussions within the academic community, the RISE Lab aims to contribute significantly to the scholarship of educational diversity. This project highlights the gaps and opportunities within current educational practices and proposes actionable strategies for incorporating more inclusive materials into school syllabi.

*The RISE Lab values diversity and equality and is committed to creating an inclusive environment for all members. We strongly encourage applications from individuals of diverse backgrounds, particularly those who are underrepresented in STEM fields.

Required skills: Current enrollment in an undergraduate concentration in psychology, sociology, or a related field. Strong organizational and communication skills, especially in handling email correspondence and managing data. Ability to discern relevant information from research articles.

Preferred skills: Experience with qualitative and quantitative research methods. Interest in developmental and social psychology, educational diversity and inclusion, and STEM engagement.
Understanding of role model theory and stereotype inoculation and their implications for gender and racial equity in education.

Is this project for more than one student: No

Roman Feiman
Department: Cognitive and Psychological Sciences
Project Type: Research
Project Title: How do children speak and think?

Project Description:
One of the most remarkable things about humans is our ability to take a finite number of words and use them to generate an infinite number of new meaningful sentences. You may have never heard the sentence, “There are no bears on Mars”, but you have no trouble understanding what it means. Not only can you understand it, you can judge that it is very likely true and make conclusions on that basis: if there are no bears on Mars, that means there are no brown bears there, no bear cubs, no bears climbing Martian trees. How is it so easy for us to understand new sentences and think new thoughts, judge whether they’re true, and reason through related thoughts and sentences?

Language may be the most obvious way we express and understand complex thoughts, but is it the only way? Does it play a special role in enabling thinking, or is it just how we communicate our thoughts? When kids learn a new word, do they gain the ability to think about a new idea — or do they only learn to label what they could already think about? Exploring these questions means exploring our shared humanity — how all of us can think new thoughts so quickly and productively, and how we communicate those thoughts to each other.

Students in the lab will help recruit and test participants, construct experimental stimuli, process and code data (audio, transcripts, etc.), and conduct literature searches and reviews. Interested students will also have opportunities to get involved with experimental design, data analysis, scientific writing, and presentation skills. Students will have the opportunity to attend weekly lab meetings to learn about cutting-edge research going on in the lab and regular meetings with senior research personnel in the lab (grad students, postdocs, and Prof. Feiman).

Required skills: Strong organizational skills, attention to detail Desire to learn new software programs, with the ability to learn independently Proficiency with Word, Excel, Powerpoint.

Preferred skills: Prior experience working in a lab, working with children; Experience conducting independent research, (e.g. an honors thesis project, an independent study) is strongly preferred, but not required; Experience with eye tracking, and knowledge of R, Python, Amazon Mechanical Turk (AMT), CHILDES, CLAN, E-PRIME, Matlab, Filemaker, OSF, and Slack are all preferred but not required.

Is this project for more than one student: Yes

Ruth Colwill
Department: Cognitive and Psychological Sciences
Project Type: Research
Project Title: Assessing behavioral disturbances in development

Project Description:
Subtle changes in behavior can signal aberrations in brain development that can have detrimental consequences for adaptive survival. My lab uses the developing zebrafish to uncover the effects of various anthropogenic challenges on mood, motivation, learning and social behavior. This project will provide the UTRA student with an authentic research experience in which they will learn about disciplinary methods used to develop and validate behavioral assays. Building on our recent work and that of students in my CURE course CLPS 1195 (Life under water in the Anthropocene), the UTRA student will have the opportunity to develop a research question, design and conduct an experiment, learn how to interpret scientific evidence, and contribute to a research paper or conference poster. Their studies will help fill a void in the behavioral literature on this important model system. The UTRA student benefits from this experience in several ways. They become familiar with experimental design and disciplinary practices. They learn how to troubleshoot and interpret experiments and to work collaboratively. They may also be able to share their knowledge as a TA in CLPS 1195 in Fall 2025 and/or continue their independent research for course credit (including Honors). For more information about the lab and research schedule, please email ruth_colwill@brown.edu

Required skills: N/A

Preferred skills: Any coursework with a lab component or equivalent experience; experience handling/working with small animals

Is this project for more than one student: No

Ruth Colwill
Department: Cognitive and Psychological Sciences
Project Type: Research
Project Title: Actions and Habits

Project Description:
This project explores the relationship between intentional, goal-directed actions and habits that are performed without thought for their consequences. This action-habit distinction has depended almost entirely on whether or not the behavior is sensitive to the current value of its outcome. Behaviors that are sensitive are considered goal-directed and those that are insensitive are categorized as habits. Using a rodent model (mice), the aim of this project is to develop a new method to distinguish between actions and habits that does not rely on the failure of a manipulation to impact performance. You will be part of a team and involved in all aspects of the research process from design to interpretation.

Required skills: N/A

Preferred skills: Experience handling small animals; coursework in learning/cognition

Is this project for more than one student: No

Serra Favila
Department: Cognitive and Psychological Sciences
Project Type: Research
Project Title: How do related memories influence one another?

Project Description:
Using behavioral experiments, computational modeling, and neuroimaging, our lab explores how memories interact, and how these interactions influence what we remember and how we behave. Next summer, we will conduct behavioral and fMRI studies investigating the mechanisms that cause related memories to be remembered as more similar to each other versus more different. We will do this by running experiments that expose human subjects to visual stimuli and by evaluating memory distortions for these stimuli under various learning and task conditions. Our fMRI research will focus on the hippocampus, a crucial component of the episodic memory system, to examine how interactions between memories influence their hippocampal representations.
As an undergraduate research assistant, you will be working with senior members of our lab on multiple aspects of the research process. This includes collecting behavioral and neuroimaging data from young healthy adults, participating in brainstorming sessions, processing and analyzing data, and presenting findings at weekly lab meetings. You can learn more about our research at https://sites.brown.edu/favila-lab/ or by scheduling an appointment with our lab manager at https://forms.gle/VLoEfe7y2ErKcNS16.

Required skills: Introductory coursework in psychology, cognitive science, neuroscience, and/or cognitive neuroscience.

Preferred skills: Any coursework in computer science, introductory coursework to computer programming, and/or other coding experience. Introductory coursework in statistics. Experience with conducting behavioral, neuroimaging experiments, and/or other human subjects research experience.

Is this project for more than one student: No

Serra Favila
Department: Cognitive and Psychological Sciences
Project Type: Research
Project Title: Understanding interactions between memories with computational models

Project Description:
Using behavioral experiments, computational modeling, and neuroimaging, our lab explores how memories interact, and how these interactions influence what we remember and how we behave. Behavioral and fMRI research has shown that related memories can sometimes change to become more similar to each other, whereas other times they change to become more different from each other. However, we don't know which computational processes facilitate these phenomena. Next summer, we aim to explore if and how different computational models of our episodic memory system and the hippocampus can account for these distinct types of memory change.
As an undergraduate research assistant, you will be working with senior members of our lab on multiple aspects of the research process, including participating in brainstorming sessions, conducting literature reviews, and presenting findings at weekly lab meetings. You will spend the majority of your time on computer programming-related tasks. This includes processing and analyzing existing datasets, adapting behavioral experiments to a computational modeling setting, making substantial changes to existing computational models, and assessing and comparing the performance of different models through a variety of metrics.
If you are interested, we encourage you to apply—even if you're unsure whether you meet all the required or preferred qualifications!
You can learn more about our research at https://sites.brown.edu/favila-lab/ or by scheduling an appointment with our lab manager at https://forms.gle/VLoEfe7y2ErKcNS16.

Required skills: Robust background in programming. Experience with common programming and data science tools such as GitHub, Jupyter Notebook/Google Colab, Matplotlib, Pandas, etc. Experience with ML frameworks such as scikit-learn and PyTorch.

Preferred skills: Introductory coursework in psychology, neuroscience, cognitive science, and/or cognitive neuroscience. Introductory coursework in statistics. Experience with using high-performance computing resources. Knowledge of common deep learning techniques and prior research experience in ML.

Is this project for more than one student: No

Kenneth Haynes
Department: Comparative Literature

Project Type: Course Development
Project Title: Reception History of Julius Caesar

Project Description:
The UTRA will assist in the development of a course centered on Shakespeare's Julius Caesar, tracing the reception history of Julius Caesar from Cicero to the nineteenth century. The student will study the available sources in different time periods with a view toward selecting and annotating the material that would be most effective to teach in the context of a course. In addition, the student will make a survey of some specialist literature, with the view toward integrating current scholarship into the classroom. The particular connecting threads through the diverse materials will be the different historical understandings of mass politics and the different historical justifications for tyrannicide and political assassination. The UTRA will be divided into six sections.

The first unit will be a review of the extant sources, especially Cicero, as well as a historiographical overview of the history of classical scholarship on Caesar. The second unit will concentrate on Caesar's later reputation at Rome, particularly in Lucan, as well as on the biographies by Plutarch and Suetonius. The third unit will be focused on the French and Italian reception of Caesar in the Middle Ages, for the most part concentrating on Li Fet des Romains and letters by Petrarch and Vergerio. The fourth unit investigates Renaissance debates about civic humanism and tyranny. The fifth unit considers Caesar in the revolutionary contexts of the late eighteenth and the nineteenth centuries. Finally, the student will consider debates over nineteenth- and twentieth-century Bonapartism, Caesarism, and fascism.

Required skills: Coursework in Classics or literary study

Preferred skills: Knowledge of Greek, Latin, French, Italian, and German helpful.

Is this project for more than one student: No

Akshay Narayan
Department: Computer Science
Project Type: Research
Project Title: Measuring CCA Contention on the Internet

Project Description:
This project will involve measuring the incidence of bandwidth contention between congestion control algorithms on the Internet, to determine how different Internet users interact in the network. A preliminary paper describing this project is available here: https://akshayn.xyz/res/cca-contention.pdf.

Other projects are also possible - please contact me to learn more.

Required skills: CS300 or systems programming ability

Preferred skills: CS300, CS1680

Is this project for more than one student: No

Diana Freed
Department: Computer Science
Project Type: Research
Project Title: Navigating Coercion and Care in Digital Spaces (Book and research focused)

Project Description:
I'm looking for a student research collaborator to: (1) assist with a literature review; and (2) help conduct empirical research for a project on youth and adult interpersonal experiences managing digital safety. Drawing from examples of digital surveillance, algorithmic bias, social media dynamics, and technology-facilitated abuse, this research critically examines how digital environments impact marginalized and vulnerable groups.
This project will ask: How can we create ethical, supportive digital communities that respect privacy, autonomy, and agency? What roles do designers, policymakers, and community members play in navigating digital harm and fostering care? How is digital intimacy negotiated in interpersonal relationships across digital spaces?
The work aims to amplify voices impacted by digital harm, advocate for inclusive and responsive digital design, and develop frameworks that mitigate harm while enhancing care and well-being. A student research-collaborator would be introduced to the process of beginning a book project. This would entail gathering relevant research material (including making annotated bibliographies) and conducting interviews that will contribute to relevant research on youth digital dating abuse.
If you're a student interested in technology safety and ethics, digital interpersonal intimacy, and community-centered research this research will be of interest.

Required skills: Students must have some background in qualitative methods and conducting a literature review.

Preferred skills: Some experience with socially-responsible computing, qualitative methods, strong writing skills.

Is this project for more than one student: No

James Tompkin
Department: Computer Science
Project Type: Research
Project Title: Virtual reality Spot robot teleoperation

Project Description:
A project to control a Boston Dynamics Spot robot in virtual reality. This will build upon an existing system within a team of people. Experience in ROS, Unity, visual computing preferred. Paper writeup of current state of system:
https://cs.brown.edu/media/filer_public/b0/a3/b0a3d88c-2838-4a32-9eb3-d4eecac03f1c/janethmeraz.pdf

Required skills: CS + systems

Preferred skills: ROS, Unity, graphics, vision.

Is this project for more than one student: Yes

Nora Ayanian
Department: Computer Science
Project Type: Research
Project Title: Drone development and diagnosis

Project Description:
In this project, the ideal student will help to develop a drone from the ground up, and learn how to diagnose and repair it. The drone will be used in many projects, including in museum environments, outdoors, and research projects. The robot will have many sensors on board, and the student will be integral to making decisions about the onboard resources and how the drone will be designed. The research will take place in the ACT lab, where we study multi-robot systems.

Required skills: Physical prototyping, 3D printing, laser cutting, experience with electronics, soldering

Preferred skills: N/A

Is this project for more than one student: No

Shriram Krishnamurthi
Department: Computer Science
Project Type: Research
Project Title: Topics in Programming Languages

Project Description:
Information has already been collected by the Brown CS MURAs and posted on their spreadsheet. Please consult that for information. The spreadsheet is available from the following URL: https://docs.google.com/spreadsheets/d/1O2ezqJ4QJox3QltV3wC5WKUrEy9RqF3RwGMA-1zp3CM/edit?gid=1254465143#gid=1254465143 You can also reach out for additional information.

Required skills: Please see the MURA site.

Preferred skills: Please see the MURA site.

Is this project for more than one student: No

Srinath Sridhar
Department: Computer Science
Project Type: Research
Project Title: Multi-Camera Capture System for 3D Artificial Intelligence - BRown Interaction Capture System (BRICS)

Project Description:
We are looking for students to help us design, build, and maintain the next generation of multi-camera capture systems. Specifically, we have already built a system called BRICS (BRown Interaction Capture System) with 50+ cameras and microphones to record rich data about human interactions. We are not scaling this up to 300+ cameras to capture robots and humans. Students participating in this project will get exposed to the latest in hardware/software camera designs and learn.

Required skills: Previous experience in 3D design, 3D printing; or, experience in electronics design; or, hardware skills; basic python/C++ programming skills

Preferred skills: Previous experience designing, building, and maintaining hardware. Previous experience with camera and sensor systems.

Is this project for more than one student: Yes

Srinath Sridhar
Department: Computer Science
Project Type: Research
Project Title: Radiance Fields for 3D Computer Vision and Artificial Intelligence

Project Description:
We are looking for motivated undergraduate researchers who are interested in doing cutting edge research in 3D computer vision and deep learning. Specifically, we are looking for students to advance the state of the art in 'radiance fields' -- AI models that model visual and physical quantities of scenes and objects. This kind of research drives practical applications in robotics, augmented/virtual reality, autonomous vehicles, etc. Please see the URLs below for more information on related projects.

Required skills: Must have taken 2 or more of CSCI 1430, 1230, 1470 or related AI/Robotics/Visual Computing courses. Programming experience and strong technical skills expected.

Preferred skills: Prior experience in computer vision, deep learning or robotics is a plus.

Is this project for more than one student: Yes

Ugur Cetintemel
Department: Computer Science
Project Type: Research

Project Title: **Augmenting Database Systems with AI**

Project Description:
We are developing an AI-augmented database system that tightly integrates LLMs and other ML models to support data-intensive AI applications. Specifically, the students will help to build various components of this new system to enable richer database functionality.

Students will get deep practical exposure to cutting-edge research and practice at the intersection of databases and AI, which will give them an edge for industry positions, and gain experience in CS systems research, making them more competitive for graduate programs.

Required skills: Database or systems coursework/project experience, C++/Python skills.

Preferred skills: AI related coursework and project experience, in particular with LLMs and other ML models.

Is this project for more than one student: Yes

Ugur Cetintemel
Department: Computer Science
Project Type: Research
Project Title: **Enhancing the "Impact Afghanistan" Web Database**

Project Description:
This project is building a highly usable website to collect and publish research from various sectors on topics related to Afghanistan post-2021 with a specific focus on women rights and conditions. This website includes current publications
from academic institutions, NGOs, media and the UN System, and is a place for multi-sector research to be curated and shared in real-time. Where there is currently no comprehensive
search engine to unite reports from various, engaged sectors, this database-backed web-interface will provide a one-stop space for emerging research and documentation on Afghanistan post-2021. We have already built a working website that was launched at the September 2024 UN Summit of the Future. In the next stage of the project, we are going to be enhancing our database with new search and usability features using AI tools.

This project is done in collaboration with Center for Digital Scholarship, Brown University Library, who will be hosting this website, Afghan students and alums at Brown, and UN affiliates.

Required skills: Website front-end and/or backend development interest and experience using modern tools. Interest in socially responsible computing.

Preferred skills: UX/UI design, AI/ML.

Is this project for more than one student: Yes

Nora Ayanian
Department: Computer Science and School of Engineering
Project Type: Research
Project Title: Learning to Fly Together: Robust Quadrotor Control in Downwash-Enriched Environments

Project Description:
The objective of this project is to develop a low-level quadrotor controller that can effectively handle the challenges of downwash effects, enabling two or more quadrotors to fly in close proximity without destabilizing each other. Downwash, the turbulence created by a quadrotor's propellers, introduces complex nonlinear dynamics that are difficult to model and predict. By combining learning-based approaches with classical control techniques, this project aims to overcome these challenges and pave the way for robust multi-quadrotor operations.

The student will primarily be responsible for writing crazyflie firmware to deploy the learned controller on a real quadrotor. In addition, the student will assist graduate students deploy reinforcement learning and control algorithms in simulation.

Required skills: - Familiarity with c++ and python for algorithm implementation. - Willingness to learn ROS for quadrotor control. - Prior coursework in robotics, control theory, reinforcement learning or machine learning.

Preferred skills: - Experience with ROS-based robotics systems and Python/C++ for hardware implementation.
- Proficiency in reinforcement learning and model predictive control.
- Hands-on skills in deploying controllers on physical quadrotors (Crazyflie drones).
- Critical thinking and troubleshooting in dynamic systems research.

Is this project for more than one student: Yes

Eunyoung Cho
Department: Dermatology
Project Type: Research
Project Title: Epigenetics and psoriasis

Project Description:
We are seeking motivated undergraduate students with an interest in bioinformatics and epigenetics to join a research project investigating the role of epigenetic aging in psoriasis (PsO). This project builds on existing research that has identified accelerated aging in PsO patients. Students will have the opportunity to contribute to cutting-edge research that could provide critical insights into how epigenetic markers predict disease progression, inflammation, and aging in PsO patients. This is a valuable opportunity for students to engage in real-world research and develop skills in data analysis, scientific writing, and presenting at academic conferences. This project offers a comprehensive experience in epigenetic research with the potential for significant academic and professional growth.

Required skills: Students with experience or coursework in bioinformatics, computational biology, or a related field are encouraged to apply. Familiarity with statistical software (e.g., R, Python) and an interest in epigenetics will be beneficial, but additional training will be provided as needed. Students with experience or coursework in bioinformatics, computational biology, or a related field are encouraged to apply. Familiarity with statistical software (e.g., R, Python) and an interest in epigenetics will be beneficial, but additional training will be provided as needed.

Preferred skills: Students with experience or coursework in bioinformatics, computational biology, or a related field are encouraged to apply. Familiarity with statistical software (e.g., R, Python) and an interest in epigenetics will be beneficial, but additional training will be provided as needed.

Is this project for more than one student: No

Kavita Ramanan
Department: Division of Applied Math
Project Type: Research
Project Title: Rigorous Analysis of Interacting Particle Systems and related applications

Project Description:
Many random phenomena of interest can be usefully modeled as a large collection of stochastically evolving processes that interact locally with respect to an underlying network or graph. For example, neural networks encode the connectivity structure of billions of neurons that synergistically interact with one another to perform cognitive functions; signals are routed through cell towers and data centers in the form of queueing networks to ensure quality services are delivered; our interactions with one another can be represented as social networks, from which information or diseases can propagate from one person to the next through social engagement. All of these examples (and many more) feature an intricate relationship between the network structure and dynamics of the individual agents---cells, data centers, and people. This project seeks to study these large interacting particle systems through rigorous mathematics.

Specifically, we will aim to develop tractable descriptions of typical and atypical behavior of large systems at relevant time-scales. We will develop limit theories for sparse networks that retains the strong correlation among neighboring particles, which subsequently require novel mathematical techniques to analyze. The student will contribute to the understanding of these particle systems through reading relevant papers and conducting a literature survey of a class of interacting particle systems, theoretical investigation and numerical experiments. Potential mathematics topics include algorithm design for efficient simulation, analysis of long-time behavior of stochastic dynamics, and multiscale dynamics, with applications to artificial and biological neural networks, epidemic models, statistical physics, and more.

In their applications, students should
1. Make clear in their application what are all the things they hope to get out of this summer project.
2. What are their longer term aspirations and goals, and how this aligns with that.
3. In what ways they feel they are suitable for the project.
4. List the relevant courses they have taken along with (with relevant course matter described, not just course numbers).

Required skills: Courses in probability theory (e.g., APMA 1650), elementary coding ability.

Preferred skills: familiarity with Markov chains, exposure to undergraduate analysis and proofs, exposure to graduate-level mathematics, prior experience converting mathematical theories to code.

Is this project for more than one student: No

Eben Hodgin
Department: Earth, Environmental and Planetary Sciences
Project Type: Research
Project Title: Isotopic Fingerprinting of Cretaceous Peat on Block Island

Project Description:
This field and lab-based project would support ongoing research that seeks to understand the Pleistocene glacial history of Block Island including how the underlying geology affects the island's cliff erosion rates. The field work will involve assisting with mapping, stratigraphic and structural reconnaissance on Block Island. The lab work will focus on isotopically characterizing a specific sedimentary unit on Block Island: a fossil-rich Cretaceous peat containing large pyrite crystals (FeS2). The goal of the lab research is to test if the peat is the origin of material that ultimately precipitated as iron oxides within the Pleistocene units making up Block Island during glaciotectonic deformation. The S, Fe, C, N, and O isotope characterization of the peat (and pyrite crystals in the peat) can serve as an isotopic fingerprint and compared to the iron oxides. The project can be carried out in 8-10 weeks, but the ideal candidate would be interested in turning the summer UTRA project into a senior thesis project to be carried out in collaboration with other DEEPS faculty members.

Required skills: N/A

Preferred skills: Some background and experience doing geological, stratigraphic, and isotopic analysis is encouraged but not required. Relevant coursework would be EEPS 220, 240, or equivalent.

Is this project for more than one student: No

Emily Cooperdock
Department: Earth, Environmental and Planetary Sciences
Project Type: Research
Project Title: Tracing Fluid-Rock Interactions: O-Isotope Analysis of Ophiolite Rocks and Minerals

Project Description:
'Ophiolites' are multi-kilometer thick slabs of oceanic crust and mantle that formed in ocean basins and later emplaced onto continents during tectonic plate activity. These geologic sequences provide a unique record into the physical and chemical character of oceanic plates, which are otherwise inaccessible on the seafloor. Of particular interest is how water interacts with the rocks and minerals within ophiolites.

Water-rock interactions can physically change the minerals within the rocks, impart unique geochemical signatures, and change the strength of the rock package. Geochemical tools, such as stable isotopes, can be used to determine the history of fluid-rock interactions, such as, fingerprint fluid sources, record reaction temperatures, or paleo-redox conditions. We can use these tools to understand how economically critical minerals form, how tectonic plates respond to weathering and erosion at Earth's surface, and about ancient habitats for deep sea hydrothermal systems.

We seek a student to make oxygen isotope measurements on a suite of ophiolite samples from around the world linked to ongoing research projects in the Cooperdock and Ibarra laboratories. The student will prepare the samples, learn state-of-the-art laboratory techniques, and how to analyze and interpret O-isotope data.

Required skills: We seek a student who has completed at least one course in DEEPS and/or Chemistry at Brown. The student must have strong communication and time management skills, be able to perform detailed and careful laboratory work, and be able to learn to work with laboratory instruments (i.e., microscopes, balances, mass spectrometers).

Preferred skills: We prefer a student who has coursework background in geochemistry, or prior laboratory experience.

Is this project for more than one student: No

Harriet Lau
Department: Earth, Environmental and Planetary Sciences
Project Type: Research
Project Title: The Deep Interior of the Moon: is it made of Cheese?

Project Description:
The Moon's interior is a mystery. Scientists hypothesize about what it could be made of, from looking within our own planet and meteorites, but also using geophysical techniques such how the Moon's gravity varies at altitude (from satellites), how seismic waves travel through its interior (from seismic monitors placed during the Apollo missions), and the entire body deforms from the Earth's gravitational field (known as "lunar tides"). Our group is developing an internal "Cat Scan" of the Moon's interior that will map out how density and other properties of the Moon varies within its deep interior. However, to understand the significance of these variations in different properties, we have to understand what might give rise to these variations. Could it be temperature? Could it be variations in composition? In this project, you will apply "Equations of State" to map variations in density and pressure to the lunar interior's compositional and temperature variations. With these, we will be able to probe the Moon's evolution into the past. How did the Moon develop these distinct variations? You will gain experience in applying thermodynamical principles to planetary-scale problems that may be applied to any number of geophysical and planetary science problems.

Required skills: A keenness to learn and an interest in geophysics or planetary science. Ideally comfortable with manipulating data types with a programming language (e.g., MATLAB, Python, R). We most likely will use Python – which can be learned if the student is familiar with a different language.

Preferred skills: Ideally some exposure to one or two DEEPS classes.

Is this project for more than one student: No

Harriet Lau
Department: Earth, Environmental and Planetary Sciences
Project Type: Research
Project Title: The Ice Age and Volcanism in North America

Project Description:
Around 21,000 years ago, during the peak of the last ice age, half of North America was covered in a several mile-thick ice sheet known as the Laurentide Ice Sheet. It has since vanished but its signature on Earth's crustal motions are still evident. Much of Canada is rebounding in response to its melting. Over the last million years, North America has cycled through ice ages every 100,000 years. This periodic changing surface mass load sets the stress environment within the Earth's crust. The overarching goal of this project is to see if such periodic stress changes might be evident in the volcanic record across the Western United States. All along the west coast the Cascade volcanoes have been active over the past million years. Global datasets of eruption records do not capture a detailed record of volcanic activity across this range. During your summer, the first task would be to perform a comprehensive literature search to compile a volcano-by-volcano record of Cascadian volcanic activity. After this is compiled, you will conduct sophisticated statistical analyses to explore the potential of linking this activity to the advance and retreat of the Laurentide ice sheet. Implications for feedback between ice growth and volcanism relate to both long-term and immediate climate change, where volcanic outgassing can release greenhouse gases which may lead to further ice sheet instability.
Skills to be gained are a deep understanding of ice-volcano dynamics (these settings are common across the globe, both present and geologically: e.g., Iceland, West Antarctica, and Patagonia) and applying statistical tools to test hypotheses.

Required skills: A keenness to learn and interest in Earth science and Geophysics. Ideally comfortable with manipulating data with a programming language (e.g., MATLAB, Python, R). We most likely will use Python or MATLAB – which can be learned if the student is familiar with a different language.

Preferred skills: Ideally some exposure to one or two DEEPS classes.

Is this project for more than one student: No

Ingrid Daubar
Department: Earth, Environmental and Planetary Sciences
Project Type: Research
Project Title: Investigating new impact sites in dusty areas on Mars

Project Description:
The surface of Mars is bombarded by meteoroids, and the craters resulting from this process can be

observed by spacecraft. These new, dated impact sites display a suite of albedo features, one of which is a long, dark streak trailing from the crater. The objective of this project is to conduct geomorphometric measurements across planetary datasets to help distinguish between various theories of their formation.

The student will analyze map-projected high resolution orbital images; global atmospheric circulation data; and/or simulated data of impact cratering. The student will be using QGIS (an open source geographic information system, GIS) as well as writing scripts in Python.

This project will introduce the student to the exciting world of space exploration: planetary missions and data analysis with GIS. The project will be data heavy, hence it will help develop skills in research data management and sharpen programming skills. It is also an opportunity to learn about a variety of physical processes that shape planetary surfaces, such as impact cratering, aeolian and impact winds, and other atmospheric-related phenomena. Finally, the student will get to see an interdisciplinary project in action with collaborators across various career stages (graduate, postdoctoral, professorial).

The measurements conducted by the student will then be used by a team of international investigators to determine the dominant formation mechanism of these streaks. Hence, the student will be able to contribute to the ongoing team effort and a resulting publication. As such, it presents an excellent opportunity to be exposed to various stages of the research process (data analysis, interpretation, dissemination).

Required skills: No prior knowledge of planetary geology or experience with GIS is required, as the necessary background information and training will be provided by mentors. Some knowledge of programming in Python is preferred, at least at a beginner level. We are looking for candidates who are truly passionate about space exploration and have the drive to take ownership of technical and quantitative tasks; are proactive and curious; and enjoy learning and working with a team.

Preferred skills: Prior programming / geospatial analysis experience, and demonstrated coursework or interest in planetary sciences are highly advantageous.

Is this project for more than one student: No

James Russell
Department: Earth, Environmental and Planetary Sciences
Project Type: Research
Project Title: Tropical climate and ecosystem change

Project Description:
Future climate change and its impacts on ecosystem functioning are poorly understood in the tropics. Climate model projections of tropical rainfall remain highly uncertain, and because tropical ecosystems exist in the warmest places on Earth their upper thermal limits are poorly known. This project seeks to assess the effects of changes in temperature and precipitation on ecosystem functioning in tropical South America, Africa, and/or Southeast Asia in the recent geological past to improve projects of future change. A key goal is to test the hypothesis that changes in climate affect fire regimes, which can transform and/or

stabilize tropical ecosystems. Students will generate organic geochemical, sedimentological, and/or microfossil records of temperature and rainfall, fire, and vegetation from lake sediment cores to unravel recent climate change and its impacts on tropical ecosystems. Specific analyses can be tailored to your skills and interests, from isotope and geochemical records of climate to plant fossil records of fire. You will develop skills in laboratory analyses, data analysis, hypothesis testing, data visualization, and presentation skills.

Required skills: Students interested in this project should demonstrate a commitment to research science, have prior coursework related to climate science, ecology, or environmental chemistry.

Preferred skills: Prior experience working in a chemistry lab preferred but not necessary.

Is this project for more than one student: No

Seda Salap-Ayca
Department: Earth, Environmental and Planetary Sciences
Project Type: Research
Project Title: GIS-Driven Environmental Hazard Monitoring: Bridging Scientific Data and Indigenous Knowledge in the Arctic

Project Description:
Background and Context

The Arctic is both an environmentally and culturally significant region, yet it faces increasing threats from industrial activities, particularly mineral and hydrocarbon exploitation. These activities often result in serious environmental hazards, such as toxic spills and infrastructure failures, which can have long-term impacts on fragile ecosystems and Indigenous communities. For instance, the 2020 Nornickel diesel spill and the 2018 ALROSA dam collapse in Russia caused widespread environmental damage, contaminating rivers and threatening Arctic marine environments.
Indigenous communities, whose livelihoods and cultural practices are deeply intertwined with the land, bear the brunt of these environmental impacts. While international frameworks such as the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) aim to protect Indigenous rights, their enforcement remains inconsistent. Legal battles like Canada's Tsilhqot'in Nation v. British Columbia and the U.S. Dakota Access Pipeline protests highlight the ongoing tension between resource development and Indigenous sovereignty.
The integration of Indigenous Knowledge (IK) with scientific data represents a powerful tool to address these challenges. Participatory Geographic Information Systems (GIS) can facilitate the documentation of environmental hazards by communities, promote advocacy, and aid in developing sustainable management strategies. However, there is still a need for robust data management systems and tools that effectively combine local observations with scientific data.

Objectives

This UTRA project aims to integrate GIS with Indigenous Knowledge for environmental hazard monitoring in the Arctic. The specific objectives are:
- Data Collection and Organization: Compile data on environmental hazards affecting Arctic Indigenous

lands.
- Collaboration with Indigenous Communities: Work with Indigenous communities to document local observations and traditional knowledge.
- Development of an Interactive GIS Tool: Create a GIS tool that visualizes environmental risks and supports community-led decision-making.

Methodology

The project will be carried out in three phases:

1) Data Collection and Integration
Compile scientific data on environmental incidents such as toxic spills, industrial accidents, and other hazards.
2) Gather Indigenous Knowledge through secondary sources
Employ automated media scraping tools to gather data from Russian-language news articles, reports, and other digital platforms.
Use text mining tools (e.g., Voyant, AntConc) to analyze the frequency, geographic distribution, and public discourse around environmental incidents.
3) Database Development
Develop a geodatabase to manage both scientific data and Indigenous Knowledge.
Build an interactive GIS dashboard to visualize the spatial and temporal distribution of environmental hazards, integrating both data sources.

Expected Outcomes

The project will produce several key deliverables:
- A Geodatabase of Environmental Hazards: Consolidating scientific and Indigenous data on toxic events and their impacts.
- An Interactive GIS Dashboard: Enabling visualization and analysis of environmental risks.
- Community-Centered Reports and Maps: Tools to support Indigenous advocacy and inform policy development.

These outcomes will not only enhance the ability of Indigenous communities to monitor and respond to environmental hazards but also contribute to the broader field of environmental and Indigenous studies.

Broader Impacts

This research aligns with Brown University's commitment to addressing global challenges and promoting social justice. By empowering Arctic Indigenous communities through data-driven tools, the project advances environmental justice and Indigenous sovereignty. Additionally, the participatory GIS framework developed here can serve as a model for other regions facing similar environmental and social challenges.

Required skills: Proficiency in Geographic Information Systems (GIS), particularly using software such as ArcGIS Pro or QGIS.

Preferred skills: Experience in data management, including organizing and querying geodatabases.
Strong skills in spatial analysis, including working with geospatial data (raster and vector).
Experience in literature review and synthesizing information from diverse sources.

Strong writing skills for creating reports and documenting research findings.

Is this project for more than one student: No

Seda Salap-Ayca
Department: Earth, Environmental and Planetary Sciences
Project Type: Research
Project Title: Spatial Relationships Between Social Vulnerability and Flood Risk Using Advanced Geospatial Techniques

Project Description:
Context and Background

Floods are socio-environmental disasters affecting landscapes and people across the globe. These natural disasters are among the costliest hazards in the US and the world. The most common natural disaster, floods are also the most frequent and produce the most fatalities. Flooding causes $10 billion in damage to homes and lives lost annually in the US, averaging $4.8 billion per event (NOAA, 2023). Who is affected by floods? Often, the most vulnerable and least resilient people are most affected by the worst impacts of flooding. Thus, these natural disasters are fundamentally social in that some places and people are far more vulnerable to harm (White 1945; Burton, et al. 1963; Platt 1986; Cutter 2003). Because of this spatial variability, mapping social vulnerability and flood risk have long been a part of directing where and how to address and reduce flood hazards and flood damage.
Traditional methods of analyzing population vulnerability often rely on static and coarse geographic boundaries, such as census tracts. These units, while useful, may fail to capture localized variations in population distribution and risk exposure. Dasymetric mapping—a technique that integrates population data with ancillary information—offers a refined approach, enabling a more precise assessment of vulnerable populations in disaster-prone areas (Mennis 2009). Similarly, advanced spatial statistical models like Geographically Weighted Regression (GWR) account for geographic variability in relationships between variables, uncovering patterns that conventional regression models may overlook. This research focuses on integrating dasymetric mapping with GWR to analyze how social vulnerability influences flood risk across diverse geographies. By leveraging custom-defined geographic units and local flood risk projections, this study aims to illuminate spatially varying relationships and guide targeted disaster mitigation efforts.

Research Objectives

1. Refine Population Data: Create dasymetric maps to better represent population density and distribution, using custom geographic boundaries tailored to the study area.
2. Analyze Localized Patterns: Apply GWR to examine how social vulnerability interacts with flood risk, revealing geographic variability in vulnerability.
3. Integrate Flood Risk Projections: Utilize datasets from FEMA, USGS, and NOAA to incorporate flood hazard projections, including riverine flooding and sea level rise.

Learning Outcomes
- Develop technical expertise in GIS and advanced spatial analysis methods like GWR and dasymetric mapping.

- Gain a deeper understanding of disaster resilience, flood risk assessment, and social vulnerability concepts.
- Build experience in academic research, including data integration, analysis, visualization, and publication.
- Engage with the geographic and GIS professional community through presentations and networking events.

Long-Term Impact

The ultimate goal of this project is to produce actionable insights for policymakers and disaster management agencies. Findings will be submitted as a research article, contributing to the academic discourse on spatial vulnerability analysis. This project provides students with a unique opportunity to address real-world challenges while gaining skills and experiences that will prepare them for careers in geospatial analysis, environmental science, and public policy

Required skills: Students applying for this position should have a strong interest in GIS and spatial data analysis.

Preferred skills: Familiarity with the following tools and skills is required or highly encouraged:
- GIS software (e.g., ArcGIS Pro, QGIS).
- Scripting and programming using Python, including Jupyter Notebooks.
- Basic statistics and quantitative analysis.
- Willingness to learn new geospatial techniques and perform web-based research.

Is this project for more than one student: No

Timothy Herbert
Department: Earth, Environmental and Planetary Sciences
Project Type: Research
Project Title: Mediterranean paleo-climate: a window to human evolution

Project Description:
This project investigates past climate in the Mediterranean region from clues left in marine sediments. Variables to be reconstructed are ocean temperature, biological productivity, and salinity (the Mediterranean region goes through cycles of wet versus dry climate). We will look at records between 3 and 5 million years ago, a crucial time for environmental change in Africa and Southern Europe, and a pivotal time for the evolution of our ancestors. The project will involve geochemical analyses of sediments and graphing and analyzing past climate variability in the region.

Required skills: Attention to detail, basic knowledge of chemistry

Preferred skills: familiarity with earth history, EEPS 0240 preferred, familiarity with scientific graphing a plus

Is this project for more than one student: No

Yongsong Huang
Department: Earth, Environmental and Planetary Sciences
Project Type: Research
Project Title: Reconstruction of polar sea ice using novel lipid biomarkers

Project Description:
Sea ice is rapidly decreasing in the polar, especially the Arctic oceans, which threatens to form a vicious feedback cycle to amplify global warming. We urgently need to reconstruct sea ice extent in the polar oceans for model calibrations and projecting future changes. However, there has been a lack of accurate proxies to quantify past sea ice changes. This research builds on our exciting recent discovery of Isochrysidales algae named 2i (i refers to ice) that thrive in ocean settings with seasonal sea ice (https://doi.org/10.1038/s41467-020-20187-z; https://doi.org/10.1038/s41598-024-62162-4). 2i makes a set of highly unusual alkenone biomarkers that can be used to quantitatively track past sea ice concentrations. The measurement of these alkenones in polar samples was previously very difficult due to low concentrations and chromatographic interferences. But we have developed a new liquid chromatography mass spectrometry technique that can easily measure exceptionally low concentrations. We have recently further demonstrated the power of our new proxies and our new analytical method by measuring a site with well established sea ice history in the Arctic ocean during the Younger Dryas Interval, 13,000 to 11,500 years ago: previous studies were unable to detect alkenones in the samples (but our new method can do so easily). We are inviting students who are interested in studying sea ice to work with us over the summer to quantitatively reconstruct sea ice changes in the Arctic and Antarctic sites using novel approaches.

Required skills: Strong interest in climate change; coursework in DEEPS and some chemistry

Preferred skills: Organic chemistry

Is this project for more than one student: Yes

Yongsong Huang
Department: Earth, Environmental and Planetary Sciences
Project Type: Research
Project Title: Redefine the Alaska tephra chronology using the longest lake sediment record from Imuruk Lake, Alaska

Project Description:
This is the continuation of a spring 2025 UTRA project. Tephra, or volcanic ash, provides one of the best ways to determine age of past events for paleoclimate, paleoenvironmental and paleoecological research. Tephra from volcanic eruption spread the ash over a very wide area and form a distinct layer in sediments or soils. Individual tephra layers often contain characteristic chemical and isotopic compositions, making them easily recognizable using conventional geochemical measurements. This research will take advantage of the longest continuous sediment record in the Arctic Alaska from Imuruk Lake, Seward Peninsula, Alaska that spans the past 240,000 years. This record dwarfs any other sediment records in

the region by at least 6 times, and is the longest continuous sediment record in the Arctic North America. Imuruk is located downwind from the most Volcanically active region on Earth, Aleutian Islands, and therefore is ideal (and the only available known so far) for recording volcanic eruptions over the past 240,000 years. This research will isolate tephra glasses from sediments and perform geochemical measurements of various elemental compositions using microprobe. We anticipate identifying many new tephra layers and define the most complete tephra chronology for Alaska and Northwestern America. The research will have a profound impact on paleoclimatology, paleoenvironmental study and paleoecology. It will also provide novel insights volcanology in World's most active volcanic province.

Required skills: Interest in paleoclimatology, volcanism; DEEPS courses, good lab skills

Preferred skills: Chemical courses, especially with labs

Is this project for more than one student: No

Mara Freilich
Department: Earth, Environmental and Planetary Sciences and Applied Mathematics
Project Type: Research
Project Title: From extreme storms to ocean carbon: Chemical metabolites and salinity tolerance in marine microorganisms

Project Description:
Extreme storms are projected to become more frequent with a changing climate. How might these storms impact the oceans and carbon cycling? Storms will impact the concentration of salt (or salinity in the ocean). Salinity impacts the metabolism of marine microorganisms, hence microorganisms may change alongside future changes in salinity. Research from plant literature reports that secondary metabolism (chemical compounds that are not directly essential for growth, but may influence fitness and alter the organism's chemical environment) may play an important role in salt tolerance (Benjamin et al. 2019; Sunita et al. 2020; Hossain et al. 2017). This project will combine oceanographic model data analysis with bioinformatic analysis of metatranscriptomic data (gene expression across a community of microorganisms). The key tasks will be to (1) leverage model output to identify regions of the global ocean that have seasonally or consistently atypical or high variability in salinity, (2) to identify metatranscriptomic datasets from those regions, and (3) to investigate relative differences in secondary metabolite pathways that may contribute to the survival or success of organisms in areas with unusual salinity. This project will involve working closely with Professor Mara Freilich and Postdoctoral Fellow Arianna Krinos, and there are opportunities to tailor the project towards oceanographic data analysis or bioinformatic objectives based upon the interests of the student. This project will involve interfacing with ideas and data from the NSF Center for Chemical Currencies of a Microbial Planet (C-CoMP).

Required skills: N/A

Preferred skills: Knowledge of or interest in bioinformatic data processing, Python and R programming, and high-performance computing

Is this project for more than one student: No

Mara Freilich
Department: Earth, Environmental and Planetary Sciences and Applied Mathematics
Project Type: Research
Project Title: Community Science for Environmental Justice at the Salton Sea
[This project is cross-listed with the Brown Laidlaw Scholars Program.]

Project Description:
Communities around the Salton Sea in Southern California face poor air quality due in part to dust and odors emanating from the Salton Sea. Established in 2021 as a project of the environmental justice campaign of the grassroots organization Alianza Coachella Valley, the Salton Sea Environmental Timeseries (SSET) is a collaboration between community scientists — who are local residents in the predominantly Latinx and Indigenous environmental justice communities surrounding the Sea —, professional scientists based at universities, and community organizers. Community science aims to transform the material conditions of marginalized communities. The UTRA students will contribute to this project through analysis of data collected by the program including water quality and air quality data and/or analysis of transcripts from focus groups or survey data.
Research on this project includes geography, public health, biogeochemistry, and physical hydrology. The exact project is flexible depending on the interests of the student, but could include analysis of water quality data collected as part of the community science work to understand seasonal cycles of chlorophyll, developing a computer-based model of biogeochemistry (nutrient cycles) in the Salton Sea, developing machine learning algorithms to extend the use of air quality and water quality satellite data, synthesizing survey and interview data with physical science results, or developing materials to engage community members with research results and processes. For all projects, data and results will be developed in close collaboration with community scientists and organizers to be used in advocacy for improved water quality and air quality.

Required skills: Ability to work with diverse teams. In your application please articulate your interest, perspective, and experience with environmental justice.

Preferred skills: N/A

Is this project for more than one student: Yes

Daniel Ibarra
Department: Earth, Environmental and Planetary Sciences, Institute at Brown for Environment and Society
Project Type: Research
Project Title: Analyzing chemical weathering processes using the isotope geochemistry of rivers

Project Description:
The negative feedback between chemical weathering of silicate rocks and atmospheric carbon dioxide concentrations is a critical control on the global carbon cycle over geologic time. Recent studies have even explored enhancing weathering to shorter time scales as a way to combat global warming.

Additionally, recent and ongoing work has demonstrated that additional fluxes of carbon into the atmosphere-ocean system have been previously overlooked or underestimated, including organic matter oxidation and sulphuric acid weathering of carbonates. We seek an undergraduate researcher interested in applying metal isotope geochemistry techniques to understand the sources, sinks and fluxes of weathering products in river waters. Ongoing projects include generating datasets from metasedimentary catchments in Alaska and the Rocky Mountains, ultramafic catchments in the Philippines, and igneous catchments in the Pacific Northwest. Isotope systems used as tracers may include uranium, strontium, and lithium, as well as concentration measurements of other useful tracers such as rhenium and other redox sensitive elements. Work will include dataset compilation, geospatial analysis and laboratory work to generate new datasets.

Required skills: N/A

Preferred skills: Some wet chemistry experience (research or coursework based)

Is this project for more than one student: No

Daniel Ibarra
Department: Earth, Environmental and Planetary Sciences, Institute at Brown for Environment and Society
Project Type: Research
Project Title: Ecosystem Services in the Concrete Jungle: Understanding the Hydro-Biogeochemistry of Urban Green Spaces for Improved Water Quality

Project Description:
Addressing water-related challenges in urban environments is increasingly important as climate change intensifies and urban areas expand. Urbanization replaces natural vegetation and permeable soils with impervious surfaces like roads, sidewalks, and roofs, leading to higher temperatures (e.g. urban heat island), increased surface runoff, elevated pollutant levels, and degraded aquatic health in urban streams. Sustainable urban design has recently prioritized integrating green spaces into the urban fabric to help mitigate these effects. Green spaces (parks, green roofs, and urban forests) can help improve groundwater recharge, sequester atmospheric pollutants, maintain soil health, reduce the urban heat island effect, and enhance the aesthetic and recreational value of a city. However, much of our hydro-biogeochemical understanding is derived from minimally impacted systems, which fail to account for the unique interactions present in the urban landscape. This reliance on natural analogues limits our ability to design cities that effectively balance human needs with ecological sustainability.

“How do runoff patterns and solute loads differ between green spaces and impervious urban areas?”

Approach: Collect and compare stream discharge and chemistry from impervious and green space catchments. Biweekly stream samples and high-frequency storm event samples will be collected.

Student Tasks: This project will include three primary tasks with the opportunity to tailor efforts based on mutual interests of the student, visiting researcher (Dr. Devon Kerins, Asst. Prof. University College Dublin), and Brown faculty advisor (Dr. Daniel E. Ibarra).

1) Water Samples: You will collect grab samples from multiple catchment outlets draining various urban land cover.
2) Sample Analysis: You will analyze samples on a variety of analytical instruments at Brown.
3) Data Interpretation: You will integrate new analyses with existing datasets into a database. With this database you will explore how urban catchment hydrology and biogeochemical behavior is related to its land-cover and structure.

Required skills: N/A

Preferred skills: Background in catchment hydrology and/or biogeochemistry topics (Classes: EEPS/ENVS 1300 – Terrestrial Biogeochemistry, Ecosystems, and the Global Carbon Cycle; EEPS 1370 – Environmental Geochemistry)

Is this project for more than one student: No

Trang Tran
Department: East Asian Studies
Project Type: Course Development
Project Title: Vietnamese Quest: Gamifying Language Learning (Beginner Level)

Project Description:
This project aims to revolutionize how students learn Vietnamese by integrating gamification into the beginner-level language course. Gamification involves using game-like elements, such as points, levels, and interactive scenarios, to create an engaging and motivating learning environment. The project will focus on designing activities that encourage active participation, collaboration, and cultural exploration.

Students involved in the project will have the opportunity to:
1. Develop Engaging Content: Contribute to creating interactive tools like quizzes, role-playing scenarios, and story-based challenges.
2. Test and Refine Gamified Activities: Participate in trial sessions to ensure the activities are both fun and effective.
3. Enhance Learning Outcomes: Explore innovative ways to teach vocabulary, grammar, pronunciation, and cultural understanding.

This initiative will make language learning more enjoyable and provide students with measurable progress and achievements. The gamified approach will enhance retention and mastery of the Vietnamese language by fostering a sense of community and accomplishment.

Required skills: 1. Strong interest in language learning and/or educational innovation. 2. Basic knowledge of or interest in the Vietnamese language and culture. 3. Ability to collaborate effectively in a team environment. 4. Strong organizational and communication skills.

Preferred skills: 1. Familiarity with educational tools such as Kahoot, Quizlet, or similar platforms.
2. Experience in creative writing, storytelling, or game design.
3. Basic understanding of gamification principles or willingness to learn.
4. Prior experience in designing or participating in interactive learning activities.

Is this project for more than one student: Yes

Hye-Sook Wang
Department: East Asian Studies
Project Type: Research
Project Title: Generation Gap and Other Essays - Readings in Korean Culture

Project Description:
The goal of this project is to produce the 2nd edition of my book entitled “Generation Gap and Other Essays.” This textbook has been used in my Advanced Korean classes since its publication in 2008. About 15 years have passed and it is time to publish the 2nd edition.

The book is developed based on a ‘content-based instruction approach’ (commonly known as CBLT) and ‘task-based language teaching’ (TBLT). When learners reach the advanced level in a foreign language, they have already built a foundation in terms of grammar and basic vocabulary. In order to further develop their proficiency, studying with specialized reading texts that integrate Korean society and culture are believed to be most effective. The twenty chapters in the book engage learners to read and discuss various core issues that are pertinent to modern Korean society and culture such as generation gap and women’s issues. Each chapter is designed not only to improve learners’ linguistic competence (i.e., multiple exercises) but also to enhance their cultural understanding of Korea (e.g., discussion questions, related activities).

Since Korean society changes so fast, some parts of the book need to be updated in order to better reflect the changing views of the people and social landscape. A few topics that reflect many learners’ interests in ‘Hallyu’ (Korean popular culture) will also be added. The UTRA fellow will help me a) to survey former students who have taken these courses in the past to gain some insights into the new topics, b) to do background research for rewriting parts of the main texts to accurately reflect changes, and c) to find additional related materials from media sources that would supplement the main texts. The fellow’s input from a learner’s perspective will be invaluable in the discussion process.

Required skills: Roughly advanced level of Korean proficiency (KREA0600 or equivalent); strong interests in Korean culture and society

Preferred skills: Good communication and time management skills;

Is this project for more than one student: No

Marc Tatar
Department: Ecology, Evolution and Organismal Biology
Project Type: Research
Project Title: Macronutrient regulation of intestinal neuropeptides in Drosophila

Project Description:
Intestinal neuropeptides provide a signaling interface between environmental factors and the coordinated physiology of animals. The Tatar lab studies how components of the diet regulate intestinal neuropeptide secretion, where this in turn modulates tissue maturation, reproduction and lifespan. Our proposed project will use cutting-edge single cell transcriptomics of adult guts to understand how aspects of diet affect the secretion of specific intestinal neuropeptides. We will perform diet intervention experiments with adult flies and quantify gene expression from individual cells of their guts. These are 'big data' and will lead us to learn and use advanced bioinformatic tools. These experiments will identify specific intestinal neuropeptides that respond to macronutrients and provide a new way to understand how diet modulates maturation, reproduction and aging.

The students will
- conduct single cell transcriptomics of adult guts from Drosophila melanogaster exposed to varied diets, and
- use bioinformatics tools to analyze the RNA-seq dataset. They will identify differentially expressed genes of intestinal neuropeptides that respond to key macronutrients.

Through this project, the students will develop
- understanding of transcriptomic theory and practice, and concepts in endocrinology.
- Hands-on experience with single-cell RNA-seq.
- bioinformatics analysis of large datasets with computational tools to interpret gene expression changes using.

Required skills: Knowledge in molecular biology and genetics, basic computational skills.

Preferred skills: Hands-on experience in molecular biology and genetics, computational skill with Python or R.

Is this project for more than one student: Yes

Eleanor Caves
Department: Ecology, Evolution, and Organismal Biology
Project Type: Research
Project Title: Cleaning Behavior in Cleaner-Client Mutualisms: Examining Individual Behavioral Variation

Project Description:
Most organisms on Earth are involved in a mutualism—a mutually beneficial interaction between species—making mutualisms a profoundly influential, structuring force across levels of biological organization. Mutualisms provide ecosystem services like nitrogen fixation and pollination and contribute to ecosystem stability. Despite their importance, general principles regarding the mechanisms of mutualistic cooperation—the nuts and bolts of how and why mutualistic partners cooperate—have remained elusive. Understanding how mutualisms function will contribute to our understanding of ecosystem function, and help identify mutualisms, and thus ecosystems, vulnerable to changing environments.

Research in the Caves lab focuses on the Caribbean cleaner shrimp Ancylomenes pedersoni, a small tropical crustacean that engages in a “cleaning mutualism.” A. pedersoni live in groups of ~2-7 individuals on an anemone host, or “cleaning station”, and eat ectoparasites from dozens of species of reef fish “clients.” Intriguingly, at least half of client visits are by fish species that eat crustaceans, but cleaner shrimp are almost never consumed. Our research asks: Why doesn’t the client eat the cleaner? Or: how, evolutionarily, do parties that would otherwise be predator and prey recognize one another and decide to cooperate?

To answer this question, we record video footage of cleaner-client interactions, and bring cleaner shrimp to the lab to perform behavioral assays. This project will specifically examine individual variation in cleaner shrimp behavior; cleaner shrimp usually live in groups, but the individuals that comprise the group differ from one another in many aspects of their behavior, including their willingness to clean. For this project, students will watch video footage of cleaning stations at which all shrimp have been individually tagged, annotate the behaviors of each individual, and then assist with lab assays on individual cleaner shrimp to quantify how they differ from one another behaviorally.

Required skills: N/A

Preferred skills: BIOL450 Evolutionary Behavioral Ecology

Is this project for more than one student: Yes

Eleanor Caves
Department: Ecology, Evolution, and Organismal Biology
Project Type: Research
Project Title: The Function of Animal Color Patterns: Quantitative Color Pattern Analysis in Cleaner Shrimps

Project Description:
Animal color patterns can serve many functions: they can act as signals, for example allowing females to select high quality mates, or camouflage, allowing animals to pass undetected by predators. To understand the function of a color pattern, however, one must account for the fact that color patterns evolved to be viewed by animal viewers (not humans), and animal visual capabilities vary hugely across species. Thus, to understand how one animal appears to another, we must have (1) objective measurements of animal color patterns and (2) measures of the intended viewer’s visual capabilities.

Research in the Caves lab focuses on the cleaner shrimp Ancylomenes pedersoni, a small tropical crustacean that eats ectoparasites from dozens of species of reef fish “clients.” At least half of client visits are by potential predators, but cleaner shrimp are almost never consumed. Why doesn’t the client eat the cleaner? We have shown that cleaners and clients visually recognize one another as beneficial partners, but thus far, our research has focused on specific body parts that serve as signals, and not the overall appearance of the cleaner shrimp. Cleaner shrimp are highly patterned, colorful animals, but whether and how that color pattern aids in client recognition of cleaners is unknown.

This project will use quantitative color pattern analysis of cleaner shrimp color pattern, applying image calibration analysis software to both quantify the color pattern and calculate metrics that describe how

that color pattern appears to the client fish. This student will (1) help develop quantitative color pattern analysis pipelines for photographs of cleaner shrimp using the open source FIJI-based MICA toolbox, (2) investigate whether color pattern varies across sexes, size classes, or populations, and (3) apply measures of client fish vision to determine how cleaner shrimp appear to client fish.

Required skills: N/A

Preferred skills: N/A

Is this project for more than one student: No

Elizabeth Brainerd
Department: Ecology, Evolution, and Organismal Biology
Project Type: Research
Project Title: High-Speed Video Analysis of Heron Predatory Behavior

Project Description:
Herons, with their rapid and precise predatory strikes, offer a compelling model to investigate the biomechanical mechanisms of high-speed craniocervical movements in vertebrates. This project aims to quantify the kinematics and dynamics of heron strikes, which could provide insights into kinematic factors that enable successful prey capture and fundamental principles that govern rapid movements in animals.

Our approach is to collect and analyze high-speed video footage of herons feeding in their natural habitats. Videos will be collected from various sites around Rhode Island. We seek a student collaborator who is reliable, organized, patient (ok with potentially sitting and waiting for long periods of time in the field), and who is tolerant of potentially harsh field conditions (sunlight, heat, hiking with heavy equipment, wetland/muddy areas, bugs). A typical field day might involve the following activities: Waking up early and traveling to a field site (carpooling with a graduate student will be available), walking with equipment to the location of feeding herons and setting up an observation spot, waiting patiently for opportunities to record videos, taking notes relating to each video as they are collected, keeping track of individual herons as they move around, and capturing photos of herons as they feed to verify whether prey was caught. Multiple sites will likely be visited in a single day.

Once videos have been collected, motion tracking software (XMALab) will be used to quantify key kinematic variables (distance, velocity, acceleration, etc.) relating to forward head motion during feeding strikes. This will involve frame-by-frame point tracking for each video. The student will gain fieldwork experience and understanding of how high-speed videography can be used to study kinematics. They will also gain skills in data collection and analysis.

Required skills: N/A

Preferred skills: Videography, photography, binocular use, and/or computer analysis. Preferred coursework in Ecology, Evolution, Organismal Biology, Biomechanics, or related fields.

Is this project for more than one student: No

Patrick Green
Department: Ecology, Evolution, and Organismal Biology
Project Type: Research
Project Title: Predator-prey behavior in mantis shrimp and cleaner shrimp: video coding and behavioral experiments

Project Description:
The two PIs on this project–Patrick Green and Eleanor Caves– recently collected a video from a coral reef showing a mantis shrimp (PI Green's organism of study) capturing and, presumably, eating a cleaner shrimp (PI Caves' organism of study). This observation creates huge opportunities for further study, as mantis shrimp are known as major marine predators, yet cleaner shrimp are known for their ability to avoid predation; specifically, they pick parasites off of otherwise-predatory fish without the fish eating the cleaner shrimp. Further study of this predatory behavior would show whether mantis shrimp truly do consume cleaner shrimp, and how strongly this influences cleaner shrimp behavior. PIs Green and Caves conducted a simple lab experiment placing a cleaner shrimp and a host anemone (which the cleaner shrimp can rest on without being stung) in a small tank with a mantis shrimp (predatory treatment), a second cleaner shrimp (as a control), or by itself (a second control). We hypothesize that, if the cleaner shrimp perceives the mantis shrimp as a predator, the cleaner shrimp should stay closer to the protective anemone in the mantis shrimp treatment, as compared to the controls. The UTRA students will code images from these videos, measuring the distance between the focal cleaner shrimp and the anemone. The students will also statistically analyze the data they collect, learning skills in R coding and data analysis. Finally, there is also scope for further experimentation. For instance, anecdotal observations suggest adding environmental complexity (e.g., rocks, plants) increases mantis shrimp exploration–the students could test the hypothesis that environmental complexity increases mantis shrimp predatory behavior. Overall, this project will lend insights to the predatory interactions between often-ignored, enigmatic invertebrates that, nonetheless, contribute disproportionately to coral reef health.

Required skills: Introductory Biology

Preferred skills: Experience using FIJI (or ImageJ) to collect measurement data from images; coursework in invertebrate zoology

Is this project for more than one student: Yes

Rebecca Kartzinel
Department: Ecology, Evolution, and Organismal Biology
Project Type: Research
Project Title: Tracking Rhode Island's Rare Plants

Project Description:
Informed conservation and ecosystem management decisions rely on up-to-date biodiversity data, especially information on the distribution and occurrence of rare and endangered species. In Rhode Island, these biodiversity data are maintained in a database operated by the Rhode Island Natural History

Survey (RINHS). This database provides information on the viability of plant and animal populations in the state for planning, research, conservation, and regulatory activities. Data on rare species are, ideally, updated with regular field visits and surveys by staff and volunteers at RINHS. However, every year there is a significant shortfall between rare plant sites needing re-visits and the number of qualified people available to make them, meaning the database's contents grow increasingly outdated.

This project is a collaboration between the Brown University Herbarium and RINHS, with a goal of surveying natural areas within Rhode Island to monitor and collect data on rare plants. Using a list of target species provided by RINHS, students will plan and carry out site visits to natural areas around the state for monitoring. Tasks will include: Preparing for field work, which includes reviewing the target species' seasonality and habitat requirements, compiling information from prior field observations, and securing landowner permission; carrying out field monitoring, which includes navigating to field sites (often off-trail) to search for target species, completing observation data forms, taking photos and possibly voucher samples; and office tasks such as data entry, photo labeling, and herbarium specimen preparation. Students will become familiar with field techniques for plant identification and monitoring; habitat and plant species diversity in Rhode Island; biodiversity database management; and herbarium specimen preparation. We anticipate that students will spend 2-3 days per week in the field and the remainder of the time completing office and/or herbarium tasks. Students will work in the field alongside Prof. Kartzinel and/or staff or volunteers from RINHS.

Required skills: Coursework in plant biology, ecology, and/or conservation. Candidates should be willing and able to participate in day-long field excursions, including hiking off-trail, working outdoors in hot, buggy and/or inclement weather, and carrying equipment when needed.

Preferred skills: Ability to work with large data sets in Excel, experience in plant collecting and identification, especially using dichotomous keys.

Is this project for more than one student: Yes

Tyler Kartzinel
Department: Ecology, Evolution, and Organismal Biology
Project Type: Research
Project Title: Wildlife ecology in Yellowstone National Park.

Project Description:
Yellowstone National Park is a biodiversity and cultural hotspot. Large mammals including bison, elk, deer, pronghorn antelope, and bighorn sheep engage in epic annual migrations across the ecosystem and have critical roles in its food web. Yet despite the significance of these animals and their migrations, we understand relatively little about their foraging ecology and behavior. This project addresses the question: what food plants provide the fuel that these animals need to complete their great migrations? Project participants will conduct fieldwork in collaboration with a team of researchers from Brown University and the National Park Service. Skills and knowledge that will be gained include basic experimental ecology and research methods such as plant identification and monitoring, tracking and observing animals, conducting experiments to characterize plant-herbivore interactions, running genetic analyses, and working with large electronic datasets. Part of the program will take place at our field sites in Yellowstone and the remainder may continue on campus. Housing will be provided for the research

team in Gardiner, Montana. If fieldwork proves logistically infeasible due to remote travel concerns, there will be additional opportunities to collaborate in our molecular ecology lab at Brown or to reorient the project around a remote/hybrid collaboration involving project data. For more information about the lab and our project, please visit: www.kartzinellab.com/research

Required skills: Coursework in plant biology, ecology, biostatistics or experimental design.

Preferred skills: Ability to work with large data sets in Excel, stamina for fieldwork as evidenced by outdoor experience or sports, coursework or other experience involving genetics or molecular techniques.

Is this project for more than one student: No

Katherine Rieser
Department: Education
Project Type: Research
Project Title: Brown Summer High School Research and Expansion

Project Description:
I'm looking for undergraduates who can work with me and my colleagues in the beginning stages of designing high quality programs for high school students in the summer. The undergraduates will develop a literature review on high quality programming, design future programming, and facilitate some of the programming with young people.

Required skills: Must be eager to work with, interview, and facilitate young people; must have an interest in learning research skills.

Preferred skills: Interest in library research and data analysis.

Is this project for more than one student: Yes

Laura Snyder
Department: Education
Project Type: Research
Project Title: The Humanities Reimagined Project: Curriculum Development

Project Description:
Students engaging in this UTRA/Sprint will become curriculum designers to design culturally sustaining curriculum for middle and high school Humanities classrooms. Do you enjoy reading literature and looking for primary sources that can make connections to contemporary life? Are you passionate about providing high school students with a curriculum that more adequately reflects them, their community, and the diversity of the world around them? You will curate material and you will create publicly accessible curriculum materials for teachers. Researchers will assist the professor to revise and create new culturally sustaining materials based around essential questions and contemporary adolescent fiction. Researchers

will need to read fiction, select supplemental materials from contemporary and historical sources in genres such as poetry, film, news media, and art. The priority will be to create excellent materials and to create free and easy access for teachers. Some materials will also be curated and revised that the professor has already created. Students will gain experience with graphic design for developing digital products, social media posts and websites. Additionally, researchers will work with curators and librarians at the Rockefeller Library and the John Hay Library at Brown, the Library of Congress, and contemporary popular culture resources to select supplemental curricular materials. Researchers will do a team project, curate a project that includes the professor's work and/or the work of the Adolescent Literature class, and select an independent project if time and interest allows. There is an option to present at a national conference with the professor or at a student roundtable at the National Council of Teachers of English national convention in Denver, CO in November 2025.

Required skills: Skills in lesson and unit planning, interpretation of literature, understanding of primary source analysis, and excellent writing and communication skills. Strong organizational skills. Knowledge of: contemporary adolescent fiction, culturally relevant pedagogy.

Preferred skills: Students who have taken a curriculum development course and have the preparation in instructional design will be prioritized. Technology expertise is desired including: proficiency in the Google suite for education, Canva, Adobe InDesign and Spark, Zotero, and Google Classroom. Ability to navigate library archives for primary sources. Experience maintaining basic websites and marketing educational material on social media. Students who are in or who are planning to apply to the BAC/MAT Program will be prioritized if they apply.

Is this project for more than one student: Yes

Matthew Kraft
Department: Education
Project Type: Research
Project Title: How Climate Change is Increasing the Risks of K-12 School Closures Due to Extreme Weather Events.

Project Description:
The emerging risks posed by climate change are not thoroughly understood by education policymakers or widely reflected in education policy or practice. As one of the first projects of my new Education Systems and Climate Change Initiative housed at the Annenberg Institute, I am examining the risks posed to schools by climate change. Schools are increasingly becoming susceptible to damage caused by flooding, wildfire activity, irregular weather patterns, and natural hazards. In addition to physical damage caused to school infrastructure, erratic weather behavior results in school closures and a loss of instructional time for students in the classroom. This project will result in an academic paper summarizing such risks and outlining the schools and student demographics that are most vulnerable to the effects of climate change. This project will use data from a number of sources, including the National Center for Education Statistics, the Federal Emergency Management Agency, the Environmental Protection Agency, and First Street Foundation. I also hope to provide predictions of forecasted risk to schools to highlight the urgent need to address these issues. My aim is for this information to be used by policymakers to prepare public schools for, and adapt to, climate change so they can ensure productive learning environments for all students.

Required skills: n/a

Preferred skills: Knowledge of earth systems, environmental sciences and/or education policy are a plus.

Is this project for more than one student: Yes

Tricia Kelly
Department: Education
Project Type: Research
Project Title: En comunidad: Amplifying the voices of Latinx neighbors
[This project is cross-listed with the Brown Laidlaw Scholars Program.]

Project Description:
¿Hablas español? ¿Quieres conocer a personas hispanohablantes en nuestras comunidades? Students engaged in their project will put their Spanish-speaking skills to use by designing and conducting interviews in Spanish with local community members who represent wide-ranging lantinx experiences in Rhode Island (i.e teachers, political leaders, community activists, small business owners, etc.) These interviews will be used as part of a research project to create asynchronous modules for a Spanish language development course for community members. With faculty support, UTRA responsibilities will include:
*Writing interview questions in Spanish
*Conducting video interviews in Spanish
*Editing interview recordings
*Designing Spanish language lesson plans and materials to accompany the video recordings

Required skills: Advanced oral and written proficiency in Spanish; Personable; Interest in meeting new people

Preferred skills: Video recording and editing skills;
Interest in second language acquisition

Is this project for more than one student: Yes

Meredith Hastings
Department: Environmental Science / Ecology, Evolution, and Organismal Biology
Project Type: Research
Project Title: The Breathe Providence Project
[This project is cross-listed with the Brown Laidlaw Scholars Program.]
Project Description:
Breathe Providence is a high-resolution air monitoring project based in Providence, RI. Our research team is currently operating 25 low-cost air monitors throughout the city that measure air quality and climate-related pollutants at high spatial and temporal resolution (CO2, CO, NOx, O3, and PM2.5). We

also host high temporal resolution measurements of greenhouse gases carbon dioxide, methane and water vapor. We aim to better understand pollution sources and patterns across the city at approximately a neighborhood scale. In particular, we're focusing on frontline communities and neighborhoods with high rates of respiratory disease that are not currently represented by state-run monitoring efforts. Throughout the site selection process, we've drawn on the Climate Justice Plan and guidance from community-based organizations. Ultimately, we hope to inform policies and community health initiatives that reduce emissions and exposure in overburdened areas. For summer 2025, we are interested in having several students working on different aspects of the overall project including (but not limited to): data analysis, interpretation and creating data visualizations; coding for data incorporation and visualization; developing and maintaining content for our website/newsletter/social media and for different types of audiences; outreach with organizations dedicated to youth empowerment and knowledge sharing/building; and/or organizing outreach events with neighborhood associations or community-serving organizations (e.g., libraries, recreation centers, etc).

Required skills: Participation in this project necessarily requires a demonstration of strong written and oral communication skills, organizational skills, attention to detail, and motivation to work both independently and in a team environment. The position also requires a basic background in environmental studies or science (e.g., related coursework or work experience), as well as an appreciation for issues related to environmental justice. Additional required coursework or training will be based on the type of project the student is keen to pursue. For example, for data analysis and interpretation projects, some computer programming experience (e.g. R) and environmental or earth science background would be of interest. For coding- and visualization based projects, computer science background would be of interest.

Preferred skills: A preferred candidate will have completed coursework related to their chosen topic of research as well as as environmental science, chemistry, environmental justice, environmental engineering, and/or environmental policy and management. Engaged Scholar coursework and/or work experience engaging with public outreach/education is a plus. Spanish language skills would also be an asset.

Is this project for more than one student: Yes

Allan Just
Department: Epidemiology
Project Type: Course Development
Project Title: Reproducible research for public health analyses: assembling concepts and tools

Project Description:
The goal of this course development project is to develop a new semester-long curriculum for advanced undergraduates or graduate students in public health that builds data handling and analysis practices that foster greater reproducibility. Reproducible research is beneficial to the scientific community in a variety of ways, but one of the primary beneficiaries is the author themself. In public health, it is particularly important to foster trust through increased transparency so that quantitative findings may be applied in new situations and lead to real-world impacts.

Curricular development is needed to pull together the appropriate level of principles, practices, and available tools into working tutorials with lab exercises to facilitate greater reproducibility in data analyses

for public health students. With a focus on analyses using R and RStudio, the course will also engage a broader ecosystem of principles and tools for reproducible and collaborative science including “good enough” project organization and data management practices; version control with git and github; workflow management with the targets package; scientific writing with quarto; FAIR principles (findability, accessibility, interoperability, and reusability) and data sharing that aligns with recent National Institutes of Health (NIH) requirements. Without duplicating existing workshops and resources at Brown, there may be additional opportunities to coordinate with High Performance Computing with the Oscar cluster via Open OnDemand; and working with Open Science librarian Andrew Creamer on best practices for NIH data sharing.

Building a curriculum around reproducible research with epidemiological applications will include collaboratively sketching the rough outlines of lectures and lab activities. A potential real-world dataset is the daily zipcode-level emergency department visits publicly shared by the New York City Department of Health and Mental Hygiene linked with estimated temperature and air pollution estimates from the PI’s lab.

Required skills: Skill/familiarity with R and RStudio; introductory biostatistics; some experience with git

Preferred skills: Some interest in public health

Is this project for more than one student: No

Hannah Ziobrowski
Department: Epidemiology
Project Type: Research
Project Title: Stress, trauma, and disordered eating behaviors among young adults

Project Description:
The proposed project will examine the impact of stress and trauma on disordered eating behaviors among young adults. In the main project, students will examine associations of racial trauma with disordered eating among college students using a large, cross-sectional epidemiological dataset. While it is well established that individuals who experience traumatic events have an increased risk of disordered eating, it is unknown whether racial trauma is a risk factor for disordered eating, and whether this association varies by race-ethnicity. Students may also have the opportunity to examine the joint impact of child and adult adverse experiences on disordered eating risk among Rhode Island young adults. This project would be novel by examining interactive effects of experiencing stressful events in both childhood and adulthood. Students would be involved in data analysis, literature reviews, creating tables and figures, and contributing to writing a scientific manuscript. Students who contribute substantially to the project will have the opportunity to be included as a co-author. Students will be mentored by Dr. Hannah Ziobrowski in the School of Public Health, whose research profile can be found here:

https://vivo.brown.edu/display/hziobrow

https://scholar.google.com/citations?user=SvprTNQAAAAJ&hl=en&oi=ao

Required skills: Ability to work collaboratively and independently.

Preferred skills: This project is ideal for students interested in mental health, public health, and epidemiology. Coursework in epidemiology and biostatistics is highly preferred. Some data analysis experience, including in previous courses, is strongly preferred. Strong writing skills are an asset.

Is this project for more than one student: No

Melissa Palma
Department: Family Medicine
Project Type: Research
Project Title: TayoHelp.com: Culturally Tailored Health Education for Filipino Americans
[This project is cross-listed with the Brown Laidlaw Scholars Program.]

Project Description:
TayoHelp.com is a project of the Filipino Young Leaders Program (FYLPRO). Tayo's online platform serves as a trustworthy resource for Filipino American communities founded in the COVID-19 pandemic, providing culturally-tailored information regarding public health education and linkages to community resources. Join a disciplinary team of public health physicians, behavioral health professionals, journalists, policy experts, technologists, and Filipino community members working to address Asian American health disparities combatting mis-and dis-information via community-based participatory research, community engagement, and participation in our FYLPRO summer fellowship. More information on ongoing projects at link below.
https://docs.google.com/document/d/1y6VdBA73Fef53JRhdR4st3z6E0rvERnUIZpisp67XhI/edit?usp=sharing

Required skills: Interest in health equity research and community health engagement.

Preferred skills: Willingness to learn about Filipino community, quantitative survey design, or qualitative research methods.

Is this project for more than one student: No

Elyse Couch
Department: Health Services, Policy & Practice
Project Type: Research
Project Title: Dyadic perspectives of the caregiving relationship following an amyloid PET scan

Project Description:
Amyloid PET scans are a novel diagnostic tool for Alzheimer's disease. On the one hand, amyloid scans can provide an earlier or more accurate diagnosis of Alzheimer's disease and enable the scan recipient and the care partner to plan for the future. On the other hand, this knowledge during the early stages of Alzheimer's disease could reshape the relationship between the scan recipient and the care partner to that of a patient-caregiver dynamic. Research shows a positive relationship can have a beneficial effect

on both members of the caregiving dyad. Our previous work found that receiving an amyloid scan influences how caregivers perceive their caregiving role. However, it is not understood whether an amyloid scan can influence how scan recipients and care partners perceive their relationships. Therefore, this study aims to explore how patients and care partners perceive or manage their caregiving relationship dynamic in light of an amyloid scan.

The student will assist with analyzing qualitative data and preparing a manuscript for a scientific journal. Tasks will include working with the PI to develop a qualitative codebook, applying qualitative codes to the data, creating tables, and assisting with a literature review. Training in qualitative data analysis will be provided.

Required skills: Good organizational skills, strong writing skills, experience with Microsoft Word and Excel, interest in Alzheimer's disease or other dementias

Preferred skills: Experience with conducting qualitative analysis

Is this project for more than one student: No

Emily Gadbois
Department: Health Services, Policy & Practice
Project Type: Research
Project Title: Evaluating The Effectiveness Of Mode Of Meal Delivery On The Ability Of Homebound Older Adults To Remain In The Community

Project Description:
This project supports research to better understand the health and social benefits that homebound adults experience from receiving meals through Meals on Wheels America. We will be comparing the benefits of traditional home delivered meals to alternate methods of frozen meal delivery through the mail. By studying participants who receive these two options, we will better understand how they are different and similar.
This UTRA project will support the qualitative data collection that is part of this research. The UTRA student will assist with coding approximately 30-50 meal recipient and/or caregiver interviews over the course of the summer and will be supported in the development of a presentation/paper highlighting the preliminary research findings. The UTRA student will gain experience in pragmatic research, qualitative data collections methods, communication with diverse clientele, and summarizing research findings for technical and non-technical audiences.
For more information:
https://sites.brown.edu/deliveree/

Required skills: • Student has completed related coursework in topics such as: qualitative methods, research methods, and/or anthropology • Ability to work independently and as part of a team • Ability to communicate clearly by email, Zoom, and phone • Ability to manage time effectively and meet assigned deadlines • Ability to break down complex transactions into elementary tasks • Interest in the techniques for manipulating transcribed text for analysis • Interest in best practices for data management, data analysis, and archiving • Ability to maintain confidentiality of sensitive information

Preferred skills: • Familiarity with software such as NVivo and Excel
• Familiarity with research ethics/CITI trained

Is this project for more than one student: No

Eric Jutkowitz
Department: Health Services, Policy & Practice
Project Type: Research
Project Title: Day Care: Rules and Regulations for Dementia Care.

Project Description:
Adult Day Care centers provide care and companionship for older adults during the day, offering family caregivers a respite from their caregiving duties. However, there is limited knowledge about state regulations of adult day care, particularly in relation to dementia care. Under the direction of Dr. Eric Jutkowitz (Brown) and Dr. Kali Thomas (Johns Hopkins), this project aims to build a comprehensive database of state regulations for adult day care. This database will then be used to investigate whether adult day care improves outcomes for people living with dementia. The student involved in this project will work with the study team to identify and review state-level regulations of adult day care. This opportunity will provide exposure to both qualitative and quantitative research methods, with potential opportunities for manuscript authorship. This research opportunity is ideal for students interested in aging and dementia care, health policy and regulations, mixed-methods research, and gaining practical research experience. It offers a unique chance to contribute to a significant study in the field of elder care and health policy. Opportunities for manuscript authorship are possible!

Required skills: -Ability to present and summarize results -Ability to prioritize multiple research tasks

Preferred skills: -Ability to present and summarize results

-Ability to prioritize multiple research tasks

Is this project for more than one student: Yes

Eric Jutkowitz
Department: Health Services, Policy & Practice
Project Type: Research
Project Title: Memory Care in Assisted Living: Does it Improve Quality Outcomes?

Project Description:
Nearly 25% of assisted living (AL) facilities provide specialized care for people living with dementia (also known as “memory care”). Very little is known about the quality of memory care. Under the direction of Dr. Eric Jutkowitz, Dr. Kali Thomas and study team members at Johns Hopkins University, this project will understand whether the quality provided in memory care settings, at a surcharge of almost 36% compared to a room in general AL, is worth the cost. The student will work with the study team to identify

and review state level regulations of AL. This opportunity is ideal for students who want exposure to qualitative and qualitative methods, and opportunities for manuscript authorship are possible!

Required skills: -Ability to present and summarize results -Ability to prioritize multiple research task

Preferred skills: -Ability to present and summarize results
-Ability to prioritize multiple research task

Is this project for more than one student: No

Fangli Geng
Department: Health Services, Policy & Practice
Project Type: Research
Project Title: Enhancing Resident Care in Nursing Homes with AI and Electronic Health Record Data

Project Description:
This project explores the use of electronic health record (EHR) data to improve care for nursing home residents. Residents in these settings often face complex health challenges, and early identification of those at risk for hospitalization or other adverse outcomes is critical. We aim to leverage nursing notes and vital signs data to create tools that flag residents needing timely interventions. These tools could guide staff in initiating preventative care, reducing unnecessary hospitalizations, and improving quality of life. Additionally, the project will explore how this information can be used to support critical conversations, such as palliative care planning, for residents with advanced care needs.

The broader goal of this work is to address gaps in how care needs and risks are identified and managed in nursing homes. This includes exploring disparities in responses to health changes and rethinking care delivery models to meet the needs of the most vulnerable residents.

Students involved in this project will gain experience in analyzing health data, developing actionable insights, and contributing to impactful health policy research. This work is ideal for those interested in health services research, data science, and improving care for older adults. Opportunities to collaborate with a multidisciplinary research team and participate in lab meetings will be available.

Required skills: * Strong programming and statistical skills (preferably in Stata, R, or Python) to analyze Medicare claims data. * Interest in health services research and patient outcomes.

Preferred skills: * Background in health economics or health policy, particularly regarding Medicare and payment reforms.
* Statistical and econometric skills for analyzing large datasets.
* Previous coursework or research experience in public health, economics, data science or a related field.

Is this project for more than one student: Yes

Momotazur Rahman

Department: Health Services, Policy & Practice
Project Type: Research
Project Title: Private Equity Expansion in Assisted Living: Implications for Dementia Care

Project Description:
Assisted living (AL) is a growing long-term care industry providing housing and supportive services to almost one million frail and functionally impaired older adults - 49% of whom are living with Alzheimer's disease or a related dementia (ADRD). Demographic projections of increased demand for AL, and especially dementia care (also referred to as "memory care"), has attracted notice from private equity (PE) firms. PE ownership advocates argue that PE firms bring much needed capital, allowing providers to update facilities, invest in new technology, and gain economies of scale to enhance efficiency, increase profitability, and improve care quality. However, the growing concern is that some PE firms' focus on short-term profits may compromise the quality of care of AL residents, particularly those living with dementia. Research findings on the effects of PE acquisitions of nursing homes are mixed: while some studies found negative effects (e.g., decreased staffing, increased mortality) others have found no change in staffing or quality outcomes. However, unlike nursing homes, there is no national framework of regulations, payment policies, or public reporting of care quality in AL to work as "guardrails" against the possible negative impacts of PE acquisitions as there are in nursing homes. UTRA students will assist and be exposed to all manner of mixed methods research, including qualitative methods (semi structured interviews with key stakeholders) and quantitative methods (building private equity acquisition databases, linking assisted living facilities to owners and operators), and will work with a large, multi-site research team with expertise in long-term care, health economics, business, and gerontology. Students who excel in this position will have opportunities to continue working with this team and partner on peer-reviewed scientific manuscripts.

Required skills: N/A

Preferred skills: -Excellent communication skills -Interest in senior housing and healthcare financing -Attention to detail -Ability to work within teams -Proficiency with G-Suite and Microsoft Office

Is this project for more than one student: Yes

Omar Galarraga
Department: Health Services, Policy & Practice; International Health Institute
Project Type: Research
Project Title: Empirical testing of an insurance-based monetary incentive program for exercise: A randomized trial

Project Description:
This 5-year NIH-funded research study is using a randomized controlled trial (RCT) to examine the efficacy of an exercise incentive program currently offered by at least three major US insurance companies, in which participants must attend a YMCA fitness facility at least 50 times within 6 months to receive an incentive. Participants (N = 330) are randomized to gain-framed $100 incentive (n = 55), gain-framed $200 incentive (n = 55), loss-framed $100 incentive (n = 55), loss-framed $200 incentive (n = 55), or control (n = 110). Each participant is enrolled in the same condition for two consecutive 6-month periods for a total of 12 months. The primary outcome is number of visits to the fitness facility over each

6-month period, verified by objective swipe-card data at Great Providence YMCAs. Project details are described in the published protocol:
https://www.sciencedirect.com/science/article/pii/S1551714423003051?via%3Dihub#gts0005

Examples of tasks the student will work on:
The student will be expected to use RCT data to conduct an interim longitudinal analysis assessing the extent to which randomization assignment influences (1) loss aversion and (2) delayed discounting over 6-months. Specific tasks may include:

- Conduct data cleaning using a standard statistical software package (Stata preferred)
- Create composite measures based on participant responses to established loss aversion and delayed discounting measures, referring to the published literature for scoring guidance
- Select and implement regression models that are appropriate for panel data and the dependent variables
- Clearly communicate findings to lab members and other interested parties via group discussions, poster presentations, and/or manuscripts

Skills or knowledge the student will obtain include:

- Applied practice in quantitative data analysis, including data cleaning, variable generation, running descriptive statistics, and regression modelling using panel data.
- Experience interpreting results and communicating findings via informal (e.g., lab meetings) and formal (e.g., poster presentations) channels.
- New knowledge related to the behavioral economics principles of loss aversion and delayed reward discounting.
- Close mentorship from Dr. Galárraga and his Project Manager, and the opportunity to work collaboratively with other research assistants on the project.
- The opportunity to present their work at the School of Public Health's annual poster conference or the Summer Research Symposium

How or why this specific project is important to the overall work being completed:
A tertiary objective of the project is to explore potential moderators (i.e., participant age, subjective social status, reward responsiveness, consideration of future consequences, delayed discounting, loss aversion) of the incentive-YMCA attendance relationship over time. Thus, the student's analysis will be a key first step in assessing some of the hypothesized moderators over the 6- and 12-month follow-up intervals. Findings from the student's analysis may also be used to support future grant submissions.

Required skills: (1) Beginner-level experience working with at least one statistical analysis software (e.g., Stata (preferred), R, SAS); Beginner-level experience may include such things as importing/exporting data sets, cleaning the data (e.g., identifying duplicate or out-of-range values), creating simple composite measures or dummy variables, running basic descriptive statistics (2) A genuine interest in health economics and/or behavioral economics (3) Able to be productive when working both independently and as part of a small team (4) Able to work and communicate effectively with community members in diverse academic positions (e.g., professors, administrative staff) and who have diverse backgrounds

Preferred skills: (1) Intermediate-level experience working with at least one statistical analysis software (e.g., Stata (preferred), R, SAS); Intermediate-level experience may include such things as implementing cross-sectional analyses, cross-sectional time series analysis, or longitudinal panel data analyses.
(2) Familiarity with the project data (e.g., has previously worked with the data, has reviewed the

study's codebook)
(3) Experience conducting a reproducible, systematic literature review
(4) Experience presenting quantitative analysis results more formally to scientific audiences (e.g., via poster or podium presentations, manuscripts)

Is this project for more than one student: No

Omar Galarraga
Department: Health Services, Policy & Practice; International Health Institute
Project Type: Research
Project Title: Cost-effectiveness of Statins for the Reduction of Major Adverse Cardiovascular Events in Persons Living with HIV in sub-Saharan Africa

Project Description:
Project Description: The Research Assistant (RA) will be expected to support an ongoing research project that is modelling the cost-effectiveness of statins for the reduction of major cardiovascular events (MACE) in persons living with HIV in sub-Saharan Africa. Our research team, based at Brown University and Temple University, is using effectiveness data from the phase 3 Randomized Trial to Prevent Vascular Events in HIV (REPRIEVE) and cost data from the HIV and non-communicable disease literature. Completed in 2023, REPRIEVE enrolled over 7,500 people with HIV (PWH) at over 100 clinical sites across 12 countries. The trial was highly successful, finding that for PWH at low-to-moderate traditional risk for cardiovascular disease, pitavastatin is safe, effective and prevents major adverse cardiovascular disease events like heart attack and stroke.

To date, REPRIEVE is the largest trial to provide a representative global sample of persons living with HIV with low-to-moderate risk for cardiovascular events. Specifically, 15% of the participants in the trial were from sub-Saharan Africa. Because almost 70% of the HIV burden is in sub-Saharan Africa, our research aims to determine if the use of statins will be cost-effective for health systems who face a growing burden of cardiovascular diseases but who have limited funds available to promote the wide use of statins at the population level. Our research is expected to be the first to use REPREIVE trial data to estimate the cost-effectiveness of different statin therapies in SSA, and make relevant policy recommendations based on findings.

RA Responsibilities: The RA will be expected to (1) perform a systematic literature review to extract data related to the cost(s) of providing statins and treating MACE in the target countries, and (2) generate descriptive statistics of the per-patient costs and effects in the target countries. For the systematic literature review, the RA will be expected to follow best practices for ensuring reproducibility and transparency (e.g., The Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) statement). For generating descriptive or analytic statistics, the RA is expected to use an established statistical software program (e.g., Stata, R) and make their analytic code publicly available.

The RA will receive ongoing mentorship from project's investigators at Brown University (Omar Galarraga, PhD) and Temple University (Dan N. Tran, PharmD). The RA will also receive mentorship from and have the chance to work collaboratively with the project manager at Brown University and other senior (e.g., PhD-level, Postdoc-level) research assistants at Brown and Temple. The RA may have opportunities to present their work in small group presentations, in larger forums (e.g., academic conferences), and/or

contribute to manuscripts (e.g., writing, table and figure generation).

Required skills: • Basic proficiency in at least once statistical program such as Stata (preferred), R, SAS etc. • Genuine interest in health system strengthening and health economics • Ability to multitask and prioritize effort to meet project goals • Excellent oral and written communication skills. Strong organizational skills and attention to detail • The ability to work independently and collaboratively on a research team

Preferred skills: • Experience conducting systematic literature reviews using established search engines (e.g., PubMed, EconLit, EBSCO)
- Coursework in public health research methods and/or health economics
- Prior work /familiarity with TreeAge Software
- Prior work in or related to health systems in a Sub-Saharan African country
- Possess a willingness and ability to support and promote a diverse and inclusive campus community

Is this project for more than one student: No

Faiz Ahmed
Department: History
Project Type: Research
Project Title: Between the Ottoman Empire and USA: Exploring Historical Collections and Connections from the Local to Global

Project Description:
The purpose of this UTRA opportunity is to assist a full-time History Department faculty member with US-based historical research pertaining to his current academic book project, tentatively titled Ottoman Americana: The Late Ottoman Empire and the Early United States, c. 1776–1923. This is a large and ambitious historical study that seeks to understand not only the diplomatic relations between the two states (officially, 1830–1917), but the deeper social, economic, and legal underpinnings of ties between the Ottoman Empire and the United States from the birth of the American republic to the collapse and partition of Ottoman Turkey after World War I. The book represents a new line of historical inquiry straddling Middle East Studies and American Studies, including commercial, educational, familial, and other socioeconomic networks bridging the Ottoman Empire, colonial North America, and the early United States, as well as the intersection of late Ottoman-early US diplomacy and law. The professor has already completed extensive research in archives in Turkey, as well as Britain, Spain, and Canada for this project. He seeks to combine his findings abroad with consideration of a new and long overlooked source base for exploring the history of the Ottoman Empire and its ties to the Americas: local city and state archives, museums, and historical societies across the US.

Required skills: Strong organization and administrative skills; strong internet research skills; and strong reading, writing, and communication in English are a must. Ability to periodically meet and/or send the professor written updates on work progress, at least once every other week via Zoom and/or via email. Research shall be focused on English language materials. If and when items in Turkish, Arabic, Persian, French, or Spanish are identified in a collection, the researcher shall notify the professor so he can take a closer look.

Preferred skills: Proficiency in one or more of the following languages is an added plus, but NOT required: French, German, Italian, Portuguese, or Spanish. It is NOT a requirement of this job to enroll in Professor Ahmed's courses at any time, although it could expedite some research assignments. Similarly, prior coursework in Ottoman, Middle East, North African, Mediterranean, or Balkan history can help, but is NOT a requirement.

Is this project for more than one student: No

Françoise Hamlin
Department: History
Project Type: Research
Project Title: Black Panther Party Health Activism in 1970s New York

Project Description:
I am seeking a student interested in conducting research for a project focusing on the health activism of the Black Panther Party (BPP) in New York City during the 1970s. Beginning in 1969, the BPP opened People's Free Medical Clinics (PFMCs) in Harlem to provide free, basic healthcare services mainly in poor urban areas. This project seeks to understand how the BPP applied its model of health activism, alongside federal social welfare legislation of the 1960s, leftist political figures such as Frantz Fanon and Mao Zedong, the sociopolitical crisis of heroin abuse, local city politics, and broader ideological disputes within the Black radical left. The student will conduct historical research in the physical archives of the New York City Public Library and the City University of New York. Research will mainly consist of reading, summarizing, and interpreting historical documents, including correspondence between the leadership of the Harlem branch of the BPP; newspapers, pamphlets, and flyers that the BPP disseminated as part of its health activism; and local press coverage of the Party's activism. Research may also involve conducting oral interviews with the activists who participated in the BPP's health initiatives. Additional research (for example, in digitized newspaper archives) may be conducted remotely. The student will develop skills in navigating historical archives, reading and interpreting historical documents, and conducting oral histories (i.e., devising relevant and insightful questions, transcribing responses, etc.). The student will also develop the skills necessary to distill and communicate complex information to a general audience by participating in the Summer Research Symposium.

Required skills: Strong research, writing, and communication skills. Past coursework in African American history.

Preferred skills: N/A

Is this project for more than one student: No

Holly Case
Department: History
Project Type: Research

Project Title: Summer Seminar in Eastern Europe on the theme of "Attention"

Project Description:
This project entails selecting readings and other materials, organizing them around sub-themes, and formulating questions and activities for a one-week intensive not-for-credit reading/discussion/writing seminar on the theme of "Attention" to be held in Eastern Europe (likely Czech Republic, Hungary, Bulgaria, or Bosnia & Herzegovina) in July of 2025. The theme of "Attention" will be considered from various disciplinary and source perspectives, and from within a variety of sub-themes (historical practices of focus/reflection in religion, sports, various professions, etc.; reading practices; seeing/unseeing; non-visual forms of attention; the "attention economy"; fixation/obsession; neglect/ignorance/indifference; care; etc.). Participants will include undergrad and grad students as well as scholars from institutions in the US and Eastern Europe. The UTRA student(s) will be collaboratively involved in shaping the content, format, and logistics of the seminar together with myself and Prof. Ondřej Slačálek (Political Science, Charles University, Prague) during the months of May, June, and July 2025. The UTRA student(s) would then also participate in the seminar. It is important to note that as part of the theme of "Attention," the entirety of the week-long seminar in Eastern Europe will be "unconnected" (no internet, computer, or phone use). There will be an emergency contact on hand, but otherwise all participants will be expected to agree in advance to this condition and adhere to it throughout the week of the seminar.

Required skills: N/A

Preferred skills: An interest in the theme of "Attention"; ability and willingness to read texts thoroughly and carefully; an inclination to think across disciplines; experience taking courses in both the sciences and the humanities/social sciences; a delight in thinking, discussing, reading, and writing

Is this project for more than one student: Yes

Lukas Rieppel
Department: History
Project Type: Research
Project Title: Traditional Knowledge and Settler Colonialism in Lakotan Treaty Lands

Project Description:
This UTRA is part of a collaborative project between Lukas Rieppel from the Brown History Department and Craig Howe (Oglala, Lakota) from CAIRNS, the Center for American Indian Research and Native Studies. CAIRNS is an American Indian-controlled nonprofit located in the Lacreek District of the Pine Ridge Reservation near Martin, South Dakota. Our collaboration aims to document traditional knowledge about the 1868 Treaty Lands. This region is defined by an important treaty that was signed at Fort Laramie in 1868, wherein the US Federal Government formally recognized Lakotan severity in a large territory that encompasses parts of present-day North & South Dakota, Montana, Wyoming, Nebraska, Utah, and Colorado. However, Federal recognition of Lakotan sovereignty in the region did not prevent white settlers from coveting the stunning aesthetic beauty as well as the rich mineral resources of the 1868 Treaty Lands. To facilitate the settlement and, eventually, dispossession of these lands, the United States invested enormous resources to document their natural history, physical geography, and Native cultures.

This project will mine the rich archive of information produced by colonial scientists and federal bureaucrats for information about the Native inhabitants of the 1868 Treaty Lands. We are especially interested in documenting traditional Lakotan knowledge about plants, animals, stars, fossils, and other features of the region's natural landscape (particularly Makosica, the White River Badlands, and He Sapa, the Black Hills).

Required skills: Strong research, writing, and communication skills are required; as is the ability to work with people from a diversity of backgrounds. A demonstrated interest in Native American & Indigenous studies is important as well.

Preferred skills: Technical skills in GIS mapping, computer programming (esp. Java or python), image processing (Adobe photoshop & illustrator), and the Lakotan language are helpful but not necessary.

Is this project for more than one student: Yes

Nancy Jacobs
Department: History
Project Type: Research
Project Title: Designing a Parrot Museum for Bigodi, Uganda
[This project is cross-listed with the Brown Laidlaw Scholars Program.]

Project Description:
This application is part of a project to design and install a parrot museum, the first of its kind in the world, in Bigodi, Uganda. The parrot museum project is overseen by Nick Byaba, a professional bird guide, grey parrot enthusiast, and organizer of Bigodi's Parrot Tree Caretakers Association. Bigodi is the gateway to Kibale National Park and already has several successful community-based attractions for tourists. The public who would be patrons of the museum already exists. Mr. Byaba also wants to reach local people, especially school children, whom he already serves in another mentoring project. Professor Jacobs has been working with him on her own research since 2022.

The SPRINT/UTRA program has already generously funded a student for the spring of 2025, to prepare materials in Providence. The history department has granted $5000 for translations, printing, and mounting costs.

This proposal is to hire two students to work with Professor Jacobs in Providence and Uganda in June and July to design and set up the museum.

The project begins with a few weeks in Providence for orientation and library research. We will fly to Uganda in mid-June. After a few days in Entebbe, where we will stay in accommodation at the Uganda Wildlife and Education Center, we will travel by car to Bigodi, where we will stay at Sunbird Hill's accommodation for researchers. We will use the Sunbird Hill kitchens for our meals. We will use local transportation between Sunbird Hill and Bigodi town. Professor Jacobs will be with the students every day in Uganda.

I am applying for two students because the project requires different skill sets and there is enough work for two. One student will conduct research, the other will be in charge of graphic design and exhibition

design and construction.

The first student collaborator in summer 2025 will have four tasks:

1. Research information and write exhibit labels on the history and ecology of parrots in other parts of the world.
2. Research information and write exhibit labels on grey parrots in Uganda. This will involve interviewing staff at the Uganda Wildlife and Education Center in Entebbe, members of the Parrot Tree Caretakers Association and implementing Mr. Byaba's vision for exhibits.
3. Help the staff of Sunbird Hill (Mr. Byaba's employer) with electronic records management and social media.
4. If time permits, research and design informational exhibits for a honey market in Bigodil.

The second student collaborator in summer 2025 will have two tasks:

1. Select illustrations and design posters with images, English-language text and Rutooro translations for all displays for the parrot museum and honey market.
2. Suggest arrangements of the museum space and help Mr. Byaba mount the exhibit.

The summer schedule will begin with three weeks in Providence, doing background reading on the region and research for the museum. They will meet with Professor Jacobs regularly during this period. Both students and Professor Jacobs will then travel to Uganda for four to five weeks to do the local research and mount the exhibits. In Uganda, the team will work together every day. On return to the United States, they will help Mr. Byaba and Sunbird Hill staff with publicity for the museum. They will meet with Professor Jacobs as needed.

The student collaborators in summer of 2025 will gain from this experience in several ways: they will learn about the history of grey parrots as well as the ecology and environment history of western Uganda. They will have an immersive experience in western Uganda. Finally, they will gain experience in designing exhibits for historical interpretation.

The successful applicant for the first position will:

Have experience in history analysis and excellent writing skills.
Preferred qualifications are: experience with the study of environmental history and African history, and an interest in birdlife.

The successful applicant for the second position will:

Have experience with graphic design and a demonstrated interest in museum interpretation.
Preferred qualifications are: experience with set or museum exhibit construction, interest in the environment, birds, and Africa.

Required skills: Student 1: Have experience in history analysis and excellent writing skills; Student 2: Have experience with graphic design and a demonstrated interest in museum interpretation.

Preferred skills: Student 1: experience with the study of environmental history and African history, and an interest in birdlife. 2: experience with set or museum exhibit construction, interest in the environment, birds, and Africa.

Is this project for more than one student: Yes

Naoko Shibusawa
Department: History
Project Type: Course Development
Project Title: US Empire & Archives

Project Description:
This course development project tentatively has the name "US Empire and Archives." It will be a capstone seminar for the History Department that gives students hands-on experience with documents archived at Special Collections in the Hay Library. The theme of the US Empire is expansive, relating to peoples, places, and events within the metropole (i.e., the United States) and the larger world in the mid-20th century to the present. Focus will be on hegemonic and counter-hegemonic ideologies and actions, especially concerning racial capitalism, settler colonialism, free trade imperialism, Third Worldism, gender and queer politics, ethnicity, and more. Archival collections include the Hall-Hoag Collection, the Mumia Abu-Jamal Collection, and more.

Required skills: Historical skills in research, writing, and analysis required.

Preferred skills: Preference given to students who have taken a class with Professor Shibusawa.

Is this project for more than one student: Yes

Seth Rockman
Department: History
Project Type: Research
Project Title: Brown and the Creation of the National Endowment for the Humanities

Project Description:
“Brown 2026,” a campus-wide initiative to demonstrate the important role of research and teaching universities in fostering open and democratic societies. In 1963, Brown's president Barnaby Keeney chaired a national committee to argue for the Humanities as a crucial element of "the national interest" and to call for the federal funding of a National Endowment for the Humanities. The following year, President Lyndon B. Johnson spoke on campus in support of the endeavor, and Rhode Island's congressional delegation played a key role in shepherding the legislation into law in 1965. Throughout the whole process, the discussion largely centered on the role of humanistic inquiry in a society whose technological capacities were as terrifying as they were potentially liberating. As we confront a similar moment in human history, "Brown 2026" seeks to document Brown's role in the initial discussion and to evaluate its lessons for the present. Potential outcomes include a documentary website, an installation, and/or various public programming.

https://brown2026democracy.brown.edu

Required skills: Experience (or interest in) historical research in archival collections; strong writing skills

Preferred skills: Previous coursework in History, Science and Technology Studies, American Studies, or other humanistic/social science disciplines; previous experience in public history, website design, or museum installations; commitment to questions at the heart of Brown 2026

Is this project for more than one student: No

Seth Rockman
Department: History
Project Type: Research
Project Title: Sovereignty and Society in the United States, 1776-1848

Project Description:
This position is to assist Professor Seth Rockman (History) in the research for a book project on the United States between the American Revolution and the US-Mexico War. The book is intended to offer a major reinterpretation of US history, focusing on economic sovereignty, political self-determination, and the laboring lives of ordinary people. Put differently, the book seeks to ground the abstractions of "global capitalism" and "democracy" in the experiences of diverse Americans (including the enslaved and the dispossessed). The research will involve manuscript sources in local repositories (e.g. Rhode Island State Archives, Rhode Island Historical Society); rare book materials in the John Hay Library and John Carter Brown Library; digitized collections of primary source materials; and material culture artifacts.

Required skills: Coursework in 18th and 19th c. North American history; research experience in primary sources

Preferred skills: a previous course with Professor Rockman; experience reading eighteenth- and nineteenth-century handwriting; interest in material culture studies, slavery studies, and labor and social history.

Is this project for more than one student: Yes

Kenneth Sacks
Department: History and Classics
Project Type: Research
Project Title: The Abbot Affair: Harvard, Freedom of Speech, and the Making of the Modern American University

Project Description:
I am researching a book on the 19th Century philosopher and political activist, Francis Abbot. It is intensively archivally-based and requires a lot of time in the Harvard University archives and perhaps other archives in the greater Boston area. Commuting to Cambridge once/week with me is essential. (I

will cover MBTA commuting costs.) We are reading, quite literally, thousands of handwritten documents of Abbot's and those of various figures related to Abbot. Abbot's threatened lawsuit against distinguished philosopher Josiah Royce is a window into the world of the issues of free speech and libel as the modern American university evolves during the Gilded Age.

Required skills: Ability to concentrate for long periods of time., read obscure materials, follow your instincts about what is significant. Most importantly: patience and appreciation that small details can become large insights Preference for anyone with some background in 19th Century American history and/or intellectual history..

Preferred skills: enthusiasm, willingness to learn and be invested in new ideas.

Is this project for more than one student: No

Rebecca Nedostup
Department: History and East Asian Studies
Project Type: Course Development
Project Title: Authoritarian Archives and Transitional Justice

Project Description:
This project will gather primary and secondary materials for a course on justice in the aftermath of authoritarian regimes, focusing on information systems, archives, and other forms of historical memory. Research will involve a literature review on such fields as comparative transitional justice; archival silences and absences; and oral history, personal collections, and other forms of non-state information sharing. The researchers will also work to help organize a symposium series and public events related to a NEHC funded multi-campus project on transitional justice and archives in China and Taiwan. Finally, researchers might engage with open access collections of archives and other materials from China, Taiwan, and elsewhere in the world.

Required skills: Significant coursework in History, Anthropology, East Asian Studies, or Ethnic Studies

Preferred skills: Ability to read traditional and simplified Chinese or another East Asian language

Is this project for more than one student: Yes

Itohan Osayimwese
Department: History of Art and Architecture
Project Type: Research
Project Title: Between Barbados and Boston: Histories of Migration and the Built Environment

Project Description:
This research is part of an ongoing project to write a book that analyzes the effects of migration on the built environment of the island nation of Barbados from the beginning of the large-scale voluntary

movement of people across national borders in the 1830s to recent manifestations in the 1990s. Remittances transformed the built environment of the island by financing land purchases and the construction of houses that proclaimed their status through style, scale, and materials. But émigrés also purchased property and built houses in destination cities like Boston. Ultimately, this study sheds light on the Barbadian experience since the nineteenth century but also contributes to our understanding of the racialized urban built environments of the Global North

This position is for a student to work as a research assistant in June 2025. The student will travel with me to Barbados at the end of May or beginning of June. The student will assist me with performing searches on government land databases as I try to track down properties owned by Barbadians who emigrated early in the twentieth century. They will also provide support for oral history interviews of former émigrés and their families by preparing voice recording equipment prior to interviews and downloading and archiving completed interviews. They will accompany me to the National Archives and the archives of the Barbados Museum and Historical Society and conduct archival research under my guidance. They will also accompany me on field trips to document and measure buildings built by and inherited from émigrés. This position therefore requires working closely with me on a daily basis. Upon return to Providence, students will assist me with archiving data and historical material collected during the trip.

Required skills: At least one college-level research-based seminar course in art and architectural history or urban studies. Experience with archival research. Ability to maintain careful records and notes of data and information uncovered during archival research. Experience with analyzing archival material and extracting conclusions from it. Ability to conduct secondary source research on historical topics. Ability to generate bibliographies and reading lists. Strong writing ability. Willingness to conduct guided fieldwork involving old and sometimes decrepit structures. Willingness to apply for a passport if the student does not already have one.

Preferred skills: At least two college-level courses in art and architectural history or urban studies. Experience with both historical and creative writing.
International travel experience.

Is this project for more than one student: No

Alexie Rudman
Department: Institute at Brown for Environment and Society
Project Type: Research
Project Title: Community-driven Coastal Climate Research and Solutions (3CRS): Designing & Maintaining a Community-Facing Online Hub for Coastal Climate Information
[This project is cross-listed with the Brown Laidlaw Scholars Program.]

Project Description:
Low-lying, working waterfront communities throughout New England are disproportionately vulnerable to climate hazards, which threaten livelihoods, ocean-reliant economies, critical infrastructure, community health and wellbeing, and peoples' heritage. By collaborating with four focal communities in Rhode Island and Maine (2023 - 2028), the Community-Driven Coastal Climate Research & Solutions (3CRS) Project aims to co-develop processes, expert networks, data streams, local relationships and knowledge needed to expand the capacity of working waterfront communities to become more climate resilient. Information

about the 3CRS Project and our team can be found at 3crs.org.

To increase access to tools, knowledge, and data used to inform coastal climate decision-making, a major product of the 3CRS Project will be the development of a community-facing Community Knowledge Collective (CKC). The CKC will be both a virtual information and educational resource hub, and a network of organizations and partners dedicated to supporting working waterfront communities achieve their visions of a climate resilience future. The virtual hub will look different for each of the four focal communities, as it will be shaped around communities' specific needs and interests around coastal climate resilience. This UTRA project will focus on developing the online hub, or interface, that communities will use to access information on climate and health hazards affecting their community.

We seek an undergraduate student to design, develop, and begin populating the virtual Community Knowledge Collective web platform. We are seeking someone who has some experience with website design and/or data visualization, has an interest in science communication, and is a creative thinker. The student will:
-Work with different researchers on the 3CRS Project to design a community-facing online hub for each of our four focal communities, that will house information on climate hazards and health impacts targeted to different user groups (community members, decision-makers and emergency managers, business owners, educators, etc).
-Populate this hub with existing and new information/resources on coastal climate resilience in each community;
-Interface with community liaisons from each focal community to ensure that virtual hub design and content are accessible to different users;
-Assist in developing different communication products to be included in the hub- such as short videos, two-pagers, graphics and visuals, primers or instructional guides on how to use different resources in the virtual hub- to make information accessible to coastal stakeholders, as interested.

Required skills: website design and/or data visualization, and is a creative thinker

Preferred skills: an interest in science and risk communication, climate resilience, and community health

Is this project for more than one student: No

Leslie Acton
Department: Institute at Brown for Environment and Society
Project Type: Course Development
Project Title: ENVS 0110: Humans, Nature, and the Environment course revision

Project Description:
The student will work collaboratively with me to revise key components of the course ENVS 0110: Humans, Nature, and the Environment: Addressing Environmental Change in the 21st Century. Revisions will focus on effectively accommodating (1) a larger class size than previous iterations, (2) new and potentially rotating instructors for the course, and (3) new thematic foci in key areas (e.g., natural resource management). Student tasks will include (but not be limited to): reviewing and searching for course readings, updating assignments and collaborating on the creation of detailed rubrics, creating "how to" documents for student support (e.g., writing an annotated bibliography, conducting engaged

scholarship projects), and crafting new lecture slides.

Required skills: Students must have already taken ENVS 0110 to be eligible.

Preferred skills: N/A

Is this project for more than one student: No

Bathsheba Demuth
Department: Institute at Brown for Environment and Society, History
Project Type: Research
Project Title: Law on the Yukon River
[This project is cross-listed with the Brown Laidlaw Scholars Program.]

Project Description:
Professor Demuth is seeking a research assistant to work with her on archival and legal research related to her current book project, an environmental history of the Yukon watershed in Alaska and Yukon, Canada. The book examines ideas of law and sovereignty for people and other-than-human beings as conceptualized by Indigenous, British/Russian imperial, and American/Canadian national practices. Work this summer includes research with archival and legal sources, primarily digitized, and is focused on finding, analyzing, and organizing the public reporting process documents that are part of water related projects in Canada and related public comment processes in Alaska; and cataloguing and analyzing a collection of oral histories focused on water quality along the Yukon River over the past 35 years (more information on this research can be found at http://www.brdemuth.com/research).

Required skills: Some experience in legal and/or historical research; organizational skills.

Preferred skills: Past HIST coursework, esp HIST1820.

Is this project for more than one student: No

Karin Wulf
Department: John Carter Brown Library and History
Project Type: Research
Project Title: Brown and the US Bicentennial (1976)

Project Description:
“Brown 2026,” a campus-wide initiative to demonstrate the important role of research and teaching universities in fostering open and democratic societies. "Brown 2026" seeks to document Brown's approach to the bicentennial ,and to evaluate its lessons for the present as we work towards the semiquincentennial.Potential outcomes include a documentary website, an installation, and/or various public programming.

In 2026 the United States will commemorate 250 years since its declaration of independence from Great Britain. Previous commemorations, at 100, 150, and most recently and energetically 200 years for the bicentennial in 1976, have engaged local, national, and international audiences. Materials in the University Archives, including yearbooks and the archived BDH, as well as elsewhere on campus will help to illuminate how the campus community connected with or collectively participated in the bicentennial. Some interviews with emeritus faculty may also be useful.

This UTRA application is paired with a submission from Seth Rockman on the establishment of the NEH. The request here notes only one student but we could accommodate more than one in each research area if there is interest. Members of the Brown 2026 steering committee will play a collective role in assuring the student is supported in their summer research. Professor Wulf will take primary responsibility, alongside Professors Rockman and McLaughlin and Brown University librarian Joseph Meisel. The students will be incorporated into ongoing work of the Brown 2026 project (housed at JNBC), will meet regularly with the other graduate and undergraduate researchers working on Brown 2026, and will have sustained access to university archives. Students will have the opportunity to bring their research into various presentation modes, both by the end of summer and beyond as Brown 2026 builds its campus presence. Students will receive training in basic elements of historical research, from locating appropriate repositories to gathering and organizing information.

Required skills: Experience (or interest in) historical research in archival collections; strong writing skills.

Preferred skills: Previous coursework in History, Science and Technology Studies, American Studies, or other humanistic/social science disciplines; previous experience in public history, website design, or museum installations; commitment to questions at the heart of Brown 2026

Is this project for more than one student: Yes

Tyler Franconi
Department: Joukowsky Institute for Archaeology & the Ancient World
Project Type: Research
Project Title: Excavations at Antiochia ad Cragum, Türkiye

Project Description:
This project investigates the Roman and Late Antique archaeological site of Antiochia ad Cragum, located near the town of Gazipaşa on the southern Mediterranean coastline of Türkiye. Perched high on the craggy slopes of the Taurus mountains, the site and its nearby coves were a haven for pirates in the first millennium BC before Antiochus IV, a client king of Rome, founded a city on the site. Antioch grew to become an active and monumental port city under the Roman Empire and flourished until the mid-third century when it was attacked and raided by Sassanian forces. There is archaeological evidence of destruction during this period, but the city bounced back into a vibrant Late Antique settlement following a period of fortification and reconstruction. There is some scattered evidence of occupation in the city between the 10th and 14th centuries, but by this period the city no longer seems to have been permanently inhabited.

This project investigates the urban history of the site through archaeological excavation, particularly focusing on the so-called Civic Basilica–a large, public building that may have been used for judicial and

market purposes. Excavation in this building began in 2024 and will continue in 2025 with the goal of reaching the original occupation levels and understanding the full use history of the building, as well as its place within the urban fabric of Antiochia. Students will learn cutting edge techniques in archaeological excavation and documentation in addition to digital surveying methods and artifactual study.

**Please note that this project is dependent on the issuing of an excavation permit by the Turkish Ministry and that each participant will be required to obtain a Turkish research visa. There will be associated costs for flights, room, and board. Please contact Prof. Tyler Franconi (tyler_franconi@brown.edu) with questions.

Required skills: Prior coursework or relevant experience in Archaeology or another related field.

Preferred skills: Experience with physical labor, ability to work as part of a team.

Is this project for more than one student: Yes

Katharina Galor
Department: Judaic Studies
Project Type: Research
Project Title: Expressions of Innocence: Children's Drawings from Israel-Palestine
[This project is cross-listed with the Brown Laidlaw Scholars Program.]

Project Description:
Expressions of Innocence: Children's Drawings from Israel-Palestine will be a multi-disciplinary project consisting of collecting art works of children from various communities within Israel, the West Bank, and the Gaza Strip; establishing a database of the drawings; developing an interactive program for students, educators, visitors, and layperson; collaborating on the curatorial work involved in selecting representative drawings for an exhibition; engaging the larger cultural, historical, and geopolitical context. The targeted communities included in the study will encompass Jewish Israelis from the cities of Jerusalem, Tel Aviv, and Haifa, rural areas near the Lebanese and Gazan borders, settler communities in the West Bank; Palestinians living in Israel, in East Jerusalem, the West Bank, and the Gaza Strip; targeted groups will include secular, religious, and ultra-Orthodox populations. The study will integrate tools from visual and material culture, anthropology, cultural heritage and museum studies, peace and conflict studies, especially as applicable to the religious and political landscape in Israel-Palestine. The work will draw from and build on research on the Israeli Palestinian conflict as well as on publications in related areas with a focus on child psychology, especially the use of drawings and artwork to engage, express, and analyze emotions relevant to the current and recent situation of war. The goal of the exhibit and related research project is to 1) highlight the joint humanity and innocence of the different children's populations across the region; 2) bring to the fore the nuances, distinctions, and asymmetries among the different communities affected by the conflict and war; 3) encourage involved students, communities, and audiences to establish contact and engage in dialogue across divides within the exhibit space, as well as through the use of the website interface and database featuring the complete set of collected drawings.

Required skills: Knowledge in Hebrew and/or Arabic.

Preferred skills: Some background knowledge in the history of Israel-Palestine, interest in art, in

museums, and/or in children would be helpful, but not necessary.

Is this project for more than one student: Yes

Felix Kpogo
Department: Linguistics
Project Type: Research
Project Title: Crossing Linguistic Borders: Immigrant Speech and New England Dialects

Project Description:
New England speakers of American English exhibit distinctive linguistic features, such as the deletion of /r/ after vowels and the Mary-Marry-Merry vowel merger (see Stanford, 2019, for more). Globally, numerous English varieties exist, each with unique distinguishing characteristics. When English speakers from around the world immigrate to the U.S., they often adapt their speech to align with the local dialect, a process referred to as second dialect acquisition or linguistic accommodation.
The goal of this project is to investigate how immigrants acquire the salient features of New England English, exploring questions such as: Do all immigrants acquire the local dialect? If they adopt a second dialect, do they fully converge to New England English norms? What linguistic or social factors predict the use of these features? Do speakers value all features equally? What are their attitudes toward using these features? The overarching goal of this project is to test linguistic theories like the critical period hypothesis, which posits that language acquisition is constrained to a specific developmental window, and alternative perspectives suggesting that linguistic development and/or changes can occur throughout a person's lifespan given appropriate linguistic, social, and cognitive conditions. This study will provide insights into how language learning and adaptation unfold in real-world settings, contributing to a deeper understanding of sociolinguistic variation and change.

Required skills: Completion of an introductory linguistics course (e.g., Introduction to Linguistics).

Preferred skills: N/A

Is this project for more than one student: No

Pauline Jacobson
Department: Linguistics
Project Type: Research
Project Title: research assistant for book: Direct Compositionality and Variable Free Semantics

Project Description:
The project will involve both research and editorial assistance for a book in progress titled "Direct Compositionality and Variable Free Semantics". The book puts forth two related hypotheses about the syntax/semantics interface. One has to do with the architecture of the grammar and derives from work in the 1970s by the philosopher/logician Richard Montague, and the other concerns the role of 'variables' in the modeling of natural language semantics. The book is about 3/4 complete in draft form, but the

research assistant will check the formulas, check for formal consistency throughout, be engaged in bibliographical assistance and help check the writing for transparency and clarity. Moreover, depending on the interest and talents of the research assistant, they can help work out some of the technical details involved in formalizing the proposals. For example, the major hypothesis of the book is that variables are not needed to model the semantics of natural language, and that what is known as 'binding' phenomena can instead be done by a rule manipulating the argument structure of a verb. But the rule needs to be stated in full generality. While the current draft does contain such a formalism, I suspect that this can be simplified, and hopefully a pair of 'fresh eyes' looking at this might derive some of the properties from other apparatus motivated independently in the book. I hope also in collaboration with the research assistant to expand the coverage to include a domain called 'parasitic gaps'; this is not yet treated in the book. The research assistant will aid in compiling the known generalizations and going through past proposals in the literature in order to bring this domain in line with related domains covered in the book.

Required skills: At least one course in formal semantics (e.g., Compositional Semantics or its equivalent), technical ability and interest in formal semantics, and a background in syntax (at least one introductory course) and in Categorial Grammar.

Preferred skills: A background in philosophy of language.

Is this project for more than one student: No

Scott AnderBois
Department: Linguistics
Project Type: Research
Project Title: Making a dictionary of A'ingae, an indigenous language of Amazonia
[This project is cross-listed with the Brown Laidlaw Scholars Program.]

Project Description:
Over the past 8 years, the A'ingae Language Documentation Project (ALDP) has collected a large collection (https://cofan-aldp.github.io/LingView/#/about) of annotated audio/video recordings of traditional narratives, oral histories, autobiographies, and other interviews in A'ingae (an indigenous isolated language spoken in Amazonian Ecuador). The ALDP team comprised of academics, US-based students, and A'i community members continues to expand this resource as well as using it to answer scientific questions about the language's grammar and to meet community language goals (e.g. creating pedagogical materials).

One central focus of our team at present is the creation of a bilingual A'ingae-Spanish dictionary. A dictionary brings together information about the various grammatical systems of a language with culturally specific information about the words of the language and the concepts they encode. In a practical sense, a dictionary serves a vital role for educators and community members invested in the vitality of a language and its maintenance or revitalization across diverse contexts.

Students in this project will work in partnership with A'ingae-speaking collaborators to ensure that Spanish definitions and examples include relevant cultural information, have necessary images accompanying them for some entries, are intelligible, and are properly edited lexicographically (e.g. avoiding circularity, separating subsenses). One specific challenge for creating a dictionary of A'ingae is determining which

morphologically complex forms are sufficiently lexicalized to merit inclusion in a dictionary, and so students will have a chance to investigate a specific kind of morphologically complex form or words within a specific cultural area (e.g. words related to shamanism, hunting, family life). Overall, students will gain experience in lexicography, community-engaged scholarship, and the linguistics of an understudied indigenous language.

Required skills: Solid Spanish language proficiency and either Introduction to Linguistics (LING 0100/CLPS 0300) or other relevant course background (e.g. in Linguistic Anthro, Comparative Literature, Hispanic Studies)

Preferred skills: Native fluency in Spanish, additional coursework in Linguistics

Is this project for more than one student: Yes

Scott AnderBois
Department: Linguistics
Project Type: Research
Project Title: Describing motion events in A'ingae narratives

Project Description:
Over the past 8 years, the A'ingae Language Documentation Project (ALDP) has collected a large collection (https://cofan-aldp.github.io/LingView/#/about) of annotated audio/video recordings of traditional narratives, oral histories, autobiographies, and other interviews in A'ingae (an indigenous isolated language spoken in Amazonian Ecuador). The ALDP team comprised of academics, US-based students, and A'i community members continues to expand this resource as well as using it to answer scientific questions about the language's grammar and to meet community language goals (e.g. creating pedagogical materials).

Currently, I am investigating the range of constructions in A'ingae that involve multiple verbs or clauses combining to create complex descriptions of events. In recent publications with colleagues, I have explored one such construction known as clause-chaining, and a recent BA thesis investigated a quite different construction in detail, serial verbs. Clause-chaining involves complex events comprised of sequences of events (e.g. "I came, I saw, I conquered"). Serial verbs also allow for this interpretation, but additionally allow the individual event descriptions to describe different aspects of the same event (e.g. "I came by riding my bike").

In the current project, the goal is to investigate associated motion constructions, comparing them with what we know about clause-chaining and serial verbs. This comparison is especially interesting since with motion verbs, these options all exist alongside each other. The plan for this project would be to figure out how these constructions work by examining texts in our database and conducting elicitations with native speakers via zoom. In addition to basic description, the project could (but need not) additionally involve syntactic or compositional semantic analysis.

Required skills: Introduction to Linguistics (LING 0100) or similar background

Preferred skills: Solid Spanish language proficiency, additional coursework in Syntax and/or Semantics

Is this project for more than one student: No

Uriel Cohen Priva
Department: Linguistics
Project Type: Course Development
Project Title: Developing a Language of Marketing course

Project Description:
Language use has garnered significant attention within marketing research (Packard and Berger 2024), with interest steadily increasing over time. However, this interest has seen limited reciprocation in the field of linguistics, with some notable exceptions (Sedivy and Carlson 2011). This project aims to gather materials that would support the creation of a Language of Marketing course at Brown University. This course will introduce students to research in marketing from a linguistic perspective while also familiarizing them with various aspects of linguistics. The Program in Linguistics is interested in establishing this class as an additional gateway course to the program, with broad appeal to a wide audience.

The participating student will help collect highly influential articles and other resources that were published at the intersection of marketing research and linguistics, and use them to (a) build learning goals for the course, (b) create a concrete timeline and syllabus for the course, (c) develop lecture materials, and (d) create learning activities and assignments to promote student engagement.

Resources:

Packard and Berger: https://doi.org/10.1093/jcr/ucad013

Sedivy and Carlson:
https://www.wiley.com/en-us/Sold+on+Language%3A+How+Advertisers+Talk+to+You+and+What+This+Says+About+You+-p-9781119996088

Required skills: Having taken Introduction to Linguistics, Language and the Mind, Introduction to Linguistic Anthropology, or other courses in linguistics

Preferred skills: Any course development and / or teaching background, additional courses in linguistics; classes in decision making

Is this project for more than one student: No

Uriel Cohen Priva
Department: Linguistics
Project Type: Research
Project Title: The phonetic and sociophonetic dynamics of Modern Hebrew

Project Description:
The field of laboratory phonology is increasingly recognizing the value of analyzing data produced during natural conversation. In such settings, speakers are more likely to use casual, reduced, and colloquial speech variants. These variants are important because they provide information about the scope of natural articulatory processes and can signal potential directions of language change. Unfortunately, highly detailed annotations of conversational data are currently limited to a small number of high-resource languages, such as English.

The proposed project aims to expand the availability of highly annotated conversational data in Modern Hebrew, a language spoken by millions but currently lacking such resources. To this end, the project will support the annotation and analysis of sociolinguistic interviews in Modern Hebrew, focusing on a range of word-level and sound-level phenomena. These phenomena include sound omission, duration, and substitution.

The analysis will use the annotated data to examine ongoing sound change processes in Modern Hebrew, such as vowel reduction, /h/-omission, glottal stop insertion, and other variables that signal social identity. Additionally, we will revisit studies conducted using US English to determine whether their findings generalize to Modern Hebrew, indicating whether such processes are language-specific or universal.

Students participating in this project will learn to analyze and annotate spoken language using Praat. They will also learn to use R to organize, visualize, and identify meaningful trends in the collected data.

Required skills: Ability to understand conversational Modern Hebrew

Preferred skills: Having taken Introduction to Linguistics, Phonology, Phonetics, or other related courses in linguistics and adjacent fields

Is this project for more than one student: Yes

Melody Chan
Department: Mathematics
Project Type: Research
Project Title: Computations and conjectures in algebraic combinatorics

Project Description:
This is a project on building and using computational structures in Sage to investigate problems and formulate conjectures in algebraic combinatorics. The basic algebraic combinatorial structure at hand is a partially ordered set, also known as poset. These are finite sets with an order relation that holds "partially," that is, for some but not necessarily all pairs of elements. For this project, there are at least two possible sources of partially ordered sets: the minuscule posets, i.e., posets coming from minuscule representations of complex simple Lie algebras; and lattices of flats, associated to a combinatorial structure called a matroid. The expectation in this project will be to write code in SageMath, a computational algebra software, to formulate, test, and possibly prove conjectures about these structures, while simultaneously learning the conceptual background from combinatorics and algebra from the recent

literature.

Required skills: Linear algebra at the level of Math 520 or Math 540, abstract algebra at the level of Math 1530 or higher and at least one other algebra related course (Math 1540, 1560, 1580, 1820A, 1230).

Preferred skills: Prior experience with computational mathematics could be useful for a faster start, but is not required.

Is this project for more than one student: Yes

Hongwei Yao
Department: Medicine
Project Type: Research
Project Title: Metabolic dysregulation in right ventricle of pulmonary hypertension

Project Description:
Pulmonary arterial hypertension (PAH) is a disease that causes remodeling of the right ventricle (RV) and increases its afterload. Chronic pressure overload stimulates RV hypertrophy, which can compensate for the increased afterload and maintain cardiac output. Persistent RV hypertrophy could create RV ischemia and lead to RV failure. RV dysfunction is the strongest predictor of mortality in PAH. Unfortunately, no currently available PAH therapy directly targets the RV. Therefore, there is an unmet need to combat the mechanisms underlying RV dysfunction directly to improve long-term outcomes in PAH. Dysregulated metabolism is observed in the RV of patients with PAH. Previous studies suggest complex and cell-specific alterations of metabolism in the RV of PAH. Understanding cell-specific metabolic dysregulation in the RV adaptation and maladaptation of PAH will help uncover new mechanisms and develop targeted therapies for this disease. Endothelial cells (ECs) account for approximately 60% of non-cardiomyocyte cells in the heart. Roles of EC function and their metabolic reprogramming in mediating the transition from RV adaptation to failure are unknown. In this study, we will test the hypothesis that RV endothelial metabolism is dysregulated, thereby causing RV inflammation and dysfunction in PAH.

Required skills: N/A

Preferred skills: N/A

Is this project for more than one student: No

Joseph "Greg" Rosen
Department: Medicine
Project Type: Research
Project Title: Evidence to Action: Tools to Translate Evidence-Based Practice and Strategies into Actionable and Sustainable Public Health Programs

Project Description:
The LISTEN (Leveraging Implementation Science to Enhance HIV and Harm Reduction Service Delivery) Research Program, a new research enterprise at Brown University led by Dr. Joseph "Greg" Rosen, is seeking a student to support marketing and communications activities for ongoing and completed research studies. Examples of ongoing and completed research within the LISTEN Research Program portfolio include: (1) assessment of barriers and facilitators of implementation of the revised infant feeding guidelines for persons living with HIV in the United States; (2) evaluation of the implementation of community-based and fast-track clinical models of HIV treatment medication dispensing in rural Uganda; (3) evaluation of the installation and implementation of restroom-based reverse-motion detectors for drug overdose monitoring/response in emergency shelters in New England; and (4) exploratory study of drug use patterns and their consequences on HIV care continuity among female sex workers in urban South Africa.

The candidate will have the opportunity to support the following marketing and communications activities: develop branded content and lay summaries of research findings for public consumption (i.e., infographics, press releases, presentations); brainstorm innovative approaches for communicating and visualizing quantitative and qualitative data in digestible ways; and contribute to website design and layout.

Required skills: (1) Strong written communication skills; (2) Experience with graphic design and/or website development

Preferred skills: (1) Interest in global public health, especially at the intersection of HIV and harm reduction; (2) Experience developing public communications (e.g., press releases, newsletters)

Is this project for more than one student: No

Ju Park
Department: Medicine
Project Type: Research
Project Title: Harm Reduction Research Dissemination

Project Description:
We are looking for undergraduate students who are interested in receiving training and experience in communicating harm reduction research and health resources to the public. The students will have the opportunity to work with the Harm Reduction Innovation Lab team and with faculty based at the Warren Alpert Medical School of Brown University.
Our research includes qualitative interviews, surveys and secondary data analysis. Students will participate in team meetings, regional trainings and conferences, as well as research activities including literature reviews, data analysis, and web-based dissemination. The position will be tailored according to the student's interests. The majority of the work will be conducted at the COBRE on Opioids and Overdose (1125 N Main St, Providence, RI, 02906) though some work may be conducted remotely.

Required skills: Public health, social sciences

Preferred skills: Data analysis, website development, social media

Is this project for more than one student: No

Alison DeLong
Department: Molecular Biology, Cell Biology and Biochemistry
Project Type: Research
Project Title: Does protein phosphatase 2A regulate the unfolded protein response in Arabidopsis?

Project Description:
Understanding plant stress responses is key to improving food security under conditions of global climate change, with increasing ambient temperatures and rhizospheric changes such as soil salinization. In plants as well as animal systems, reversible protein phosphorylation plays a central role in coordinating cellular and organismal functions, including adaptation to environmental stresses. The protein phosphatase 2A (PP2A) enzyme family is a highly conserved regulatory hub that controls the phosphorylation status (and thus the activities) of many key cellular players. The DeLong laboratory has identified PP2A mutants that affect several adaptive traits including salt tolerance of roots, leaf expansion and production of the key growth regulator ethylene. A recent publication also linked PP2A to the unfolded protein response, a highly conserved cellular response to temperature stress. This project focuses on probing the mechanistic link between PP2A and the unfolded protein response using quantitative phenotypic analysis and molecular tools. The student working on this project will learn fundamental tools of molecular genetics and plant biology, characterizing the stress responses of normal and mutant plants under controlled growth conditions. Assays will include both quantitative plant growth analysis and molecular assays such as qPCR. These experiments will provide important insights into the roles of specific protein phosphatase 2A complexes in plant stress responses including temperature stress.
Students interested in learning more about the project may attend a DeLong lab Open House on Wednesday Jan. 22, 2025. For additional information, visit: https://forms.gle/B9gqUSwphU18kCa57

Required skills: Coursework in biochemistry, cell biology or genetics

Preferred skills: Strong communication skills; Coursework in statistics and/or applied math

Is this project for more than one student: No

Alison DeLong
Department: Molecular Biology, Cell Biology and Biochemistry
Project Type: Research
Project Title: How and where do protein phosphatase complexes act to regulate leaf size?

Project Description:
Leaf area is an important agronomic trait because it is a major determinant of photosynthetic capacity and yield of leaves, roots, fruit and seeds. The DeLong laboratory has identified two novel genes that regulate

leaf expansion in Arabidopsis. The protein products of these two genes are calcium-binding “B72” subunits of the highly conserved protein phosphatase 2A (PP2A) enzyme family, a regulatory hub that controls the phosphorylation status (and thus the activities) of many key cellular players in both plants and animals. Using quantitative phenotypic analysis and molecular tools, we are analyzing the mechanistic basis of increased leaf expansion in plants that carry b72 mutations. This project focuses on using green fluorescent protein (GFP) reporter constructs to 1) determine which B72 protein domains are required for normal function and 2) analyze the subcellular localization of B72 complexes that regulate leaf expansion. The student working on this project will learn fundamental tools of fluorescence microscopy and plant molecular genetics, testing the biological activity of GFP fusion proteins and characterizing their overall tissue distribution and subcellular accumulation. These experiments will provide important insights into the cellular compartments and pathways in which specific protein phosphatase complexes act to control leaf size and plant growth.
Students interested in learning more about the project may attend a DeLong lab Open House on Wednesday Jan. 22, 2025. For additional information, visit: https://forms.gle/B9gqUSwphU18kCa57

Required skills: Coursework in cell biology or genetics

Preferred skills: Strong communication skills; Coursework in biochemistry, statistics and/or applied math

Is this project for more than one student: No

Arthur Salomon
Department: Molecular Biology, Cell Biology and Biochemistry
Project Type: Research
Project Title: Role of zeta chain in CAR T cell constimulation-independent signaling

Project Description:
Chimeric antigen receptors (CAR) T cell therapy is a monumental achievement in the advancement of immunotherapies, providing the first potential modular therapeutic for a variety of disease states including autoimmune disorders and cancers. CAR designs include an extracellular targeting domain, typically a single chain variable fragment (scFv) of a highly specific antibody, a transmembrane domain, typically from T cell protein CD8 or CD28, and one or more intracellular signalling domains scavenged from the T cell receptor (TCR) itself and/or costimulatory receptors.Regardless of design, the promise of a treatment adaptable to a specific disease state is highly desirable and has the potential to reshape personalised medicine.
To better optimize the design of CAR T cell therapy, it is necessary to understand how CARs influence signalling networks in T cells. Recently, we developed a co-culture LC-MS/MS workflow for evaluating bi-directional signaling in a mixed cell population using stable isotopic labelling of amino acids in cell culture (SILAC), providing a physiologically relevant stimulant for CAR T cells. Using variable minimized first, second, and third generation CD19-targeted CAR designs mimicking the approved therapies, we will provide a comprehensive comparative analysis of the phosphotyrosine (pY) and ubiquitinated lysine/arginine (ubK/ubR) signaling networks involved in CAR T cell activation. Further, we will evaluate the role of tyrosine kinases and Ub ligases in the patterning of pY and ubiquitination in CARs, and evaluate T cell activation in the context of kinase or Ub ligase inhibition.

Required skills: N/A

Preferred skills: Strongly preferred experience in mammalian cell culture and western blot

Is this project for more than one student: No

Eric Morrow
Department: Molecular Biology, Cell Biology and Biochemistry
Project Type: Research
Project Title: Intellectual Disability and Neurodevelopmental Genetics

Project Description:
Intellectual disability (ID) is a common neurodevelopmental disorder that affects about 1% of the global population. The Morrow Laboratory, within the Center for Translational Neuroscience (CTN) at Brown University, uses powerful genetic, molecular, and cellular methods to study brain development. The mission of the CTN is to advance knowledge of the pathogenesis of brain disease and to translate this knowledge to improved outcomes for affected families.

This approach involves conducting wet-lab biological research as well as allied patient-oriented research (which is conducted in collaboration with colleagues in affiliated hospital settings). Conditions we study include Christianson Syndrome, GPT2 Deficiency, and 17q12 CNV disorders. We are seeking a motivated undergraduate student with an interest in human genetics and neuroscience to join an on-site research project. We are investigating the genetic underpinnings and mechanisms in intellectual disability using laboratory-based model systems of disease. The UTRA student will gain experience in the application of molecular biology, biochemical and cellular biology techniques.

Required skills: Course work in biology; some knowledge of basic laboratory techniques; interest in human genetics and neuroscience

Preferred skills: Advanced coursework in cell biology, molecular biology, and genetics; past work in PCR, histology, and other laboratory techniques; interest and/or past experience in developmental or intellectual disability

Is this project for more than one student: No

Juan Alfonzo
Department: Molecular Biology, Cell Biology and Biochemistry
Project Type: Research
Project Title: Characterization of the TilS tRNA modification enzyme in Candida

Project Description:
A lysine residue is sometime added to the anticodon of a tRNAMet and that converts it into a tRNAIle (tRNAIle). This modification called lysine is essential in most bacteria but not common in eukaryotes and it is not present in humans. We have found that the Nuclear genome of a number of fungi, including

pathogenic fungi (like Candida), encode a copy of a putative TilS enzyme, which in bacteria is responsible for adding the aforementioned lysine modification (Known in tRNA as lysine, k2C). This project involves the genetic and biochemical characterization of this enzyme. Notably, since humans do not encode TilS, it offers a potential target for anti-fungals.

Required skills: Knowledge of basic Biochemistry and some Molecular Biology

Preferred skills: training in sterile techniques

Is this project for more than one student: No

Mamiko Yajima
Department: Molecular Biology, Cell Biology and Biochemistry
Project Type: Research
Project Title: **Computationally identifying the mechanism of Vasa function in RNA biogenesis**

Project Description:
Localized mRNA translation on the mitotic apparatus is hypothesized to be an essential biological strategy: proteins are synthesized and function immediately on-site for mitotic regulation and/or for delivery to daughter cells with high fidelity. The PI's lab previously reported, in the sea urchin embryo, that Vasa is a promising factor that may regulate localized mRNA translation on the spindle. However, how and which mRNAs Vasa targets on the spindle are yet to be identified. To address these questions, in the proposed project, the students and the senior computational scientist in the lab will process multiple omics datasets that are manipulated for Vasa expression to identify its RNA targets and potential selection mechanisms under the PI's supervision. In addition to the conventional omics analyses, we will also explore Vasa's potential involvement in splicing by utilizing multiple updated and conventional splicing software tools. Through this process, the students will receive training to handle the RNA-seq, small RNA-seq, proteomics, and metabolomics datasets and further process the motif and splicing analyses to identify the possible mechanism of Vasa in RNA biogenesis.

Required skills: Basic computational skills in R and/or Python to process the raw dataset. Intellectual background in Cell and Developmental Biology: Strong interest and commitment to Science.

Preferred skills: Intellectual background in Cell and Developmental Biology, Alternative splicing, small RNA regulation, Metabolism

Is this project for more than one student: Yes

Mamiko Yajima
Department: Molecular Biology, Cell Biology and Biochemistry
Project Type: Research
Project Title: **Cellular and Developmental biology using the sea urchin embryo**

Project Description:
Our lab studies embryonic cell fate specification through the lens of translation, metabolism, and plasticity regulation, using the sea urchin embryo as a primary model system. In this project, each student and the PI will investigate how each biological element contributes to asymmetric cell fate specification, developmental transition, and overall embryonic patterning. Through the training provided by the PI's lab, students will learn embryo handling, general microscopy, confocal microscopy, molecular biological methods, immunofluorescence, immunoblotting, and quantitative and statistical analyses

Required skills: PCR, Subcloning, and general molecular biology skills; Intellectual background in Cell and Developmental Biology: Strong interest and commitment to Science.

Preferred skills: Microscopy (Epifluorescence and Confocal laser microscopy), Embryology, handling of RNAs

Is this project for more than one student: Yes

Erica Larschan
Department: Molecular Biology, Cell Biology and Biochemistry
Project Type: Research
Project Title: X marks the spot: Defining how the X-chromosome is identified for co-regulation

Project Description:
Within highly compacted genomes, thousands of genes have to be tightly regulated in order to precisely coregulate them. My laboratory studies these mechanisms of coregulation using the X-chromosome and sex differences as a model. We use a combination of 2D and 3D genomic approaches to define how the X-chromosome is different from autosomes. We also have newer projects on coregulation of genes in the context of synapse formation, neurodegenerative disease and autism.

Required skills: N/A

Preferred skills: Familiarity and/or interest in genetics and genomics
We are looking for one student with interest in bench work and one with interest in computational biology

Is this project for more than one student: Yes

Phyllis Dennery
Department: Molecular Biology, Cell Biology and Biochemistry, Pediatrics
Project Type: Research
Project Title: Developing druggable targets to prevent macrophage senescent in neonatal lung injury

Project Description:
Premature neonates are often exposed to mechanical ventilation and high oxygen. This leads to lung

injury that persists into adulthood. We have recently observed that neonatal mice exposed to hyperoxia (a model of neonatal lung injury) develop lung alveolar macrophage senescence which can transmit injury to neighboring cells via the senescence associated secretory proteins (SASP). We have also begun to characterize the components of the SASP using proteinomics. This project will involve isolating senescent macrophages in culture after hyperoxic exposure via FACS cell sorting and allowing these cells to incubate for 24 hours. Thereafter, the conditioned media from the senescent cells will be subjected to proteinomics and target proteins that are upregulated in the SASP from senescent macrophages compared to non-senescent controls will be identified. The abundance of these proteins will be further verified using Western blotting. A library of potential drugs inhibiting these proteins will be obtained. The SASP from the senescent macrophages will be injected intranasally into the lungs of neonatal mice to determine whether this results in decreased lung alveolarization and vascularization, characteristic of neonatal lung disease. The most relevant proteins identified in the SASP will be inhibited using potential drugs identified above. If available, lungs from knockout mice with absence of the targeted proteins will be evaluated for their response to hyperoxic lung injury by measuring alveolarization and vascularization. This could lead to therapeutic approaches to prevent neonatal hyperoxic lung injury

Required skills: some experience with lab techniques such as Western blotting, PCR or immunohistochemistry would be helpful but not mandatory.

Preferred skills: Cell biology and Molecular Biology would be helpful but not mandatory

Is this project for more than one student: Yes

Shobha Vasudevan
Department: Molecular Biology, Cell Biology and Biochemistry, RNA Center
Project Type: Research
Project Title: Intra and extracellular regulation of RNA mechanisms in tumor persistence

Project Description:
Tumors demonstrate heterogeneity, harboring a small subpopulation that switches from rapid proliferation to a specialized, reversibly arrested state of quiescence that decreases their susceptibility to chemotherapy. Quiescent cancer cells resist conventional therapeutics and lead to tumor persistence, resuming cancerous growth upon chemotherapy removal. Our data revealed that post-transcriptional mechanisms are altered, with modification of noncoding RNAs, associated complexes and ribosomes. These control vital genes in cancer and are important for chemo-resistance and persistence of quiescent cancer cells.

Quiescence is understudied and these hidden RNA mechanism changes that are induced by tumor stress conditions, are unexplored, but are unique vulnerabilities in refractory cancer cells that they target to improve patient survival. The primary goal of our research is to characterize the specialized post-transcriptional gene expression and their mechanisms that underlie persistence of resistant cancer cells. In this project, we will elucidate the chemical modification and regulation of key RNAs and ribosomes, by G0- and chemotherapy-induced signaling.A complementary focus is to use these findings to develop RNA-based therapeutics against these mechanisms and their regulation and test if these mechanisms can be subverted to reduce tumor persistence.

The project is an offshoot of a significant study in my lab. Our lab has found how an RNA modification that changes critical gene expression in cancers, is itself controlled by cancer conditions. The goal of the project is to understand how ribosomal RNAs and other noncoding and coding RNAs are modified and used in chemoresistant cells as well as transmitted to the tumor microenvironment for enabling tumor persistence. If we get rid of the increased RNA modification, or alter the RNAs that are exuded in extracellular vesicles from chemoresistant quiescent cancer cells, such persistent cells become susceptible to therapies and can be eliminated, providing an avenue to prevent recurrence. Given the emerging role of RNA modification and transmission as major regulators of gene expression in cancer, and our findings of distinct post-transcriptional gene expression in chemoresistant cancer, investigating the regulation of RNA mechanisms and transmission in chemoresistance, provides extensive insights into mechanisms of critical gene expression that promote tumor persistence. The student will learn to treat and work with resistant cancer cells, analyze proteins and RNAs biochemically, and run time courses to study the impact of modifications on tumor survival.

https://vivo.brown.edu/display/svasude5#All

Required skills: any past molecular or cell biology lab work or computational work

Preferred skills: any of molecular biology, cell culture, nucleic acid or protein work, computational analysis

Is this project for more than one student: No

Robbert Creton
Department: Molecular Biology, Cell Biology, and Biochemistry
Project Type: Research
Project Title: Calcineurin-dependent behaviors in zebrafish

Project Description:
Calcineurin is a calcium-dependent serine-threonine phosphatase with broad clinical relevance. Calcineurin inhibitors are used as immunosuppressants in transplant medicine and several lines of evidence suggest that changes in calcineurin signaling contribute to neural dysfunction in Down syndrome and Alzheimer's disease. However, little is known about the risks and potential benefits of treatments that aim to restore calcineurin signaling pathways in the brain. Our long-term goal is to better understand the effects of modulated calcineurin signaling in the brain and to contribute to the discovery of novel treatments of neural dysfunction in developmental and neurological disorders. This long-term goal will be pursued by automated analyses of behavior, using zebrafish as a model system. Zebrafish are well suited for automated analyses of vertebrate behavior in a high-throughput format and such analyses can reveal subtle defects in neural function.

The UTRA project is focused on the automated analysis of behaviors associated with memory and social interactions during various stages of zebrafish development and aging. The project will utilize machine learning approaches for automated analyses of behavior, examine the signaling pathways that regulate behavior, and screen potential treatments for behavioral deficits.

Required skills: Experience with Java, Python, and machine learning; Strong background in mathematics

Preferred skills: Experience with zebrafish; Experience in the field of neurodegenerative disorders, including Alzheimer's disease

Is this project for more than one student: No

Amanda Jamieson
Department: Molecular Microbiology and Immunology
Project Type: Research
Project Title: Visualizing the cancer microbiome response to metabolic and immune changes in non small cell lung cancer models.

Project Description:
Lung cancer is the most common cause of cancer deaths in both women and men, and is responsible for more than 30% of all cancer deaths. Recently there have been marked successes in treating previously intractable tumors with immunotherapy. However, the primary focus of the immunotherapy field has been T cells. The innate immune response is essential for activating T cells, and can also have direct anti-tumor capabilities. One important potential target for innate immunotherapy is tumor associated macrophages (TAMs). An underexplored strategy is to alter the macrophage so that it assists the immune response against cancer. Emerging evidence has demonstrated that there is an association between dysbiosis of the lung microbiome and lung cancer. However, how this impacts the ability of macrophages to respond to lung cancer, and how the lung microbiome can be harnessed to improve immunotherapy is currently not known. We hypothesize that the dysregulated microbiome during cancer initiation and progression can alter the function of TAMs, and by altering the microbiota macrophages are exposed to we can generate anti-tumor macrophages. This project will explore this hypothesis by manipulating microbes in the lung and visualizing their localization within the lung and the tumor microenvironment. How the specific location of certain microbes influences cancer metabolism and immune responses. This project will explore a new avenue for cancer research and using novel spatial proteomic and transcriptomic techniques. Students will learn microscopy, histology, metabolomics, microbiology techniques, and animal work. This will also open up a new direction for investigation in the field of cancer immunotherapy, and propel the field in new directions.

Required skills: 1) fundamental coursework including basic course lab work in biology 2) Interest and knowledge of immunobiology as evidenced by concentration selection (or planned selection) or course work. 3) 4) reliability and dependability and willingness to work the appropriate hours for 10 weeks during the summer 5) willingness to learn new things

Preferred skills: 1) experience with microscopy 2) interest and knowledge in cancer biology 3) interest and knowledge in microbiology techniques

Is this project for more than one student: Yes

Chris de Graffenried
Department: Molecular Microbiology and Immunology
Project Type: Research

Project Title: Morphogenesis in Trypanosomatids

Project Description:
Trypanosomatids are unicellular parasites that cause various diseases that severely affect human health worldwide, primarily affecting people from developing nations. These parasites have complex life cycles within their insect vectors and mammalian hosts that require significant alterations to parasite shape, allowing them to colonize different tissues effectively, evade the host immune system, and disseminate. A set of microtubules, known as the subpellicular array, underlies the plasma membrane and is responsible for shaping the parasite. Changes to the subpellicular array, such as altering the number of microtubules within the array and the lengths of the microtubules, are essential for altering parasite shape. Microtubules are found in all known eukaryotes but have been studied primarily within a small subset of organisms closely related to humans. As trypanosomatids represent an early branching eukaryote that has been selected by a very different evolutionary trajectory than mammals, understanding the function of trypanosomatid microtubules will provide important insight into how a conserved cellular polymer can be used to serve different functions. Identifying key microtubule-interacting proteins in trypanosomatids that contribute to organizing the subpellicular array could identify unique and essential pathways that could be targeted for drug design, which is vital due to the lack of treatments available for combatting these parasites. Students involved in this project will learn how to cultivate trypanosomatids, genetic modification strategies, and assess phenotypic changes in the organisms using microscopy and biochemistry.

Required skills: Basic pipetting skills, some coursework in molecular biology and cell biology.

Preferred skills: Students with basic lab skills (pipetting, working with bacteria, an ability to perform calculations necessary for making buffers and other solutions), along with coursework in molecular and cellular biology, will be strong applicants for this position.

Is this project for more than one student: No

Karthikeyani Chellappa
Department: Molecular Microbiology and Immunology
Project Type: Research
Project Title: Validation of Metabolic Pathway Models of Aging in Model Organism

Project Description:
This is a joint proposal by Dr. Karthikeyani Chellappa (MMI) and Dr. Ritambhara Singh (Computer Science and DSI). Aging is a significant risk factor for chronic diseases, including cardiovascular diseases, neurodegenerative diseases, and cancer. Aging clocks are powerful predictive models that measure chronological and biological age using large datasets such as DNA methylation, transcriptome, proteome, and metabolome. We hypothesize that computational models built using metabolomics dataset will identify causal metabolic pathways that regulate healthspan in mammals. To this end, we obtained metabolomics datasets from two deeply phenotyped human studies, the Arrivale cohort (ages 18-87, N=1459) and the Wisconsin Registry for Alzheimer's Prevention (WRAP) (ages 40-80, N=1475), to develop deep learning and machine learning models to predict chronological age. Our current model identifies novel metabolite pathways, such as the transport of small molecules and specific metabolites hydroxyasparagine and glycosyltryptophan, as predictors of chronological age in humans. In this work, we

propose to validate the implications of identified metabolic pathways and metabolites in mouse models. Here, we propose to perform metabolomics analysis in serum samples collected from various age groups using an LC/MS instrument in the lab. We have established methods to detect ~300 known metabolites from serum samples in the lab. We have assessed the frailty index in 80 young and aged mice. The Frailty index measures the overall health status in mice using 31 different non-invasive parameters and is known to correlate with lifespan and healthspan. We will use the metabolomics dataset and frailty index generated in this work to validate the computational models we have developed to predict chronological and biological age in humans. We will refine the computational models to measure biological age across mammals and identify conserved metabolic pathways. This work will identify the molecular pathways that can be targeted to improve health span across species and establish the significance of using mouse models to conduct intervention studies in the future.

Required skills: Deep learning and Machine learning course, Biochemistry

Preferred skills: Experience in ML/DL modeling and interest in bench work

Is this project for more than one student: Yes

Karthikeyani Chellappa
Department: Molecular Microbiology and Immunology
Project Type: Research
Project Title: NAD metabolism at the interface of host-microbiome interactions

Project Description:
Nicotinamide adenine dinucleotide (NAD) is an essential redox cofactor and signaling molecule in all living microorganisms. Our knowledge of NAD metabolism in the gut microbiome and its impact on systemic NAD homeostasis and host physiology is predominantly unexplored. We recently established a bidirectional sharing of NAD precursors between the host and microbiome. We are currently employing interdisciplinary approaches to investigate the impact of microbially generated nicotinic acid (NA) on the gut microbiome and intestinal homeostasis. Our preliminary data suggests that manipulating microbial NA levels and disrupting host enzyme NAPRT, which converts NA into an intermediate product of NAD, leads to altered microbiome composition and function. Here, we propose to use an in vitro culturomics approach to understand the metabolic resilience of microorganisms in response to alterations in NAD metabolism. Luminal contents of the ileum and colon will be collected from mice and cultured in the anaerobic chamber under different sources of carbohydrates (glucose, lactate, mannitol) and fibers and treated with pyrazine carbonitrile (PCN) and 2-hydroxy nicotinic acid (2-HNA) to inhibit bacterial enzymes PncA and PncB. Bacterial PncA and PncB enzymes are widely expressed in the core human gut microbiome and convert nicotinamide to NA and NA to intermediate product NAMN, respectively. The impact of nutrients and bacterial NAD metabolism on bacterial composition and function will be assessed by 16S rRNA sequencing and metabolomics analysis, respectively. 16S rRNA libraries of experimental samples will be prepared in the lab and sent to The University of Rhode Island Sequencing Core. Metabolomics analysis will be done in-house using an LC/MS instrument. The proposed experiments will be complementary to the ongoing in vivo assessments of PCN and 2-HNA on microbiome composition and function and aid in delineating the direct (microbiome) and indirect (host-microbiome interactions) impact of nutrients and bacterial enzymes on the gut microbiome.

Required skills: Coursework in Microbiology and Biochemistry

Preferred skills: Lab experience in Microbiology, Bacterial culture

Is this project for more than one student: No

Richard Bennett
Department: Molecular Microbiology and Immunology
Project Type: Research
Project Title: Analysis of fungal metabolism and its impact on gut colonization

Project Description:
This project will examine how transcription factors impact the metabolism of Candida albicans - the most prevalent human fungal pathogen. The student will perform a screen of a library of transcription factor deletion mutants for their ability to grow on different media (e.g., mGAM and OTEB). Screening will be done by inoculating mutants into 96 well plates in each of the media and performing growth curves to find those that are defective in the first or second phase of growth (as WT cells show a clear biphasic pattern of growth that appears to be lacking in some transcription factor mutants). We hope that these experiments will shed light on the transcriptional control of metabolism in C. albicans with implications for understanding how this fungus is able to utilize different nutrients when colonizing the human gastrointestinal tract.

Required skills: N/A

Preferred skills: Preferred skills include basic molecular biology techniques (PCR, gel electrophoresis, etc)

Is this project for more than one student: No

Enongo Lumumba-Kasongo
Department: Music
Project Type: Course Development
Project Title: Research for "Collective Genius: Black Music Collectives from AACM to Odd Future"

Project Description:
Student researchers will be asked to collect reading, listening, and viewing material for a new music department course entitled "Black Music Collectives from AACM to Odd Future." This course explores the impact and innovative contributions of black music collectives, from the Association for the Advancement of Creative Musicians (AACM) to groups like the Soulquarians and Odd Future. This course examines how these collectives have shaped the soundscape of music and culture through their experimental approaches, collaborative ethos, and socio-political commentary.

Required skills: Students must be organized and self-directed. Research experience is not expected, but

is a plus.

Preferred skills: Preference will be given to students with a demonstrated knowledge and interest in the study and performance of black musics. Greater consideration will be given to students whose previous coursework includes any of the courses on the Black Music Lab website: https://arts.brown.edu/institute/research/black-music-lab

Is this project for more than one student: No

Liqi Shu
Department: Neurology
Project Type: Research
Project Title: Clinical Neurotechnology: Building Movement Databases and Assessing Diagnostics for Neurological Disorders

Project Description:
This project offers an immersive clinical research experience in neurotechnology, where students will work on two pivotal studies aimed at enhancing neurological care. In the first project, Neurological Disorder Motor Database, students will establish a foundational video database by recording patients with neurological disorders performing basic motor tasks. This dataset will support future research on movement patterns potentially linked to neurological conditions, enabling the prediction of movement trajectories and informing early diagnosis. Students will actively recruit and consent patients, collect video data during clinical visits, and contribute to the organization and management of this kinematic resource.

In the second project, EEG LVO Prehospital Detection, students will participate in a study evaluating the effectiveness of portable EEG systems in prehospital settings to detect large vessel occlusion (LVO) strokes. Working closely with EMS, Emergency Department, and Neurology personnel, students will assist in gathering EEG data from patients exhibiting stroke symptoms. Their roles will include obtaining consent from patients or family members, collecting and organizing EEG data, and contributing to data management. This research has the potential to improve prehospital stroke care, optimizing patient outcomes by identifying LVO strokes earlier and more accurately.

Through these dual projects, students will gain first-hand experience in patient interaction, recruitment, consent processes, and data collection in both clinical and acute care environments. Additionally, they will be exposed to neurotechnology applications, including computer vision for kinematic analysis and portable EEG systems. This combined opportunity allows students to work at the interface of neurology, data science, and clinical care, contributing to research that may shape the future of diagnostic neurotechnology.

Required skills: Strong interpersonal skills and a genuine interest in patient interaction. Basic understanding of data collection methods and ethical research practices. Ability to work attentively and responsibly within clinical settings

Preferred skills: Experience with clinical research. Familiarity with video data processing, computer vision, or EEG data analysis.

Is this project for more than one student: Yes

Liqi Shu
Department: Neurology
Project Type: Research
Project Title: Neurotechnology: Enhancing Medical Care through Machine Learning and Computer Vision

Project Description:
In our neurotechnology research at Brown University's Neurology Department, we are dedicated to leveraging advancements in computer vision, machine learning, and large language models to revolutionize medical care. Our diverse range of projects includes kinematic analysis of stroke recovery, real-time medical conversation analysis and pre-hospital stroke triage using EEG. By integrating these technologies, we aim to develop sophisticated tools for assessing and enhancing stroke rehabilitation, as well as improving the accuracy and efficiency of neurology documentation and consultation. Our approach is multidisciplinary, combining clinical insights with cutting-edge computational techniques to create innovative solutions for complex medical challenges. This program offers students the opportunity to be at the forefront of neurotechnological research, contributing to projects that have the potential to significantly impact patient care and treatment outcomes.

Required skills: Proficiency in programming (Matlab/Python) Fundamental knowledge of machine learning and data analysis

Preferred skills: Experience with computer vision, audio processing, natural language processing, or large language models.
Advanced coursework or projects in computer science, engineering, data science, or related fields.

Is this project for more than one student: Yes

Saud Alhusaini
Department: Neurology
Project Type: Research
Project Title: The association between brain imaging phenotypes and genetic risk variants of common neurological conditions

Project Description:
In this project, we aim to examine the association between MRI-based brain phenotypes and genetic risk variants of common movement disorders and other neurological conditions, including Parkinson's disease, essential tremor, and epilepsy. We use locally acquired data (from Rhode Island Hospital) and publicly available databases. The student will have the opportunity to learn many research skills, such as participants recruitment and data collection, processing of genetic and MRI-based data, and working with big data.

Required skills: Basic computational skills and interest in interacting with human research participants. This project would be suitable for students interested in neuroscience, computational biology, biomedical engineering, etc

Preferred skills: Programming using R, Matlab, etc.

Is this project for more than one student: Yes

Justin Fallon
Department: Neuroscience
Project Type: Research
Project Title: Novel phenotyping and therapeutic testing in Alzheimer's Disease models

Project Description:
This project has two goals. In the first we will extend and deepen our phenotypic analysis of Alzheimer's mouse models ('5xFAD' initially) using Automated Continuous Behavioral Monitoring (ACBM), a method developed by the Serre lab at Brown and implemented for ALS-FTD models in the Fallon lab (White et al., Nature Neuroscience 2018). We are also collaborating with the Gutman lab in Biostatistics, who has developed a Baysian statistical model to analyze the data. We are performing a natural history study of the 5xFAD male and female mice to establish the baseline ACBM phenotype of these animals. We will then test the impact of two interventions designed combat AD: 1) donanamab - an anti-amyloid antibody current on the market for treating AD (Kinsula™) and 2) splice-modifying antisense oligonucleotides (ASOs) developed in collaboration with Bolden Therapeutics designed to promote adult hippocampal neurogenesis and restore neuronal function in AD and other neurodegenerative diseases.
(Disclosure: JRF is co-founder and shareholder of Bolden)

Required skills: Working knowledge of Python. Ability to work with and integrate large datasets

Preferred skills: Experience with handling mice.

Is this project for more than one student: Yes

Michael Paradiso
Department: Neuroscience
Project Type: Research
Project Title: Sensorimotor interactions in human vision

Project Description:
Human vision is often studied as a passive process, but there is increasing evidence that interactions between the visual and motor systems play a critical role in visual processing. It appears that a motor signal associated with eye movements is sent to the visual cortex and that this signal resets the system to analyze the scene on each new fixation of the eyes. Brain recordings reveal that saccadic eye movements also make visual neurons more sensitive and their activity more independent. The goal of this

project is to quantify effects of saccadic eye movements on human visual perception. To clarify the role of sensory-motor interactions, the experiments will use computer-controlled stimuli and an eye tracking system to quantify sensitivity to stimuli and the spatial interactions between stimuli with and without saccades.

Required skills: NEUR 0010, 1030. Matlab programming experience

Preferred skills: Prior experience with human psychophysics and Psychtoolbox

Is this project for more than one student: No

Shane Lee
Department: Neurosurgery
Project Type: Research
Project Title: AI to improve outcomes using a multimodal clinical neurosciences data

Project Description:
In the Center for the Applied Neurosciences AI Registry (CANARY), our aim is to create and support a comprehensive multimodal clinical database toward improving access for clinical and basic research in the neurosciences. This series of projects includes initiatives such using AI to perform automated de-identification of multimodal data (e.g., physician notes or MRIs) or creating AI-driven patient summaries to enable clinicians to rapidly gain a meaningful understanding of complex patient profiles. Students will learn the challenges of multimodal data and develop state-of-the-art, HIPAA-compliant machine learning models intended to out-perform current data curation strategies.

Required skills: Students should have experience in one or more of the following: neuroscience, biomedical engineering, machine learning, or mathematics. Some computer programming experience is also required.

Preferred skills: Students working toward a concentration in neuroscience, applied math, biomedical engineering, or related (such as biophysics) are preferred. Python programming experience is helpful.

Is this project for more than one student: Yes

Shane Lee
Department: Neurosurgery
Project Type: Research
Project Title: Optimizing deep brain stimulation for Parkinson's disease

Project Description:
Parkinson's disease (PD) is a neurodegenerative disorder marked by characteristic motor symptoms such as tremor, bradykinesia, and rigidity. Deep brain stimulation, or DBS, is a therapy in which electrodes are implanted in the brain and stimulated. Though continuous stimulation is the current norm, the idea of

closed-loop DBS is attractive for stimulating "on demand", or only when symptoms appear. Our work using explainable machine learning has shown that certain neural biomarkers are related to the presence of symptoms in PD and that distinct biomarkers may be related to distinct symptoms.

In these projects, students will aid in the collection of human behavioral and neural activity to identify neural biomarkers of dysfunction in PD. We develop explainable machine learning techniques that can improve both our detection of pathological states and our understanding of the neural features that are indicative of these states.

Required skills: Students should have experience in one or more of the following: neuroscience, biomedical engineering, machine learning, or mathematics. Some computer programming experience (in any language) is also required.

Preferred skills: Students working toward a concentration in neuroscience, applied math, biomedical engineering, or related (such as biophysics) are preferred. Python programming experience is helpful.

Is this project for more than one student: Yes

Wael Asaad
Department: Neurosurgery and Neuroscience
Project Type: Research
Project Title: Research in Neurophysiology & Neuromodulation

Project Description:
We undertake a variety of neurophysiology and neuromodulation research studies in humans undergoing relevant neurosurgical procedures (e.g., deep brain stimulation for parkinson's disease; intracranial electrodes for seizure mapping; focused ultrasound for tremor, etc.). Our goals are: 1) to understand normal brain circuit function related to various aspects of motor function, cognition, attention, and memory; 2) identify neurophysiological signatures of particular disease states; 3) develop new circuit-modulation strategies to better treat brain disease.

Required skills: Students should have some background in neuroscience or cognitive science, be comfortable with quantitative analysis.

Preferred skills: Students with solid coding skills (e.g., Python, Matlab, etc.) and strong quantitative skills (e.g., linear algebra, machine learning, etc.), or who are in the process of actively developing these skills, will be given preference.

Is this project for more than one student: Yes

Kate Schapira
Department: Nonfiction Writing Program / English Department
Project Type: Research

Project Title: Uphill Both Ways: Intergenerational Storytelling for Hard Times
[This project is cross-listed with the Brown Laidlaw Scholars Program.]

Project Description:
Warren, Rhode Island is facing land loss through sea level rise, threatening residents with uninhabitable homes and impassable roads within the next ten years. But this isn't the first time Warren has weathered a crisis. This oral history/living archive project will equip elders and teenagers/young adults to interview one another about strained circumstances through which they have lived, and how neighbors, community members, and local institutions (including municipal governments, religious institutions and more) supported one another—or failed to do so—in those circumstances. At the beginning and end of the project, participants will be asked to measure their preparedness for change, sense of purpose in their lives, and connection in their communities.

Building on existing relationships with members of the Warren Health Equity Zone's Climate, Safety and Resilience Working Group, the Mt. Hope High School Environmental Club, and participants in a documentary workshop with The Collaborative, 6-8 young adults and 6-8 seniors will do the following:

1) Attend a training to learn and practice mutual interviewing, story-gathering and story-sharing methods, as well as audio recording.

2) Schedule and carry out three mutual interviewing sessions of at least an hour each, in pairs or trios.

3) Upload their audio to an archive hosted by the George Hail Library.

4) Attend a wrap-up celebration where they can talk about the process. People from town will be able to listen to the recordings and register how the recordings affect them on the levels of preparedness, purpose, and connectedness.

Required skills: Applicants must have interviewing experience; they must be skilled with audio recording and production and be able to show people how to do it well, and they must be able (by the end of the project) to build and maintain a web-based audio archive.

Preferred skills: Experience with community-driven/participatory research and/or oral history will be welcome.

Is this project for more than one student: No

Wentian Yang
Department: Orthopaedics
Project Type: Research
Project Title: Deciphering the role of protein kinases and phosphatase in skeletal development and diseases

Project Description:
Our lab studies the development and homeostasis of bone and cartilage. We aim to understand how these processes are regulated by the protein tyrosine kinases (PTKs), phosphatases (PTPs), and their

signaling partners under physiological and pathological conditions. Our goal is to translate knowledge gained from basic science research into the development of better therapeutics, as well as regenerative and preventive means to combat skeletal disorders. We have been using combined approaches to achieve our goal. These approaches include characterizing the phenotypes of genetically modified mice, interrogating cellular signaling pathways coupled with cell differentiation and function, studying genetic and biochemical modifications of genes and proteins that link to skeletal disorders, and developing new therapeutic strategies and medications. Below is a list of our research directions for various projects in which students may be interested.

1. Characterizing and modifying SHP2-regulated signaling pathway to improve cartilage anti-degeneration and regeneration
2. Studying the cross-talk between bone marrow stroma and hematopoietic cells
3. Investigate the role of CHSY3 and CHSY3G629R mutation in carpometacarpal joint osteoarthritis
4. Study the role of SHP2 in macrophages and rheumatoid arthritis

Required skills: Required skills: Cell culture and immunostaining

Preferred skills: Preferred skills: Previous experiences with cell and bacteria culturing, molecular cloning, PCR, and immunostaining are preferred.

Is this project for more than one student: Yes

Daniel Spade
Department: Pathology and Laboratory Medicine
Project Type: Research
Project Title: Spatial RNA-seq method development for reproductive toxicity projects

Project Description:
The goal of this project is to develop methods for conducting spatial RNA-seq using fixed or frozen samples from two reproductive toxicology experiments. (1) We have formalin-fixed paraffin-embedded samples from a large dose response experiment, in which fetal rats were treated with a mixture of 9 phthalates. We know that there was a dose-dependent histological response, including induction of multinucleated germ cells, a hallmark of phthalate toxicity, and we know the transcriptional response to phthalates in bulk RNA-seq. We aim to use nanostring GeoMx to test how specific testicular cell types respond to phthalates and learn more about the mechanism of multinucleation of germ cells. (2) We have frozen tissue samples from a dose-response experiment in which adult rats were treated with ethylene glycol monomethyl ether (EGME). EGME selectively targets a single germ cell stage, spermatocytes, for unknown reasons. We aim to use nanostring GeoMx to identify spermatocyte-specific responses to treatment that could explain the selectivity of the treatment. This project will require optimization of methods to stain specific cell types in both FFPE and frozen tissue sections, which are likely to differ.

Required skills: prior laboratory research experience is required

Preferred skills: prior toxicology research or coursework, prior coursework in molecular/cell biology

Is this project for more than one student: Yes

Eric Darling
Department: Pathology and Laboratory Medicine
Project Type: Research
Project Title: Macrophage degradation of hyper-compliant MPs

Project Description:
This study will evaluate the stability and biodegradability of polyacrylamide hydrogel-based microparticles (MPs). These hyper-compliant MPs replicate the size and mechanical properties of living cells and are promising for applications in device calibration, regenerative medicine, and drug delivery. Although these MPs are known to be phagocytosed by macrophages, their degradation timeline, mechanism, and biological fate remain unclear. This study addresses the need to ensure that MPs, after serving their function, do not persist forever in biological systems. Polyacrylamide is traditionally regarded as non-biodegradable, with limited research on its breakdown. However, for therapeutic applications, ensuring predictable degradation is essential. To investigate this, fluorescently labeled MPs will first be phagocytosed by macrophages. Continuous imaging will quantify MP degradation over time, with fluorescence loss serving as an indicator of breakdown. Additionally, lysosomes within macrophages will be stained to determine if phagocytosed microparticles localize to lysosomes and degrade through enzymatic activities. If time permits, the same experiments will be repeated using polyethylene glycol-based MPs.

Required skills: Experience with cell culture and fluorescence imaging is required.

Preferred skills: Prior coursework in biology and chemistry are preferred to understand macrophage function and particle degradation mechanisms. Experience with image data analysis for quantifying fluorescence intensity is a plus.

Is this project for more than one student: No

Robert Sobol
Department: Pathology and Laboratory Medicine and Legorreta Cancer Center
Project Type: Research
Project Title: Characterization of a novel mouse models of base excision repair deficiency for the study of active gene demethylation at neuronal enhancers and the impact on senescence and neurodegeneration

Project Description:
The base excision repair (BER) pathway is one of five major genome maintenance mechanisms in each cell that provide protection from exogenous and endogenous sources of DNA damage, e.g., oxidative stress, radiation, cigarette smoking. Specifically, genes and proteins of the BER pathway are essential for the repair and resolution of approximately 20,000 base lesions per cell per day in both the nuclear and mitochondrial genomes and facilitates active gene demethylation that can impact transcription. The BER pathway, and in particular, the essential BER enzymes DNA Polymerase 🚲 (Polβ, Polb), Apex1 and Ung have all been shown to have an impact on several aging associated phenotypes using cell and transgenic

mouse models, including a role in senescence, triplet repeat expansion, telomere loss, stroke or Alzheimer's. Missing from these studies are robust mouse models of Polb deficiency, Apex1 deficiency, or loss of Ung, that can be used to define a biologically relevant role for these genes in a whole animal. To that end, we have recently developed a new Polb knockin mouse model. In this new mouse model, functional Polb protein is expressed, albeit at 10-15% the normal levels, rendering the BER pathway defective to as much as 85-90%. Further, we have developed mouse models with deficiency in the AP endonuclease Apex1 (expressing less than 2% of the Apex1 protein) and the DNA glycosylase Ung (tissue specific gene knockout). To aid in this project, the student will participate in mouse genotyping, tissue (liver, brain) isolation, DNA/RNA/protein isolation, RNA analysis by qRT-PCR, analysis of BER and senescence-related protein expression by immunoblotting and/or immunofluorescent staining, all so as to help fully characterize these mouse models and their role in active gene demethylation and neurodegeneration. https://sites.brown.edu/sobollab/

Required skills: Past coursework that includes an understanding of basic biology and of molecular biology.

Preferred skills: Experience in a cell biology lab setting and/or experience working with mice.

Is this project for more than one student: Yes

Robert Sobol
Department: Pathology and Laboratory Medicine and Legorreta Cancer Center
Project Type: Research
Project Title: Identification and validation of replication-stress and DNA damage dependent base excision repair protein complexes

Project Description:
The base excision repair (BER) pathway is one of five major genome maintenance mechanisms in each cell that provide protection from exogenous and endogenous sources of DNA damage, e.g., oxidative stress, radiation, cigarette smoking. Specifically, genes and proteins of the BER pathway are essential for the repair and resolution of approximately 20,000 base lesions per cell per day in both the nuclear and mitochondrial genomes and facilitates active gene demethylation that can impact transcription. More recently, we have shown that a major role of these BER pathway proteins in cancer cells is to function in concert with the replication machinery and to then help in the response to replication stress that can come about from genotoxin exposure or cancer genome mutations. In this regard, BER pathway proteins regulate the formation of protein complexes that facilitate the intra-S phase checkpoint (https://pubmed.ncbi.nlm.nih.gov/34806016/) and the response to PARP and PARG inhibitors (manuscript in preparation). Using cancer cell lines expressing TurboID fusion proteins, the goal is to characterize the protein complexes that associate with each of the BER proteins. To aid in this project, the students will participate in studies involving human cancer cell line culture, protein complex isolation via biotin-capture protocols, immunoblotting and validation of protein complex association. More details about the research goals and focus of the lab can be found at: https://sites.brown.edu/sobollab/.

Required skills: Past coursework that includes an understanding of basic biology, cell biology and molecular biology

Preferred skills: Experience in a cell biology lab setting and/or experience working with cells in culture.

Is this project for more than one student: Yes

Monica Serrano Gonzalez
Department: Pediatric Endocrinology
Project Type: Research
Project Title: Dietary Behaviors, The Food Environment and Sleep Duration Changes in Urban Children with Asthma

Project Description:
We are seeking a research intern to help with a study examining the effects of the sleep restriction on eating behaviors, such as food preferences and choices (Project FEAST). As part of the Pediatric Health Disparities Program directed by Drs. Daphne Koinis Mitchell, PhD and Elizabeth McQuaid, PhD, ABPP, Project FEAST will involve an experimental protocol to assess the impact of changes in sleep duration on diet, immune balance, and asthma activity in children living in urban neighborhoods of RI.

UTRA students will have the opportunity to shadow full-time research assistants, assist with data collection, and attend weekly research staff meetings as well as the monthly lab meetings, in which faculty and fellows affiliated with the group present ongoing research. This opportunity will provide excellent research training for those planning to pursue paid research assistantships for graduate studies in psychology, public health, nursing, or medicine.

Specific tasks will include assistance with research participant recruitment and scheduling for studies, as well as assisting with a limited amount of data collection (e.g., administering questionnaires to child research participants and their caregivers) and with other tasks integral to research (e.g., preparing graphs and tables of results, preparing materials for research sessions, some clerical tasks, etc.).

Required skills: Strong multitasking and time management abilities, critical thinking, and collaboration within an interdisciplinary team. Strong communication skills, meticulous attention to detail. Proficiency in relevant computer applications for research purposes and/or an ability and willingness to learn new applications as needed (i.e., Microsoft Office 365, REDCap, SPSS, ASANA). Experience working in ethnically, culturally, and racially diverse environments.

Preferred skills: Spanish fluency. Valid driver's license and one's own car. Knowledge of research concepts.

Is this project for more than one student: No

Sheryl Kopel
Department: Pediatric Health Disparities Research Program (Pediatrics and Psychiatry)
Project Type: Research
Project Title: Pediatric Asthma and Health Disparities

Project Description:
The Pediatric Health Disparities Research Program is directed by Drs. Daphne Koinis Mitchell, PhD and Elizabeth McQuaid, PhD, ABPP. The lab conducts research studies examining disparities in health outcomes and develops and evaluates interventions to improve health and sleep outcomes in youth. Studies investigate sleep, immune function, obesity, and asthma outcomes in children with asthma and allergy living in urban environments in greater Providence, RI.

UTRA students will have the opportunity to shadow full-time research assistants, assist with data collection, and attend weekly research staff meetings as well as the monthly lab meetings, in which faculty and fellows affiliated with the group present ongoing research.

Specific tasks will include assistance with research participant recruitment and scheduling for studies, as well as assisting with a limited amount of data collection (e.g., administering questionnaires to child research participants and their caregivers) and with other tasks integral to research (e.g., preparing graphs and tables of results, preparing materials for research sessions, some clerical tasks, etc.).

This opportunity will provide excellent research training and public health experience for those considering pursuing graduate studies in psychology or public health, as well as those planning to apply to nursing or medical school.

Required skills: Strong multitasking and time management abilities, critical thinking, and collaboration within an interdisciplinary team. Strong communication skills, meticulous attention to detail. Proficiency in relevant computer applications for research purposes and/or an ability and willingness to learn new applications as needed (i.e., Microsoft Office 365, REDCap, SPSS, ASANA). Experience working in ethnically, culturally, and racially diverse environments.

Preferred skills: Spanish fluency. Valid driver's license and one's own car.

Is this project for more than one student: Yes

Robin Miller
Department: Pediatrics
Project Type: Research
Project Title: NNNS-II (NeoNatal Neurobehavioral Scale) Database Project

Project Description:
The NNNS (NeoNatal Neurobehavioral Scale) examines neurobehavioral organization, neurological reflexes, motor development of active and passive tone, and signs of stress and withdrawal of the at-risk and healthy infant. Women and Infants Hospital (WIH) is proud to be using the NNNS not only for research but clinically, as part of hospital guidelines to enhance developmental outcomes of infants at risk. The Brown University, Center for the Study of Children at Risk website can be found here for more details on the assessment: Newborn Assessment (NNNS-II) | Center for the Study of Children at Risk | Medical School | Brown University. Women and Infants' current hospital guidelines include the following populations of infants: those born preterm (all preterm infants <34 weeks and preterm infants 34 0/7-36 6/7 weeks at the request of the infant's provider), have been exposed to opioids in utero (exposure to

other substances at the request of the infant's provider), are experiencing neonatal encephalopathy, are having clinical seizure activity, and by consult. We will be adding parental and newborn demographic variables to our already existing database of NNNS scores on over 2700 NNNS exams. This expanded database will create pilot data for many future research studies.

Research assistants will learn about all aspects of the NNNS-II examination, data collection, and the compilation of pilot data. In order to complete the primary task of data collection, students will be trained to collect data from the electronic medical records. All students will attend weekly NNNS-II Team meetings with Dr. Miller and Dr. Andreozzi. Students will have the opportunity of hands-on experiences working with high-risk families in the NICU (Neonatal Intensive Care Unit) and MBUs (Mother/Baby Units) along with Drs. Miller and Andreozzi.

Required skills: N/A

Preferred skills: An eye for detail, a knowledge of Excel, basic computer experience, data entry ability

Is this project for more than one student: No

Jack Rusley
Department: Pediatrics, Adolescent Medicine
Project Type: Research
Project Title: Helping Trusted Adults and Youth Talk about Sexual Health (The Talk Study)

Project Description:
HIV rates among LGBTQ+ youth remain persistently higher compared to their straight, cisgender peers. Key barriers to HIV prevention for LGBTQ+ youth include a lack of supportive, affirming healthcare and limited relationships with trusted adults in their life. Prepping for The Talk: Helping Trusted Adults and Youth Talk about Sexual Health (The Talk Study) is an NIH-funded research study aimed at developing a program to improve sexual health communication between youth (ages 14-17, assigned male at birth who identify as sexual and/or gender minorities) and their parent(s) or trusted adult(s). In Phase 1, we conducted qualitative interviews to identify gaps in sexual health communication and understand the barriers to these conversations. In Phase 2, we developed an intervention based on these findings and gathered feedback from both youth and adults. Currently, in Phase 3, we are recruiting dyads of youth - focusing on those who may have an elevated risk for HIV infection - and a parent or trusted adult to participate either in the control group or in the group receiving the modified intervention from Phase 2. A key aspect of the program is educating both youth and their parents/trusted adults about PrEP (Pre-Exposure Prophylaxis).
Research interns may assist with the following tasks: literature reviews and summarization, data entry and data management, organizing and taking notes at team meetings, developing social media advertisement content and tracking advertisement performance, revising and editing study documents such as consent forms and handouts. Interns are expected to be cleared by the Brown University Health system for remote work, attend weekly team meetings (1-2 hrs per week), monthly 1:1 meetings with the PI, and commit to significant involvement (5-10 total hrs/week during semester, 30-40 total hrs/wk during summer).

Required skills: n/a

Preferred skills: In-person work with adolescents, Social media content creation, graphic design experience (e.g., Canva, other platforms), data entry experience (e.g., Excel, REDCap, other database tools), customer service experience (e.g., in person and/or digital), research experience especially human subjects research (e.g., CITI training).

Is this project for more than one student: No

Jack Rusley
Department: Pediatrics, Adolescent Medicine
Project Type: Research
Project Title: Mental health of BIPOC youth in Providence and school resource officers
[This project is cross-listed with the Brown Laidlaw Scholars Program.]

Project Description:
There has been a dramatic increase in the employment of sworn school law enforcement (School Resource Officers, "SROs") in the United States since widespread media coverage of school shootings in the 1990s. This strategy has drawn criticism due to a lack of uniform training or job description, mixed results on their benefit, and concern that police inflict disproportionate punishment upon people of color. Numerous groups have raised concerns about the impact of SROs on students, including the criminalization of developmentally appropriate behavior, the wide racial and ethnic disparities in arrest rates in schools with SROs, and the budgetary decisions that prioritize police over mental health resources. The Providence public school system has struggled with student safety and mental health, academic performance, and staff turnover for many years. The Providence Alliance for Student Safety (PASS), a coalition of youth-serving organizations including the Providence Student Union (PSU), formed in 2018 to demand the removal of SROs from schools in the district.
In collaboration with PASS and PSU, our community-based participatory research study is recruiting Black, Indigenous, and people of color (BIPOC) Providence public school students to collect data via qualitative interviews. Our primary objective in this study is to understand the impact of SROs on the mental health of BIPOC youth, with a secondary objective to understand the barriers and facilitators to mental health among BIPOC youth. Results of this project will be used in a variety of ways. First, they will be used to inform ongoing work of community-based organizations and the school district to address mental health among BIPOC youth. Second, this preliminary data will be used to apply for grants to support larger sample sizes and interventions to improve adolescent mental health, with a focus on BIPOC youth.

Required skills: n/a

Preferred skills: In-person work with adolescents, Social media content creation, graphic design experience (e.g., Canva, other platforms), data entry experience (e.g., Excel, REDCap, other database tools), customer service experience (e.g., in person and/or digital), research experience especially human subjects research (e.g., CITI training).

Is this project for more than one student: No

Maayan Leroy-Melamed
Department: Pediatrics, Adolescent Medicine
Project Type: Research
Project Title: Sexual and Reproductive Health in Adolescents and Young Adults with Sickle Cell Disease

Project Description:
Sickle cell disease affects tens of thousands of people in the US, predominantly of African ancestry. People living with sickle cell disease experience organ damage throughout their body, including reproductive organs. Reproductive effects of sickle cell disease include delayed puberty, abnormal uterine bleeding and other menstruation-related symptoms, penile dysfunction, and fertility concerns. We are conducting qualitative interviews of adolescents and young adults with sickle cell disease and their parents around topics of sexual and reproductive health such as menstruation-related symptoms, penile dysfunction, and family planning. We have begun interviewing and transcribing recordings of the interviews and will continue through the spring and maybe summer. I am also initiating survey studies and continuing analysis of prior research on SRH in AYA with SCD.

Required skills: Non-judgmental approach to reproductive health, interest in social and reproductive justice.

Preferred skills: Any experience with research studies, completion of CITI training.

Is this project for more than one student: No

Gaetano Barone
Department: Physics
Project Type: Research
Project Title: ML Developments for Characterization and Readout Compression of 4D Silicon Tracking Devices with Internal Gain

Project Description:
Resistive Silicon Devices (RSDs), such as AC-coupled Low Gain Avalanche Diodes (AC-LGADs), achieve a fine spatial resolution while maintaining excellent timing resolution when they have internal gain, achieving time and space (4D) tracking measurements for collider experiments in High Energy Physics (HEP) at the Large Hadron Collider (LHC), Electron-Ion Collider, and future collider experiments. Because of their low power consumption and tolerance to high radiation, they are also ideal candidates for satellite spectroscopy. Experiments such as the Penetrating Particle Analyzer or the Advanced Energetic Ion Electron Telescope envision such applications. Their very low dark noise performance makes them also ideal candidates for infra-red and near-infra-red light detection devices in laser imaging, detection, and ranging devices. However, the performance of this new technology is strongly affected by environmental factors such as temperature, humidity, and mechanical stresses.
Furthermore, their charge collection is challenged by the spreading of the signal well beyond two adjacent pixels when ionizing radiation hits these devices. This complex charge collection challenges the devices' readout due to the increased signal sharing and the noise in readout electronics. On one side, the lack of

universal models that account for the path of charge carriers in the multiplication limits their applications outside laboratory conditions of High Energy Physics. As their performance has never been studied to account for environmental stresses, the entire operational envelope of these devices remains unmapped. This project fits into a greater effort for establishing a performance-to-conditions map by as a function of the fabrication properties and the environmental operating conditions. By accounting for this performance change, the device's output signal can be corrected for environmental factors using artificial intelligence and machine learning techniques, mapping back the dependence of impurities during the fabrication process or intrinsic properties to the signal acquisition performance. On the other, current readout methods restrict themselves to either using only one high-level quantity or imposing (spatial) restrictions on the number of readout channels used due to the complexity. Given the complexity of correlated degrees of freedom involved in the charge collection, applying Machine Learning (ML) techniques becomes advantageous. The information loss will be minimized by benefiting from all the correlations among all the readout quantities of the device. This motivates the optimization of these additional degrees of freedom with ML, which can be fine-tuned when targeting a specific application. This project aims to pair compression algorithms in digitizing the analog signal of RSDs that exploit the correlated degrees of freedom for improved spatial resolution with the sensor design. Aiming to embed ML positioning reconstruction algorithms in front-end electronics, this project intends to take the first step toward that goal. In particular, we will study how the rasterization of the waveform impacts the signal-over-background ratio of the collected signal and, hence, the timing performance of such algorithms. In the second stage, we will study how these algorithms perform when using a signal input shaped by an analog preamplifier and a discriminator. This unique approach is expected to be a stepping stone towards significantly reducing the data throughput while optimizing the sensor geometry with arbitrary pad arrangements to maximize the temporal and spatial resolution. The work will fit into the greater plan for a sensor fabrication that can be tuned explicitly for collider physics, space research, and industrial applications.

Required skills: Essential coding experience, with a preference for C++/Python.

Preferred skills: PHYS60 or PHYS160 or equivalent knowledge of modern physics. Extensive programming knowledge; previous data analysis research experience.

Is this project for more than one student: Yes

Gaetano Barone
Department: Physics
Project Type: Research
Project Title: Uncovering the Higgs potential without the Higgs

Project Description:
Studying Higgs boson properties is a top priority for the (HL-)LHC physics program. We are exploring a novel method to expand the current experimental reach by measuring and correlating effects between the on-shell vector boson fusion (VBF) Higgs production and the off-shell Higgs production in vector boson scattering (VBS). We select longitudinally polarized vector bosons with advanced ML techniques by disentangling their signatures from those of transversely polarized ones. We will accurately map back our ML-assisted polarization variable to the fundamental interactions governing these processes by defining a final state observable in fiducial phase space. We will explore the sensitivity to all-hadronic final states, where the higher branching fraction offers improved rates. ML methods will be developed for tagging and

polarization determination of the hadronically decaying vector boson. We will create the effort in the Higgs to vector boson decay channel, complementing our current research program in the Higgs to bb decay channel.

Required skills: Essential coding experience, with a preference for C++/Python.

Preferred skills: Extensive programming knowledge; previous data analysis research experience.

Is this project for more than one student: No

Greg Landsberg
Department: Physics
Project Type: Research
Project Title: Anomaly Detection at the Large Hadron Collider Using Machine Learning Techniques

Project Description:
Large Hadron Collider (LHC) at CERN (near Geneva, Switzerland) is a cutting-edge energy frontier facility with the major goal of finding physics beyond the established description of our Universe, known as the Standard Model. While many dedicated searches for new physics have come empty-handed so far, there are strong theoretical reasons to believe that the Standard Model is incomplete, despite its enormous success. At the same time, signatures for new physics may be different from the proposed theoretical paradigms and appear just as subtle modifications of the properties of various objects in proton-proton collision events. In particular, jets--- the product of fragmentation of quarks and gluons, particles most copiously produced at the LHC--- may carry these subtle signatures of new physics in their internal structure. Given the lack of precise knowledge of how these modifications may look, a search for such anomalous signatures is a perfect problem for the rather novel concept in artificial intelligence: unsupervised machine learning. In this approach, the discriminator based on deep neural networks and autoencoders, is trained on a large sample of ordinary jets expected from the Standard Model processes, either using Monte Carlo simulation or control samples in data that are not expected to have significant contamination from new physics. At the next step, jets from classes of events likely to contain subtle anomalies are subjected to this classifier, and their degree of difference from the training sample is quantified as an anomalous score. We can check the validity of this approach utilizing "known anomalies", e.g., jets that are the product of two or more merged jets due to highly Lorentz-boosted signatures, or jets coming from the long-lived particles, such as bottom or charm quarks. The ultimate goal is to add all the known anomalies to the training sample, with the goal of searching for the "unknown anomalies", which may be either detector malfunctions or signatures of new physics. The project could support up to four UTRA students, given its modular structure and the possibility of exploring different classifier architectures (e.g., transformers and graph neural networks with regular vs. variational autoencoders) in parallel.

Required skills: Operational knowledge of python, basic knowledge of quantum mechanics

Preferred skills: Experience with machine-learning frameworks (e.g., KERAS, Pytorch), basic knowledge of particle physics.

Is this project for more than one student: Yes

Ian Dell'Antonio
Department: Physics
Project Type: Research
Project Title: Dark Matter and Galaxies in small galaxy clusters

Project Description:
Our research group is conducting a survey of the dark matter in large galaxy clusters with the Dark Energy Camera (DECam) in Chile. However, analysis of the DECam image archive reveals that there are about 25 smaller galaxy clusters that have been observed and have data publicly available in the archive. The goal of this project is to analyze the data from these clusters to compare their dark matter content and distribution with those of the larger clusters we are studying. Because each cluster takes about 5 days to analyze (to the point of mapping out the dark matter), two students will divide the sample between them to complete the project within one summer.

Required skills: Familiarity with computers is required, particularly with understanding how shell scripts work.

Preferred skills: Programming experience (particularly the ability to edit shell scripts and some knowledge of python) preferred but could be learned as part of the project. Some familiarity with astronomy (at the level of PHYS0270) is preferred but not required.

Is this project for more than one student: Yes

Ian Dell'Antonio
Department: Physics
Project Type: Research
Project Title: Star Clusters and Star Formation in nearby galaxies

Project Description:
As part of our group's research, we obtain very long exposures of the sky near clusters of galaxies with the Dark Energy Camera on the Blanco 4-meter telescope in Chile. Often, nearby galaxies end up in the field of view of the camera. This data gives us a very detailed look into the structure of those galaxies. The students will be working on two very closely linked problems related to the structure (using the same data). First, they will use the color images and measurements of flux derived from the images to investigate the spatial distribution of star formation in the galaxies, and investigate whether galaxy-galaxy interactions have triggered new bursts of star formation. Second, they will use the color and size information to determine the number and size of the globular star clusters surrounding these galaxies, which can then be used as tracers of the galaxy's gravitational potential.

Required skills: Required skills are some familiarity with astronomy (magnitudes, fluxes, what galaxies are) at the level of PH0270 or the equivalent.

Preferred skills: Experiences with shell scripting and python are preferred, but can be learned as part of

the project (and are a useful skill in all astrophysics research). Familiarity with astronomy at a level above PH0270 might be useful, but again is not required beforehand.

Is this project for more than one student: Yes

Jay Tang
Department: Physics
Project Type: Research
Project Title: Microscopic imaging and tracking of bacteria racing over an agar surface

Project Description:
Many bacteria are not only motile in liquid, but also on solid surfaces. My laboratory conducts experiments with bacteria that migrate over wet surfaces via a process called swarming. The rate of swarming, which is set by the speed of bacteria advancing collectively at the front of a spreading colony, is sensitive to a number of factors. Recent experiments in our lab have pointed to fluid physics phenomena of wetting and contact line pinning as the key determinants of the bacterial swarming rate. An interested undergraduate student will be guided to observe the swarming behavior of a species of gut bacterium, the Enterobacter sp. SM3, and to test how mucin, a glycoprotein that is a major component on the stomach lining, affects the swarming behavior in ways that are relevant to human physiology. The technical skills the student shall acquire include bacterial culture, analyzing images using available software such as Image-J, tracking the motion of individual bacteria aided by an AI software, modeling and explaining the observed results, and writing a scientific report, all with the guidance of the mentoring PI and senior PhD students.

Required skills: NA

Preferred skills: The student should have taken some college level STEM courses, such as Bio0200, Chem0033, Eng 0030, and Phys0030. Some wet lab experience is highly desirable.

Is this project for more than one student: No

Jennifer Roloff
Department: Physics
Project Type: Research
Project Title: Characterization of silicon detectors for high energy physics applications

Project Description:
High energy colliders, such as the Large Hadron Collider (LHC), provide a unique opportunity to answer big questions about the universe by studying the fundamental interactions between particles in high energy collisions. In order to optimally utilize the large datasets from the collisions, we rely on state-of-the-art detector technologies. One promising detector being considered for future detectors is low-gain avalanche diodes (LGADs), a type of silicon detector. These detectors have the capacity for incredibly precise timing spatial resolution, making them a powerful tool for a collider experiment. The

student will characterize their behavior, including their current and capacitance under different operating voltages, and help set up new systems for testing the spatial and timing resolution of these sensors. Students will also test and develop different algorithms for sharing signals across channels, optimizing for the spatial and timing resolution of the sensors. These studies will be performed on LGADs and capacitively-coupled LGADs with different geometries and characteristics in order to study the complex interaction between the sensor design and their performance. The work will be a combination of hands-on data collection, and data analysis using either C++ or python.

Required skills: Basic competency in python or C++, introductory E&M course

Preferred skills: Silicon detector or other hardware experience

Is this project for more than one student: No

Loukas Gouskos
Department: Physics
Project Type: Research
Project Title: Development of the Next Generation of Silicon Detectors for Future Particle Colliders

Project Description:
The next generation of particle colliders, such as the proposed Future Circular Collider (FCC), demands advanced silicon detectors to enable precision measurements and explore Higgs boson interactions. This project offers students an opportunity to contribute to this frontier, focusing on two critical areas:

Simulation of Beam-Induced Backgrounds:
Beam-induced backgrounds challenge the performance of tracking and calorimeter systems, affecting their ability to measure particle interactions accurately. Students will use advanced simulation tools to model and analyze these effects, developing strategies to mitigate their impact. Building on preliminary work from U.S. and CERN collaborations, participants will refine simulations and optimize detector designs, directly influencing future experiments.

Chip and Module Testing:
Silicon detectors depend on high spatial and timing resolution for accurate particle detection. Students will test advanced chips and modules at Brown University's state-of-the-art facilities and CERN's silicon testing lab. This hands-on experience includes performance evaluation, data analysis, and an understanding of the underlying physics and engineering. A summer placement at CERN provides further mentorship and access to world-class resources.

Students will:
(1) Develop expertise in simulation, data analysis, and experimental techniques.
(2) Contribute to innovative detector designs for one of the most ambitious particle physics projects.
(3) Collaborate with global leaders, including CERN scientists and U.S. researchers.
(4) Gain practical experience with advanced technologies, preparing for future careers in research and industry.

This project integrates theory and experimentation, allowing students to tackle critical challenges in

modern science and contribute to shaping the future of particle physics.

Required skills: Good knowledge of Python and C++, basic knowledge of particle physics, interest in detector R&D

Preferred skills: Excellent knowledge of Python and C++, Basic knowledge of AI/ML development, data analysis in particle physics, prior experience in detector R&D

Is this project for more than one student: Yes

Loukas Gouskos
Department: Physics
Project Type: Research
Project Title: AI/ML on FPGA and ASIC

Project Description:
The project focuses on the development of ultra-efficient AI algorithms for identifying particles responsible for jet formation at the Large Hadron Collider (LHC). This work is crucial for fully exploiting the potential of the LHC by enabling real-time selection and detailed analysis of particle collision data. By enhancing the LHC's capabilities, these developments could lead to groundbreaking results in particle physics. The project will explore various machine learning architectures, such as Fully Connected Neural Networks, Convolutional Neural Networks, and Graph Neural Networks, along with model compression techniques. These are vital for integrating advanced algorithms into FPGA (Field-Programmable Gate Array) and ASIC (Application-Specific Integrated Circuit) systems. FPGAs and ASICs are types of integrated circuits. An FPGA is a hardware circuit that a user can program to carry out one or more logical operations, providing flexibility and speed beneficial for real-time data processing. ASICs are custom-built for specific applications rather than intended for general-purpose use, offering high performance and efficiency in energy consumption. These technologies not only enhance the processing capabilities at the LHC but also find applications in other areas of physics, such as gravitational wave detection, and industries like automotive for self-driving cars and mobile technology. By participating in this project, the student will dive into the sophisticated intersection of AI, machine learning, and hardware implementation, learning to develop solutions that are not only pivotal for particle physics but also transferable to various technological applications.

Required skills: Good knowledge of Python and experience in AI and ML algorithm development. Familiarity with hardware description languages like VHDL or Verilog

Preferred skills: Understanding of digital circuit design and implementation processes for FPGA and ASIC. Strong background in computer science or electrical engineering

Is this project for more than one student: Yes

Matt LeBlanc

Department: Physics
Project Type: Research
Project Title: Building the Tools for Discovery: Open Source Software Developments for Particle Physics

Project Description:
This project offers an opportunity to gain valuable experience in open source software development within the domain of particle physics. Such software is commonly used in analysis of data from the Large Hadron Collider, and contributions to its development and growth from the user community is essential to ensure long-term sustainability.

The student will contribute to existing software repositories by implementing new features, improving data processing capabilities, testing and validating new developments, improving software documentation, etc. The specific developments to be performed will be determined in consultation with interested students, although an emphasis will be placed on software that is related to particle 'jets' (e.g. https://github.com/scikit-hep/fastjet) and/or applications of Optimal Transport algorithms in particle physics data analysis (e.g. https://github.com/thaler-lab/Wasserstein, https://github.com/caricesarotti/event_isotropy).

This experience will provide practical, real-world experience to a motivated student in software development using C++ and Python, in addition to exposure to the cutting-edge particle physics research that is being performed at Brown.

Required skills: N/A

Preferred skills: Python, C++, unix operating systems

Is this project for more than one student: No

Matt LeBlanc
Department: Physics
Project Type: Research
Project Title: Modernising Particle Physics Software: Jet Reconstruction in Julia

Project Description:
One of the main software packages used for particle physics research at the LHC is 'FastJet,' which is an efficient C++ implementation of the recursive pairwise combination algorithms that are used to find particle jets in LHC collisions. This software relies on a breakthrough finding that allowed these complex algorithms to be implemented with a computational efficiency of Nlog(N), significantly better than the naive N^3 complexity that was originally expected.

An exploratory reimplementation of FastJet using the Julia programming language has been initiated by developers at CERN's Experimental Physics Software department. Julia is a new programming language that has not yet been widely adopted by the particle physics community, but it is known to have numerous advantages over both C++ and python, combining the latter's ease-of-use and applicability for rapid prototyping with the former's performance in terms of execution speeds and applicability for scientific

computing. The proof-of-concept reimplementation of the most basic FastJet functionality performs ~20% faster than the existing C++ version, and has further room for optimization.

Presently, this package is at an exploratory stage and the existing development team is open to new contributors. The student working on this project will be expected to port aspects of the C++ fastjet implementation into Julia, and to make contributions to the reimplementation's development as part of the wider, international team. This experience will provide practical, real-world experience to a motivated student in software development using Julia and C++ (and potentially python), in addition to exposure to the cutting-edge particle physics research that is being performed at Brown.

Required skills: N/A

Preferred skills: Programming experience is an asset (Julia, C++, python)

Is this project for more than one student: No

Deva Woodly
Department: Political Science
Project Type: Research
Project Title: The Politics of Futurity: Phase I - Histories of Futurity

Project Description:
The Histories of Futurity Project is the first phase in an ongoing project called The Politics of Futurity. Futurity is a word with multivalent meanings; it indicates the future time, a future event, and renewed or continuing existence. Futurity is the conviction that the part of the story one is living in is not and cannot be the whole of it. This moment in time – fraught as it is with uncertainty - gives us a rare political opportunity to begin something new. This project is undertaken with the understanding that the year 2080 should be as different from 1980 as 1980 was from 1880. Students who assist with the first phase of research will be collecting biographical and historical information about early 20th century thinkers in politics, economics, and literature in England, USA, and the Caribbean. Students will be tasked with putting together summary documents detailing the political thought, policy proposals, social movement participation, and social mores that exhibit the experimental nature of early 20th century luminaries like John Maynard Keynes, Zora Neal Hurston, and Aimé Césaire, among others. Students will help to tell the story of the contingency and ambition of our 20th century forebears in order to begin to set expectations for the scope, scale, and ambition of the 21st century politics that the current turn of the century generation is tasked to build.

Required skills: N/A

Preferred skills: History, Economic History, American Politics, African American Politics/Africana Studies, Political Theory, Comparative Politics

Is this project for more than one student: Yes

Peter Andreas
Department: Political Science, Watson Institute for International and Public Affairs
Project Type: Research
Project Title: History of the Illicit Global Economy

Project Description:
Adam Smith long ago wrote that people have an intrinsic "propensity to truck, barter, and exchange one thing for another." He could have added, "licitly or illicitly." Indeed, Smith's famous metaphor of the "invisible hand" to describe market forces can be extended to include sneaky illicit traders whose business was based on being as invisible as possible. This new book project is about the illicit side of trade and how it has shaped the world for the past five centuries. More than a decade ago, I wrote Smuggler Nation, which re-examined the story of America—its founding, development, and emergence as a global superpower—through the lens of contraband commerce. My ambition in this new book is to go well beyond this U.S.-centric, national narrative by telling a much bigger and more ambitious global and transnational story of the many ways in which the dynamics of illicit trade have been intimately intertwined with the making and remaking of the modern world. The main focus of the book is on clandestine cross-border flows of goods and people from the early modern era to the present day. Student researchers will find, summarize, and synthesize literature and documents related to the role of smuggling in the rise and decline of empires, state-building and subversion, colonial expansion, the spread of industrialization, the opening of new markets, and the creation of a global consumer culture.

Required skills: Experience with library research, good writing skills, careful attention to detail.

Preferred skills: Prefer students who have taken a course with me, but not required. Fluency in a foreign language and some familiarity with archival research would also be helpful.

Is this project for more than one student: Yes

Prerna Singh
Department: Political Science, Watson Institute for International and Public Affairs
Project Type: Research
Project Title: Measuring the Cultural and Ideational Components of State Capacity

Project Description:
How do states gain citizen cooperation with their agendas and programs? A vast scholarship across the social sciences has fixated on states' use of 'sticks' (such as coercion, penalties for breaking the law, which include monetary fines and even imprisonment) and 'carrots' (for example, a range of incentives). This 'rational' repertoire of tactics is certainly important but also insufficient. States across the world and through time have relied equally and arguably, even more heavily, on a vast, relatively underemphasized but potent reservoir of cultural and ideational power to persuade and gain the cooperation of their citizens. What exactly is this 'symbolic power'? How can we operationalize it? These are the main tasks of this project.
Research assistants will work closely with me and a graduate student manager (Shreya Singh, Department of Political Science; Fellow in the Graduate Program of Development) in the planning and creating of a database that seeks to capture the strength of symbolic power across different states over

time. We will identify and draw on a diverse range of primary and secondary historical sources to develop a coding framework for state symbolic power.

Required skills: Passion for research; willingness to learn statistical software like R, research software like Zotero

Preferred skills: Previous research experience, Statistical skills, including working with R

Is this project for more than one student: Yes

Robert Blair
Department: Political Science, Watson Institute for International and Public Affairs
Project Type: Research
Project Title: Understanding and Combating Democratic Erosion in the US and Beyond

Project Description:
The Democratic Erosion Fellowship supports students from Brown to engage in cutting-edge and policy-relevant research on democratic erosion and resilience in comparative perspective. Fellows will contribute to the Democratic Erosion Consortium, a multi-university project that helps students and faculty evaluate threats to democracy both at home and abroad through the lens of theory, history, and social science. The Democratic Erosion Consortium aims to help understand and mitigate threats to democracy through a combination of research, teaching, and civic and policy engagement. Fellows may help with any or all of the following: 1) expand and improve the Democratic Erosion Event Dataset (DEED), an original dataset on the precursors and symptoms of, democratic backsliding around the world; 2) develop policy briefs on democratic backsliding and resilience in collaboration with the National Democratic Institute (NDI) and other policy partners; and 3) further our research on affective polarization in the United States. They will work individually and in teams under the direction of Robert Blair (Associate Professor of Political Science and International and Public Affairs) and the other Consortium directors and research associates. Students will build professional and research skills, learning how to code and analyze qualitative and quantitative data on democratic backsliding in countries across the world, produce independent policy analyses, and collaborate with non-academic clients. Please find more information about the Consortium here (https://www.democratic-erosion.com/).

Required skills: Self-starter, effective and reliable communicator, accountable team member, creative problem-solver

Preferred skills: Experience with Stata or R; proficiency in Powerpoint and/or Overleaf/Beamer; courses in political science and other social sciences; experience developing educational materials

Is this project for more than one student: Yes

Anna Yeo
Department: Psychiatry and Human Behavior

Project Type: Research
Project Title: Dietary Patterns and Asthma Activity in Urban Children

Project Description:
We are seeking a research intern to help with a study examining Dietary Patterns and Asthma in Children (Project DPAC). As part of the Pediatric Health Disparities Program directed by Drs. Daphne Koinis Mitchell, PhD and Elizabeth McQuaid, PhD, ABPP, Project DPAC will involve a daily observational protocol to assess dietary quality, quantity, and timing and asthma activity in children living in urban neighborhoods of RI.

UTRA students will have the opportunity to shadow full-time research assistants, assist with data collection, and attend weekly research staff meetings as well as the monthly lab meetings, in which faculty and fellows affiliated with the group present ongoing research. This opportunity will provide excellent research training for those planning to pursue paid research assistantships for graduate studies in psychology, public health, nursing, or medicine.

Specific tasks will include assistance with research participant recruitment and scheduling for studies, as well as assisting with a limited amount of data collection (e.g., administering questionnaires to child research participants and their caregivers) and with other tasks integral to research (e.g., preparing graphs and tables of results, preparing materials for research sessions, some clerical tasks, etc.).

Required skills: Strong multitasking and time management abilities, critical thinking, and collaboration within an interdisciplinary team. Strong communication skills, meticulous attention to detail. Proficiency in relevant computer applications for research purposes and/or an ability and willingness to learn new applications as needed (i.e., Microsoft Office 365, REDCap, SPSS, ASANA). Experience working in ethnically, culturally, and racially diverse environments.

Preferred skills: Spanish fluency. Valid driver's license and one's own car. Knowledge of research concepts.

Is this project for more than one student: No

Carolina Haass-Koffler
Department: Psychiatry and Human Behavior
Project Type: Research
Project Title: Investigating the Relationship Between Alcohol Use Disorder and Pain Using a Preclinical Model

Project Description:
Alcohol Use Disorder has profound implications on physical and mental health, with emerging evidence suggesting a strong link between addiction and the exacerbation of pain, including psychosomatic pain disorders. This project utilizes a preclinical rat model to explore the mechanisms underlying alcohol-induced modulation of pain pathways. Unlike traditional models requiring prolonged addiction training, this study employs rats genetically selected to exhibit innate alcohol dependence. This innovative approach streamlines experimental timelines and provides unique insights into the direct effects of alcohol addiction on pain perception and psychosomatic disorders.

The prospective researcher will gain hands-on experience in designing and conducting behavioral and neurophysiological assays to assess pain responses and analyze the impact of alcohol abuse on pain modulation. Training will include data acquisition, interpretation of results, and the opportunity to develop science communication skills through presentations and report writing. This project offers a unique platform to contribute to the growing field of neurobehavioral research, paving the way for improved therapeutic strategies targeting comorbid addiction and pain disorders.

Required skills: Ability to work with preclinical models

Preferred skills: Pharmacology course

Is this project for more than one student: No

Carolina Haass-Koffler
Department: Psychiatry and Human Behavior
Project Type: Research
Project Title: Alpha-1 receptor blockade for the treatment of alcohol use disorder

Project Description:
Alcohol use disorder (AUD) is a chronic disease that is characterized by a physical and emotional dependency on alcohol. This summer, we will have an opportunity for a research student to work in an FDA-regulated clinical trial with a patient population suffering from AUD. This is a 16-week, between-subject, double-blind, randomized clinical trial that will investigate the alpha-1 receptor blockade as a novel pharmacological treatment for AUD by administering doxazosin or placebo paired to a stress induction procedure in the laboratory drugs to individuals who are seeking treatment with AUD. Specifically, this study will aim to understand the role of stress in the development of AUD pharmacotherapies that target noradrenergic blockades. The trial will involve screening of participants, medication administration, and monitoring of adverse events. The student should plan to dedicate 8-10 consecutive weeks and around 20 hours per week to this trial. Students will be expected to demonstrate a strong interest in the research and exhibit flexibility with time contributed to the trial.

Required skills: CITI course for human subject biomedical research; Previous experience with participants with substance use disorders; Previous experience with cue-reactivity studies; Biomedical experience with collecting biosamples (urine and saliva) and administering an EKG; Interest in psychiatry and mental health

Preferred skills: Course in pharmacology

Is this project for more than one student: No

Gabriela López
Department: Psychiatry and Human Behavior
Project Type: Research

Project Title: **Event-level Antecedents of Heavy Drinking Among Bisexual and Heterosexual Women with and without Histories of Sexual Assault**

Project Description:
This study is focused on bisexual+ women's health and understanding the reasons why they might drink. The topics of interest include their psychological distress, experiences of microaggressions, and their reasons for drinking. This is a large-scale study recruiting 200 participants for an ecological momentary assessment (EMA) study. Participants will complete a baseline orientation and 30 days of EMA data collection. Students would be asked to help with day to day tasks including scheduling and coordinating new participants as well as tracking the active participants in the EMA study.

Required skills: Great interpersonal communication skills, good time management, flexibility, prior research experience is a plus but not necessary time management, flexibility, prior research experience is a plus.

Preferred skills: If you have an interest in health disparities or bisexual+ women's health then that would be ideal.

Is this project for more than one student: No

Grace Cushman
Department: Psychiatry and Human Behavior
Project Type: Research
Project Title: **Developing Prevention and Intervention Strategies to Improve Adolescent Health**

Project Description:
Dr. Grace Cushman (Assistant Professor) and Dr. Kristine Durkin (postdoctoral psychology research fellow) at Rhode Island Hospital/Brown Medical School are seeking a student for Summer 2025 to help in their behavioral-health focused psychology lab. The two primary studies that will occur during the summer are 1) a study focused on the development of a community-based intervention to improve diet quality and physical activity in youth and 2) a study assessing barriers and facilitators to food allergy management among adolescents and young adults. Some tasks can be conducted remotely while others will need to be completed on-site at either Hasbro Children's Hospital or the Coro Building. Students will also be given the opportunity to attend meetings with youth community collaborators at the non-profit organization, Young Voices, RI. Specific tasks will include assisting in coordinating youth panel member meetings, research participant recruitment and scheduling, assisting with focus groups, preparing and summarizing study results, and other tasks integral to research. Drs. Durkin and Cushman are members of the Brown Clinical Psychology Training Consortium and are actively involved in research and clinical work with children. This opportunity will provide excellent research training and public health experience for those considering pursuing careers or graduate studies in psychology or public health, as well as those planning to apply to nursing or medical school. Responsibilities include but are not limited to: 1. Recruitment eligible families through phone, email, or on-site (mostly remote recruitment but some in-person opportunities may be available) 2. Ensure that all documentation maintained for each study is readily available for review by study staff 3. Collect data in the form of focus groups, and data organization and transcription of focus groups 4. Assist with quantitative and qualitative analyses and preparation of study results.

Required skills: 1. Ability to function autonomously on a collaborative interdisciplinary team involving research, medical and mental health care 2. Excellent written and verbal communication and interpersonal skills 3. Strong administrative skills and a strong attention to detail 4. Strong computer skills 5. Ability to work harmoniously with diverse groups of individuals

Preferred skills: N/A

Is this project for more than one student: No

Laura Korthauer
Department: Psychiatry and Human Behavior
Project Type: Research
Project Title: Investigating neural predictors of risk and resilience to Alzheimer's disease

Project Description:
My research focuses on predictors of risk and resilience to Alzheimer's disease, including the use of EEG and MRI in people who are cognitively unimpaired but at high risk for developing the disease. Students will assist with acquisition and analysis of EEG and/or MRI data, data processing, and data analysis. Exposure to neuropsychological testing will be provided if desired by the student.

Required skills: N/A

Preferred skills: Experience with MATLAB is preferred

Is this project for more than one student: No

Laura Stroud
Department: Psychiatry and Human Behavior
Project Type: Research
Project Title: Exploring the Impact of Prenatal Substance Use on Fetal and Infant Neurobehavioral Development

Project Description:
The Maternal and Infant Studies Lab, under the direction of Dr. Laura Stroud at the Center for Behavioral and Preventive Medicine (The Miriam Hospital and Alpert Medical School of Brown University), is dedicated to advancing our understanding of how prenatal exposures—such as substance use, stress, and depression—affect fetal and infant neurobehavioral development. Undergraduate research assistants selected to join the Maternal and Infant Studies team will engage in a wide range of research activities. These include acquiring proficiency in coding fetal neurobehavioral assessments through the Fetal Neurobehavioral Coding System (FENS), which combines ultrasound-recorded fetal behaviors with fetal heart rate monitoring. Additionally, undergraduate research assistants will have the opportunity to interact with research participants and their data, assist with biospecimen collection, and contribute to other

critical aspects of the research process.

This opportunity provides undergraduates with comprehensive exposure to biobehavioral research methodologies, offering them valuable skills that will benefit both their academic and professional development. The lab ensures that all activities adhere strictly to HIPAA and IRB protocols, maintaining the highest ethical standards. Throughout the program, undergraduate research assistants will receive close mentorship from the study staff, culminating in the design and execution of an independent research project. Moreover, they will have the opportunity to attend regular meetings with an interdisciplinary team of researchers, fostering a collaborative and intellectually enriching environment.

Required skills: N/A

Preferred skills: We are seeking an Undergraduate Research Assistant with a strong interest in biobehavioral research, exceptional attention to detail, and enrollment in Psychology, Public Health, Biology, Neuroscience, or a related field. Candidates should demonstrate strong academic performance and a commitment to learning and contributing to research in this interdisciplinary area.

Is this project for more than one student: No

Meghan Sharp
Department: Psychiatry and Human Behavior
Project Type: Research
Project Title: Characterizing stress and resilience in women trying to conceive

Project Description:
Infertility, or the failure to conceive a pregnancy after one year of regular unprotected sexual intercourse, is common, costly, stressful, and associated with adverse maternal fetal health outcomes. A recent survey of women engaged with infertility care identified infertility as more stressful than money, work, and even the COVID-19 pandemic. In fact, women experience infertility-related stress at levels comparable to those undergoing cancer or HIV treatment. There is mounting evidence that stress associated with trying to conceive (TTC) begins before infertility care commences and worsens as failed pregnancy cycles accrue. In fact, after just two cycles of failed conception attempts, women report negative impacts on sexual satisfaction and marital quality, feelings of failure and self-blame, and obsessive conception-related thoughts and behaviors. Thus, women enter infertility care with TTC-specific stress and distress that can then be exacerbated by subsequent conception difficulties and infertility intervention. The well-established negative psychological impacts of infertility-related stress include anxiety and depression escalating during infertility care that can extend into pregnancy and peripartum maternal-fetal health. It is, therefore, crucial that we have effective and accessible treatment options to reduce stress and distress for women who are TTC.

In this research funded by the Women's Medicine Collaborative at Brown University Health, participants complete quantitative and qualitative research measures. First, participants complete 6 months of quantitative measures of reproductive health, TTC behaviors, stress, distress, and resilience. Second, participants complete an individual interview regarding their TTC experience and coping strategies. The aim of this research is to inform the development of a TTC-specific intervention to promote resilience and decrease stress/distress.

Participants are currently enrolled and completing quantitative measures. Interviews will be conducted through the spring. The research assistant may be asked to transcribe and clean interview transcripts, manage the project database, participate in qualitative/quantitative analysis, and help prepare presentations/manuscripts.

Required skills: Non-judgmental approach to perinatal mental and physical health, interest in mental health care, independent organizational skills, strong attention to detail

Preferred skills: Any experience with research studies

Is this project for more than one student: Yes

Meghan Sharp
Department: Psychiatry and Human Behavior
Project Type: Research
Project Title: Primary prevention of posttraumatic stress symptoms following Cesarean section

Project Description:
Cesarean section (C-section) birth increases risk for postpartum posttraumatic stress disorder (p-PTSD), with one-in-three birthing people reporting clinically significant PTSD symptoms after a surgical birth. P-PTSD has been linked with lower rates of breastfeeding, compromised parent-infant bonding, and long-term deficits in child cognitive development. PTSD, generally, increases risk for long-term health problems, including cardiovascular disease, substance abuse, and additional psychiatric disturbance. Despite the risks, there have been no prevention studies for p-PTSD. The patient experience of surgical birth may provide a modifiable factor to prevent the development of p-PTSD.

In this research study funded by the Rhode Island Foundation, we are conducting individual interviews with birthing people following C-section. Through qualitative analysis, we will characterize patient experiences of prenatal, peripartum, and postpartum care. We will conduct mixed-methods analyses to examine aspects of C-section experience associated with postpartum mental health, including depression, anxiety, and PTSD symptoms.

Interviews are underway and will continue into the Spring. A research assistant will receive training in research ethics and qualitative methods. The RA may be asked to transcribe and clean interview transcripts, manage the project database, and participate in qualitative/quantitative analyses. The RA will also have the opportunity to help prepare presentations/manuscripts.

Required skills: Non-judgmental approach to perinatal mental and physical health, interest in obstetrics and/or healthcare quality, independent organizational skills, strong attention to detail

Preferred skills: Any experience with research studies

Is this project for more than one student: Yes

Tosca Braun
Department: Psychiatry and Human Behavior, ABMS; Behavioral and Social Sciences, SPH
Project Type: Research
Project Title: Intersectional Stigma and Multilevel Resilience among Individuals Taking Opioid Agonist Therapy with Chronic Pain
[This project is cross-listed with the Brown Laidlaw Scholars Program.]

Project Description:
We are seeking students to assist with an NIH-funded qualitative study examining intersectional stigma and multilevel resilience among people taking opioid agonist therapy with chronic pain in a clinical trial of a yoga-based intervention. Part of the study also involves assessing approaches that support stigma resilience for this population, using a community-engaged approach. Interview data are rich, and provide an excellent opportunity to learn more about the complexity of intersectional stigma and resilience among people with opioid use disorders who experience chronic pain.

The study working on this project will assist with qualitative coding and analysis, attend team meetings and community engagement events, and have the opportunity to develop stigma reduction materials to translate findings to healthcare providers and the general public. They will also have the opportunity to consult with a stakeholder that has lived experience at the studied intersections. For those who wish, opportunities for publication or presentation are also available.

Required skills: Good time management and strong attention to detail, as well as communication and interpersonal skills including cultural humility and sensitivity. Reliable transportation will also be needed, as most activities will occur at Butler Hospital and elsewhere in the Providence, RI area.

Preferred skills: If you have an interest or experience in community-engagement, public health, intersectionality, stigma, and/or health equity that would be ideal. Experience with qualitative research, structured literature reviews, and community engagement is also a plus.

Is this project for more than one student: Yes

Tosca Braun
Department: Psychiatry and Human Behavior, ABMS; Behavioral and Social Sciences, SPH
Project Type: Research
Project Title: Integrative Yoga and Self-Compassion for Survivors of Violence: A Community-Engaged Study
[This project is cross-listed with the Brown Laidlaw Scholars Program.]

Project Description:
Phase of the study (nearing completion) involves developing a community action panel, conducting focus groups and interviews with women with lived experience, and integrating data with community feedback to draft the program manual. Phase 2 (2025) involves pilot testing the intervention in a pre-post pilot, and Phase 3 involves running a randomized controlled trial, comparing the program to a women's wellbeing education control group. The student research assistant working on this project will help develop the

wellbeing program manual, based on prior community feedback; assist community workshops; and support other study activities, including team meetings and qualitative data analysis. This internship will offer helpful insights and experience in a conducting community-engaged research study.

Required skills: Good time management and strong attention to detail, as well as interpersonal skills including cultural humility and sensitivity. Reliable transportation will also be needed, as some activities will occur at Butler Hospital and elsewhere in the Providence, RI area.

Preferred skills: If you have an interest or experience in community-engagement, public health, intersectionality, stigma, and/or health equity that would be ideal. Experience with qualitative research, structured literature reviews, and community engagement is also a strong plus.

Is this project for more than one student: Yes

Michelle Pievsky
Department: Psychiatry and Human Behavior; Developmental Behavioral Pediatrics
Project Type: Research
Project Title: Increasing the presence of AIML in a multidisciplinary pediatric clinic

Project Description:
Augmented intelligence and machine learning (AIML) are changing the face of healthcare, but there are many barriers to their adoption. We are interested in completing a small quality improvement study aiming to assess the degree to which our clinical staff at our clinic utilize AIML in their work while using AIML as part of the study methodology. The study will take place at Children's Neurodevelopment Center, a multidisciplinary pediatric clinic with developmental behavioral pediatricians, neurologists, geneticists, psychologists, social workers, pharmacologists, nutritionists, genetic counselors, service coordinators, nurses, MAs, and multidisciplinary trainees among the clinical staff. The goals of the research project are (1) to assess how people are using AIML in their clinical work, (2) to utilize AIML as part of the study methodology, and (3) reflect on the role that AIML had in the generation of the research. The student will be expected to be first author on a poster and propose a project that builds upon this one. The student will also have the opportunity to shadow CNDC staff (especially Dr. Pievsky and others in the developmental behavioral pediatrics department) and participate in other research projects that Dr. Pievsky is working on. Please refer to her Researchers@Brown page for more information.

Required skills: Basic computer science knowledge (either from a beginner course or from previous experience), strong organizational skills, an interest in learning about the research process, credentialing as an intern at Lifespan OR the ability to begin the credentialing process prior to the start of the summer

Preferred skills: Background knowledge of how to conduct research (either through past experience or coursework), interest in child development

Is this project for more than one student: No

Anita Shukla
Department: School of Engineering
Project Type: Research
Project Title: Bacteria-responsive microneedles for the treatment of antibiotic-resistant biofilm infections

Project Description:
Antibiotic-resistant wound infections have been an increasing clinical challenge over the last few decades due to overuse and misuse of antibiotics. There has been limited development of new effective antibiotics to combat these infections. Biofilms, which are three-dimensional microbial communities, are typically involved in wound infections and exhibit sophisticated antibiotic resistance mechanisms, ranging from antibiotic inactivation to host immune evasion. Enzyme-responsive microneedles are a potentially promising approach to treat biofilm wound infections. These microneedles will be designed to physically disrupt the biofilm matrix composed of extracellular polymeric substances (EPS), and then degrade and release antimicrobial agents on-demand in the presence of specific enzymes present inside of the biofilm. A SPRINT UTRA undergraduate student on this project will fabricate and characterize these bacterial enzyme responsive microneedles. This research will involve use of certain characterization techniques such as mechanical compression testing, scanning electron microscopy, puncture studies, and degradation/drug release assessment from the microneedles. Additionally, the student will understand and conduct bacterial culture and in vitro testing of microneedle activity with bacteria.

Required skills: Engineering and/or science concentrators

Preferred skills: Introductory engineering knowledge/courses; familiarity with drug delivery and/or chemistry; microbiology

Is this project for more than one student: No

Anita Shukla
Department: School of Engineering
Project Type: Research
Project Title: Development of immunomodulatory nanoparticles for the treatment of biofilm infections

Project Description:
Modulation and reprogramming of immune cells using engineered biomaterials to treat infections is an emerging area of interest. The rise of antibiotic resistant bacteria threats, and decreasing antibiotic efficacy motivate the need to develop novel therapies that are able to target the host through the implementation of immunomodulatory biomaterials.

Leukocytes, such as macrophages, can polarize into different phenotypes, from more proinflammatory to anti-inflammatory immunosuppressed states depending on the conditions of the microenvironment. Cellular metabolism and regulation of gene expression contribute to the function and activation of these immune cells. Bacterial biofilm infections have been shown to hijack the innate immune system by suppressing the host-immune system and promoting immunosuppressed anti-inflammatory activity. Thus, targeting macrophage metabolism along with down regulating immune suppressing genes to reprogram

immune cell functions and redirect bacterial clearance is a novel therapeutic strategy.

This project aims to develop and test a library of immunomodulatory lipid nanoparticles to reprogram macrophage polarization from an anti-inflammatory state to a pro-inflammatory state to combat biofilm infections. The prospective student will delve into nanoparticle (NP) fabrication via microfluidics and characterize the NPs using dynamic light scattering and transmission electron microscopy. In vitro experiments to assess nanoparticle cytotoxicity, uptake, transfection efficiency in macrophages, as well as macrophage polarization studies via flow cytometry will take place. The student will learn experimental design, troubleshooting of experiments, and documentation of experimental procedures in a lab notebook. The student will also have the opportunity to develop science communication skills by presenting at lab group and mentor meetings.

Required skills: Engineering or science concentrator

Preferred skills: BIOL 0530 (Principles of Immunology)

Is this project for more than one student: No

Ian Wong
Department: School of Engineering
Project Type: Research
Project Title: Profiling Circulating Tumor Cell Heterogeneity using Computer Vision and Machine Learning

Project Description:
Cancer cells exhibit profound heterogeneity in shape and biomarker expression, which remains challenging to profile using computer vision and machine learning. In particular, primary tumors release heterogeneous circulating tumor cells (CTC) into the bloodstream, which then encounter hostile microenvironments en route to forming a metastatic colony in a distant tissue. This project will investigate how cellular behavior and gene expression change based on the tumor microenvironment, by analyzing morphological changes, proliferation rates, and RNA sequencing data. In order to properly evaluate cell behavior, a trained computational pipeline is needed to correctly identify CTCs, their shape, nuclei, etc, during live cell imaging as well as stained samples. We are recruiting an undergraduate student for the Wong Lab in the School of Engineering to continue a computational project to analyze cell shape and classify heterogeneous phenotypes.

Required skills: Past coursework and experience with image processing is needed

Preferred skills: High proficiency with computer programming is required (e.g. MATLAB, Python, R), and the position requires a commitment of 35 hours a week through the summer

Is this project for more than one student: No

Kareen Coulombe
Department: School of Engineering
Project Type: Research
Project Title: Engineering new cardiac conduction pathways for heart regeneration

Project Description:
Disruption of the conductive paths in the heart can lead to poor heart rhythm, arrhythmias, stroke, heart attack, and even death. We are developing a new engineered tissue from human stem cell-derived cardiomyocytes to restore paths around the heart. We develop custom tools and analyses, and examine the structure and function of these tissues. The student working on this project will be directly mentored by a postdoc in the lab to learn sterile technique, cell culture, experiment design, data collection, image analysis, and data summary and interpretation in the context of this cardiac tissue engineering project. This project has the potential to create a new clinical therapy and has been funded by an NIH R21 Exploratory/Developmental Grant.

Required skills: Reading the literature, completed Biomaterials (ENGN 1490), at least one lab course completed at Brown, trained in the Brown Design Workshop in SOE

Preferred skills: Pipetting, sterile technique

Is this project for more than one student: No

Kareen Coulombe
Department: School of Engineering
Project Type: Research
Project Title: Surgical meshes for Heart Regeneration with Engineered Human Myocardium

Project Description:
Heart attack patients who survive the acute injury often experience decline in heart function and need support for the contracting heart. Translation of engineered human myocardium (EHM) into the clinic for heart regeneration after heart attack requires durable implants for surgical use. We have developed EHM from human stem cell-derived cardiomyocytes and implanted them in rodent models of heart attack. However, we must work on the biomanufacturing pipeline for an EHM product that will be surgically implanted. This project is aimed at customizing a biocompatible and biodegradable polycaprolactone mesh for culturing and implanting the EHM. The student working on this project will be directly mentored by a PhD student in the lab to learn CAD, 3D printing, sterile technique, cell culture, mechanical assessment (Instron), experiment design, data collection, image analysis, and data summary and interpretation in the context of this cardiac tissue engineering project. This project has the potential to advance EHM as a clinical therapy and will be an integral component of continued work in the Coulombe Lab.

Required skills: Reading the literature, completed Biomaterials (ENGN 1490), at least one lab course completed at Brown, trained in the Brown Design Workshop in SOE

Preferred skills: Pipetting, CAD, 3D printing

Is this project for more than one student: No

Kenny Breuer
Department: School of Engineering
Project Type: Research
Project Title: Dynamics of Offshore Wind Turbines

Project Description:
Wind turbines are getting larger and larger and increasingly are being deployed offshore, in deep ocean waters which requires them to be mounted on floating platforms, not anchored in bedrock. We are studying the unique environment of these huge turbines, which includes the effects of the non uniform velocity in the ocean boundary layer, atmospheric turbulence, and rocking that the turbines experience due to wave motion that causes the mounting platform to pitch back and forth, We conduct experiments in the 1.2x1.2 meter wind tunnel at brown using a scale model of a floating turbine. Our experiments include performance measurements as well as particle image velocimetry of the velocity fields in the wave of the wind turbine.

Required skills: Quantitative classes in a STEM field. Interest in hands-on science (e.g. robotics, electronics, set building, model airplanes, etc).

Preferred skills: Programming (esp. Matlab) and a class in Fluid Mechanics are all added advantages.

Is this project for more than one student: Yes

Kenny Breuer
Department: School of Engineering
Project Type: Research
Project Title: Fluid-Structure Interactions in Science, Nature and Engineering

Project Description:
Structures that bend and deform (and break) in a flow are everywhere - in nature (trees, seal whiskers, fish fins), sport (sailing, hang-gliding), our built environment (skyscrapers, wind turbine blades, power lines, marine cables), etc. Unfortunately, fluid-structure interactions are still difficult to model and predict. Our experiments involve measurements of highly elastic structures that exhibit extreme deformations. You will conduct the experiments in either our wind tunnel, or our water tunnel testing facility, and measure the shape of the structures as they bend due to the flow, the forces generated by the flow, and the complex turbulent and unsteady the velocity wake behind the structure (using “Particle Image Velocimetry”). We have several possible projects with different applications from the examples above.

Required skills: Quantitative classes in a STEM field. Interest in hands-on science (e.g. robotics, electronics, set building, model airplanes, etc).

Preferred skills: CAD, Programming (esp. Matlab) and a class in Fluid Mechanics are all added

advantages.

Is this project for more than one student: Yes

Kimani Toussaint
Department: School of Engineering
Project Type: Research
Project Title: Exploring biomedical applications of space-time light

Project Description:
Space-time optical fields that exhibit tight correlations between spatial and temporal frequencies have enabled a relatively small but explosive area of research over the last decade. Currently at a fundamental research stage, space-time light shows promise for a myriad of applications; perhaps underexplored are biomedical applications. Space-time fields are propagation-invariant, both spatially (diffraction-free) and temporally (dispersion-free). These fields are similar to the more widely known diffraction-free beams such as Airy and Bessel Beams. Due to the correlations between space and time, the field can be programmed with arbitrary group velocities and transverse spatial extents—we aim to determine the utility of these qualities for biomedical microscopy. Recently, we have shown the resistance of space-time fields to speckle noise generation which we see as a first step toward biomedical relevance. Building from here, we hope to build a novel microscopy platform for space-time fields.

The undergraduate student will be involved in experiment design, execution, and analysis. Tasks will include generating and characterizing space-time beams, implementing space-time light into microscopes, collecting and analyzing images, and making conclusions based on the findings. The student will gain skills in optical design, data analysis, and scientific communication. The student will be encouraged and expected to make author-worthy contributions toward a peer-reviewed publication of this work.

Required skills: • Python, MATLAB, R, or an equivalent tool for data analysis • Coursework in electromagnetics, optics, and/or related • Self-motivated and curious • A basic understanding of microscopy

Preferred skills: • Previous experience in an optics lab
- ImageJ / FIJI
- CAD
- Coachability

Is this project for more than one student: No

Kurt Pennell
Department: School of Engineering
Project Type: Research
Project Title: Removal of PFAS from Water Using Foam Fractionation

Project Description:
Remediation of soils and groundwater impacted by per- and polyfluoroalkyl substances (PFAS) is particularly challenging due to the strength of the carbon-fluorine bond and the need to achieve extremely low drinking water levels. PFAS-impacted groundwater is managed using conventional “pump and treat” remediation approaches that rely on extraction and above-ground treatment with granular activated carbon (GAC) or ion exchange resin (IXR). However, the cost of GAC and IXR can be exorbitant, especially for pump and treat systems that may be operational for long periods of time. One potential approach to extend the lifetime of GAC or IXR and reduce costs is foam fractionation (FF), which could be applied as a pre-treatment technology to remove PFAS due to their strong tendency to accumulate at the air-water interface. Although FF holds promise as a cost-effective treatment technology for PFAS impacted waters, low removal efficiencies have been reported for short-chain PFAS. To overcome this limitation and make the technology more feasible, the objectives of the proposed research are to: (1) Evaluate polymers and other additives to increase accumulation of short-chain PFAS at the air-water interface; (2) Assess the ability of polymer(s) or combinations of polymers to remove PFAS from water using DAF; and (3) Develop a mathematical model to predict PFAS removal and design DAF systems for pilot-scale testing.

Required skills: wet lab experience, solution preparation

Preferred skills: ENGN 490, CHEM 330

Is this project for more than one student: Yes

Leigh Hochberg
Department: School of Engineering
Project Type: Research
Project Title: iBCI Research

Project Description:
We are seeking a highly motivated undergraduate student to join our research team in the exciting field of intracortical brain-computer interfaces (iBCIs) and virtual environment design using Unity. This internship offers a unique opportunity to contribute to cutting-edge research, gain hands-on experience, and develop valuable skills in neuroengineering, human-computer interaction, and game development. Brain-Computer Interfaces (BCIs) are systems that enable direct communication between the brain and external devices, such as computers or robotic limbs, using electrical activity from the brain. Our lab, BrainGate, aims to develop BCIs that can restore mobility and independence to individuals with tetraplegia. Under the guidance of a BrainGate mentor, the prospective student will use Unity and Mixed Reality Headsets to design virtual environments and tasks that integrate with our BCI system, including creating interactive scenarios, user interfaces, and feedback mechanisms. The student will collaborate with the research team to design tasks that test various aspects of BCI performance, such as speed and accuracy, while ensuring user engagement. This role involves learning the principles and technologies behind BCIs, developing gamified tasks using Unity and Augmented Reality, and participating in the entire research process from ideation to data collection and analysis.

Required skills: Programming skills in Matlab and/or Python

Preferred skills: GitHub, Unity, C#, Experience with AR/VR

Is this project for more than one student: Yes

Marissa Gray
Department: School of Engineering
Project Type: Research
Project Title: Increasing the effectiveness of sleep measurements using movement data

Project Description:
The importance of high-quality sleep for physical and mental health has been increasingly recognized over the past decade. There are many commercial devices that monitor sleep from companies like Apple, Amazon, Fitbit, and Whoop. These devices offer insights into sleep duration, quality, and stages, but their accuracy varies depending on the sensors and their placement. Most sleep tracking devices incorporate advanced, often costly sensors alongside actigraphy—measuring limb movement via triaxial accelerometers—to estimate sleep stages. Actigraphy has proven to be an inexpensive, non-invasive method for estimating total sleep time, with reported accuracy rates between 88-90.7%, depending on the algorithm used. While this accuracy appears high, these algorithms tend to underestimate the amount of time it takes to fall asleep and overestimate the number of awakenings. This makes the total sleep time seem highly accurate while actually presenting room for improvement. Most current devices rely on a single actigraphy sensor, usually worn on one wrist, which may contribute to these over- and under-estimations. In this project, we are using up to four actigraphy sensors, one on each limb, to improve total sleep classification accuracy. This will increase the number of movement data points so that we can construct an algorithm to detect sleep-onset and wake-onset more accurately. Students working on this project will be working alongside a Computer Science master's student who has developed a protocol for a human subject study to test the actigraphy system. Students will likely be working with simulated data, test data, and potentially data from human subjects.

Required skills: Data science experience, Python, critical thinking, and independence when working on tasks

Preferred skills: Computer science, engineering (any type), data science, applied math, and physics concentrators preferred.

Is this project for more than one student: Yes

Mauro Rodriguez
Department: School of Engineering
Project Type: Research
Project Title: Numerical simulations of acoustic wave-soft tissue interface interaction

Project Description:
In ultrasound imaging of soft tissues (e.g., lungs), bubbles are used to create a higher contrast in the imaging. The small bubble nuclei respond to the ultrasound by inertial growing and increasing contrast in the images. However, the ultrasound grows bubbles that oscillate violently leading to adverse bioeffects (e.g., bleeding) in the soft tissue. The aim of this project is to study the wave-induced vorticity-related mechanisms that lead to adverse bioeffects. The problem of interest involves the following. An acoustic wave travels in a viscoelastic liquid towards a liquid-air interface. The interface is initially perturbed (typically with a sine wave profile) and stationary. The acoustic wave interacts with the interface. The wave is partially transmitted and reflected. The density and pressure gradients from the interaction deposit baroclinic vorticity along the interface. Vorticity distorts the interface and could be a mechanism for the adverse bioeffects. Earlier water-air numerical simulations have enabled the prediction how much the perturbation can grow depending on the initial acoustic wave parameters and interface shape. However, these simulations typically involve a water-air system, water representing the soft tissue. The lung soft tissue has elastic characteristics pertinent to the acoustic wave interface interactions. The student shall use an in-house code to run numerical simulations of this problem with a viscoelastic liquid. The in-house code has an existing viscoelastic model, the student shall run a 2D version of the code to compare the differences between viscoelastic-air and water-air simulations. The numerical simulations shall be run on Brown's Oscar supercomputer.

Required skills: Fascination with fluid mechanics, some knowledge of fundamental fluid mechanics, understanding of how to solve a system of ordinary differential equations (ODEs), some working knowledge of C++ or Matlab

Preferred skills: Written and ran ODE numerical solvers,
knowledge of acoustic and/or shock waves,
some working knowledge of viscoelasticity

Is this project for more than one student: No

Mauro Rodriguez
Department: School of Engineering
Project Type: Course Development
Project Title: Bubbles in trees: Fully confined microbubble oscillations in soft materials

Project Description:
The aim of this project is to investigate microbubbles oscillating in a liquid that is fully confined by a hyperelastic solid. This configuration is found in various biological (e.g., trees, plant cells, geological fluid inclusions) and technological applications (e.g., cavitation erosion, peeling of adhesives). Microbubbles respond to environmental pressure forcing by oscillating in volume. The governing equation that describes oscillations of a bubble in a liquid are Rayleigh-Plessset-type equations. State-of-the-art approaches have a Rayleigh-Plesset-type equation to account for the three-component configuration: bubble, liquid, and solid. However, the solid is treated as a linear elastic solid. The research objective is to extend current theory to account for hyperelastic solids (e.g., materials that are soft and can undergo large deformations). This research-based project is a combination of theoretical (analytical) and computational work. The scholar shall write and run a numerical simulation code that solves nonlinear

ordinary differential equations that are an initial-value problem.
The ideal candidate for this project has some working knowledge of numerically solving ODEs via Matlab or a similar tool (e.g., Python and/or C) and some knowledge of fluid mechanics. Additional knowledge of the numerical techniques and physics shall be provided by the faculty member. The scholar shall be provided computational resources (e.g., CCV's Oscar) to conduct the work.

Required skills: Fascination with fluid mechanics and/or bubbles, some knowledge of fundamental fluid mechanics, understanding of how to solve a system of ordinary differential equations (ODEs), some working knowledge of Matlab, C, C++, Python, or similar

Preferred skills: Written and ran ODE numerical solvers,
knowledge of the Rayleigh-Plesset-type equations,
some working knowledge of viscoelasticity,
knowledge of machine learning algorithms

Is this project for more than one student: No

Monica Wilhelmus
Department: School of Engineering
Project Type: Research
Project Title: Identifying Small-Scale Ocean Features from Very-Sparse Lagrangian Data using Network Science

Project Description:
The Arctic is entering a new phase marked by thinner ice, reduced ice coverage, and changing weather patterns. These new trends in sea ice not only compromise the reliability of existing climate model predictions but also result in a different oceanic state than what historical data suggests. Among the various rotating features in the ocean, mesoscale and submesoscale eddies, which range in size from 200 meters to 100 kilometers, play a crucial role in the transport of heat, freshwater, and sea ice. However, their distribution and behavior in this altered Arctic environment remain poorly understood. The proposed project aims to detect and identify rotating structures in the Arctic Ocean using satellite observation data and network science. Satellite altimetry data, which effectively captures ocean eddy signatures in open water regions, will be the primary data source. The UTRA scholar will begin by reviewing remote sensing literature to develop proficiency in handling satellite altimetry data. Next, the UTRA scholar will explore methodologies from network science, such as multiscale recurrence networks, to measure swirling motions in the ocean data. Ultimately, the UTRA scholar is expected to develop an algorithm, potentially using data-driven or machine-learning approaches, for the automatic detection of ocean features. The ideal candidate for this project has a strong interest in one of these fields: fluid dynamics, applied mathematics, ocean and atmospheric science, data processing, and coding software (e.g., MATLAB).

Required skills: Some experience with MATLAB, Python, or other similar-level coding software

Preferred skills: Introductory material in engineering, computer science, or earth sciences

Is this project for more than one student: No

Monica Wilhelmus
Department: School of Engineering
Project Type: Research
Project Title: Producing Comprehensive Arctic Ocean and Sea Ice Data Products from Satellite Imagery

Project Description:
Swirling motions (i.e., eddies) in the Arctic Ocean are receiving increased attention due to their significant impact on ocean circulation, heat transfer, and freshwater distribution. According to NASA's research, these eddies—ranging from small submesoscale eddies (200 m) to larger mesoscale ones (up to 300 km)—play a crucial role in regulating heat and momentum exchanges between the ocean and atmosphere. As sea ice in the Arctic diminishes, the intensity and frequency of eddy activity increase, especially in regions, such as the Beaufort Gyre, where eddies help stabilize freshwater content and influence the energy dynamics of the ocean. The loss of sea ice enhances eddy activity, resulting in greater mechanical energy input into the ocean. NASA's findings suggest that this process boosts mixing and energy dissipation, potentially contributing to changes in ocean currents and accelerating sea ice melt patterns in the Arctic.
The proposed project focuses on detecting and identifying ocean eddies in the Arctic using satellite data. Synthetic Aperture Radar (SAR) will be used because of its ability to capture detailed eddy signatures in both open water and ice-covered areas. Initially, the UTRA scholar will review remote sensing literature to build expertise in processing SAR data. Next, they will investigate techniques to detect eddies and sea ice. Ultimately, the scholar will develop an algorithm, potentially utilizing machine learning or data-driven approaches, for the automatic and faster detection of these ocean and sea ice features. The ideal candidate should have a strong interest in fields such as ocean and atmospheric science, image processing, fluid dynamics, applied mathematics, or coding with tools, such as MATLAB.

Required skills: Some experience with MATLAB, Python, or other similar-level coding software

Preferred skills: Introductory material in engineering, computer science, or earth sciences

Is this project for more than one student: No

Rashid Zia
Department: School of Engineering
Project Type: Research
Project Title: Land Records Public Interest Data Project

Project Description:
Land records in the United States represent a large open dataset of immense historic value and public interest. Such records can provide a wealth of information about how communities are formed and evolve over time through both public and private action, especially when combined with other public records including decennial census data and state business records. In many counties and towns, it is now

possible to electronically search land records back to colonial times, and in these records, you can see details about every transfer of ownership (whether by sale or seizure), lien and mortgage (including who issued them), and other encumbrances including racially restrictive covenants placed by private parties.

Our research group is currently working with collaborators to build datasets and programmatic toolkits to cross reference land records with public census data and state business records. With a focus on how private actions combine with financial interest and government policies to shape communities, these tools can help map transactional networks to highlight the actions and assess the impacts of key agents such as banks, developers, and government agencies.

In this project, we will work to identify a specific community and topic of interest to you that can be used as a test domain for these developing tools – with a special focus on producing a spatial temporal visualization and associated open dataset for a specific contemporary or historic use case. Example contemporary projects could include: identifying the network of transactions predating a large-scale urban redevelopment plan, or mapping home seizures through the Medicaid Estate Recovery Program. Example historic projects could include: mapping the rise in racially restrictive covenants following the Supreme Court's 1917 Buchanan v. Warley decision, and quantifying and visualizing the impact of New Deal government programs on long-term farm and home ownership.

Required skills: Basic experience using Python (or another programming language) for data analysis or visualization, plus interest and commitment to expanding computational skills through direct self-study during this project. Successfully completing any introductory programming course at Brown would satisfy this requirement.

Preferred skills: Interest in history, public policy, and/or urban studies as demonstrated through coursework or other engagement.

Is this project for more than one student: Yes

Rick Fleeter
Department: School of Engineering
Project Type: Research
Project Title: Orbital Multi-Use facility Design and Development through Science Fiction

Project Description:
Imagining the possibility of a commercially viable multi-use facility in space is the first step to its realization. The orbital facility will include at a minimum a 3 dimensional arena for sport and competition and hotel facilities both for teams and officials, the technical staff for recording and broadcasting, plus support staff, and guests who come for a space vacation. In addition to these core facilities, and the support facilities necessary, for resupply, for food preparation, for washing, recycling, and spacecraft systems such as orbit maintenance and debris avoidance, docking, command and control, the facility can be grown to include additional functionality including a medical clinic, research facilities including materials processing and space observation, studio space and recreational activities.

Such a facility would be a cornerstone of the long imagined space economy. But it is a long term, capital intensive, complex undertaking - how to get started?

Our answer is a visioning exercise - what is it and how could it come to be. That visioning exercise under the UTRA takes shape as a science fiction novel about a small group of recent college graduates who dedicate themselves to creating the company that will build the space facility. The book follows their paths collectively and as individuals - their social relationships, their professional roles, the startup, financing, the political, competitive and regulatory environment, and the evolution of the design of the final product. It is envisioned as a lifetime of work, and the novel would open at the end of the entrepreneurial and engineering story, when the once young entrepreneurs are at the end of their careers, visiting the space complex and recounting, remembering, how it came to be, the highly nonlinear path meandering through 60 years of their lives, resolving the technical, financial, organizational, impediments and maintaining their vision..

The student who I expect to apply for the UTRA, Chompoonek (Chicha) Nimitpornsuko, an electrical engineering concentrator, has been working with me since summer of 2024 to develop the concept of using science fiction to plant the seed of possibility, the vision, and in writing an outline and some sample chapters. We would like to really focus on getting the project done this summer. Chicha is doing the structuring and writing and my role is as an editor, suggestor, proof-reader and to guide her in the more technical aspects of the actual design and also the details of the entrepreneurial process - company organization, investments, the startup and company-building experience.

Required skills: proven writing capability including both fiction and nonfiction and the ability to get a lot done on a writing project, some knowledge of space system design (for example having taken my course ENGN 1760. Both engineering and writing experience are required.

Preferred skills: some entrepreneurial experience or coursework

Is this project for more than one student: No

Vikas Srivastava
Department: School of Engineering
Project Type: Research
Project Title: Study of cell migrations

Project Description:
We are interested in the discovery of fundamental phenomena related to the migration behavior of cells, including differences in migration among cancer, healthy, or injured cells. The student will need to be able to fabricate microfluidic devices in a clean room and be able to work with cell culture to do experiments.

Required skills: Familiar with cell culture, familiarity with clean room/microfluidic or other polymer/device fabrication process

Preferred skills: biomedical/material/mechanical relevant background is useful. imaging experience is useful

Is this project for more than one student: Yes

Vikas Srivastava
Department: School of Engineering
Project Type: Research
Project Title: Cancer Tumor Growth Modeling

Project Description:
Cancer tumor growth depends on chemical, mechanical, and physical stimuli in their surrounding microenvironment. The research goal is to develop a comprehensive computational model that describes the growth of breast cancer tumors. The focus will be (i) understanding the fundamental effects of pH and hypoxia on cancer tumor growth, (ii) investigating which differential equations can properly model the growth of breast cancer tumors with respect to pH and hypoxia, and (iii). numerically implement (in MATLAB or Python), calibrate, and validate the model with previously collected in-vitro tumor growth experimental measurements.

Required skills: MATLAB, PYTHON, ODE Course knowledge

Preferred skills: Biomechanics knowledge, Knowledge of Cancer and Tumor Growth basics

Is this project for more than one student: No

Theresa Raimondo
Department: School of Engineering / Biomedical
Project Type: Research
Project Title: Machine-learning driven optimization for siRNA-lipid nanoparticle delivery

Project Description:
Small interfering RNA or siRNA were historically used to validate drug targets but are now being pursued as a therapeutic. As siRNA can be many times shorter than mRNA, lipid nanoparticle (LNP) delivery systems optimized for mRNA delivery such as the covid vaccine or similar may not be suitably optimized. Our lab's prior work has shown that the LNP can be optimized for delivery of a specific siRNA to a specific cell line. This project seeks to discover wider trends through the use of machine learning. The first half of the project will be dedicated to building a large dataset of lipid nanoparticle formulations wherein the component ratios and components will both be varied. The formulations will be used for transfection of cancer or immune cells and the delivery and encapsulation of the formulations assessed. The second half of the project will be dedicated to building machine learning models and comparing their performance. Interested undergraduate students should be eager to work hands-on in the lab, or ideally have prior experience with programming and statistics. This project has room for flexibility based on your enthusiasm and background, so please reach out if either half of the outlined project sparks your interest!

Required skills: N/A

Preferred skills: N/A

Is this project for more than one student: No

Theresa Raimondo
Department: School of Engineering / Biomedical
Project Type: Research
Project Title: Lipid Nanoparticle (LNP) optimization for RNA delivery to Monocytes

Project Description:
Checkpoint inhibitor therapy has demonstrated clinical efficacy to treat many cancers (notably skin cancer, and non-small cell lung cancer, among others). This therapy works by blocking inhibitors (checkpoints) of immune cell activation, so that immune cells are better able to identify and kill cancer cells.

Nucleic acids, particularly ribonucleic acids (RNAs), are rapidly changing modern medicine. siRNAs are a group of non-coding RNAs that silence gene expression. By silencing immune checkpoints, siRNA can be used as a new platform for cancer checkpoint inhibitor therapy.

One of the most significant hurdles in therapeutic siRNA usage is the ability to delivery siRNA into immune cells. Lipid nanoparticles (LNPs) are able to encapsulate and deliver RNA inside cells. LNPs are typically made of four lipid components (ionizable lipid, phospholipid, cholesterol, and PEG-lipid) and the identity of the lipids, as well as their ratios determine RNA delivery efficiency.

This project will investigate LNPs for their ability to deliver RNA to immune cells, specifically monocytes. LNP design parameters, such as which lipids are used and the ratio of lipid to RNA, will be altered to optimize delivery. Design of experiment strategies (JMP software) will be used to optimize LNP design. Reporter fluorescent-mRNA will be used to quantify successful RNA delivery into the monocytes. We are recruiting an undergraduate student for a wet-lab research project. The student will learn how to mix LNPs that encapsulate RNA, and apply those LNPs to monocyte cell cultures to assess (and optimize) RNA delivery.

By the end of the summer, the student will have developed practical experience in mammalian cell culture, LNP formulation and characterization, and plate reader-based fluorescence quantification. Most importantly, the student will work collaboratively with interdisciplinary colleagues to develop an intimate understanding of academic research that will allow them to develop as a future STEM leader.

Required skills: N/A

Preferred skills: Prior experience in a wet-lab (or course-based lab work) would be helpful, cell culture/sterile technique is a bonus but not a required prerequisite (you will learn and practice this over the summer).

Is this project for more than one student: No

Nils Tack
Department: School of Engineering, Fluids and Thermal Sciences
Project Type: Research
Project Title: Advancing bioinspired propulsion in novel metachronal autonomous underwater vehicle.

Project Description:
Our lab harnesses principles from marine animal evolution to design innovative underwater propulsion systems. We focus on metachronal propulsion, the coordinated motion of flexible appendages, known for its exceptional efficiency and maneuverability. This swimming mode benefits from appendages that bend asymmetrically—remaining stiff during thrust-generating strokes and bending nearly horizontally during recovery to minimize drag.

We aim to apply this mechanism in our current 12 cm self-powered metachronal robot, equipped with ten independently controlled appendages to increase its energy efficiency and swimming performance. The next phase involves improving the design and fabrication of the flexible appendages using advanced fabrication techniques like 3D printing and injection molding to achieve optimal passive bending. This project focuses on:

1) Designing asymmetrically bending, flexible appendages: Exploring innovative methods such as injection molded silicone appendages, origami-based structures and living hinges.
2) Evaluating efficiency: Quantifying leg bending and hydrodynamic forces using experimental techniques, including Particle Image Velocimetry (PIV) and force measurements.

The selected student will collaborate with a multidisciplinary team of graduate students and postdocs to prototype, fabricate, and test new appendage designs iteratively. This hands-on role provides experience in experimental fluid dynamics, advanced manufacturing, and design optimization. Participants will also have opportunities to present findings at conferences and contribute to scientific publications. Through this project, the student will play a critical role in developing cutting-edge bioinspired AUVs for efficient ocean exploration, pushing the boundaries of traditional underwater propulsion systems.

Required skills: Good knowledge of CAD (Fusion 360, Solidworks…) and fast prototyping via 3D printing (resin and/or FDM); Good programming skills (Matlab) for data analysis; Skills in experimental fluid dynamics (i.e., Particle image velocimetry, coursework in fluid dynamics).

Preferred skills: Basic knowledge of Arduino to operate the robot

Is this project for more than one student: No

Nils Tack
Department: School of Engineering, Fluids and Thermal Sciences
Project Type: Research
Project Title: Developing a novel bioinspired metachronal autonomous underwater vehicle .

Project Description:
Our lab is advancing the design of autonomous underwater vehicles (AUVs) inspired by metachronal

propulsion, a highly efficient swimming strategy used by small oceanic invertebrates. This mode of locomotion, driven by the coordinated movement of multiple flexible appendages, enables remarkable efficiency and maneuverability. Over the past two years, we have developed several metachronal robotics systems and proof of concept (link) to study the fundamental mechanisms enabling such performance and initiate the development of a metachronal AUV. Ultimately, our goal is to launch a new generation of miniaturized AUV for ocean exploration that achieve higher efficiency than traditional systems and navigate autonomously.
We recently developed a 12 cm self-powered robot with ten independently controlled appendages to explore the mechanisms behind metachronal propulsion and iterate upon early designs of our intended metachronal AUV. The next steps involve refining its design and control systems for autonomous 3D navigation. The proposed project focuses on:

1) Motion control development: Programming routines for yaw, pitch, and roll maneuvers.
2) Performance testing: Measuring fluid-structure interactions, forces, and turning performance using advanced techniques like Particle Image Velocimetry (PIV).

The student will work with a team of undergraduate and graduate students and postdocs to code and implement motion control programs, integrate them into the robot's source code, and validate their effectiveness. Testing will include free-swimming trials in still tanks and a water tunnel to evaluate the robot's capabilities compared to traditional propulsion systems.
This project offers hands-on experience in programming, experimental fluid dynamics, and rapid prototyping, as well as opportunities to present findings at conferences and contribute to publications. By joining this effort, the student will play a pivotal role in creating a miniaturized, bioinspired AUV that could revolutionize ocean exploration.

Required skills: Good knowledge of C/C++ (for Arduino coding) and Matlab (for data analysis and statistics); Skills in experimental fluid dynamics (i.e., Particle image velocimetry, coursework in fluid dynamics).

Preferred skills: Basic knowledge of CAD (Fusion 360, Solidworks…); Fast prototyping using 3D printing (resin and/or FDM)

Is this project for more than one student: No

Jane Metrik
Department: School of Public Health, Behavioral and Social Sciences
Project Type: Research
Project Title: Cannabis Use and Driving in Daily Life (the CAR Study)

Project Description:
The student will work on NIH-funded research study that investigates driving under the influence of cannabis. This study aims to understand decisions people make about driving when using cannabis, with real-time objective data on driving behaviors collected from a GPS tracking device installed in their vehicle. The study also collects data on cannabis use in the natural environment with daily surveys completed on participants' smartphones. The study uses mixed-methods ranging from laboratory assessment to observational field data to qualitative interviews, extraction, and coding of data.

The student will have the opportunity to work with both people and data. The intern will learn how to assess and determine study eligibility, conduct participant outreach, and state-of-the-art methods for laboratory and field research. Tasks include (1) participant recruitment (e.g., posting advertisements, social media recruitment, responding to interested contacts), 2) screening participants on the phone; 3) maintaining study databases; 4) tracking participant data in real-time; 5) promoting study retention via regular contact with participants; 6) coding interview data; 7) assisting with the laboratory sessions with study participants; and 8) basic data management and analyses. Students will attend weekly lab meetings with the study investigator, co-investigators, and other undergraduate and graduate students, postdoctoral fellows, and full-time staff contributing to the project. The intern will participate in team meetings and all discussions pertaining to conducting human subject research, IRB oversight, and state- and federal-level organizations overseeing cannabis regulations.

Required skills: Knowledge of Microsoft Suite (Word, Excel, PowerPoint) and Google Suite (Gmail, google calendar, google voice, google drive); strong communication and interpersonal skills, excellent organizational skills, attention to detail, maturity and responsibility, ability to work independently and as part of a team, comfort working with research participants and discussing substance use. Must be available to work onsite at Brown University.

Preferred skills: Research experience (especially with human subjects) and psychology or public health coursework.

Is this project for more than one student: No

Jane Metrik
Department: School of Public Health, Behavioral and Social Sciences
Project Type: Research
Project Title: Cannabis' Impact on Alcohol Consumption (Project MARS)

Project Description:
The student will work on NIH-funded research study on cannabis and alcohol co-use. This FDA placebo-controlled randomized clinical trial involves cannabis and alcohol administration to participants in our smoking laboratory and a simulated barlab at Brown. The study also collects data on cannabis use in the natural environment with daily surveys completed on participants' smartphones. The study uses mixed-methods ranging from experimental procedures, as part of a randomized clinical trial, to observational field data to qualitative interviews, extraction, and coding of data.

The student will have the opportunity to work with both people and data. The intern will learn how to assess and determine study eligibility, conduct participant outreach, and state-of-the-art methods for laboratory and field research. Tasks include (1) participant recruitment (e.g., posting advertisements, social media recruitment, responding to interested contacts), 2) screening participants on the phone; 3) maintaining study databases; 4) tracking participant data in real-time; 5) promoting study retention via regular contact with participants; 6) coding interview data; 7) assisting with the laboratory experimental sessions with study participants; and 8) basic data management and analyses. Students will attend weekly lab meetings with the study investigator, co-investigators, and other undergraduate and graduate students, postdoctoral fellows, and full-time staff contributing to the project. The intern will participate in

team meetings and all discussions pertaining to conducting human subject research, IRB oversight, and state- and federal-level organizations overseeing cannabis regulations.

Required skills: Knowledge of Microsoft Suite (Word, Excel, PowerPoint) and Google Suite (Gmail, google calendar, google voice, google drive); strong communication and interpersonal skills, excellent organizational skills, attention to detail, maturity and responsibility, ability to work independently and as part of a team, comfort working with research participants and discussing substance use. Must be available to work onsite at Brown University.

Preferred skills: Research experience (especially with human subjects) and psychology or public health coursework.

Is this project for more than one student: No

Andy Ryan
Department: School of Public Health, Health Services, Policy & Practice
Project Type: Research
Project Title: Health Data Science Summer Fellowship

Project Description:
The fellowship is coordinated by the Center for Advancing Health Policy (CAHPR) within the School of Public Health (SPH) and trains students in key data management and programming tools and the use of datasets for health data science. It is delivered through a combination of didactic and project-based learning. The didactic training takes place in person during the first two weeks of the program and includes two short classes on: 1) key programming concepts and data management for health data science; and 2) the application of #1 to common datasets, such as medical claims files. The remainder of the program is devoted to project-based learning where students work on projects submitted by participating SPH research centers. Students meet regularly with their faculty mentors to discuss research questions, data and methods, and project expectations and progress.

To reinforce the project-based experience, the fellowship will also include an Introduction to Health Services Research training program coordinated by the Health Services, Policy & Practice Department at SPH. Students working on projects from across the department (not only the Health Data Science Fellowship) will meet over zoom twice a week for an hour, for 8 weeks. Program expectations are: 2-3 required readings in advance of each class and presentation of student research projects, first during a troubleshooting workshop in the middle of the program, and a second time at the end of the program. Networking sessions and a Slack channel will be offered to support communal learning.

At the conclusion of the fellowship, there will be an in-person presentation session where students will share their project results with their fellowship peers and faculty mentors and have the opportunity to receive and offer feedback.

Required skills: N/A

Preferred skills: Priority is given to students with some programming experience and those with knowledge of public health and health policy.

Is this project for more than one student: Yes

Georgia Lagoudas
Department: School of Public Health, Pandemic Center
Project Type: Research
Project Title: A Breath of Fresh Air: Policy Roadmap for Clean Indoor Air

Project Description:
Clean indoor air is critical for human health and wellbeing - it influences how we feel, how we think, and whether we get sick. Yet, most buildings are designed for minimum standards for odor and comfort, not health. While we expect clean water to flow out of our taps, we don't have any standards for the cleanliness of air flowing out of our vents. We do not have health-based standards for indoor air quality nationally. Cleaner indoor air in public buildings will support childhood learning, reduce asthma rates, improve workplace productivity, and reduce respiratory diseases. In this work, a student will conduct research on policy measures in place for clean air, past proposed legislation, and future public health policies that can be enacted at the state or federal level. The student will conduct literature review, interview government officials, review policy reports, and propose a roadmap and next steps to advance clean indoor air policy in the United States.
This public policy project will be grounded in both an exploration of federal and state policies as well as public health measures guided by science.

Required skills: Ability to work independently and strong writing and organizational skills.

Preferred skills: Experience conducting literature searches and writing summaries of findings. Comfort reading through scientific literature and conducting independent online research.

Is this project for more than one student: No

Georgia Lagoudas
Department: School of Public Health, Pandemic Center
Project Type: Research
Project Title: Breathe Easy: How the Public Health Community Can Play a Role in Healthy Buildings

Project Description:
Clean indoor air is critical for human health and wellbeing - it influences how we feel, how we think, and whether we get sick. While we spend 90% of our time indoors, we do not have any health-based standards for indoor air quality. Most buildings are designed for minimum standards for odor and comfort, not health, and the Covid pandemic demonstrated how important the indoor environment is for respiratory disease transmission. The public health community can play a role in promoting healthier buildings and recommending guidelines and policies for cleaner indoor air, especially during times of high risk (such as flu season or elevated wildfire smoke).

In this work, a student will conduct research on policy measures in place for clean air, what state health departments have taken action to promote clean indoor air, and guidelines from the public health community. The student will compile these resources and propose actions from the state health departments for elevating awareness for cleaner indoor air. In this work, the student will research other past examples of public health alerts and campaigns and speak with public health state leaders to gather input. The student will conduct literature review, interview state officials, and outline a proposal for the role of public health officials in effectively promoting clean indoor air.
This public policy project will be grounded in both an exploration of federal and state policies as well as public health measures guided by science.

Required skills: Ability to work independently and strong writing and organizational skills.

Preferred skills: Experience conducting literature searches and writing summaries of findings. Comfort reading through scientific literature and conducting independent online research.

Is this project for more than one student: No

Jenna Morton-Aiken
Department: Sheridan Center for Teaching and Learning / English
Project Type: Course Development
Project Title: Leveraging writing best practices to mediate difficult discussions

Project Description:
ENGL1190M (Writing Fellows course) already takes a deep dive into inclusive best practices for writing and communication, but we want to do more. This project would ask a student to work with program director Dr. Morton-Aiken to research the most innovative research in writing studies and related fields regarding difference, conflict, resolution, and communication, particularly in the context of heated civil discourse. Tasks might include working with Dr. Morton-Aiken to update course readings and assignments. Tasks may also include working with Writing Fellows student leadership to develop other professional development mechanisms for existing Writing Fellows to receive equivalent training, and/or developing or updating online resources for Brown and outside community.

Required skills: Completion of ENGL 1190M and at least one semester working as a Writing Fellow.

Preferred skills: Enthusiasm for working with spreadsheets and Google Drive; ability to ask clarifying questions when confused; attention to detail in planning, research, and document management; interest in the practice and scholarship of rhetoric and composition (writing studies); sense of (or interest in) intellectual curiosity balanced with practical application; and excited by reading interdisciplinary writing-related scholarship.

Is this project for more than one student: No

Emily Rauscher
Department: Sociology
Project Type: Research
Project Title: Hidden Funds: Parent-Teacher Associations and Inequality of School Funding

Project Description:
School finance reforms in nearly every state since the 1970s have drastically reduced inequality of funding across school districts. Despite greater funding equality, unequal outcomes persist by student race, ethnicity, and income. One reason could be that existing evidence underestimates the degree of school funding inequality because it excludes a potentially important source of money: local school-supporting non-profit agencies. These non-profits include parent-teacher associations (PTAs), parent-teacher organizations (PTOs), booster clubs, alumni associations, school foundations, and other non-profits whose mission is to support the local school or district. By raising funds for educational programs, field trips, extracurricular activities, playground equipment, music or art equipment, and other expenses, nonprofits may improve local educational outcomes directly through spending and indirectly by freeing district funds for instructional spending.
This project uses annual non-profit tax return data from the Internal Revenue Service from 2009 to 2020 to document the amount of "hidden money" districts receive from non-profits and how unequally these funds are distributed by student race, ethnicity, and income. The project will build a national database of school-supporting non-profit organizations and their tax information.

Required skills: N/A

Preferred skills: Some experience with data analysis, statistics, or excel.

Is this project for more than one student: Yes

John Logan
Department: Sociology
Project Type: Research
Project Title: Mapping segregation and neighborhood inequality

Project Description:
This is a set of related projects using historical data and GIS maps for 1880-1980 to study issues of segregation and inequality across neighborhoods in U.S. Cities. The UTRA student will join a team of undergraduate RAs who have been working on various aspects of this research for several years, especially to develop the historical street and census block maps that allow us to define the neighborhoods where people lived. One project will look across the whole century to document the trajectory of segregation of Blacks and Hispanics from whites across neighborhoods, between cities and suburbs, and within suburbia. Another focuses on redlining and discrimination in mortgage availability in the 1930s and beyond, documenting which neighborhoods were underserved and how that affected their development. Another analyzes deaths from the Spanish flu in 1917-1918 in Philadelphia and New York, identifying which people and which neighborhoods were most vulnerable to that pandemic.

Required skills: We will train students who can work carefully, regardless of prior skills.

Preferred skills: Students from different backgrounds have worked successfully on this project. Some background or interest in urban issues, urban history, racial segregation and neighborhood inequality would be of value. Some GIS or computing background would be a plus.

Is this project for more than one student: Yes

Nicole Gonzalez Van Cleve
Department: Sociology
Project Type: Research
Project Title: Race and Wrongful Conviction in the U.S.

Project Description:
Wrongful conviction is defined by racial disparity. However, we know little about how racial stigma creates egregious miscarriages of justice. This study offers a novel intervention in the field of wrongful convictions by examining how racial stigma embeds in the seemingly race-blind, fact-finding stage of criminal investigations. Specifically, I focus on false confessions because they are the most common type of evidence used in serious cases like murder but also because they are important indicators of how police and prosecutors craft criminal cases with "contaminating narratives" used to incite racial animus with juries.

I rely on data from the National Registry of Exonerations and from the Center for Science and Justice at Duke University. I code false confessions in 98 exoneration cases from Chicago, IL, and look at "narrative contamination" or extra-legal narratives that leverage racial tropes and transform an innocent person into a criminal "monster" through their confession.

Students will work to examine the dynamics of wrongful conviction and map out publishable papers from the body of data. They will be required to fact-check legal citations and collaborate on the authoring of academic articles.

Required skills: Research methods in relevant social science fields. Previous coursework in the study of race and ethnicity.

Preferred skills: Strong writing and editing skills. Research methods class in the sociology or related field. Coursework in the area of race/racism and ethnicity or Black Studies. Familiarity with navigating university libraries and archives.

Is this project for more than one student: No

David Lindstrom
Department: Sociology, Population Studies and Training Center
Project Type: Research

Project Title: **Mesoamerican Migration Project**

Project Description:
The Mesoamerican Migration Project is the longest ongoing study of migration from Mexico and Central America to the United States. The study involves the collection of survey data in migrant places of origin, which becomes part of a public access database for the study of migration flows, determinants and consequences. The UTRA project will involve the writing of software code in the program Stata to transform the raw survey data that is entered into digital files in Mexico, into public use data files to be placed on a website at Brown.

Required skills: Experience in using Stata for statistical analysis. A course in introductory statistics or econometrics.

Preferred skills: Basic Spanish reading skills (preferred but not required).

Is this project for more than one student: Yes

Andrew Schrank
Department: Sociology, Watson Institute for International and Public Affairs
Project Type: Research
Project Title: **National Laboratories and Regional Development: A Historical Perspective**

Project Description:
I'm currently partnering with colleagues in the Department of Economics at Case Western Reserve University to study the economic impact of the Department of Energy's 17 laboratories (e.g., Los Alamos) on their surrounding communities. Do they generate innovation, investment, and employment spillovers and, if so, of what kind and degree? To answer this question, we hope to compare "host" communities that have national laboratories to a "control" group of otherwise comparable communities that do not. The answers speak to the relative returns to federal research and development investment and the drivers of regional development, issues that are of profound importance practically as well as theoretically in multiple disciplines. I'd like to work with two UTRA students to develop the peer group. The research will include three steps:

1. We'll begin by developing a literature review on the origins of the national laboratories with an eye toward their siting. This will draw primarily on published books and scholarly articles.
2. We'll move on to identify all US communities that were considered for national laboratories but eventually passed over (e.g., "candidate communities"). This will exploit both the literature review and additional research using secondary sources, government reports, and gray literature.
3. We'll subsequently identify the economic, geographic, socio-demographic, and political features that distinguish candidate communities and host communities from otherwise comparable communities at the times the labs were established. This will involve the use of federal—and potentially state and local—databases and descriptive statistical analysis.

My colleagues at Case Western have secured funding for an adjacent project from the National Science Foundation. We're in the running for seed funding for a related project from the Canadian Institute for Advanced Research. We're hoping to build upon this research for a second NSF proposal as well as scholarly publications.

Required skills: N/A

Preferred skills: In descending order of importance: responsibility, creativity, writing skills, spreadsheet management, basic statistical inference

Is this project for more than one student: Yes

John Eason
Department: Sociology, Watson Institute for International and Public Affairs
Project Type: Research
Project Title: Punishment Beyond Mass Incarceration: Immigrant Detention, Jails, and Prison

Project Description:
We have three central projects to reframe the national narrative surrounding prison abolition to focus on policy solutions targeting health/wealth initiatives in rural communities of color. These criminal legal system policy reforms will be focused on how to best repurpose prisons, jails, and immigrant detention centers once these facilities are shuttered. We are looking for four research assistants: two to help with quantitative data analysis, one to assist with qualitative data analysis, and potentially a Production Assistant on our documentary film. Students will contribute to data analyses and strengthen skills such as coding, cleaning of data, interviewing, and memo writing. They will also have space to discuss their interpretations of the findings with the PI and will have a chance to guide the study towards new research questions. For the Prison Bust Project, one central question of our investigation asks: how do prison closures directly and indirectly impact local prison town communities? How can impacted stakeholders and communities be involved in the creation of viable, safe, and ethical policies (and practices) for closing prisons in ways that mitigate potential or unintended harms? Another project we have is Health, Violence, in Immigrant Detention which seeks to understand how race and punishment intersect to produce health disparities in immigrant detention centers. Lastly, we have an emerging project investigating Mass Jailing where we are mapping the growth of the jail population and location of facilities over the last 50 years.

Required skills: Interest and passion around the criminal legal system.

Preferred skills: Quantitative research assistants preferred skills:
-Experience working with quantitative data analysis tools such as STATA or commitment to learning
-Experience working with spatial analysis tools such as ArcGIS or commitment to learning
-Interest in the US prison system, inequality, and sociological research

Qualitative research assistants preferred skills:
-Experience working with qualitative data analysis tools such as MAXQDA or commitment to learning
-Experience or interest in conducting qualitative research interviews
-Interest in the US prison system, inequality, and sociological research

Film
-Post production
-Editing

Is this project for more than one student: Yes

Poulami Roychowdhury
Department: Sociology, Watson Institute for International and Public Affairs
Project Type: Research
Project Title: Pro-Life to Pro-Family?

Project Description:
The 2022 Supreme Court ruling in Dobbs v. Jackson Women's Health was the culmination of years of grass-roots organizing and careful political alliances on the part of the pro-life movement in the United States. But what now? Since Dobbs, pro-life activists have been looking for a new focus. While some branches of the movement are now concentrating on making the abortion pill illegal, others are working at the state level to fight constitutional amendments. A third and increasingly vocal group, however, has been rebranding itself as "pro-family": pushing policy reforms that would cheapen the cost of daycare, extend family leave policies, and provide housing support for young families. This project attempts to understand this shift, asking why certain activists have adopted this message while others have not, what strategies activists are using to push these policies forward, and to what degree these policies are gaining traction among Republican and Democratic politicians.

This UTRA project builds on Professor Roychowdhury's ongoing work on the effects of the fetal personhood movement in the US. Tasks include:
- Online research on pro-life activists, Republican and Democratic officials, and policy changes at the state and federal level
- Literature review of the rise of maternalist and pro-family policies in Canada and Europe as a comparison to the US

Required skills: Basic comprehension of excel is necessary as well as prior experience conducting independent online research.

Preferred skills: Students with prior experience in reproductive justice issues and those interested in gender/law/welfare policy/human rights may find this project especially interesting.

Is this project for more than one student: Yes

Becci Davis
Department: Visual Art
Project Type: Research
Project Title: Unpolished Legacies Online

Project Description:
Unpolished Legacies Online is a digital resource for middle and high school education that uses art to explore Rhode Island's cultural and natural histories. This project supports instruction on local Indigenous, botanical, industrial, and post-industrial heritage using Mashapaug Pond, as a focal point and springboard

for study. By centering the work of local artists who engage in advocacy and activism through their artistic practice, Unpolished Legacies Online enables students and teachers to realize the role that the arts can take in raising awareness of contemporary issues, exploring historical content from multiple perspectives, and deepening critical thinking and discussion.

The intention of this website is to share different perspectives on the impact of the Gorham Silver Manufacturing Company brought together by the Unpolished Legacies project (2019) to support place-based instruction for science, social studies and art. The original project consisted of a series of collaborative interventions in response to the RISD Museum's 2019 exhibit, Gorham Silver, Designing Brilliance, 1850-1970, which included the production of a zine, a pop-up exhibition featuring twelve local artists, a blog, two community conversation panels, and an evening of performances. At this stage of development, we are editing content, collecting resources to complete the website, and preparing for its launch in spring of 2026. You can view several of our contributor feature pages here. We are looking for a UTRA research assistant to support content creation, editing, and graphic design. This team member will assist in developing and designing downloadables to be hosted on the site. They will also interface with local educators contributing to the project to assist in the development of discussion questions and additional curriculum support for the website. Thank you for your consideration and please feel free to reach out to us if you have any questions.

Required skills: Interest in visual arts, environmental studies, and/or history, strong writing skills, willingness to read background material related to the website content to approach editing with an informed lens, curiosity in art as a catalyst for change, ability to work independently and meet deadlines

Preferred skills: Experience in graphic design; proficiency in Adobe Photoshop, Adobe InDesign, and/or Canva; interest in pedagogy; art, english or education courses

Is this project for more than one student: No

Kimberly Turner
Department: Watson Institute for International and Public Affairs
Project Type: Research
Project Title: Evaluating the Outcomes of Protests and Demonstrations

Project Description:
Protests and demonstrations have become the dominant form for public signals of discontent. The literature on nonviolent civil resistance has noted the successfulness of protestors and demonstrations in removing dictators and changing policy. However, there is also evidence of significant democratic backsliding in the immediate aftermath of a nonviolent movement. Lacking in literature is quantitative evidence on the intermediate impact of movements, are the intermediate and long-term effects of a movement?
In this research project, students will research and gather information on the aftermath of protest movements. Students will be directly involved in the compiling of an event history dataset on protest concessions, outcomes, and consequences.

Required skills: High level of knowledge and comfort with Microsoft Suite (Word, Excel) and Google Suite (Google Calendar, Google Drive). High level of comfort with general news searches and some

Lexus-Nexus experience. Excellent time management and organizational skills, attention to detail, and ability to prioritize among multiple tasks.

Preferred skills: students with some familiarity with coding, survey research, and/or data and/or statistical or methodological course completion.

Is this project for more than one student: Yes

Kimberly Turner
Department: Watson Institute for International and Public Affairs
Project Type: Research
Project Title: Polarization and Political Violence in the US

Project Description:
The United States is polarizing faster than any other country and the effects are severe and widespread. Of concern is the linkage between polarization and domestic political violence. This project analyzes and measures 1) how polarization influences an individual's attitudes towards political violence, 2) the levels of public complacency towards political violence. Students will get hands-on experience in the deployment process of surveys and experiments.

Required skills: High level of knowledge and comfort with Microsoft Suite (Word, Excel) and Google Suite (Google Calendar, Google Drive). High level of comfort with general news searches and some Lexus-Nexus experience. Excellent time management and organizational skills, attention to detail, and ability to prioritize among multiple tasks.

Preferred skills: students with some familiarity with coding, survey research, and/or data and/or statistical or methodological course completion.

Is this project for more than one student: Yes

Tyler Jost
Department: Watson Institute for International and Public Affairs, Political Science
Project Type: Research
Project Title: Major Power Cooperation in the Modern Era

Project Description:
When do major powers cooperate? How did the Cold War between the United States and the Soviet Union begin? How did the competition between the United States and the People's Republic of China come about? This project is an opportunity to work on a project with Professor Tyler Jost documenting the evolution of cooperation between major powers (United States, China, Soviet Union/Russia, France, United Kingdom, Germany, Japan) since the mid-twentieth century. Research assistants on the team will review transcripts of high-level diplomatic meetings between heads of state and foreign ministers – and be responsible for writing summaries of the types of cooperative agreements reached during these

engagements. Transcripts have been collected from various archives around the world.

Required skills: N/A

Preferred skills: Professional fluency in French, German, Russian, Chinese, and Japanese may be helpful but is not mandatory.

Is this project for more than one student: Yes
