National Institute on Drug Abuse
Summer Research Internship Program

2020
**Program:**
The NIDA Summer Research Internship Program supports all students with a focus on increasing underrepresented populations in drug abuse research. Through this program, undergraduates age 18 and older are introduced to the field of drug abuse and addiction research by participating in research internships with NIDA's distinguished scientists at universities across the United States. Students work with leading scientists for eight weeks during the summer. The internship may include laboratory experiments, data collection, data analysis, formal courses, participation in lab meetings, patient interviews, manuscript preparation, and literature reviews. In addition, it is expected that each intern will deliver a formal presentation on his/her research project at the end of the internship.

The NIDA Summer Research Internship Program is in its 23rd year. Since the program's inception in 1997, more than 1200 students have gained experience in drug abuse and addiction research.

**Eligibility:**
- This NIDA Summer Research Internship program is designed to train individuals from diverse backgrounds, including those from groups underrepresented in the biomedical, behavioral, clinical and social sciences research workforce, to conduct research and to prepare for careers in the biomedical, behavioral, clinical and social sciences such as individuals from racial and ethnic groups that have been shown by the NSF to be underrepresented in health-related sciences on a national basis (see data at http://www.nsf.gov/statistics/showpub.cfm?TopID=2&SubID=27 and the report Women, Minorities, and Persons with Disabilities in Science and Engineering). The following racial and ethnic groups have been shown to be underrepresented in biomedical research: Blacks or African Americans, Hispanics or Latinos, American Indians or Alaska Natives, Native Hawaiians and other Pacific Islanders. In addition, it is recognized that underrepresentation can vary from setting to setting; individuals from racial or ethnic groups that can be demonstrated convincingly to be underrepresented by the grantee institution should be encouraged to participate in this program. For more information on racial and ethnic categories and definitions, see NOT-OD-15-089.
- Although this program is designed to enhance underrepresented populations in science, all racial/ethnic populations are eligible to apply.
- Applicants must be at least 18 years old by May 31, 2020 and must be U.S. citizens or permanent residents of the United States (No Exceptions).
- Graduating 2020 college seniors are also eligible to apply.
- Individuals who have already participated in the NIDA Summer Research Internship Program are no longer eligible to apply.

**Scope of Support:**
- Stipends in the amount of $12.00 per hour for a maximum stipend of $3,840 for eight weeks.
- Up to $2,500 for housing assistance.
- Up to $500 to be used for air or local travel.

**Housing Accommodations:**
There are two different housing options for the research sites included in the NIDA Summer Research Internship program. For both options, the housing is funded by NIDA and will be
reimbursed to the intern by the host research institution. For research sites with the “Campus Housing Available” option, the intern will be able to stay in on-campus housing which is coordinated through the research site, institution, and intern. For research sites with the “Housing Subsidized” option, housing will still be funded by NIDA, however for these research sites, the intern will be responsible for securing their own housing accommodations. Some research sites have local housing resource guides that they share with interns.

Application Procedures:
To apply for this program, fill in all sections of the application form. Prior to making research site selections, review the research projects and locations listed in the online brochure. After reviewing the descriptions, indicate on the application the three sites that best match your research interests. All efforts will be made to match applicants to one of their top three choices.

Application components include:

- a completed application form
- current transcripts (unofficial transcripts are acceptable)
- two letters of recommendation (should be on letterhead)

***If unable to complete in one sitting, press SUBMIT and your entries will be saved. At any time prior to the application due date, you may access your application to enter updates/edits. To retrieve it, click on the link sent to the email address entered in the application and enter the token code included in the email. Complete/update the application and press SUBMIT. Your last, most recent electronic submission will be the one recorded in the application system and used during the evaluation period.

All application materials must be submitted by 11:59 pm EST, Monday, February 10, 2020.

Application Review and Selection:
Interns are selected according to the following criteria:

- Professional/Career goals
- Research interests
- Academic Achievement
- Letters of recommendation
- Program priorities

For additional information see the FAQs.

Contacts:
Feel free to contact Julie Huffman, julie.huffman@nih.gov, phone 301-443-9798; or Albert Avila, Ph.D., aavila@nida.nih.gov.
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Arizona

Investigator: John Streicher, Ph.D.
Institution: University of Arizona
Tucson, AZ
Project Title: Development of a Selective Mu-Delta Opioid Receptor Heterodimer Antagonist Using a Linked Bivalent Pharmacophore Approach
Research: Basic Research
Research Area: Opioid; Pain; Signal Transduction; Heterodimer; G Protein Coupled Receptor; Drug Discovery; Drug Development; Signaling Regulators; Opioid Behavior
Earliest Start Date: 5/17/2020
Housing: Campus

Student Qualifications: No prior research experience required. Previous research experience in mouse behavioral or molecular analysis (Western, CRISPR, qPCR, etc.) or the opioid field is a bonus. Previous coursework in biology is required, Cell Biology being the most important and relevant. No specific major is required if coursework has been taken. No specific career interests required. Interns will be required to work with mice.

Project Description: The Streicher Lab focuses on uncovering novel signal transduction mechanisms of the opioid receptors. This involves identifying novel regulators, and determining their molecular mechanisms, mostly through in vivo opioid pain and side effect models. The Streicher Lab then uses this novel signaling mechanisms to develop new profiles for drug discovery and development to create new analgesic drugs without the addictive and other side effect liabilities of opioids. The current project focuses on the mu-delta opioid receptor heterodimer (MDOR), which previous work has suggested acts as a negative feedback system to the opioid receptors, reducing analgesia and promoting side effects. We have developed a novel, first-in-class MDOR antagonist, and shown that this drug selectively blocks the MDOR in vivo, leading to enhanced analgesia and reduced opioid withdrawal. The intern summer project will focus on extended studies from these preliminary results, to identify molecular signaling mechanisms underlying the MDOR that promote these negative effects in vivo. This will involve administration of our MDOR antagonist to mice followed by opioid drugs like oxymorphone in acute and chronic pain models. The behavior of the mice will be analyzed, and their molecular signaling in the brain and spinal cord analyzed by cutting edge methods including CRISPR gene editing, proteomic analysis, and similar.
## Arkansas

**Investigator:** Merideth Addicott, Ph.D.  
**Institution:** University of Arkansas for Medical Sciences  
Little Rock, AR  
**Project Title:** Neural Correlates of Distress Tolerance in Tobacco Addiction  
**Research:** Behavioral Research  
**Research Area:** Tobacco Addiction, fMRI, Distress Tolerance, Behavioral, Smoking Cessation.  
**Earliest Start Date:** 5/28/2020  
**Housing:** Campus

**Student Qualifications:** This research involves working with self-report and behavioral data collected from humans, students will not be working directly with participants. Student should be interested in psychology/neuroscience and addiction. Student should be familiar with statistics and Microsoft Excel/Access.

**Project Description:** Many smokers smoke in response to stress or anxiety and quitting smoking can be a stressful experience. How well individuals tolerate stress (i.e., distress tolerance) may relate to their ability to quit smoking. This project compares behavioral measures of distress tolerance between smokers and former smokers. These measures include self-report questionnaires, physical stress challenges (like breath holding), and computerized emotional stress challenges (like a math test). This study also investigates what brain regions underlie emotional stress and distress tolerance.
Arkansas

Investigator: Clinton Kilts, Ph.D.
Institution: University of Arkansas for Medical Sciences
Little Rock, AR
Project Title: The Sex-Specific Roles and Neural Processing Correlates of Future-Oriented Estimation in the Drug Addiction Process
Research: Clinical Research
Research Area: Individual and Sex Differences, Neuroimaging, Episodic Future Thinking, Addiction Risk Factors, Adolescence, Temporal Discounting, Attentional Bias Effect Child Health and Development

Earliest Start Date: 5/30/2020
Housing: Campus

Student Qualifications: Interns must have an interest in human behavior and neuroscience. Prior training in neuroscience, computer programming, or statistics is not necessary but preferred. Interns will interact with human participants and analyze data acquired from human populations, including questionnaires and neuroimaging data. Previous research experience is preferred but not required.

Project Description: The intern will be engaged in guided instruction and hands-on training related to the human drug addiction process in the Brain Imaging Research Center of the University of Arkansas for Medical Sciences. The research project will explore the role of future oriented thing in biasing decision making in the drug addiction processes across adolescence and adulthood. Interns would gain experience in structured assessments, functional magnetic resonance imaging, and the use of tasks as processing demands for episodic future thinking, drug incentive motivation, and the temporal discounting of future gains or losses, as well as human neurodevelopment. Experience extensions into the area of resilience, computational modeling, coding, real-time fMRI, and adverse/protective childhood experience mapping and outcomes are additionally possible. The intern will also gain research experience in cross-disciplinary team science approaches to translational addiction research. There will be opportunities to interact and learn with the medical students, graduate students, postdoctoral fellows and psychiatry residents currently participating as trainees in the UAMS NIDA T32 training program ("Translational Training in Addiction"). The intern will work with the mentor to develop a project tailored to his or her research interests.
Student Qualifications: You should be considering a research career, leading to a PhD or MD/PhD, in one of these areas: neuroscience, biophysics, biochemistry, drug abuse, chemical biology, or bioengineering. You will work primarily with instruments, microscopes, and test tubes. You can also choose to work with mice. If you're always calculating things in your head, you'll fit right in! If you live near Caltech, you could attend lab meetings earlier than the official start date.

Project Description: What happens in the body when a person smokes a cigarette? What happens after several weeks of smoking? Why do dopaminergic neurons degenerate when people develop Parkinson's disease? And why does smoking appear to lower the probability of a person developing Parkinson's disease? The Lester lab uses techniques at the intersection of biophysics, single-molecule imaging, chemistry, mouse genetics, and neuroscience to understand the biophysical basis of ligand-gated ion channels including the nicotinic acetylcholine receptor. Recently our lab has shifted from focusing on the immediate effects of nicotine binding to receptors on the surface of nerve cells to what happens when that nicotine infiltrates deep into the cell. Nicotine receptors entering the endoplasmic reticulum increase its output of these same nicotine receptors which then travel to the cell's surface. In other words, nicotine acts "inside out," directing actions that ultimately fuel and support the body's addiction to nicotine. These longer-term changes deep within the cell may also explain why the beneficial actions of antidepressants and antischizophrenic drugs require several weeks to develop. The student will also participate in Caltech's WAVE program, http://sfp.caltech.edu/programs/wavefellows & http://lester.caltech.edu
Investigator: Theodore Friedman, M.D., Ph.D.
Institution: Charles R. Drew University
Los Angeles, CA
Project Title: Nicotine Exacerbates High Fat Diet-Induced Hepatic Steatosis and Skeletal Muscle Abnormalities in Obese Mice
Research: Behavioral Research
Research Area: Nicotine, Smoking, Diabetes, Obesity, Hepatic Steatosis, Nhanes, Addiction, Dopamine
Earliest Start Date: 5/14/2020
Housing: Yes

Student Qualifications: The following skills are preferred, but not required:
• Molecular Biology skills
• Animal handling skills
Computer skills (Excel, Word, and PowerPoint)
• Prior research experience is desirable, but not required.

For epidemiology and literature review projects, only computer skills are needed.

Project Description: Our laboratory focuses on the detrimental effects of e-cigarettes in mice. We are especially looking at effects of the heart, liver and fat at neonatal exposure. Be part of ground-breaking research that will definitely affect public policy. Additional opportunities exist for clinical projects, literature review projects and epidemiology projects related to drug addiction.

All experiments are well suited for student involvement and will introduce them to major techniques in substance abuse research. Housing is available at nearby California State University-Dominguez Hills and USC students will be given the opportunity to present at our annual Drew Substance Abuse Research Day. Come enjoy a great summer in sunny Los Angeles and learn about drug addiction research.
California

Investigator: Maria Cecilia Marcondes, Ph.D.
Institution: San Diego Biomedical Research Institute
San Diego, CA
Project Title: Dopamine System as Reporter of HIV Status and Inflammation in Meth Abusers
Research: Basic Research
Research Area: HIV, Neurological Disorders, Dopamine, Peripheral Biomarkers, Substance Use Disorders, Methamphetamine, Hyperthermia, Neuroimmunology
Earliest Start Date: 06/01/2020
Housing: Subsidized

Student Qualifications: Curiosity is a must. A little bit of experience with computers, maybe enjoy Math, might be helpful.

Project Description: The summer intern will be examining the relationship between the expression of inflammatory markers in the peripheral blood and the dopamine receptor genotype, in a 2 by 2 design, where individuals are HIV positive or negative, and methamphetamine users or not. We are investigating the hypothesis that the individual differences in the genes that encode dopamine receptors may dictate the susceptibility to inflammation, detectable in the periphery. This is because inflammatory cells express dopamine receptors and are responsive to high levels of dopamine that become available during drug exposure.
California

Investigator: Xiaoke Chen, Ph.D.
Institution: Stanford University
Stanford, CA
Project Title: Thalamic Circuits Underlying Opioid Seeking
Research: Basic Research
Research Area: Opioid Withdrawal, Neural Circuits Dissection, Examining Circuitry Mechanism Underlying Opioid-Associated Memories
Earliest Start Date: 06/16/2020
Housing: Campus

Student Qualifications: The intern need have experiences working with mice and a strong interest in neuroscience. Experience in stereotaxic surgery and immunohistochemistry will be ideal.

Project Description: We will combine optogenetic pathway manipulation and morphine-conditioned place preference assay to dissect the contribution of each output pathway from the paraventricular nucleus of the thalamus to opioid-associated memory.
California

Investigator: Gary Peltz, M.D., Ph.D.
Institution: Stanford University
Stanford, CA
Project Title: Computational Methods for Identification of Genetic Factors Affecting the Response to Drug Abuse
Research: Basic Research
Research Area: Genetics, Computational Methods, Mouse Genome (CRISPR) Engineering
Earliest Start Date: 05/30/2020
Housing: Campus

Student Qualifications: We develop computational methods that will enable genetic factors affecting many biomedical traits to be discovered and experimentally characterized. A computational method will be used to analyze 213,000 responses in inbred mouse strains. These tools will be used to analyze 15 responses of inbred strains to cocaine, methamphetamine, fentanyl, and nicotine. We use a high efficiency method for engineering allelic changes into the mouse genome to analyze the effect of these genetic factors.

Project Description: The interns will: 1) help to develop computational methods for analysis of genetic and genomic data; or 2) aid engineering the genome of mice using CRISPR to produce lines that can be tested for response to drugs of abuse.
California

Investigator: Kevin Beier, Ph.D.
Institution: University of California Irvine
Irvine, CA

Project Title: Investigating Function of Novel Drug-Induced Synaptic Changes in the VTA

Research: Basic Research

Research Area: We Aim to Identify How Drugs of Abuse Modulate Circuit Function in The Brain. To This End, We Are Using Cutting-Edge Methodologies to Conduct High-Throughput, Unbiased Analyses to Identify Neuronal Circuits That Critically Contribute to Psychostimulant-Induced Behavioral Adaptations

Earliest Start Date: 06/01/2020
Housing: Subsidized

Student Qualifications: Work ethic and a passion for science are valued above all else. Coding skills, in particular python, are highly valued. Basic molecular biology skills are preferred. Interested students should be comfortable with rodent work. Be reliable, communicative, and flexible working individually or with a team.

Project Description: The project will involve understanding the behavioral and molecular contributions of particular circuits to the development of addictive behaviors. We will have identified promising circuit candidates prior to intern arrival; interns will learn molecular and/or behavioral methods and assist students/postdocs with data collection, analysis, and interpretation. This may involve one or more of the following: 1) functional validation of the importance of the circuit in addictive behaviors, 2) identifying molecular (RNA, epigenetic) signatures of addiction, 3) mapping circuit architecture (input and outputs of identified circuits) using virus and genetic methods.
California

Investigator: Stephen Mahler, Ph.D.
Institution: University of California Irvine
Irvine, CA
Project Title: ICAL: Impact of Cannabinoids Across Lifespan: Behavioral Project
Research: Basic Research
Research Area: Behavioral Neuroscience, Addiction, Cannabis, 
Adolescence, Reward, Drugs, Motivation, Dreads, 
Optogenetics, Channel Rhodopsin, Relapse, Reinstatement, 
Cues, Conditioned Stimuli, Motivation, THC

Earliest Start Date: 06/01/2020
Housing: Campus

Student Qualifications: Prior research experience is preferable, especially with rat behavioral experiments, electrophysiology, immunohistochemistry, microscopy, and/or computer programming.

Project Description: The project seeks to determine in rats how administering THC, the main drug in cannabis, to the adolescent brain can disrupt its development. We expose adolescent male and female rats to low and moderate doses of THC while they are adolescent, either by systemic injection (maximizing dosing control), or by vapor inhalation (maximizing translational relevance). We then allow the rats to grow into adulthood and examine how they differ from control-treated rats in behavior, reward circuit function, neural activity, and endocannabinoid system function.

This is an ongoing collaboration with 3 other UC Irvine labs, so the potential for interactions with other prominent scientists researching similar topics is high. The intern will also be exposed to our other ongoing projects in the lab, in which we study how 1) early life stress impacts reward circuit development, and 2) neural circuits involving the ventral pallidum participate in decision making, and relapse to heroin and cocaine seeking.
California

Investigator: Uma Rao, M.D.
Institution: University of California Irvine
Irvine, CA
Project Title: Prevention of Adolescent Risky Behaviors: Neural Markers of Intervention Effects
Research: Clinical Research
Research Area: Child, Adolescent, Life Skills, Risky Behavior, MRI, Ethnicity/Race, African-American
Earliest Start Date: 6/1/2020
Housing: Subsidized

Student Qualifications: This is a clinical research project involving interaction with human research subjects. Certification in human subject’s protection and Good Clinical Practices (GCP) is critical for observing the research assessments. NIH sponsored certification is acceptable. Obtaining the training prior to joining the internship will facilitate better use of the 8-week program. Students should have a background in psychology, public health, biological sciences, psychobiology, neuroscience, or related fields.

Project Description: Adolescents face many challenges as they begin to gain independence and prepare for adult roles in society. Due to covert and overt racial discrimination in our society, Black (African-American) youth experience more challenges during this transition. The investigator’s research team has developed a culturally-sensitive family intervention program, Pathways for African American Success (PAAS), which helps youth and parents to cope with such challenges. This 6-week parent-child program has been shown to be effective in promoting positive outcomes in later adolescence and young adulthood. In the current project, 11-14-year-old Black (African-American) youth (both boys and girls) are recruited. Using magnetic resonance imaging (MRI) technology, brain scans are performed before and after PAAS to learn more about the brain changes associated with positive outcomes in response to the PAAS program. A better understanding of the brain network changes will help us to fine-tune the program or develop alternative strategies for those who don’t show significant benefit.
California

Investigator: Steven Shoptaw, Ph.D.
Institution: University of California Los Angeles
Los Angeles, CA
Project Title: MSM and Substances Cohort at UCLA Linking Infections Noting Effects (mSTUDY)
Research: Clinical Research
Research Area: Addiction and HIV
Earliest Start Date: 06/01/2020
Housing: Subsidized

Student Qualifications: This internship is particularly suited to an undergraduate studying medicine, psychology, community health science, public health or a similar field. Candidates should be entering junior or senior year. Completion of a statistics course is helpful, but not required. The intern will not be working directly with research subjects but will be exposed to a variety of clinical research projects and will visit clinics conducting this research.

Project Description: The UCLA Center for Behavioral & Addiction Medicine is a multidisciplinary center that seeks to advance the prevention and treatment of chronic illnesses, especially in communities with health disparities. We work at the intersection of academia and community with a focus on treating addiction and preventing the spread of HIV. People who use substances are at much greater risk of acquiring HIV and for those with HIV, use of substances hinders viral suppression (a key measure of health for those with HIV). The intern will work closely with faculty, staff and postdoctoral fellows to gain a general understanding of addiction and how it affects (and is affected by) other medical, behavioral, and social conditions.
California

Investigator: Olivier George, Ph.D.
Institution: University of California San Diego
San Diego, CA
Project Title: Identification of Genetic Variants that Contribute to Compulsive Cocaine Intake in Rats
Research: Basic Research
Research Area: Drug Abuse, Addiction, Dependence, Neuropharmacology
Earliest Start Date: 05/31/2020
Housing: Subsidized

Student Qualifications: Basic laboratory experience. Willing to perform behavioral studies with rodents. Interest in Drug abuse research.

Project Description: Human studies have shown that approximately 50% of the vulnerability to cocaine use disorder is determined by genetic factors, but the specific genes that confer this risk are unknown. This project uses a multidisciplinary, highly collaborative team that combines next-generation DNA sequencing with state-of-the-art behavioral testing in a unique, genetically diverse, nonhuman animal model of cocaine use disorder to identify the gene variants that are associated with compulsive cocaine use. The NIDA student will participate in behavioral experiments (cocaine and oxycodone self-administration) in heterogenous stock (HS) rats. The student will be responsible for handling animals, analyzing data, collecting tissues, and organizing samples in the biobank. The student will help prepare intravenous catheters and set up equipment. Students will also present an article at the lab Journal Club and present their research experience during lab meetings.
California

Investigator: Davey Smith, MD
Institution: University of California San Diego
San Diego, CA
Project Title: Opioid Impacts on T Cell Pathways and Epigenetics to Modulate HIV Integration, Latency and Reservoirs
Research: Basic Research
Research Area: HIV Cure, Neurocognition, Reservoir
Earliest Start Date: 05/04/2020
Housing: Subsidized

Student Qualifications: Desired qualifications in order of importance include: desire to learn about research, interest in helping people with HIV, willingness to work hard, and reliable. Mentees will not work with animals but will work with tissues obtained from people with HIV.

Project Description: This project is designed in a two-stage process to tease out the mechanisms of how opioids impact: cellular receptor signaling for opioids, cellular coreceptors for HIV, epigenetic control (chromatin packing and methylation), and gene expression.
California

Investigator: Francesca Telese, Ph.D.
Institution: University of California San Diego
San Diego, CA

Project Title: Epigenomic Approaches to Study the Gene Networks Underlying the Cannabis Effects on Genetic Vulnerability to Psychosis

Research: Basic Research

Earliest Start Date: 05/31/2020
Housing: Campus

Student Qualifications: Students will be required to work with tissue samples or mice. Basic knowledge of neurobiology and molecular biology are preferred. Bioinformatic skills are a welcome.

Project Description: Adolescence represents a critical time window of neurodevelopment during which the brain undergoes critical changes at the behavioral, cellular and molecular level. The adolescent brain is highly responsive to the environment and this plasticity might lend to this period of development a greater vulnerability to external insults, such as drugs of abuse. In my laboratory, we investigate the effects of cannabis abuse in the adolescent brain using novel mice models that permit the analysis of cell-specific epigenetic pathways.
Colorado

Investigator: L. Cinnamon Bidwell, Ph.D.
Institution: University of Colorado Boulder
Boulder, CO
Project Title: Novel Approaches to Understanding the Role of Cannabinoids and Inflammation in Anxiety
Research: Clinical Research
Research Area: Health Effects of Legalized Cannabis
Earliest Start Date: 04/27/2020
Housing: Subsidized

Student Qualifications: Seeking a motivated undergraduate who is interested in gaining research experience at the intersection of public health, neuroscience, and psychological health. Some coursework in research methods and/or statistics preferred.

Project Description: We are conducting a study to understand the relationship of legalized cannabis use to the biological and behavioral factors related to anxiety. Interestingly, cannabis acutely can increase anxiety, but is related to lower anxiety levels overtime. We will study this paradox by examining the impact of cannabis strains that differ in the amount of THC and CBD (the two major cannabinoids in cannabis) on biological processes in order to inform individual choices regarding the use of cannabis and policy decisions regulating cannabis strains.
Investigator: Angela Bryan, Ph.D.
Institution: University of Colorado Boulder
Boulder, CO
Project Title: Exploring the Anti-Inflammatory Properties of Cannabis and Their Relevance to Insulin Sensitivity
Research: Clinical Research
Research Area: Health Effects of Legalized Cannabis
Earliest Start Date: 04/27/2020
Housing: Subsidized

Student Qualifications: Seeking a motivated undergraduate who is interested in gaining research experience at the intersection of public health, neuroscience, and psychological health. Some coursework in research methods and/or statistics preferred.

Project Description: We are conducting a study to understand the relationship of legalized cannabis use to the biological and behavioral factors related to Type 2 Diabetes. Interestingly, cannabis use increases caloric intake, but is related to lower body mass index, better insulin function, and lower risk for type 2 diabetes. We will study this paradox by examining the impact of cannabis strains that differ in the amount of THC and CBD (the two major cannabinoids in cannabis) on diabetogenic biological processes, in order to inform individual choices regarding the use of cannabis and policy decisions regulating cannabis strains.
**Colorado**

**Investigator:** Kent Hutchison, Ph.D.  
**Institution:** University of Colorado Boulder  
**Boulder, CO**  
**Project Title:** Marijuana Harm Reduction: Innovative Strategies for Developing New Knowledge  
**Research:** Clinical Research  
**Research Area:** Health Effects of Legalized Cannabis  
**Earliest Start Date:** 04/27/2020  
**Housing:** Subsidized

**Student Qualifications:** Seeking a motivated undergraduate who is interested in gaining research experience at the intersection of public health, neuroscience, and psychological health. Some coursework in research methods and/or statistics preferred.

**Project Description:** We are conducting a study to understand the relationship of legalized recreational cannabis use to biological and behavioral factors, as well as opiate use reduction. We examine the potential risks and benefits of cannabis use by comparing cannabis strains that differ in the amount of THC and CBD (the two major cannabinoids in cannabis) on mood, cognition, motor battery skills, and other biomarkers in order to inform individual choices regarding the use of cannabis and policy decisions regulating cannabis strains.
Connecticut

Investigator: Frederick L. Altice, M.D., M.A.
Institution: Yale University
New Haven, CT
Project Title: Expanding Medication Assisted Therapy in Ukraine (ExMAT)
Research: Epidemiology Research
Research Area: Opioid Agonist Therapy, Implementation Science, HIV Prevention, HIV Treatment, Methadone, Buprenorphine, Prisoners, Attitudes, Health Beliefs, Operations Research, Qualitative Research, People Who Inject Drugs, Criminal Justice System
Earliest Start Date: 6/1/2020
Housing: Campus

Student Qualifications: We conduct clinical behavioral research. A broad range of data analyses are available to the student, depending on his/her skill set. We have extensive qualitative data, quantitative survey data and mixed methods options. Basic understanding of epidemiologic research would be an asset. No work with animals or tissue samples is needed. Ideally should have some experience with Qualitative Methods and Software (nVIVO, dedoose, other)-OR-Quantitative Methods and Software (STATA, SAS, SPSS, or R)

Project Description: HIV incidence and mortality decreased globally yet increased markedly in the Commonwealth of Independent States (CIS) of Eastern Europe and Central Asia. Consequently, HIV epidemics remain volatile, fueled primarily by people who inject drugs (PWIDs) with opioid use disorders (OUDs). HIV prevalence in PWIDs in the CIS is high (21.3%-49.8%), and PWIDs account for >70% of cumulative and 56% of new HIV infections. Drug policies favoring incarceration over community treatment regionally have resulted in high incarceration rates of people with psychiatric and substance use disorders (SUD) and people at risk for or living with HIV (PLH). Prisoners often engage in risky HIV behaviors both within prison and post-release. Research confirms that scaling up and combining medically assisted therapies (MAT) and antiretroviral therapy (ART) is the most effective HIV prevention strategy in CIS countries. Despite unambiguous evidence supporting MAT, <2% of PWIDs in Ukraine are receiving MAT, especially in prisons. Using an implementation science framework, the investigators introduce or expand MAT offered to prisoners with OUDs and post release. The 2020 Summer Intern would work on the Yale campus with investigators who are working in the US and in Ukraine conducting quantitative and qualitative data analysis to assess organizational and client-level factors related to prisoners’ utilization of MAT, linkage to community treatment, and retention post-release.
Connecticut

Investigator: Marina Piccoitto, Ph.D.,
Institution: Yale University
New Haven, CT
Project Title: Acetylcholine Signaling Allows Cognitive Processes in the Brain to Regulate Physiological Responses to the Environment: The Example of Central Control of Opiate Tolerance
Research: Basic Research
Research Area: Opiates, Contextual Learning, Peripheral Nervous System, Brain-Body Integration, Acetylcholine
Earliest Start Date: 05/26/2020
Housing: Campus

Student Qualifications: It is important that an intern be willing to work with live mice and some experience handling mice is preferred. In addition, neuroscience coursework would be helpful.

Project Description: We are interested about how the brain senses changes in the body and associates that with responses to the environment. We think the neurotransmitter acetylcholine is important for both sensing those changes, enhancing learning of the environment, and changing the body's response to opiates in response to learned cues in advance of receiving the drug. We think this is important for protecting the body against opiate effects that can lead to overdose. Our experiments use mice to examine behavioral responses to opiates, changes in acetylcholine signaling and neuronal activity using fiber photometry, molecular changes using proteomics and biochemistry and manipulations of cholinergic signaling using chemogenetics, optogenetics, and molecular genetic alterations of receptors for acetylcholine.
Connecticut

Investigator: Renato Polimanti, Ph.D.
Institution: Yale University
New Haven, CT
Project Title: Investigating the Systems Genetics of the Patterns of Polysubstance Abuse and Addiction
Research: Basic Research
Research Area: Human Genetics; Statistics; Computational Biology
Earliest Start Date: 06/01/2020
Housing: Campus

Student Qualifications: The trainee should have strong interests in human genetics, computational biology, or statistics.

Project Description: Dr. Polimanti together with Drs. Wendt, Pathak, and Goswami (postdocs in Polimanti lab) will mentor the trainee with the goal of teaching basics skills related to computational biology and psychiatric genetics. The trainee will apply the novel knowledge acquired to a project designed to investigate molecular mechanisms related to substance use disorders and their comorbidity. The focus of the project will be discussed with the trainee, also considering the trainee's interest and career plans. Additionally, the trainee will participate in the activities of the Yale Psychiatry Division of Human Genetics, closely interacting with its members and participating in the meetings scheduled within the division. Furthermore, the trainee will be encouraged to attend the many relevant seminars that take place not only at the Yale Medical School but also at the Yale College of Arts and Science, and on the Yale West Campus.
**District of Columbia**

**Investigator:** Joshua Corbin, Ph.D.

**Institution:** Children’s National Hospital
Washington, DC

**Project Title:** Developmental of the Basal Telencephalic Limbic System

**Research:** Basic Research

**Research Area:** Neural Development, Developmental Disorders, Amygdala

**Earliest Start Date:** 05/31/2020

**Housing:** Subsidized

**Student Qualifications:** We are seeking students with declared majors or strong interests in neuroscience. Preferred student research interests brain development and/or neurodevelopmental disorders. No prior lab experience necessary, all that is needed is a strong desire to learn and take full advantage of the summer opportunity. Summer interns will be expected to attend summer research seminars, conduct supervised experiments, ask questions and participate in laboratory meetings. No live animal work.

**Project Description:** The Corbin lab at Children’s National in Washington DC studies how brain circuitry regulating specific behaviors emerges during development. To address this question, we focus on the limbic system of the brain: an interconnected set of brain structures that includes the olfactory system, amygdala, and hypothalamus. Moreover, we are interested in the consequences of when these processes go awry, resulting in neurodevelopmental disorders such as autism spectrum disorders. To address these questions, using a murine model, we employ a variety of state-of-the-art techniques, such as conditional transgenic, circuit tracing and optogenetic approaches. From these studies we hope not only to gain greater insight into the neurotypical developing brain, but address core behavioral deficits in prevalent human neurodevelopmental disorders. Through teaming up with current graduate students and post-doctoral fellows, summer students will be part of one of the many developmental, molecular, cellular and behavioral projects that are ongoing in the lab. Here they will learn basic techniques of neuroscience research and how to address neuroscience questions using modern tools.
Florida

Investigator: Madhavan Nair, Ph.D.
Institution: Florida International University
Miami, FL
Project Title: Nanotechnology Based Gene Editing to Eradicate HIV Brain Reservoir in Drug Abusers
Research: Basic Research
Research Area: Nanotechnology, HIV, Gene editing and Drug Abuse
Earliest Start Date: 6/1/2020
Housing: Subsidized

Student Qualifications: The prospect student will be an undergraduate student preferably majoring in physical or biological sciences with an expressed interest in pursuing a doctoral degree in basic or medical sciences. Students will be required to work with nanoparticles and tissue samples thus it is important to possess basic laboratory skills and knowledge. Students will be allowed to work only after getting appropriate training requested by the law and FIU and will not work with HIV virus or infected tissues.

Project Description: Morphine has been shown to complicate the severity of HIV-1 and its progression in the brain. The current antiviral therapy has failed to eradicate the HIV-1 genome and alleviate the complications caused by morphine and HIV-1 in the CNS. Our new strategy, which efficiently eliminates the HIV-1 genome from the infected cells along with the use of a robust delivery system such as nanoparticles, offers a new avenue for developing a method for eradication of HIV-1 and a cure for neuroAIDS.
Florida

Investigator: Yi Xiao, Ph.D.
Institution: Florida International University
Miami, FL
Project Title: Homogeneous Nuclease-Assisted SELEX for Rapid Isolation of Cross-Reactive, Functionalized Aptamers for Synthetic Cannabinoids
Research: Basic Research
Research Area: Aptamer Isolation; Biosensor; Drug detection; Electrochemical Aptamer-Based Sensors
Earliest Start Date: 05/18/2020
Housing: Subsidized

Student Qualifications: I prefer for the interns to have chemistry and biochemistry background.

Project Description: Electrochemical aptamer-based (E-AB) sensors have great potential for on-site drug detection due to their sensitivity, specificity, ease of use, portability, and robust performance in complex samples. Sensitive detection of targets using E-AB sensors requires structure-switching aptamers, which undergo large conformational changes upon target binding. We will utilize an exonuclease-based method to adopt structure-switching functionality into the aptamer that bind UR-144. We will perform exonuclease III digestion of this aptamer (46-nt in length) in the presence and absence of UR-144. Exonuclease digestion of both aptamers in the presence of target will be halted several nucleotides prior to the target-binding domain, yielding a major product with structure-switching functionality. Isothermal titration calorimetry experiments will be used to determine target-binding affinity. Moreover, circular dichroism experiments will be used to confirm that the exonuclease-truncated aptamer will perform target-induced conformational change. Finally, we will use this aptamer to fabricate UR-144-detecting E-AB sensor.
Florida

Investigator: Jian Feng, Ph.D.
Institution: Florida State University
Tallahassee, FL
Project Title: Neuron Subtype Specific role of DNA Methylcytosine Dioxygenase TET1 in Cocaine Addiction
Research: Basic Research
Research Area: Cocaine, Addiction, Epigenetics, DNA Methylation, Mouse
Earliest Start Date: 05/11/2020
Housing: Subsidized

Student Qualifications: Prior mouse handling or basic molecular biology experience is preferred, but not required.

Project Description: We propose to study the DNA epigenetic mechanism in drug addiction with a focus on TET1, a newly defined DNA demethylation enzyme. We plan to elucidate the functional role of TET1 and its mediated DNA methylation turnover in the two major neuronal subtypes of the ventral striatum, the center of the brain reward pathway. Our study will not only elucidate a novel molecular mechanism of drug addiction within specific neuron types that are differentially engaged in drug addiction but will also provide a plausible path for therapeutic manipulation of addiction behavior in the future.
Florida

**Investigator:** Linda Cottler, RN, Ph.D., M.P.H.

**Institution:** University of Florida
Gainesville, FL

**Project Title:** Identifying Patterns of Human Polysubstance Use to Guide Development of Rodent Models

**Research:** Epidemiology Research

**Research Area:** Polysubstance Use, Cocaine, Marijuana, Survey Instrument, Test-Retest Study

**Earliest Start Date:** 5/11/2020

**Housing:** Campus

**Student Qualifications:** Seeking undergraduate students with interests in behavioral research, ethics, and/or the inclusion of underrepresented minorities in research. Students with a declared major in anthropology, psychology, sociology, social work, nursing, or other related fields are preferred. Summer interns must be dedicated, reliable, curious, independent, solution-oriented, have good attention to detail, and a desire to learn about substance abuse research.

**Project Description:** The Department of Epidemiology at the University of Florida has opportunities available for Summer Scholars interested in a challenging, yet rewarding, summer experience. The 2020 Summer Scholars will work on an ongoing NIDA research project, Identifying Patterns of Human Polysubstance Use to Guide Development of Rodent Models. The project aims to determine the unique consequences of polysubstance use on behavior and neurobiology underlying cocaine-seeking. The R21 component has developed and is validating a survey instrument for evaluating detailed temporal patterns of polysubstance use in cocaine users. Summer Scholars will gain experience and appreciation for the conduct of research by conducting literature reviews, participating in faculty/staff meetings, and assisting in both data collection and data analysis. Summer Scholars will learn about community outreach, including assisting with recruitment and screening of participants, and will be exposed to the skill of assessment development and testing. The interdisciplinary nature of this study will expose Summer Scholars to a team science approach and serve as an introduction to drug abuse research.
Florida

Investigator: Jeremy McIntyre, Ph.D.
Institution: University of Florida
Gainesville, FL
Project Title: Novel Neuromodulation of Motivated and Addictive Behaviors
Research: Basic Research
Research Area: Reward, Addiction, Neuromodulation, Peptides, Neuronal Cilia, Animal Behavior, Microscopy, GPCRs, Cocaine, AAV, DREADD
Earliest Start Date: 5/26/2020
Housing: Campus

Student Qualifications: Interns should have completed their sophomore year of college, ideally with majors in neuroscience, genetics or general biology and interested in pursuing a PhD. Interns will be working with mice and mouse tissue samples. Familiarity with mouse handling, behavior experiments, PCR, immunohistochemistry are beneficial but not required.

Project Description: Interns will be involved in a project investigating the role of the peptide melanin-concentrating hormone (MCH) and neuronal cilia in mediating behavioral responses to cocaine in mice. The intern will test locomotor responses of mice to cocaine when MCH neurons are either stimulated or inhibited. This will be done in wildtype animals as well as mice that lack neuronal cilia. The intern will be responsible for assisting with injections of adeno-associated virus into the hypothalamus of mice to regulate MCH neuron activity and in performing open-field locomotor assays in response to cocaine. To complete the project the intern will then analyze expression of the virus in tissue sections through immunohistochemistry.
Florida

Investigator: Marek Schwendt, Ph.D.
Institution: University of Florida
Gainesville, FL
Project Title: Developing Novel Tools to Reverse Methamphetamine-Induced Neural and Behavioral Deficits
Research: Behavioral Research
Research Area: Neurobiology of Motivated Behavior and Cognition, Animal Models of Addiction, Cognitive Deficits in Addiction, Glutamate Receptors
Earliest Start Date: 05/11/2020
Housing: Campus

Student Qualifications: No prior research experience is necessary, but students interested in cellular/biological mechanisms of behavior/addiction are preferred. Students should be willing to work with rodents and are expected to learn various wet lab techniques to analyze rat brain tissue. Ample supervision and guidance will be provided by the mentor and his diverse group of graduate students.

Project Description: Methamphetamine (meth) use disorder poses unique challenges for treatment due to the prevalence of meth-induced cognitive deficits. These deficits contribute to persistent relapse vulnerability and complicate recovery for meth users. In this project, we will utilize an animal model of meth use (self-administration) to study neurobiological substrates underlying these behavioral deficits and evaluate efficacy of novel peptide therapeutics. Data from our laboratory (and others) indicate that when rodents are given extended access to meth, they will display escalation of meth intake, higher propensity to relapse and a spectrum of cognitive deficits, akin to human meth users. Using this model, we have identified a potential neurobiological target, meth-induced dysregulation of mGlu2/3 glutamate receptors in the prefrontal cortex (PFC). This project aims to evaluate sex-differences in availability and function of mGlu2 and mGlu3 in the PFC (Aim1) and to develop and optimize the in vivo delivery of novel therapeutic tools (interference peptides) in order to reverse post-meth changes in mGlu2 (or 3) function in the PFC (Aim 2). We will match intern(s) to research studies in the lab according to their interest either to conduct brain tissue analysis, or to assist with behavioral studies and peptide drug administration.
Georgia

Investigator: Abeed Sarker, Ph.D.
Institution: Emory University
Atlanta, GA
Project Title: Mining Social Media Big Data for Toxicovigilance:
Automating the Monitoring of Prescription Medication Abuse via Natural Language Processing and Machine Learning Methods
Research: Other
Research Area: Artificial Intelligence; Social Media; Mining Prescription; Drug Abuse; Natural Language; Processing Biomedical Informatics
Earliest Start Date: 05/15/2020
Housing: Campus

Student Qualifications: The most important attribute required is a strong interest in research and the desire to contribute to the welfare of the community through research. The intern will not be required to work with animals, humans or tissue samples--only publicly available social media data will be included in the analyses. Ability to use basic tools such as Microsoft Excel is required. Interns with some programming skills (e.g., python) are preferred. No prior experience in research is required but is desirable.

Project Description: The broader focuses on utilizing social media data for understanding and characterizing prescription drug abuse. Publicly available information regarding prescription drug misuse and abuse are detected over social media and analyzed to identify aggregated information regarding the trends and trajectories of misuse and abuse, both at the population-level and cohort-level.

The summer project will focus on performing qualitative and quantitative analyses of social media data collected from Twitter and/or Reddit. The qualitative analyses, for example, will focus on manually identifying common co-ingestion information, dosage information and information regarding social and clinical consequences of drug addiction and abuse. Quantitative analyses will focus on quantifying and comparing misuse/abuse information for distinct prescription drugs, co-ingestion and non-standard dosage patterns.
Hawaii

Investigator: Scott Okamoto, Ph.D., M.S.W.
Institution: Hawaii Pacific University
Honolulu, HI
Project Title: The Implementation, Adoption, and Sustainability of Ho'ouna Pono
Research: Preventive Research
Research Area: Health disparities, Rural, Hawaiian Youth, Prevention, Implementation Science
Earliest Start Date: 5/31/2020
Housing: Campus

Student Qualifications: This project requires students to work with humans only. It is appropriate for undergraduate students majoring in education, psychology, social work, public health, or an allied discipline. Students with knowledge and/or interest in rural populations, Native Hawaiian/Pacific Islander youth, and public and/or charter schools are preferred. Although previous research experience is not required, students with strong attention to detail and communication skills are encouraged to apply.

Project Description: Building upon prior community-based participatory research in rural Hawai'i, the primary goals of this project are (1) to examine individual- and system-level barriers and facilitators to implementing a school-based substance use curriculum (Ho'ouna Pono), (2) to elicit and evaluate strategies to overcome implementation barriers of Ho'ouna Pono, and (3) to develop regionally tailored implementation action plans for the curriculum in schools and communities in rural Hawai'i. Ho'ouna Pono is a culturally grounded drug prevention curriculum developed for rural Native Hawaiian/Pacific Islander youth. Summer Research with NIDA interns will assist in the collection, management, and/or analysis of quantitative (survey) data from public school faculty, staff, and administrators on Hawai'i Island. This project is appropriate for undergraduate students with interests in social/behavioral research in the area of drug prevention, health disparities, and implementation science. Students will collaborate with faculty and staff from multiple universities and may have opportunities to travel to Hawai'i Island for survey data collection.
Illinois

Investigator: A Vania Apkarian, Ph.D.
Institution: Northwestern University
            Chicago, IL
Project Title: Center for Chronic Pain and Drug Abuse
Research: Basic Research
Research Area: Chronic Pain, Human, Rodent, Neuroimaging, Patch Clamp,
              Behavior, Opiates, Addictive Behavior
Earliest Start Date: 6/1/2020
Housing: Subsidized

Student Qualifications: Major career interest should be neuroscience in general, but also human
or rodent studies of brain mechanisms of chronic pain, opiates, addiction, addictive behaviors.
There are opportunities to work either with humans or with rodent models. We are a large
group with 6 scientists working together. Therefore, there will be ample sources of learning and
of exposure to distinct lines of research.

Project Description: The intern will either participate in human brain imaging studies of
patient with chronic back pain and opiate use or participate in rodent model studies of
neuropathic pain and opiate exposure.
Illinois

Investigator: Linda A. Teplin, Ph.D.
Institution: Northwestern University Feinberg School of Medicine
Chicago, IL
Project Title: Drug Abuse and Related Health Disparities: An Intergenerational Longitudinal Study of Offspring of Delinquent Youth
Research: Epidemiology Research
Research Area: Substance Abuse, Substance Use Disorders, Criminal Justice, Delinquency, Service Use, Health Disparities, Racial/Ethnic Minorities, Epidemiology
Earliest Start Date: 6/6/2020
Housing: Subsidized

Student Qualifications: The Summer Intern must have an interest in criminal justice, health disparities, and substance abuse research, and in careers in psychology, sociology, and/or epidemiology. Experience conducting literature searches and statistical programming is preferable. Other preferred requirements include coursework in psychology, statistics, and research methodology. We do not require that the Summer Intern have previous experience with empirical research, although this is preferred.

Project Description: The Summer Intern’s work will support the Northwestern Juvenile Project: Next Generation, the first large-scale longitudinal study of the intergenerational transmission of substance use disorders (SUDs) and related problem behaviors in children of delinquent youth. The Summer Intern will be engaged in three main tasks: (1) create a table of the literature that examines studies of substance use service utilization among justice-involved youth and adults, and describe the strengths and weaknesses of the studies; (2) investigate racial/ethnic differences in substance use among youth involved in the justice system and as they age into adulthood; (3) learn about the operations of a longitudinal intergenerational field study. The Summer Intern will shadow all aspects of project operations including interview set-up; conducting an interview; protection of human subjects; sample retention; and database management. They will work closely with doctoral student María José Luna, current recipient of a NIDA Diversity Supplement, 3R01DA042082-02S1. To ensure they will meet these goals, the Summer Intern will meet regularly with the project’s principle investigator, associate director, biostatistician, and data analyst. They will attend departmental and university wide networking experiences and learn about research ethics and the protection of human subjects.
Illinois

Investigator: Michelle Birkett, Ph.D.
Institution: Northwestern University
Evanston, IL

Project Title: Netcanvas: Development, Hardening, and Dissemination of a Software Suite for the Collection of Complex Network and Contextual Data in HIV and Drug Research

Research Area: Social Network Analysis; Public Health; HIV; Stis; Infectious Disease; Sexual and Gender Minorities; Substance Use; Multilevel Influence; Network Data; Data Collection; Social and Behavioral Health; Prevention; Population Dynamics; Community Outreach; Software; Social Stigma; Surveys.

Earliest Start Date: 6/20/2020
Housing: Subsidized

Student Qualifications: Knowledge or interest in health disparities research, LGBTQ+ populations, HIV/infectious disease, public health, and/or community outreach and dissemination. Detail-oriented with strong written and oral communication skills. Majors in social sciences (e.g. sociology, psychology), public health or related field preferred. Basic computer proficiency required, and interest in software development a plus. Student should be comfortable engaging members of the public in a professional capacity.

Project Description: Network Canvas is a project of Northwestern University’s Institute for Sexual and Gender Minority Health and Wellbeing. The five-year project aims to develop a standalone software suite to simplify the collection and management of complex network data and, once stable, widely disseminate this tool to the research community. Capturing data “beyond” the individual (e.g. social, relational, geospatial) is a growing priority for many researchers, particularly those concerned with understanding the complex drivers of health and disease in marginalized populations. However, existing survey tools for collecting these data are often cumbersome, resource intensive and require strong technical expertise. Through a free, open-source framework, the Network Canvas suite leverages advanced technologies to allow researchers to easily design bespoke surveys, collect rich multilevel data directly from participants using intuitive touchscreen interfaces, and utilize these data in near real-time to assess associations between contextual factors and health outcomes. The intern will work on feedback and outreach activities to help hone the tool’s functionality and foster uptake across the research community during the public beta period. They will assist with the production of high-quality training materials, catalog and summarize incoming feedback, support manuscript preparation, and work directly with researchers interested in implementing Network Canvas in their studies.
Illinois

Investigator: Richard B. Silverman, Ph.D. 
Institution: Northwestern University 
Evanston, IL 
Project Title: New Inactivators of GABA Aminotransferase for Addiction and Epilepsy 
Research: Basic Research 
Research Area: Enzyme Inactivation, GABA Aminotransferase, Medicinal Chemistry, Organic Synthesis 
Earliest Start Date: 05/30/2020 
Housing: Campus

Student Qualifications: The only education requirement is a full year of organic chemistry with laboratory. Preference will be given to students interested in pursuing chemistry as a career. No work will involve animals, humans, or tissue samples. This will involve chemical reactions with some dangerous chemicals.

Project Description: Addiction is known to be caused by the release of dopamine in the brain, which binds to a receptor that produces a reward sensation. It is known that the inhibitory neurotransmitter GABA (gamma-aminobutyric acid) can antagonize the dopamine release, thereby acting as a means to prevent the reward sensation and addiction. The enzyme called GABA aminotransferase degrades GABA. Therefore, if you block GABA aminotransferase, GABA cannot be degraded, and its concentration will rise. This should lead to prevention of addiction. You will be required to carry out chemical synthesis of an organic molecule that has been designed to inactivate the enzyme GABA aminotransferase. If the molecule is synthesized, you can then study whether it inhibits GABA aminotransferase. If this occurs, and it is potent, the molecule will be sent to a collaborator to carry out addiction studies in rodents.
Illinois

Investigator: C Hendricks Brown, Ph.D.
Institution: Northwestern University Feinberg School of Medicine
           Chicago, IL
Project Title: Center for Prevention Implementation Methodology for Drug Abuse and HIV (Ce-PIM)
Research: Preventative Research
Earliest Start Date: 5/31/2020
Housing: Subsidized

Student Qualifications: Young adult (18 years old or older) that lives in the Chicago-land area, passionate about learning about drug abuse prevention and/or HIV prevention, interested in learning how to conduct research.

Project Description: The Center for Prevention Implementation Methodology for Drug Abuse and HIV (Ce-PIM) aims to develop, disseminate, and apply innovative and rigorous implementation methods for researchers, policy makers, and practitioners to improve population health, especially in HIV and drug abuse prevention. We pay special attention to addressing disparities by developing methods that improve the health of minorities and underserved communities. Many of the methods use systems science and engineering and advanced computational tools to address the complex interactions involved in implementation.

Ce-PIM identifies and responds to critical methods gaps that are holding back the movement of numerous rigorously evaluated prevention programs involving biomedical interventions for preventing HIV that have demonstrated impact in efficacy and effectiveness trials. Ce-PIM has partnered with 5 qualifying grants to support the next stage of implementation science research. The qualifying grant at Northwestern University is the NIDA funded U01 RADAR research project (full grant title “Multilevel Influences on HIV and Substance Use in a YMSM Cohort”). Led by Dr. Brian Mustanski, the overall goal of the RADAR study is to identify and understand the connections among sexually transmitted infections (like HIV), drug and alcohol use, and romantic or sexual relationship patterns over time among young men who have sex with men (YMSM).
**Illinois**

**Investigator:** Basmattee Boodram, Ph.D., M.P.H.  
**Institution:** University of Illinois at Chicago  
**Chicago, IL**  
**Project Title:** Contextual Risk Factors for Hepatitis C Among Young Persons Who Inject Drugs  
**Research:** Epidemiology Research  
**Research Area:** Persons Who Inject Drugs, Injection Drug Use, Social Networks, Social Geography, Stigma, Norms, Hepatitis C, HIV, Heroin Use  
**Earliest Start Date:** 06/02/2020  
**Housing:** Subsidized  

**Student Qualifications:** Trained in the social or health sciences., with a strong inclination toward working with marginalized populations.

**Project Description:** This is a longitudinal study of 420 young persons who inject drugs (PWID) and 1,156 of their drug injection network partners to examine the role of social networks (injection, sexual, and support), social geography, social norms related to drug use and sexual behaviors, and drug use stigma on (a) hepatitis C risk and adverse drug use outcomes (e.g. overdose).
Investigator: Nu-Chu Liang, Ph.D.
Institution: University of Illinois-Urbana Champaign
Champaign, IL
Project Title: Mechanisms of Metabolic and Cognitive Dysregulation after Combined Alcohol and THC Use
Research: Behavioral Research
Research Area: Alcohol, Cannabis, THC, Cognitive Function, Energy Balance, Adolescence, Polydrug Use
Earliest Start Date: 6/1/2020
Housing: Campus

Student Qualifications: Preferred attributes include a general interest in the neuroscience of abused drugs, feeding (e.g., overeating and binge drinking), adolescence, drug-induced neuroadaptation, and cognitive functioning. Majors in psychology and other neuroscience-related fields are preferred, as are students who are highly motivated, very attentive to details, and work well in a team environment. Students should expect to handle live, free behaving rats and process blood and tissue samples.

Project Description: Dr. Liang's laboratory studies the neurobiological and behavioral consequences of repeated exposure to psychoactive drugs such as alcohol and cannabis. In addition, the laboratory aims to study mechanisms underlying ingestive behaviors and factors that can impair or improve energy balance. Examples of the research questions currently being addressed in the lab are: (1) Do alcohol and cannabis co-use produce worse neural and behavioral outcomes than the use of either drug alone? (2) Are there more adverse consequences when drug exposure occurs early in life and are there age-dependent differences in drug-induced neuroadaptations? (3) What are the neurobiological mechanisms or pharmacokinetics that underlie individual differences in voluntary alcohol and cannabis consumption? (4) What are the cellular and molecular mechanisms that mediate alcohol and THC exposure induced working memory impairments?
Indiana

Investigator: Leslie Hulvershorn, M.D.
Institution: Indiana University School of Medicine
Indianapolis, IN
Project Title: Neural Response to Risky Decision Making in Youth at High Risk for Substance Use Disorder and HIV
Research: Clinical Research
Research Area: Brain Imaging, Substance Use Disorder, Risky Decisions, Behavioral Issues
Earliest Start Date: 6/2/2020
Housing: Campus

Student Qualifications: Interns must be detail-oriented and willing to learn new skills. Students with an interest in medicine, psychology, psychiatry, social services, or other biological sciences would be well-suited for this project. Student interns must be comfortable working with adolescent participants and participant families.

Project Description: Interns will assist in an observational study looking at risky behaviors in middle to late adolescents. This project investigates brain mechanisms in high and typical risk youth that underlie decision-making, prior to the effects of drug use on their brain. Interns will have the opportunity to shadow clinicians in a multi-disciplinary team treating adolescents with substance abuse and behavioral health disorders.
Kentucky

Investigator: Justin Yates, Ph.D.
Institution: Northern Kentucky University
Highland Heights, KY
Project Title: Contribution of NMDA NR2B Subunit to Risky Choice and Economic Demand for Cocaine
Research: Behavioral Research
Research Area: Neural Mechanisms of Risky Choice and Cocaine Self-Administration.
Earliest Start Date: 6/1/2020
Housing: Campus

Student Qualifications: The main qualification is that the intern needs to be comfortable working with rats (specifically, Sprague Dawley rats). Ideally, this student will have some background in psychology and/or biology and has an interest in attending graduate/medical school. However, I am not overly picky. I have mentored a wide range of students with varying majors during my time at NKU.

Project Description: Rats will be tested in a measure of risky choice (the risky decision task). In the risky decision task, rats will make a choice between two rewards. One reward is smaller in magnitude (1 sucrose pellet) and has no risk associated with it. The other reward is larger in magnitude (4 pellets), but subjects have a chance of receiving a foot shock for choosing this option. The probability of receiving foot shock will increase across the session (0, 25, 50, 75, 100%). Following behavioral training, rats will be tested in a 14-day cocaine self-administration paradigm. After the first 7 days (these first 7 days serve as a baseline), rats will be either treated with vehicle or the glutamate N-methyl-D-aspartate (NMDA) GluN2B subunit antagonist Ro 63-1908 (1.0 mg/kg). The goals of the experiment are to determine: 1) if high risk-taking behavior is associated with increased cocaine self-administration and 2) if Ro 63-1908 decreases cocaine self-administration. The student will be responsible for weighing and handling rats, testing rats in the behavioral paradigms described above, recording data, and analyzing data.
**Kentucky**

**Investigator:** Pavel Ortinski, Ph.D.
**Institution:** University of Kentucky
**Lexington, KY**

**Project Title:** Neural Microcircuit Selection by Astrocyte Signaling Following Cocaine Exposure

**Research:** Basic Research
**Research Area:** Substance Use Disorders; Drug Addiction; Electrophysiology; Cocaine Self-Administration; Neuron; Astrocyte; Glia; Synapse; Circuit

**Earliest Start Date:** 6/1/2020

**Housing:** Subsidized

**Student Qualifications:** No prior training is required but individuals interested in pursuing graduate education in neuroscience area are particularly encouraged to apply. The project will involve daily animal handling and training. Students will also observe animal surgeries but will not be required to perform them.

**Project Description:** Our lab studies how drugs of abuse change brain activity at the cellular level and how such changes may perpetuate the desire to use the drug. We use rats that self-administer cocaine as a model of human drug use. Cocaine-triggered changes are examined in the brains of these animals using electrophysiological recordings, imaging of Ca2+ activity, and a variety of biochemical methods. This research project will ask a question whether astrocyte Ca signals contribute to drug use when it is associated with negative consequences (mild electric shock). Human drug addicts often maintain drug use despite severe negative consequences such as impact on relationships, job loss, etc. Although neuronal activity is known to be altered following drug exposure, it is not understood how astrocytes, another major cell type in the brain, may contribute to such alterations. We hope to begin probing for answers in this project.
Kentucky

**Investigator:** Kristen Gullo, B.S.  
**Institution:** Us WorldMeds  
**Location:** Louisville, KY  
**Project Title:** Accelerated Development of Lofexidine for Neonatal Opioid Withdrawal Syndrome  
**Research:** Drug Development Research  
**Research Area:** Neonatal Opioid Withdrawal Syndrome; Neonatal Abstinence Syndrome; Pediatric Formulation Development; Clinical Trial Material Manufacturing; Nonclinical Toxicology and Pharmacology; Clinical Pharmacology, Bioavailability Study, Pharmacokinetics, Analytical, Bioassay, Regulatory  
**Earliest Start Date:** 6/1/2020  
**Housing:** Campus

**Student Qualifications:** Preferred candidates will have educational background in a relevant scientific (chemistry, chemical engineering, biology, biochemistry) or math/stats field. Some exposure to basic or clinical research and/or a regulated environment a plus, but not required. Desired skills/attributes include: analytical thinking, strong written and verbal communication, team player mentality, and a passion to help patients. Interns will have no direct contact with animals, human subjects or tissues.

**Project Description:** US WorldMeds is developing a non-opioid product for the treatment of Neonatal Opioid Withdrawal Syndrome (NOWS). In this early stage of drug development, three critical components of research are in progress: nonclinical safety and pharmacology studies to inform safety margins for the treatment of neonates, formulation development to support the particular dosing needs of neonates, and the conduct of a Phase 1 study in adult volunteers to characterize the pharmacokinetics of the neonate formulation prior to evaluating the drug in the target population. Intern(s) will be placed with mentors responsible for the executional oversight of one or more of these development program components. The intern will participate in a number of activities to learn about drug development requirements, assist with documents, perform literature reviews, compile resources and/or data required for program decisions, support vendor communications and compliance oversight, tabulate and trend data, support internal cross-functional meetings to align research activities across stakeholders, and provide organizational and/or writing assistance with regulatory communications required under an Investigational New Drug Application.
Maine

Investigator: Elissa J. Chesler, PhD
Institution: The Jackson Laboratory
Bar Harbor, ME
Project Title: Center for Systems Neurogenetics of Addiction
Research: Basic Research
Research Area: Behavioral Genetics, Computational Biology, Bioinformatics, Genomics
Earliest Start Date: 6/1/2020
Housing: Campus

Student Qualifications: Students with background in behavior, genetics and genomics are most well-suited to work in the lab, although students with a behavioral interest are able to learn genetics and genomics through analysis of behavioral data. Students with computational experience including statistical data analysis using R, or significant python coding are able to contribute readily to data analysis and software development.

Project Description: Students working on projects in the Center for Systems Neurogenetics of Addiction will use data from behavioral genetic studies in combination with molecular genomic data and genetic data to find relations among genes and traits. The traits will include traits associated with addiction risk and in model organisms, with drug self-administration. Using quantitative genetics, genomics and bioinformatics, students will find genes associated with these traits. Students with an interest in behavioral science may assist in experimental work, including automated behavioral data acquisition and analysis. Students with an interest in biostatistics or bioinformatics will use existing software and analysis tools to interpret gene-behavior relations and to find relations across behaviors. Computational Science students will be able to participate in software development or visualization to enhance the tools used by many investigators to perform analyses.
Maine

Investigator: Jason Bubier, Ph.D.
Institution: The Jackson Laboratory
Bar Harbor, ME
Project Title: Genetic Control of Addiction by Host and Microbiome
Research: Basic Research
Research Area: Systems Genetics, Microbiome, Heterogeneous Data Integration, Behavior, Mouse Genetics
Earliest Start Date: 6/1/2020
Housing: Campus

Student Qualifications: The student should have a biological science or related major. They should be interested in graduate school MD/PhD programs, however a desire for a career as a scientist with a bachelor’s degree is also sufficient. The student may have no previous research experience and computer programming experience is a plus. This research has the opportunity to include work with animals.

Project Description: Evidence from both human and animal studies indicates that a multitude of traits, including novelty seeking, novelty preference, and impulsivity are strongly correlated with the propensity to develop a substance use disorder. We are utilizing the Diversity Outbred (DO) mouse population, an advanced mouse genetic population and the computational and statistical methods in systems genetics developed to analyze these populations, to identify the genomic region associated with these behaviors. Accumulating evidence suggests that the gut microbiome plays a significant role in behavioral response to cocaine, as well as anxiety- and depression-like behaviors, many of which are co-morbid with addiction. In this study, we aim to reveal an integrated genetic basis of addiction that combines host genetics and the microbiome composition.
Maryland

Investigator: Dionna Williams, Ph.D.
Institution: Johns Hopkins University
Baltimore, MD
Project Title: Cocaine Use and HIV Antiretroviral Therapy Efficacy in the CNS
Research: Basic Research
Research Area: HIV, Drug Metabolism, Cognitive Impairment
Earliest Start Date: 5/28/2020
Housing: Campus

Student Qualifications: This research requires students to work with blood and/or immune cells obtained from HIV infected people. Outstanding aseptic technique and comfort working in a BSL2/3 laboratory is required. RNA and DNA isolations will be performed. qPCR, sequencing, and statistical analyses will be the primary experimental approaches. Appropriate majors include biology, chemistry, biochemistry, immunology, neuroscience, microbiology, genetics, or related disciplines.

Project Description: Human immunodeficiency virus-1 (HIV) enters into the brain early after infection and results in a spectrum of neurologic deficits that affect cognitive processes like learning and memory, termed HIV associated neurocognitive disorders (HAND). Antiretroviral therapy (ART) are the therapies used to treat HIV. While successful in reducing HIV to undetectable levels in the blood, ART does not successfully reduce HIV in the brain to the same extent. As a result, ART has not decreased the prevalence of HAND, which continues to increase as the life expectancy for infected individuals increases. HIV-infected substance abusers exhibit more severe cognitive impairment compared with their non-drug abusing counterparts. Specifically, cocaine use is associated with an accelerated incidence and progression of HAND. This occurs, in part, due to cocaine-mediated alterations in the metabolism of ART that inhibits the ability of the therapies to work effectively at reducing HIV in brain. CYP3A4 is a cytochrome P450 family member and is responsible for metabolizing over 50% of clinically used drugs, including ART. CYP3A4 also contributes to the metabolism of cocaine. The goal of this project is to determine whether CYP3A4 expression 1) differs for HIV-infected substance abusers, as compared to non-drug abusing infected people, and 2) contributes to the risk of developing HAND specifically in HIV-infected substance abusers.
Investigator: Kenneth Witwer, Ph.D.  
Institution: Johns Hopkins University  
Baltimore, MD  
Project Title: Extracellular Vesicle and Extracellular RNA Biomarkers of HIV-1 Central Nervous System Pathogenesis and Cigarette Use  
Research: Basic Research  
Research Area: Extracellular Vesicles; Immunity; Central Nervous System; Cigarette Smoking; HIV  
Earliest Start Date: 5/28/2020  
Housing: Campus

Student Qualifications: While basic laboratory skills and a focus on the life sciences are preferred and would aid in rapid progress, no prior research experience is required. Because the lab works with several infectious agents, interns must agree to follow instructions carefully and implement biosafety procedures that will be taught at the outset. Students may work with cell cultures and handle cigarettes (in a fume hood).

Project Description: Extracellular vesicles are nano-sized bubble-like structures that are released by all known cells. These vesicles and their cargo are known to influence other cells, including various cell types in the brain. In this project, the summer intern will conduct experiments to learn more about the ways in which inflammatory insults such as cigarette smoking affect cells of the brain. Specifically, the intern will learn and apply standardized methods of generating cigarette smoke extracts, use the extracts to treat cultured cells, and follow standard operating procedures to separate and characterize extracellular vesicles released by the cells. Functional experiments will then be conducted, in which different types of brain cells are exposed to purified vesicles, followed by assessments of cell health and behavior.
Maryland

Investigator: Joseph Cheer, Ph.D.
Institution: The University of Maryland
Baltimore, MD
Project Title: Neurodevelopmental Effects of THC on the VTA Dopamine System and Behavior
Research: Basic Research
Research Area: Marijuana, Dopamine, Cannabinoids, Dopamine, Ventral Tegmental Area, Nucleus Accumbens, Addiction, Impulsivity, Cues, Prenatal
Earliest Start Date: 6/1/2020
Housing: Subsidized

Student Qualifications: Biology, chemistry, psychology. MatLab experience highly desirable.

Project Description: Marijuana is the most common illicit drug used by pregnant women. Clinical studies on the long-term effects of marijuana smoking during pregnancy show its detrimental impact on the cognitive development of the offspring from early childhood until later in life. In fact, children and adolescents exposed to the psychoactive ingredient of marijuana, Δ9-tetrahydrocannabinol (THC), before birth display reduced attention, learning and problem solving, hyperactivity, increased impulsivity and engagement in risk-taking behaviors. Hence, early exposure to THC might induce enduring adaptations encompassing the brain reward dopamine (DA) system resulting in maladaptive behavior, ranging from affective dysregulation to addiction vulnerability. However, preclinical studies on the impact of marijuana use on the development of brain reward pathways are surprisingly lacking. Hence, there is an urgent need to identify molecular substrates and effective strategies for prevention and treatment of these detrimental effects that might confer individual vulnerability. Here, we propose three experiments to test our overarching hypothesis that prenatal THC exposure induces a strengthening at afferent excitatory synapses on ventral tegmental area (VTA) DA neurons, which together with abnormal endocannabinoid (ECB) system function, induces a persistent excitatory drive to DA neurons underlying an at-risk phenotype for alcohol seeking. First, we will determine if prenatal THC exposure leads to strength.
Massachusetts

Investigator: Peter D. Friedmann, M.D., M.P.H.
Institution: Baystate Medical Center
Springfield, MA
Project Title: Massachusetts Justice Community Opioid Innovation Network (Mass JCOIN)
Research: Epidemiology Research
Research Area: Opioid Use Disorder; Criminal Justice System; Epidemiology; Service Utilization and Outcomes; Implementation Science
Earliest Start Date: 6/1/2020
Housing: Subsidized

Student Qualifications: Students will be working with a stigmatized human population with great social and health care deficits in Massachusetts. Qualifications include excellent interpersonal and communication skills; a flexible, non-judgmental attitude; a willingness to work in county jails or other low-resourced community settings with marginalized persons; and an ability to follow directions. A current drivers’ license and a car preferred. Tattoos or piercings are welcomed.

Project Description: The Mass JCOIN project will examine the implementation and outcomes of a new legal mandate that county jails in MA provide all FDA-approved forms of medications for opioid use disorder (MOUD). In partnership with 7 jails, MOUD utilization and outcomes will be assessed via administrative records. An implementation study will be conducted to understand contextual factors that facilitate and impede MOUD delivery in jail and community care coordination. An economic evaluation will calculate the cost of implementing MOUD in jail.
Investigator: Michael Otto, Ph.D.
Institution: Boston University
Project Title: Nature and Predictor of impaired Harm Avoidance in Polysubstance Abuse
Research: Clinical Research
Research Area: This R21/R33 award will move from its animal to its clinical phase as of July 2020. Keywords: Cognitive functioning, Risk behaviors, Impaired harm avoidance
Earliest Start Date: 7/13/2020
Housing: Subsidized

Student Qualifications: Psychology major college undergraduate

Project Description: The purpose of this project is to evaluate the nature and significance of laboratory-assessed harm avoidance deficits in order to identify potential treatment targets that may underlie devastating, clinical harm-avoidance deficits: characterized by high risk for blood-borne viruses, criminality, and repeated overdoses among those with opioid poly-substance use relative to mono-substance use. We use close analogue procedures in both animal and human models to provide a comprehensive accounting of the etiology and nature of these harm avoidance deficits as an initial strategy for the goal of refining treatment and prevention interventions. The NIDA Summer intern would be engaged in study start-up, training, and recruitment procedures - thus, providing an overview of all aspects of this clinical project.
Massachusetts

Investigator: Ateev Mehrotra, M.D., M.P.H.
Institution: Harvard Medical School
Boston, MA

Project Title: Telemedicine for Treatment of Opioid Use Disorder
Research: Basic Research
Research Area: Disadvantaged Populations; Disparity; Evaluation;
Geographic Difference; Geography; Health Services Accessibility;
Improve Access; Innovation; Low Income; Medicare; Rural;
Rural Community; Racial and Ethnic Disparities; Substance Use Disorder;
SUD; Telemedicine; Tele-SUD; Uptake

Earliest Start Date: 6/1/2020
Housing: Subsidized

Student Qualifications: Students from various disciplinary backgrounds, (statistics, computer programming, biostatistics, public health, health services, data science, economics, political science/public policy, and social sciences) are encouraged to apply. No prior research experience is required for this internship; however, the intern must have a genuine interest in building research experience, including statistics and statistical programming in SAS and knowledge of insurance claims & health service delivery.

Project Description: Access to substance use treatment for addictions to opioids, alcohol, or other substances is difficult for many patients in the U.S., particularly for the poor and those who live in rural communities. Telemedicine for substance use disorder (“tele-SUD”) may be a potential solution for this access problem. However, despite the widespread interest and growing use of live video-based tele-SUD visits in the U.S., little research has rigorously examined urban/rural disparities in tele-SUD utilization and whether tele-SUD use is growing more rapidly in rural areas. To fill this knowledge gap, this project examines national rates of tele-SUD utilization among urban and rural patients using data through 2019 from Medicare and commercial insurance. The goal of this study is to explore the potential role of tele-SUD in improving access to care for individuals with substance use disorder. The summer intern will work under an NIH T32 postdoctoral fellow.
Massachusetts

Investigator: Amy Janes, Ph.D.
Institution: Harvard Medical School /McLean hospital
Belmont, MA
Project Title: Defining Individual Differences in Tobacco Smokers Using Multimodal Neuroimaging
Research: Clinical Research
Research Area: fMRI, Neuroimaging, Nicotine Dependence, EEG, Smoking Cessation, Multi-Modal Neuroimaging
Earliest Start Date: 5/1/2020
Housing: Subsidized

Student Qualifications: This position would fit with students interested in neuroscience, psychiatry, psychology, neuroimaging and those deciding whether to peruse an advanced degree focused on research and/or clinical practice.

Project Description: Students interested in studying substance abuse disorders using neuroimaging techniques may be interested in the internship position in the Functional Integration of Addiction Research Laboratory (FIARL) at Harvard Medical School's McLean Hospital. The FIARL laboratory uses neuroimaging techniques such as functional magnetic resonance imaging (fMRI) and electroencephalogram (EEG) to understand how individual differences in brain function contribute to substance abuse disorders. We also assess how various treatments influence these brain measures.
Massachusetts

Investigator: Margarita Alegria, Ph.D.
Institution: Massachusetts General Hospital
Boston, MA
Project Title: The Impact of Medicaid Plans on Access to and Quality of SUD Treatment
Research: Other
Research Area: Behavioral Health; Mental Health; Substance Use; Racial/Ethnic Disparities; Evaluation of Systems; Health Plans, New York Medicaid; Health Insurance
Earliest Start Date: 6/15/2020
Housing: Subsidized

Student Qualifications: Excellent organizational, communication and interpersonal skills required. Strong writing and analytical skills are a plus.

Project Description: The RA will work on a NIDA-funded study that examines New York Medicaid data to investigate the role of Medicaid privatization on substance use disorder (SUD) treatment, assess differential effects of privatization on access and SUD services, and determine how they might relate to SUD outcomes. The project will look at disparities in the patterns of SUD care by race/ethnicity, gender and rurality; and to generate potential ways to address these issues. As part of qualitative work, we will identify key stakeholders from patients, policy makers, providers, and clinicians who can review our findings, help identify contributors to treatment outcomes, and generate recommendations for improving delivery of SUD treatment services. Research tasks for the summer intern include conducting literature searches and write ups of relevant materials, creating tables and graphs for scholarly papers, entering data, preparing for in-depth interviews, and helping with qualitative data coding. Responsibilities may also include some administrative tasks such as general office and meeting support.
Massachusetts

**Investigator:**  R. Kathryn McHugh, Ph.D.
**Institution:**  McLean Hospital
Belmont, MA

**Project Title:**  Behavioral Strategies to Reduce Stress Reactivity in Opioid Use Disorder

**Research:**  Clinical Research

**Research Area:**  Opioid Use Disorder, Stress, Behavioral Therapy, Behavior Change

**Earliest Start Date:**  5/15/2020

**Housing:**  Subsidized

**Student Qualifications:**  This clinical project entails working with human subjects in an acute clinical setting (psychiatric hospital). Preferred qualifications include experience working in some type of helping profession role, preferably in a clinical setting; good organizational and time management skills; and an interest in human subject’s research or clinical practice. Candidates with an interest in careers in medicine, clinical psychology, or other clinical or clinical research area are preferred.

**Project Description:**  Stress is an important risk factor for opioid use. The way that people respond to stress (also known as stress reactivity) is a robust predictor of opioid use disorder treatment outcome. Accordingly, there is a clear need to improve treatments to reduce stress reactivity in people with opioid use disorder, with the ultimate goal of improving outcomes (e.g., reducing relapse) in this population. The aim of this project is to test behavioral strategies for reducing the impact of stress in people with opioid use disorder. For this study, men and women diagnosed with opioid use disorder will be recruited and will receive training in different strategies for reducing response to stress. We then test whether these strategies help people to experience less craving, negative emotion, and physiological response to stress.
Massachusetts

Investigator: Mriganka Sur, Ph.D. & Grayson Sipe, Ph.D.
Institution: Massachusetts Institute of Technology
Cambridge, MA
Project Title: Probing Astrocyte-Neuron Networks Using Optogenetic Activation of Signaling Cascades
Research: Other Research
Research Area: Cellular Neuroscience
Earliest Start Date: 6/8/2020
Housing: Yes

Student Qualifications: Mouse handling experience (or desire to learn), MATLAB programming experience, basic neuroscience understanding, major in engineering, biology, psychology, or relevant field, interest in cellular/systems neuroscience.

Project Description: The role of astrocytes in cortical neuronal networks is poorly understood. The goal of this project is to use optogenetic activation of astrocyte signaling pathways to determine the effect on information processing by neuronal networks in the mouse visual cortex.
Massachusetts

Investigator: Kiran Vemuri, Ph.D.
Institution: Northeastern University
Boston, MA
Project Title: Antidotes for Acute Cannabinoid Intoxication
Research: Drug Development Research
Research Area: Organic Synthesis; Cannabinoid; Opioid; Biochemistry;
            Competition Binding Assays; Functional Assays;
            DMPK/ADME; Plasma Stability; Microsomal Stability; HPLC;
            Mass Spectroscopy; NMR; Enzyme Assays; Fluorescent
            Assays; Animal Behavior; Drug Discrimination; Tetrad
            Assays; Micro dialysis
Earliest Start Date: 6/1/2020
Housing: Campus

Student Qualifications: Undergraduates majoring in biological and biomedical sciences, physical
sciences and/or psychology (course work should reflect theoretical and laboratory knowledge);
Basic experience in performing laboratory experiments will be an asset. Base on where he/she is
placed, the research being proposed will involve one or a combination of the following -
chemicals (organic chemistry), biochemicals, tissue material, cell lines and animals (rodents).

Project Description: As part of the Summer Research Project, the PI proposes to provide an
educational opportunity to undergraduate students within the area of drug abuse research.
He/she can choose to work in one of the branches of drug discovery - 1) Organic chemistry -
Learn aspects of synthesis of chemical compounds that have therapeutic significance for
treating drug abuse and overdose. 2) Pharmacology - Learn aspects of pharmacology and
test chemical compounds for detecting biological activity using relevant assay techniques. 3)
Bioanalytical assays and instrumentation - Learn aspects of drug metabolism and
pharmacokinetics and test compounds using liquid chromatography and mass spectroscopy
techniques.  4) Behavioral pharmacology - Learn aspects of animal behavior and test
compounds using key behavioral paradigms. The intern will first undergo Northeastern
University's required environmental, health and safety training before starting work in the
laboratories assigned. At the end of the curriculum, the intern will have the opportunity to
attend/participate in the R13 conference on the chemistry and pharmacology of drugs of
abuse at Northeastern University, Boston, co-sponsored by NIDA.
Massachusetts

Investigator: Margie Skeer, Sc.D., M.P.H.
Institution: Tufts University School of Medicine
Boston, MA
Project Title: Testing a Brief Substance Misuse Preventive Intervention for Parents of Youth
Research: Behavioral Research
Research Area: Family Intervention, Substance Use Prevention
Earliest Start Date: 5/29/2020
Housing: Campus

Student Qualifications: Excellent communication skills, attention to detail and organization; Cultural competency and ability to work well with diverse populations and families; Ability to take responsibility for assignments and work both independently and as part of a team; Ability to handle confidential materials with discretion; Travel to various sites within and around Boston required; Desirable, But Not Required: Demonstrated ability to work well with families; Bilingual in Spanish.

Project Description: schools in the Greater Boston Area. As part of the intervention, parents/guardians are asked to read a brief handbook, meet one-on-one with an interventionist for two sessions and receive two text messages a week for 13 weeks. Participants are asked to complete surveys, audio record prompted conversations and video record family meals at baseline, 3, 6, 12, and 18 months.

The Summer Intern will assist with all aspects of the day-to-day implementation of this multi-year behavioral research trial. This includes helping with the recruitment of study participants, conducting baseline data collection, and entering data. Travel to participants’ homes will be required. The Intern will gain an in-depth experience being integrated into a large research team that is dedicated to inclusiveness and mentorship. Specific responsibilities may include: Recruitment at school-based events/activities; Baseline data collection (obtaining consent/assent, orienting participants to study procedures, answering questions); Data entry into REDCap; Coding of video/audio recorded data
Michigan

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<thead>
<tr>
<th>Investigator:</th>
<th>C. Emily Durbin, Ph.D.</th>
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<tbody>
<tr>
<td>Institution:</td>
<td>Michigan State University</td>
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<tr>
<td>Project Title:</td>
<td>Neurobehavioral Liabilities for Substance Use Disorders</td>
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<tr>
<td>Research:</td>
<td>Behavioral Research</td>
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<tr>
<td>Research Area:</td>
<td>Child Temperament, Psychophysiology, Risk Factors, Behavioral, Internalizing, Externalizing</td>
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<td>Earliest Start Date:</td>
<td>6/5/2020</td>
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<tr>
<td>Housing:</td>
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**Student Qualifications:** An interest in child development is critical, as well as curiosity, and familiarity with basic databases are important.

**Project Description:** Our project is designed to understand how differences in children's emotional reactivity, responses to rewards, and their brain activity in response to simple computerized tasks are related to their risk for later developing substance use disorders. We use laboratory behavioral measures to evaluate how children respond to different stimuli and challenges to measure their temperament and we measure how their brain responds to making errors and to winning and losing rewards and we assess how these may be part of the family risk for substance use, using previously collected data on their parent(s), who have been assessed for between 5-25 years.
Project Description: Opioid-related overdoses account for almost half of all drug overdose deaths in the United States and cause more preventable deaths every year than car crashes. Fentanyl, a highly potent mu opioid receptor (MOR) agonist, and its analogues (fentalogs) are increasingly found cut into illicit drug samples. The prevalence of fentalogs in the illicit drug market is thought to be the primary driver in the increase in opioid-related overdose deaths since 2016. The standard opioid overdose rescue therapy, naloxone is often insufficient to reverse opioid overdoses caused by fentalogs. It has been reported that naloxone is either not potent enough or has too short a duration of action to effectively reverse fentanyl overdose and resuscitate patients. The objective of this proposal is to design novel opioid antagonists that are better than naloxone.
Michigan

Investigator: Jill Becker, Ph.D.
Institution: University of Michigan
Detroit, MI
Project Title: Social Support, Oxytocin and Motivation for Methamphetamine Research
Research Area: Sex Differences in Addiction; There Are No Effective Treatments for Methamphetamine on Social Support to Reduce Drug Taking in Animal Model Methamphetamine Self-Administration in Animal Model Oxytocin and Social Support to Reduce Drug Abuse in Animal Model the Role of Dopamine in Transition to Addiction
Earliest Start Date: 5/5/2020
Housing: Campus

Student Qualifications: Research involves laboratory rats and all interns will be expected to acquire animal handling skills. Knowledge of basic neuroscience principle is an advantage. Interest in acquiring skills using MatLab and LabView is desired. Major skill desired is an excitement to learn more about neuroscience and animal behavior.

Project Description: There are no effective treatments for methamphetamine addiction. Students will be involved in research aimed at understanding sex differences in the effects of a positive social environment on motivation for methamphetamine self-administration in male and female rats. The mechanisms mediating the protective properties of social support, and the role of oxytocin in this regard, may ultimately lead to improved treatment and prevention options for methamphetamine addiction in both women and men.
**Michigan**

**Investigator:** Justin Heinze, Ph.D.

**Institution:** University of Michigan
Ann Arbor, MI

**Project Title:** Understanding Intergenerational Transmission of Drug Use in the Context of Cannabis Legalization

**Research:** Behavioral Research

**Research Area:** Recreational Marijuana; Parenting; Executive Functioning; Violence

**Earliest Start Date:** 4/1/2020

**Housing:** Campus

**Student Qualifications:** Experience with or interest in substance use prevention and youth development. Comfort interacting with community stakeholders and participants from diverse demographic backgrounds.

**Project Description:** The objective of this research is to engage a sample of participants with a history of substance use who are now parents to understand how recreational marijuana legalization impacts them and their family. Using survey and interview methods, the research team will assess both parent’s and children’s a) current substance use, b) family dynamics and communication pertaining to substance use, c) understanding of the new law, and d) how legalization is affecting their broader communities.
Michigan

Investigator: Jonathan David Morrow, M.D., Ph.D.
Institution: University of Michigan
Ann Arbor, MI
Project Title: Individual Differences in Epigenetic Regulation of Emotional Learning
Research: Basic Research
Research Area: Motivation; Learning; Vulnerability; Individual Differences; Comorbidity; Rat; Behavior; Self-Administration
Earliest Start Date: 5/1/2020
Housing: Subsidized

Student Qualifications: This research requires working closely with rats, including handling, recovery surgery, and tissue harvesting. Previous experience with handling rats is preferred. Because the PI is a practicing physician-scientist, candidates with an interest in that career track may gravitate to this lab, however this is a basic science project so anyone with an interest in behavioral neuroscience would be appropriate.

Project Description: This project will involve using rats to test a new compound for its ability to reduce behaviors associated with addiction, pathological fear, and impulsivity. These experiments will be a first step providing proof of concept for the development of a new class of treatments for addiction and a number of related psychiatric disorders. The compound will also be tested for its ability to change the behavioral phenotypes of individual animals from a more vulnerable to a more resilient profile, which would indicate potential as a strategy to prevent the onset of mental illness.
**Michigan**

**Investigator:** Shane Perrine, Ph.D.  
**Institution:** Wayne State University  
**Detroit, MI**  
**Project Title:** Effects of Cocaine Taking and Seeking on Histone Deacetylase Class IIa Enzyme Activity in the Nucleus Accumbens Of Rats  
**Research:** Basic Research  
**Research Area:** Drugs of Abuse, Cocaine, Epigenetics, Behavioral Neuroscience, Behavior, Neuroimaging, Post-Traumatic Stress, PTSD  
**Earliest Start Date:** 5/1/2020  
**Housing:** Campus  

**Student Qualifications:** Ideally trainees (1) will be majoring in neuroscience, psychology, biology, or related field, (2) have laboratory research experience outside of the classroom, and (3) be willing to conduct research in animals. However, no prior research experience is required.  

**Project Description:** Cocaine addiction devastates the lives of millions of Americans, yet current therapies are poor, and development of novel therapeutics is lacking. A translational design that combines state-of-the-art neuroscience techniques with an animal model of cocaine taking and seeking behaviors is being used to study epigenetic mechanisms underlying cocaine addiction. Our studies provide a unique strategy to study the neurobiology that underlies cocaine-motivated behaviors and the knowledge gained will aid in the treatment of this devastating mental health disorder. Other laboratory projects include studies on the effects of traumatic stress exposure (as a model of post-traumatic stress disorder) on drug-taking and related behaviors and reward neurobiology.
Minnesota

Investigator: Alon Herschhorn, Ph.D.
Institution: University of Minnesota
Minneapolis, MN
Project Title: Delineation and Vulnerabilities of Hiv-1 Escape from Neutralizing Antibodies
Research: Basic Research
Research Area: HIV-1, Virology, Immunology, Neutralizing Antibodies, Viral Resistance, Envelope Glycoproteins
Earliest Start Date: 6/1/2020
Housing: Campus

Student Qualifications: A junior or senior who is Interested to learn virology, immunology and molecular biology and has some research experience. The study involves work with bacteria and animal cells.

Project Description: Project 1: Entry of human deficiency virus (HIV) into target cells is mediated by the viral envelope glycoproteins (Env). HIV Env are the sole target of broadly neutralizing antibodies but HIV-1 can evolve and develop resistance to these antibodies. The summer intern will use basic tools in molecular biology to introduce resistant mutations into HIV-1 Env from strains isolated from people who inject drugs and study how these changes affect HIV-1 Env function and replication fitness.
Project 2: The summer intern will use polymerase chain reaction to amplify the HIV env gene from samples of people who inject drugs and are infected with HIV. The env gene will be cloned into a plasmid for protein expression and the function and fitness of the Env will be studied.
Minnesota

Investigator: Sade Spencer, Ph.D.
Institution: University of Minnesota
Minneapolis, MN
Project Title: The Role of Dopamine in Modulating Relapse-Induced Transient Synaptic Plasticity
Research: Behavioral Research
Research Area: Addiction, Cocaine, Dopamine, Glutamate, Motivated Behavior,
Earliest Start Date: 5/25/2020
Housing: Campus

Student Qualifications: The intern should be comfortable working with rats. The intern should be interested in the neurobiological basis of addiction and other psychiatric disorders. The qualified student will be motivated, attentive, and careful in their work. Ideally this experience will be geared toward students with an interest in pursuing graduate studies in the field of neuroscience.

Project Description: Chronic cocaine use is associated with enduring alterations in nucleus accumbens excitatory synapses. In addition to these lasting changes, relapse triggered by drug-associated cues and resulting in eventual drug use stimulates additional rapid changes. It is relatively well understood how chronic cocaine alters glutamate and dopamine neurotransmission in key brain reward areas. What is less clear is how these neurotransmitter dynamics interact on a shorter time scale during relapse to regulate neural plasticity and behavior. The studies in this project are designed to answer that question among others.
Missouri

Investigator: Meaghan Creed, Ph.D.
Institution: Washington University in St. Louis
St. Louis, MO

Project Title: A Novel Deep Brain Stimulation Protocol to Prevent Relapse Driven by Negative Reinforcement

Research: Basic Research
Research Area: Synapse, Plasticity, Opiates, Mood, Deep-Brain Stimulation, Neuromodulation, Dopamine, Enkephalin, Gaba, Glutamate, Patch Clamp Electrophysiology, In Vivo Electrophysiology, Relapse, Anhedonia, Pain, Affect, Withdrawal, Arduino, Biomedical Engineering, Neuroscience, Psychiatry, Electronics

Earliest Start Date: 4/1/2020
Housing: Campus

Student Qualifications: Work with mice is possible, but not a requirement; past interns have not been permitted to handle rodents directly, and it has not hindered progress on their project. The intern will be working closely with myself and a post-doctoral associate who can do handling and allow the intern to focus on data/device design. Prior experience/motivation to learning programming and building electronics is required. At least 2yrs undergrad experience, interest in pursuing neuroscience graduate programs.

Project Description: The ultimate goal of our lab is to develop blueprints for novel neuromodulation therapies to treat symptoms at the interface of addiction and chronic pain. The summer research project will involve building arduino-based devices that can be used to measure rodent behavior. Specifically, the devices will track activity and effort of responding for natural and drug rewards in healthy mice and in mice that have undergone withdrawal from addictive drugs. The summer student will learn basic programming (for programming Arduinos and analyzing data in python), 3D printing skills and fundamentals of behavioral neuroscience. The devices will be adapted from previously published devices we have built in the lab (ie. Godynyuk et al., eNeuro, in Press), and the student will receive close mentorship from the PI and a senior post-doctoral associate. The primary goal of the project is to design, build and validate these devices in simple behavioral neuroscience tasks. The immediate application of the devices is to provide a novel method of assessing motivational impairments and anhedonia that emerge following withdrawal from addictive drugs and drive relapse through negative reinforcement. Technicians and summer students in my lab have a strong history of earning authorship for their contributions.
Missouri

Investigator: Lian, Min, Ph.D.
Institution: Washington University School of Medicine
St. Louis, MO
Project Title: Multilevel Interplays in the Development of Tobacco Dependence.
Research: Epidemiology Research
Research Area: Spatial Epidemiology; Geographic Information Systems; Neighborhood; Tobacco Environment; Tobacco Use.
Earliest Start Date: 6/1/2020
Housing: Campus

Student Qualifications: No specific preference is required for this internship. Good computing, writing and communication skills are the basic expectation for the candidates.

Project Description: Tobacco use is the leading modifiable and predominantly preventable cause of premature mortality. Adolescence and young adulthood is a vulnerable window for the initiation of tobacco use behaviors towards the development of tobacco use disorders. The primary study aim of the NIDA-funded R01 research project is, in a long-term longitudinal female twin cohort study, to examine the roles of changing neighborhood environment and disentangle complex gene-environment interplays in the development of tobacco use behaviors and dependence, accounting for moving-induced spatial uncertainty, among adolescents and young adults. In the summer internship, the students will involve in the team work on the assessments of neighborhood tobacco environment and its relationships with tobacco use behaviors.
Investigator: Nancy Saccone, Ph.D.
Institution: Washington University School of Medicine
St. Louis, MO
Project Title: Cannabis Use and its Medical Risks and Benefits: Leveraging Mobile Technology and Consumer Genomics
Research: Clinical Research
Research Area: Human Genetics, Statistical Genetics, Substance Use
Earliest Start Date: 6/1/2020
Housing: Campus

Student Qualifications: Interest in computational and statistical analyses. Experience with data analysis, computer programming, UNIX/Linux computer operating systems would be beneficial. No work with animals, humans, or tissue samples.

Project Description: The overall goal of this research project is to identify and understand relationships between genetic factors, cannabis use, and medical risks and benefits related to cannabis use. Past research has demonstrated genetic influences on various substance use behaviors. With the growing public health impact of cannabis use in the United States, it is important to better understand genetic and non-genetic influences on cannabis use and medically important effects of cannabis use. Interns in the lab will assist with data quality control and perform analyses to examine associations between genetic variants and cannabis-related traits, as well as other substance use behaviors.
Nebraska

Investigator: Shilpa Buch, Ph.D.
Institution: University of Nebraska Medical Center
Omaha, NE
Project Title: HIV Tat & Cocaine-Mediated Alterations in Microglial Migration & Activation Involve Epigenetic Regulation of Mirnas
Research: Basic Research
Research Area: HIV; Cocaine; HIV-associated Neurological Disorders (HAND); Endoplasmic Reticulum Stress (ER Stress); HIV-1 Tat; Chronic Neuroinflammation; Glial Fibrillary Acidic Protein (GFAP); Cell Signaling; Astrogliosis; Cytokines
Earliest Start Date: 6/1/2020
Housing: Subsidized

Student Qualifications: The intern should have a demonstrated interest in science and a desire to conduct research. Good communication skills are a must. In this application the intern will not have contact with animals or tissue samples. Prior research experience is preferred but not required.

Project Description: In era of antiretroviral therapy, HIV-infected individuals are living longer and the incidence of HIV-associated dementia (HAD) is greatly reduced. However, increased survival rates have led to an increase in the prevalence of HIV-associated neurological disorders (HAND). Drugs of abuse have been shown to accelerate the incidence and prevalence of HAND. Since HIV does not infect neurons, most neuroinflammation and subsequent neuronal damage results from glial cell activation including astrocytes. This project will examine the role of HIV viral protein tat and/or cocaine on the activation of astrocytes and whether activation is mediated via endoplasmic reticulum stress (ER Stress). Astrocyte activation will be measured by increased expression of the structural protein glial fibrillary acidic protein (GFAP) as measured by western blot from cell lysates. The intern will learn to culture both primary mouse astrocytes and the human astrocytic cell line A172. The intern will then learn the entire process of performing western blots from making the gels to analyzing the resulting blots.
Nebraska

<table>
<thead>
<tr>
<th>Investigator:</th>
<th>Corey Hopkins, Ph.D.</th>
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<tr>
<td>Institution:</td>
<td>University of Nebraska</td>
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<td></td>
<td>Omaha, NE</td>
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<tr>
<td>Project Title:</td>
<td>Optimization of MrgX1 Allosteric Agonists as Potential Therapies for Chronic Pain</td>
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<td>Basic Research</td>
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**Student Qualifications:** Preferred: Chemistry or Biochemistry major. The students will NOT work with animals.

**Project Description:** The student will work in the lab with an experienced graduate student or post-doc synthesizing novel compounds to be tested as MrgX1 allosteric agonists for pain therapy.
Nebraska

Investigator: Guoku Hu, Ph.D.
Institution: University of Nebraska Medical Center
Omaha, NE
Project Title: Intransasal Delivery of Exosomes Loaded with MIRS -223
And -124 As A Therapeutic Strategy for Hand in Cocaine
Users
Research: Basic Research
Research Area: HIV, Drugs of Abuse, Exosomes, Non-Coding RNAs
Earliest Start Date: 6/1/2020
Housing: Subsidized

Student Qualifications: The intern should have a basic knowledge of molecular and cell biology, genetics and general human physiology with a career interest in the field of substance abuse. The student will use in vitro cell culture models and ex vivo tissue samples in their study.

Project Description: The research conducted in Dr. Hu’s laboratory is focused on exploring the effects of noncoding RNAs, including IncRNA and miRNA and their dysregulation associated with drug use, such as morphine and cocaine. He has also carried out extensive work on IncRNA/miRNA studies related to HIV associated CNS disorders using cell culture models and rodent and non-human primate model systems. Furthermore, Dr.Hu is also interested in establishing Extracellular Vesicle (EV)-based methodology of RNA drug delivery for the treatment of CNS complications in HIV infected drug users. His goal is to elucidate the functional aspects of EVs and ncRNAs in drug addiction and HIV infection as well as to identify novel therapeutic strategies that may enhance neuronal function and survival in these disorders.
Student Qualifications: My lab has a long-standing record of trainees ranging from high-school students to residents in training. In summary anyone with a penchant towards neuroscience research is welcome and will have an opportunity to work with animals including biofluids such as plasma and brain sections.

Project Description: The abuse of the potent psychostimulant methamphetamine (meth) continues to pose a significant threat not just in the US but also globally. A significant attribute associated with chronic meth induced brain dysfunction is inflammation includes activation of glial cells such as astrocytes and microglia that play a crucial role in modulating inflammation including glutamate excitotoxicity at the synapse. Mounting evidence suggests that inflammation and alterations in glutamate neurotransmission are two novel pathways associated with the pathophysiology in mood disorders. Notably, this cross talk between neurons and glial cells is mediated by extracellular vesicles (EVs) which are emerging as key players in regulating brain function. With emerging role for sex differences with drug abuse pattern, the overarching goal of this proposal is to examine the role of EVs in the damaging effects of meth between the sexes using drug-triggered reinstatement (relapse) of extinguished intravenous meth self-administration in rats.
Nebraska

Investigator: Tony W. Wilson, Ph.D.
Institution: University of Nebraska Medical Center
Omaha, NE
Project Title: Role of Extracellular Vesicles in Methamphetamine Mediated Neurotoxicity
Research: Clinical Research
Research Area: Methamphetamine Addiction, Opioid Addiction, Extracellular Vesicles, MicroRNAs
Earliest Start Date: 6/3/2020
Housing: Campus

Student Qualifications: All interns will work with human subjects. Undergraduates majoring in neuroscience, psychology, engineering, biology, and computer science are preferred. Excellent computer skills are a must, as all neuroimaging data collection and processing is computer based. Prior experience in human subjects’ research, cognitive psychology, biological psychology, and related disciplines will be helpful.

Project Description: Interns will be participating in collecting and analyzing multiple types of human data from an ongoing study. This will include the use of advanced brain imaging technologies such as magnetoencephalography (MEG), functional MRI, and structural MRI, as well as neuropsychological and cognitive-emotional assessments. Participants in this study include persons living with HIV infection who either regularly use cannabis (marijuana) or have never used cannabis, as well as uninfected demographically-matched control groups who do and not regularly use cannabis. Interns will be trained in instrument safety as well as advanced signal processing methods often applied to neuroimaging data.
**Nebraska**

**Investigator:** Sowmya Yelamanchili, Ph.D.

**Institution:** University of Nebraska Medical Center
Omaha, NE

**Project Title:** Role of Extracellular Vesicles in Methamphetamine Mediated Neurotoxicity

**Research:** Basic Research

**Research Area:** Methamphetamine Addiction, Opioid Addiction, Extracellular Vesicles, MicroRNAs

**Earliest Start Date:** 6/3/2020

**Housing:** Campus

**Student Qualifications:** Interest in addiction biology is preferred but not necessary. Our laboratory has diverse set of expertise ranging from rat behavior to molecular biology techniques. Most of the studies in the laboratory is focused on rat models of addiction and therefore the intern will be working with postmortem rat tissues. Some of post-validations will be conducted on plasma and serum clinical samples from humans and therefore we expect some work to be performed on human samples.

**Project Description:** Oxycodone (oxy), is a semi-synthetic opioid commonly used as a pain medication which also is a widely abused prescription drug. While very limited studies have examined the effect of in utero oxy (IUO) exposure on neurodevelopment, a significant gap in knowledge is the effect of IUO compared with postnatal oxy (PNO) exposure on synaptogenesis – a key process in the formation of synapses during brain development in the exposed offspring. One relatively unexplored form of cell–cell communication associated with brain development in response to pre and postnatal oxy exposure are extracellular vesicles (EVs). The study would evaluate the role of brain derived EVs and their microRNA cargo signatures in the IUO and PNO exposed groups. The focus will be on assessing the EV-miRNA cargo on neuronal function and stability. Further, these EV-miRNA signatures and associated key gene targets will be validated to regulate synaptic function and subsequent neurodevelopment.
Nebraska

Investigator: Charles Wood, Ph.D.
Institution: University of Nebraska-Lincoln
Project Title: The Impact of Cannabis on Inflammation And HIV-1 Reservoirs in Zambia
Research: Basic Research
Research Area: Cannabis, HIV, Tissue Reservoirs, Pathology, Molecular Biology, Immunohistochemistry
Earliest Start Date: 6/1/2020
Housing: Campus

Student Qualifications: Students who are rising junior or seniors who are biochemistry or molecular majors, with a career goal of going to graduate school and pursuing a research career. Preference will be for those with some prior research laboratory experience with human tissue samples.

Project Description: HIV-1 latent tissue reservoirs are not fully defined, and many factors, including the use of drug of abuse will affect the size and distribution of these reservoirs, thus understanding the extent of tissue reservoirs is key to curing of HIV-1 infection. Cannabis has been implicated to be anti-inflammatory, and potentially can reduce inflammation in HIV-1 infected individuals to reduce the extent, and distribution of latent HIV-1 reservoirs. The objective of the project is to determine whether cannabis use correlates with reduce local immune activation, altered size and distribution of HIV-1 tissue reservoirs or reduced levels of persistent viral replication in those reservoirs by studying the tissues from autopsy cases of HIV-1 infected individuals that are either cannabis or non-cannabis users. This will be carried out by determining the prevalence of tissue pathology, the level of inflammation and immune activation in the brain and other potential tissue HIV-1 reservoirs and define correlations with cannabis usage. We will also determine whether cannabis use impacts the level of persistent viral replication or the size, distribution, and cellular composition of latent HIV-1 reservoirs in tissues.
New Hampshire

Investigator: Alireza Soltani, Ph.D.
Institution: Dartmouth College
Hanover, NH
Project Title: CRCNS Research Proposal: Cortico-Amygdalar Substrates of Adaptive Learning
Research: Basic Research
Research Area: Learning; Reward; Decision Making; Neural Circuit
Earliest Start Date: 6/15/2020
Housing: Campus

Student Qualifications: Training to work with human subjects, some programming skills in Matlab or similar languages.

Project Description: The real world is uncertain and constantly changing. As a result, human and other animals have evolved to adjust to the environment constantly. Specifically, certain characteristics of the real world require that learning and decision-making processes be adjusted constantly. For example, in nature and in ecologically valid settings that approximate the real world, learning from reward feedback is challenging because choices have many features (e.g. color, shape, texture), each of which can take on different values, resulting in a large number of options whose reward values have to be learned. Learning becomes even more challenging when reward information change over time. The adjustments in behavior could be about what should be learned, how much should be learned, and what information should be used for making decisions.
New Jersey

Investigator: Yufeng Wei, Ph.D.
Institution: New Jersey City University
Project Title: Allosteric Regulation and Phosphorylation Homeostasis of PEA-15 in Protection of Brain Microvascular Endothelial Cells Against Methamphetamine and HIV-1 Tat
Research: Basic Research
Research Area: Apoptosis; Cell Proliferation; Protein Expression; Phosphorylation; Cell Culture; Western Blot; Structural Biology
Earliest Start Date: 6/1/2020
Housing: Campus

Student Qualifications: Biology, biochemistry, or chemistry major with some lab experience. The student is preferably to have taken organic chemistry, cell biology, molecular biology, and/or biochemistry courses, and have basic biochemistry, molecular biology, and cell biology lab skills. The students will work with cell cultures and perform protein expression and purification experiments.

Project Description: The summer research will be focusing on the effects of methamphetamine (METH) and HIV Tat protein on the brain microvascular endothelial cells (BMVECs), a key component of the blood-brain barrier. The student will test the hypothesis that METH and HIV interrupt phosphorylation homeostasis in the BMVECs, leading to the cell death. The student will explore the protective roles of PEA-15, a small, non-catalytic protein, in preventing endothelial cell death in a phosphorylation state-dependent manner. The student will perform cell culture-based experiments, including treating endothelial cells with METH and/or HIV Tat, transfection of PEA-15 mutants, mimicking various phosphorylation states, into endothelial cells, preparing cell lysates, performing Western blotting experiments and apoptosis assays.
New Jersey

Investigator: David Barker, Ph.D.
Institution: Rutgers, The State University of New Jersey
Piscataway, NJ
Project Title: Defining the Differential Roles of Glutamatergic and GABAergic Projections from the Lateral Preoptic Area to the Lateral Habenula in Reward, Aversion, and Drug-Seeking Behavior
Research: Basic Research
Research Area: Neuroscience, Drug Addiction, Anatomy, Cocaine, Opioids, Pain,
Earliest Start Date: 5/26/2020
Housing: Campus

Student Qualifications: Interns from a broad range of backgrounds are encouraged to apply and we welcome students with little to no prior research experience. Previous laboratory assistants have come from a variety of majors related to neuroscience including psychology, cell biology, biomedical engineering, genetics, computer science, and biology. The research in our lab involves work with animals and, on some occasions, animal tissue samples. Underrepresented populations are especially welcome.

Project Description: Our work examines how a part of the brain called the lateral preoptic area is involved in processing information about positive and negative events. We are especially interested in how this area processes information in the context of drug addiction, including how the area processes information about drug-related cues and how the area changes its processing when an animal has experienced a state of depression or chronic pain.
New Mexico

Investigator: George R. Uhl, M.D., Ph.D.
Institution: University of New Mexico
Albuquerque, NM
Project Title: PTPRD Phosphatase Inhibitors for Stimulant and Opiate Use Disorders
Research: Drug Development Research
Research Area: Molecular Genetics; Post GWAS studies; Cell adhesion molecules; Receptor Type Protein Tyrosine Phosphatases; Molecular Neurobiology; Molecular Genetics; Pain Research; Addiction Research; Phosphatase Assays; Structure Activity Relationships
Earliest Start Date: 4/1/2020
Housing: Subsidized

Student Qualifications: Prior research experience with in vitro and in vivo (mouse models) desired. Prior coursework in biochemistry or molecular biology. Evidence of academic excellence and ability to learn/adapt to new environments rapidly. Commitment for whole summer (allowing training to pay off). Ability to undergo VA onboarding process/online training prior to start date.

Project Description: Students will assist in behavioral, toxicologic and biochemical assays of novel compounds that act at a novel brain target (PTPRD) to reduce its activity and reduce reward from stimulants and opiates. Biochemical assays using recombinant human tyrosine phosphatase proteins and toxicologic studies of the tolerability of novel compounds are the most likely ways in which summer students can contribute meaningfully to projects. The goals are to contribute enough to be authors on papers; the expectation is that at least half of students will perform at this level.
New York

Investigator: Saleem Nicola, Ph.D.
Institution: Albert Einstein College of Medicine
Bronx, NY

Project Title: Nucleus Accumbens Processing of Reward-Predictive Cues
Research: Basic Research
Research Area: Nucleus Accumbens, Reward, Reinforcement, Reward-Seeking, Cocaine Self-Administration, Behavior, Electrophysiology, Optogenetics

Earliest Start Date: 6/1/2020
Housing: Campus

Student Qualifications: The intern must be comfortable working with rats. No prior research experience is required. Computer programming skills would be useful but not essential. The most important qualifications are curiosity and willingness to put in the effort to learn.

Project Description: When people or animals take cocaine or other stimulants, their interest in other reinforcers (food, social interaction, etc) diminishes. This project seeks to determine the neurobiological basis for the suppression effect. The intern will use a rat behavioral model to determine how cocaine affects behavior reinforced by two different rewards, sucrose and optogenetic stimulation of dopamine neurons. The results will help us understand where and how cocaine acts in the brain to suppress natural reinforcement.
New York

Investigator: Vinayaka R. Prasad, Ph.D.
Institution: Albert Einstein College of Medicine
Bronx, NY
Project Title: Effect of Drugs of Abuse on CNS HIV-1 Reservoirs and Neuropathogenesis
Research: Basic Research
Research Area: Drug abuse, CNS HIV Reservoirs, HIV Latency, Latency Establishment, HIV Reactivation, Effect of Drug Abuse
Earliest Start Date: 6/1/2020
Housing: Campus

Student Qualifications: The intern is expected to have a strong aptitude in research, must have taken courses in biology, molecular biology or gene expression and cell biology and some experience in laboratory research.

Project Description: The intern will study how the drugs of abuse will affect the establishment of HIV latency, the size of the HIV reservoir and the efficiency of reactivation. Understanding the brain HIV reservoirs and eliminating them is an urgent problem. Drugs of abuse are known to exacerbate the infection as well as enhance the damage to the central nervous system. Therefore, the current project is aimed at addressing these issues. We will employ an in vitro blood brain barrier model comprising of human brain microvascular endothelial cells (HBMECs), astrocytes and pericytes. The methods to be employed include in vitro infection of human microglia across a blood brain barrier in the presence of drugs of abuse and the use of novel imaging procedures to quantify latent reservoirs to understand both establishment and maintenance of HIV reservoirs.
New York

Investigator: Kristen Brennand, Ph.D.
Institution: Icahn School of Medicine at Mount Sinai
New York, NY

Project Title: Functional Genomic Resource and Integrative Model of Dopaminergic Circuitry Associated with Psychiatric Disease

Research: Basic Research
Research Area: Epigenetics, Addiction, Schizophrenia, Stem Cells, Dopaminergic Neurons

Earliest Start Date: 5/1/2020
Housing: Campus

Student Qualifications: Neuroscience or Genetics major. Basic tissue culture experience a plus.

Project Description: We propose to develop methods for integrating a broad range of genomic and epigenetic data collected from hundreds of postmortem brain samples, and genetic data collected from hundreds of thousands of living subjects to build a much needed resource connecting genetic risk architecture of common psychiatric disease with neurobiology, including dopaminergic neurons as a key cell type critical important for the pathophysiology and treatment of mood and psychosis spectrum disorders and drug addiction.
New York

Investigator: Xiaosi Gu, Ph.D.
Institution: Icahn School of Medicine at Mount Sinai
New York, NY

Project Title: Computational and Neural Modeling of Cue Reactivity in Addiction

Research: Basic Research
Research Area: Computational Psychiatry; Addiction; Brain Imaging; Computational Modeling; Machine Learning

Earliest Start Date: 6/1/2020
Housing: Subsidized

Student Qualifications: Prior training or coursework in one of two of the following areas is required: math’s, physics, computer science, psychology, neuroscience, or biomedical sciences. Prior experience in programming is preferred (e.g. MATLAB, R, python, C++). This project will only involve computer-based analysis of existing data, and will NOT involve contact with animals, humans, or biological samples.

Project Description: Substance use disorders (SUD) and obesity are both major public health concerns in the United States, with an estimated 20.8 million Americans struggling with at least one SUD in 2015 and 78.6 million adults and 12.7 million children who are obese. Cue-elicited craving is a central symptom of both drug addiction and binge eating and a strong predictor of relapse. In this project, we will investigate the brain basis of cue-induced craving across multiple SUD groups (tobacco, cannabis, alcohol) and binge eaters, using state-of-the-art computational modeling and machine learning methods.
New York

Investigator: Kenneth W. Griffin, Ph.D., M.P.H.
Institution: National Health Promotion Associates
White Plains, NY
Project Title: A High School Program for Preventing Prescription Drug Abuse
Research: Behavioral Research
Research Area: Substance Abuse Prevention; Violence Prevention; High-Risk Behavior Among Children and Adolescence; Evidence-Based Prevention, Implementation Science; Digital Technology
Earliest Start Date: 6/1/2020
Housing: Subsidized

Student Qualifications: This internship has been designed for bright, highly motivated college students. Successful applicants are selected from a pool of those with distinguished academic records and evidence of demonstrated leadership in health education, wellness, and advocacy. Successful applicants will have completed at least two years of college with a major in psychology, public health, epidemiology, social work, or other health related areas.

Project Description: National Health Promotion Associates (NHPA) develops, evaluates, and disseminates evidence-based approaches to target behavioral risk factors associated with major chronic diseases as well as violence and preventable injuries. NHPA focuses on approaches shown to prevent tobacco, alcohol, drug abuse and violence among children, adolescents, and young adults.

The internship is designed to offer training in effective tools of prevention science including the responsible conduct of human subjects’ research, survey development, randomized controlled trials, statistical analysis, and report writing and dissemination. Interns will become familiar with strategies for adapting and extending evidence-based psycho-educational programs shown to be effective in preventing alcohol and cigarette use to other problem behaviors (e.g., vaping and sexual misconduct). Special emphasis is placed on the incorporation of innovative digital-based formats (e.g., e-learning, serious game technology) with evidence-based science to address pressing public health concerns such as bullying, prescription drug abuse, and sexual misconduct. The internship culminates in a capstone project.
New York

Investigator: Joseph Palamar, Ph.D., M.P.H.
Institution: New York University Langone Medical Center
New York, NY
Project Title: Drug Use Among Nightclub and Dance Festival Attendees In New York City
Research: Epidemiology Research
Research Area: Club Drugs; Nightclubs; Electronic Dance Music; Dance Festivals; Ecstasy; Molly; New Psychoactive Substances; Bath Salts; Survey; Epidemiology; Hair Testing; Adulterants; Ketamine; Cocaine; Methamphetamine
Earliest Start Date: 5/3/2020
Housing: Subsidized

Student Qualifications: Ideal candidates will be enrolled in an undergraduate program focusing on public health, psychology, sociology, nursing, or another health- or social science-related discipline. Excellent English and oral communication skills are necessary, and socially-outgoing individuals are preferred as interns must be comfortable approaching passersby on the street. Familiarity with the EDM scene is preferred and must be willing to work late night hours. No prior research experience necessary.

Project Description: This study focuses on drug use among adults in the electronic dance music (EDM) party scene in New York City (NYC). We collect data on self-reported drug use and we also collect hair samples from participants to determine whether they have unknowingly been exposed to novel drugs such as “bath salts” which are commonly present in ecstasy/Molly. The intern with help research assistants survey individuals about to enter nightclubs and dance festivals, typically late at night (from about 11pm to about 1:30am). The majority of randomly selected parties are in Brooklyn and Manhattan. Interns will help research assistants track the number of individuals entering each randomly-selected party and approach individuals about to enter parties to determine eligibility and interest in participation. They will also assist research assistants administer the survey on electronic tablets, assist in the collection and tracking of hair samples, and help track recruitment and participant payments. The intern will also attend short periodic team meetings to discuss progress. Emphasis is placed on safety and the interns will always work with a group of research assistants.
Investigator: Amanda Quisenberry, Ph.D.
Institution: Roswell Park Comprehensive Cancer Center
Buffalo, NY
Project Title: Impact of Flavor on Youth & Young Adults Use Intention, Abuse Liability and Perceptions of Cigarillos
Research: Behavioral Research
Research Area: Behavioral Economics; Tobacco Regulatory Science; Youth Cigarillo Use; Tobacco Product Flavors
Earliest Start Date: 5/1/2020
Housing: Campus

Student Qualifications: This internship is best suited for experimental psychology students but is also well suited for students of other areas of psychology, public health, health behavior, or addiction. The intern will be working with human participants. Prior experience is not necessary, but an interest in human addiction research is preferred.

Project Description: While interning in my laboratory, the intern will learn how to conduct a human experimental study, the basics of the behavioral economics, tobacco addiction, and tobacco regulatory science. The focus of this study will be on purchasing of tobacco products in the Experimental Tobacco Marketplace, an online store and behavioral economic method used to determine how individuals with addiction value the different products that they use. This study will focus on youth use of flavored and unflavored cigarillo products. The intern will have the opportunity to use this task and evaluate data, as available, using statistical analysis. S/he will also have the opportunity to learn from collaborators who investigate toxicity and sensory aspects of tobacco products.
**New York**

**Investigator:** Gregory Homish, Ph.D.

**Institution:** State University of New York at Buffalo
Buffalo, NY

**Project Title:** Substance Use in Reservists: Social and Environmental Influences

**Research:** Epidemiology Research

**Research Area:** Nonmedical Use of Prescription Drugs; Tobacco; Alcohol; Stress; Trauma; PTSD; Depression; Intimate Partner Violence; Marital Functioning

**Earliest Start Date:** 5/26/2020

**Housing:** Campus

**Student Qualifications:** Students should be pursuing an undergraduate degree in a health related/social science field (e.g., public health, premedicine, psychology). Students should be interested in research related to mental health (e.g., depression, PTSD, anxiety, trauma) and health behaviors (e.g., substance use, aggression) among adults. Students should have the ability to work well in teams and have excellent attention to detail.

**Project Description:** This project considers individual-level risk factors and the influence of social (e.g., partner/peer behaviors) and environmental (e.g., life stress) factors on changes in substance use in US Reserve Soldiers. With more than half of the Military currently married, it is important to examine the potential of a Reservist to influence, or be influenced, by a partner. Our previous research provides evidence that partner influences are powerful predictors of positive or negative changes in health. We also have found that peer networks are involved in changes in alcohol use among adults and that substance use shapes the peer network. This study is examining within- and cross-partner influences and peer influences on the association between stress and substance use for Reserve Soldiers and their partners. Reserve Soldiers and their partners (N = 400 couples) will be assessed 3 times over 2 years. This project will examine: 1) changes in substance use (alcohol, tobacco, and nonmedical use of prescription drugs) over time in Reserve Soldiers and their partners on the basis of individual (e.g., depressive symptoms), relationship (e.g., partner and peer substance use), community (e.g., workplace/deployments) and societal factors; 2) the relation between stress/trauma (e.g., combat exposure/life stress) and substance use; 3) how the integration of substance use into the relationship impacts marital aggression. Importantly, each member of the couple will provide independent data.
New York

Investigator: Alexander Khmaladze, Ph.D.
Institution: State University of New York at Albany
Albany, NY
Project Title: A Novel Phase and Spectroscopic Imaging Technique to Evaluate Mitochondrial Dynamics
Research: Basic Research
Research Area: Optical Microscopy, Digital Holography, Raman Spectroscopy
Earliest Start Date: 5/1/2020
Housing: Campus

Student Qualifications: Basic math skills.

Project Description: The intern can learn the basics of Optical Microscopy, Digital Holography, Raman Spectroscopy, Image acquisition and processing, cell maintenance and software programming.
Investigator: Paul Meyer, Ph.D.
Institution: University at Buffalo
Buffalo, NY
Project Title: Integrated GWAS of Complex Behavioral and Gene Expression Traits in Outbred Rats
Research: Basic Research
Research Area: Drug Addiction, Behavioral Genetics
Earliest Start Date: 5/21/2020
Housing: Campus

Student Qualifications: High school diploma is preferred, especially with undergraduate coursework in science and biology. Students will be working with rat test subjects. No previous research experience is required.

Project Description: Interns can participate in any projects in our laboratory (see below, and meyerlabscience.org for more information): A hallmark of addiction is the ability of drug-associated stimuli (“cues”) to instigate drug-taking, even after periods of abstinence. We use several conditioning paradigms to determine under which conditions these drug cues acquire the ability to influence behavior. For example, we model drug taking in our laboratory using intravenous and oral self-administration in rats, with a focus on nicotine, cocaine, and alcohol. Among other findings, we have found that nicotine enhances alcohol intake by altering how rats respond to alcohol cues and have established relationships between the response to food cues, drug cues, impulsivity, and cue-induced relapse.

We are also in the process of testing and genotyping 1600 rats on tests of cue responsivity and behavioral regulation, with the goal of generating a ‘map’ of genomic locations that influence these behaviors. As candidate genes emerge from this research, we will conduct several follow-up studies examining the precise roles of these genes in addiction. For example, we are using genetically modified rats to determine whether this specific gene influence drug-taking in animal models of addiction. For more information on our mapping project see www.ratgenes.org.
New York

Investigator:     Panayotis Thanos, Ph.D.
Institution:     University at Buffalo
                Buffalo, NY
Project Title:   Fatty Acid Binding Protein - Mediated Control of
                Endocannabinoid Signaling and Drug Addiction
Research:        Basic Research
Research Area:   Endocannabinoids, Cocaine Abuse, Behavioral
                Neuropharmacology, Neuroimaging
Earliest Start Date:  6/1/2020
Housing:         Campus

Student Qualifications: Qualifications preferred include: Previous lab experience handling animal or human tissue samples, previous coursework in biological psychology, neurobiology or related field, and experience working in a laboratory, following instructions, record keeping and responsible team work.

Project Description: The summer research intern will assist in this project in a variety of ways. These include but not listed to getting training in and performing numerous behavior neuropharmacology methods associated with cocaine and drug addiction. In addition, the intern will be trained in conducting basic science research, data assessment, written and oral presentation and be part of a large interdisciplinary research team in the laboratory of Dr. Thanos. Interns will gain strong research skills and experience essential for a research career.
North Carolina

Investigator: Padma Gulur, MBBS
Institution: Duke University Medical Center
Durham, NC
Project Title: Opioid Sparing Potential of Light-Induced Analgesia: a Pilot Trial of a Novel, Non-Pharmacological Treatment for Pain
Research: Clinical Research
Research Area: Pain, Opioids, Chronic Pain, Acute Pain
Earliest Start Date: 5/31/2020
Housing: Subsidized

Student Qualifications: Interns will be working with human research and data. Interns will be required to have completed CITI training prior to starting their internship. No previous research is required. Basic computer skills are preferred.

Project Description: The use of opioid analgesics for pain control is a leading cause in the opioid misuse epidemic, with increased risk due to prolonged duration and increased dose. Minimizing the exposure to opioids reduces the risk of misuse. To accomplish this, effective pain control relies upon a multimodal approach of opioid sparing strategies.

The intern will assist in a pilot trial, testing the use of eyeglasses-based green light therapy as an analgesic adjunct to opioid therapy. This approach based upon preclinical findings of pain-relieving effects of exposure to green-biased light spectrum.

This study is currently conducted in both acute and chronic pain conditions. Patients scheduled for thoracic surgery with anticipated post-operative opioid treatment (acute surgical pain) and patients with fibromyalgia currently treated with opioids (chronic pain) will be consented and randomized.

The intern will be involved in both clinical conduct of research and data entry/analysis.
North Carolina

Investigator: Dana Hancock, Ph.D.
Institution: RTI International
             Research Triangle Park, NC
Project Title: Integrating Epigenomics in Human Brain and Genomics of Nicotine Dependence
Research: Basic Research
Research Area: Genome-Wide Association Studies; Genetics; Epigenetics; Gene Regulation; Brain; Epidemiology; Gene-Environment Interaction; Addiction; Nicotine; Opioids; HIV; Lung Function
Earliest Start Date: 5/18/2020
Housing: Subsidized

Student Qualifications: A basic biological background and/or quantitative and analytic skills are preferred. The research involves analysis of existing human data. No prior research experience is required.

Project Description: The intern will work with a multi-disciplinary team of epidemiologists, geneticists, and bioinformaticians in the Center for Omics Discovery and Epidemiology (CODE) at RTI International, one of the world's leading research institutes that is dedicated to improving the human condition by turning knowledge into practice. CODE conducts research of DNA variation (genomics), gene regulation (transcriptomics and epigenomics), and environmental factors to discover risk factors and consequences of complex human diseases and traits. Our research projects aim to integrate multiple omics data and the environment using statistical analyses, bioinformatics pipelines, and high-performance cloud computing.

The goal of this overarching project is to discover biologically important genetic variants underlying risk for nicotine dependence. To achieve this goal, we are studying gene regulation differences in postmortem human brain of smokers vs. nonsmokers, mapping DNA variants underlying these differences, and conducting association testing of the DNA variants with nicotine dependence in a large collection of living human participants. Results of this study may identify important biological pathways for nicotine dependence and smoking cessation and ultimately reduce the burden of smoking-related health outcomes.
North Carolina

Investigator: Kathryn Reissner, Ph.D.
Institution: University of North Carolina at Chapel Hill
Chapel Hill, NC
Project Title: Astrocyte-Mediated Mechanisms of Cocaine Seeking
Research: Basic Research
Research Area: Addiction, Cocaine, Astrocyte, Neuron, Rat, Self-Administration, Synaptic Plasticity, Reinstatement, Glutamate Transport

Earliest Start Date: 6/1/2020
Housing: Campus

Student Qualifications: No prior experience is required. Some background in neuroscience is a valued plus but is not absolutely required. However, a conscientious nature is absolutely critical. The successful applicant will be responsible for daily training of rats, and some processing of brain tissue at the end of the experiment. Work with live vertebrate animals requires keen and constant attention to detail and to the well-being of the animal. The intern will be trained in all concepts and techniques.

Project Description: Our lab uses the rat self-administration model to study behaviors, neurocircuitry, and molecular pathways which contribute to cocaine addiction. In particular, we are interested in how cocaine self-administration leads to changes in neuron-astrocyte communication within the brain’s reward circuitry, and how these changes in communication contribute to long-lasting drug seeking behaviors. Preliminary data indicate that following withdrawal from cocaine self-administration, astrocytes in the nucleus accumbens are smaller and make fewer synaptic contacts than astrocytes from saline control animals. The available summer project will be designed to follow up on this preliminary finding and investigate how stimulation of astrocytes can influence cocaine seeking behaviors. The summer student will learn how to perform rat surgical catheterization, how to provide post-operative monitoring and care, and how to perform and analyze self-administration behavior. The intern can also participate in morphometric analysis of astrocytes, using immunohistochemistry, expression of fluorescent markers, and confocal microscopy. Our lab is a fun and collaborative environment where we work together toward education and advancement of knowledge in the neurobiology of addiction.
**North Carolina**

**Investigator:** Lisa M. Tarantino, Ph.D.

**Institution:** University of North Carolina
Chapel Hill, NC

**Project Title:** Center for Systems Neurogenetics of Addiction

**Research Area:** Cocaine, Addiction, Genetics, Genomics, Behavior, Stress, Dopamine

**Earliest Start Date:** 6/1/2020

**Housing:** Campus

**Student Qualifications:** Our laboratory conducts basic research using animal models in the areas of neurobiology, behavior and genetics. Any background in animal handling and basic laboratory techniques would be helpful but a particular skillset isn't required. The student could and will be trained in these areas - therefore, no previous research experience is required - just an enthusiasm for science and a desire to learn and grow! Intern will be required to handle live laboratory mice including IP injections.

**Project Description:** Initial sensitivity to psychostimulants predicts future drug use and abuse in humans. In rodents, psychomotor stimulation in response to a drug is often used as a model for initial sensitivity and has a significant genetic component. Repeated exposure to psychostimulants increases locomotor response: a phenomenon known as behavioral sensitization that is thought to reflect neuroadaptations in the brain. The extent to which initial drug sensitivity and behavioral sensitization predict the rewarding and reinforcing properties of drugs in animal models is still being debated. The Tarantino laboratory is involved in the Center for Systems Neurogenetics of Addiction (CSNA); a large program project centered at The Jackson Laboratory and involving 4 institutions including UNC. The CSNA is studying the phenotypic and genetic relationship between animal models of addiction including locomotor sensitivity and sensitization, intravenous self-administration, and predisposing factors such as impulsivity and circadian behavior, with the end goal of identifying genes that contribute to addiction risk. The Tarantino laboratory has identified two strains of mice that show extreme locomotor responses to cocaine and differences in drug self-administration. The NIDA Summer Intern will help with behavioral (drug) testing of new strains of mice as well as further characterization of extreme strains including genetic mapping studies and candidate gene identification and testing.
**Ohio**

**Investigator:** Alan Levine, Ph.D.
**Institution:** Case Western Reserve University
Cleveland, OH

**Project Title:** Identification of Immune Protective Pathways Dysregulated by Opioid Use in HIV Infection, Using A Systems Biology-Based Approach, Toward the Goal of Pharmacological Restoration of Immune Function

**Research:** Basic Research
**Research Area:** Intestinal permeability; Opioids; HIV; T Cells; Signal Transduction; Mucosal immunology; Microbiome; Epithelium

**Earliest Start Date:** 5/26/2020

**Housing:** Campus

**Student Qualifications:** UG education, with a keen interest in scientific research as a career goal. Interns will work with human tissue and cells.

**Project Description:** Opioid misuse is a crisis that not only includes addiction but also enhanced disease progression for an HIV infected person. We propose that opioids do so because they directly alter host immune defense, the intestinal barrier, and the microbiome. Summer interns will be paired with either graduate students or postdoctoral fellows to dissect the mechanisms and signal transduction pathways initiated by opioids in human T lymphocytes and intestinal epithelial cells, and how this affects the microbiome.
Ohio

Investigator: Erika Trapl, Ph.D.
Institution: Case Western Research University
Cleveland, OH

Project Title: Impact of Flavor on Youth & Young Adults Use Intention, Abuse Liability and Perceptions of Cigarillos

Research: Behavioral Research
Research Area: Cigarillo, Tobacco Regulatory Science, Flavor, Behavioral Economics, Eye-Tracking

Earliest Start Date: 5/18/2020

Housing:

Student Qualifications: Students should have background in public health, social sciences, behavioral economics, or related fields. This project requires the development of data collection tools and analysis of human survey and behavioral data to inform tobacco regulatory policy. Applicants must have completed at least one biostatistics or statistical methods course and be able to conduct basic statistical analysis.

Project Description: Flavored cigarillos are popular among youth and young adults, and it is not clear whether removal of flavors from cigarillos would results in cessation or substitution of another tobacco product, such as e-cigarettes, and whether that choice would be more influenced by perceptions of appeal or perceptions of risk. To accomplish this, we have proposed three integrated aims to gather data to inform CTP regulation strategies on flavored tobacco, specifically for cigarillo products; throughout the proposed research, data on JUUL will be gathered as a highly popular alternative product with potential substitutability. In summer 2020, survey data from nearly 400 cigarillo-smoking participants will be analyzed to assess risk perceptions, substitutability, and abuse liability based on presence of flavor and tobacco product type. Additionally, the protocol and survey instruments for the eye-tracking experiment will be finalized. The successful intern will contribute to analysis of the survey data and development and piloting of the eye-tracking protocol.
Ohio

Investigator: Natasha Slesnick, Ph.D.
Institution: The Ohio State University
Columbus, OH
Project Title: Prevention of OUD: The HOME (Housing, Opportunities, Motivation and Engagement) Randomized Trial
Research: Preventative Research
Research Area: Opioid Use; Prevention; At-Risk Adolescents and Emerging Adults; Homeless Youth
Earliest Start Date: 5/25/2020
Housing: Campus

Student Qualifications: While prior research experience is not necessary, students should be interested in gaining experience in clinical research within the social and behavioral sciences. Examples of major’s consonant with this work include psychology, counseling and social work. This program would be a good fit for those interested in working with marginalized, low-income adolescents and young adults (18-24 years) youth experiencing homelessness.

Project Description: Adolescents and emerging adults experiencing homelessness likely bear the highest burden of the opioid epidemic, but no prevention interventions have been developed or tested on their behalf. This study seeks to prevent opioid use disorder through a prevention intervention that includes housing and opioid and related risk prevention services. The research is expected to result in a powerful prevention package that can be implemented by systems that serve these high-risk emerging adults.

Summer interns will: (1) be immersed in the entire research experience, including a strong emphasis on research design, clinical issues, and ethics; (2) participate in bi-weekly journal club meetings with other graduate students, led by the PI, and (3) conduct a literature review on a question of particular interest to the student(s). The culmination of this review will be to write a research report and present the paper to the journal club, and/or submit the paper to a peer-reviewed journal for publication; (4) the student(s) will also participate in weekly staff meetings which will expose students to the issues central to RCTs.
**Oregon**

**Investigator:** Tamara J. Richards, Ph.D.

**Institution:** Oregon Health & Science University
Portland, OR

**Project Title:** Genetic Risk for Methamphetamine Abuse

**Research:** Basic Research

**Research Area:** Methamphetamine, Addiction, Behavioral Genetics, Genetic Risk, Mouse; Phrase: Understanding the Genetic Factors Involved in Susceptibility to Drug Addiction

**Earliest Start Date:** 4/29/2019

**Housing:** Yes

**Student Qualifications:** The intern should be working toward a bachelor’s degree in psychology, biology, neuroscience or related basic science. Helpful skills would be competency with MS Office; laboratory animal handling experience; the ability to work cooperatively in a group; the ability to efficiently perform detail-oriented tasks; familiarity with basic data analysis; flexible work schedule (specific hours of work on each day should be expected to be variable). Previous research experience is not a requirement.

**Project Description:** Genetic and experiential factors play a role in individual differences in risk for drug use disorders and in response to treatment. Dr. Richards’ laboratory uses mouse models of drug use to identify genes and mechanisms that impact addiction risk. The intern will be exposed to behavioral research and molecular techniques directed toward understanding differential risk for voluntary methamphetamine intake. Mice that have been genetically altered to have high and low levels of methamphetamine intake will be studied for sensitivity to other effects of methamphetamine and to identify mechanisms that may lead to reductions in intake. The main goal of this research is to identify genetic risk factors and mechanisms that may lead to the development of more effective treatments that may ultimately apply to human addiction.
Oregon

Investigator: Esther Choo, M.D., M.P.H.
Institution: Oregon Health & Science University
Portland, OR
Project Title: Implementation, Outcomes, and Cost of a Novel Medicaid Policy to Reduce Opioids for Back Pain
Research: Epidemiology Research
Research Area: Opioid Use Disorder; Health Services; Drug Policy
Earliest Start Date: 6/1/2020
Housing: Subsidized

Student Qualifications: Preferred but NOT required:
background in epidemiology or public health; demonstrated interest in health inequities
strong writing skills

Required:
strong interest in health inequities; There are no interactions with human subjects or animals or tissue samples.

Project Description: Oregon has a new policy that limits opioid prescribing and provides expanded coverage of non-pharmacologic therapies for patients with back pain. We are examining the impact on opioid use and related outcomes. The summer intern will work closely with the PI to examine variable impact of the policy on subgroups of Medicaid recipients, including women and racial minorities.
Oregon

Investigator: Leslie Leve, Ph.D.
Institution: University of Oregon
Eugene, OR
Project Title: Prevention Research Center: Parenting Among Women Who Are Opioid Users
Research: Preventative Research
Research Area: Parenting, Parental Opioid Use, Child Development, Intervention, Neurocognitive Development, Mhealth, Video-Based Interventions, Executive Function, Neuromaging
Earliest Start Date: 6/15/2020
Housing: Campus

Student Qualifications: Students must have a basic understanding of psychological human subjects’ research and an interest in pursuing a graduate degree in psychology, public health, counseling psychology, prevention science, or a related discipline. Must be willing to be work collaboratively as part of a team. No prior research experience required. There are opportunities for human subject activity, but this is not a requirement.

Project Description: This is a Center grant focused on improving the well-being of individuals, families, and communities affected by the opioid crisis through a focus on behavioral (parental responsivity, warmth) and neurocognitive systems (e.g., executive functioning, reward responsiveness) that are underlying mechanisms common to both addiction issues and parenting challenges. Many opioid users are parents, and their opioid-using behaviors can have significant detrimental effects on their parenting abilities, and downstream effects on child brain development, health, and subsequent risk for drug use. We aim to serve as a national resource focused on increasing scientific understanding, prevention, and providing interventions to mothers who are opioid users. The research projects and pilots all focus on parenting within samples of adults with opioid and other substance use histories. Some projects include neuroimaging components, some projects include intervention components, and some focus on rural populations. We also have a science communication focus.
Pennsylvania

**Investigator:** Jacqueline Barker, Ph.D.

**Institution:** Drexel University College of Medicine
Philadelphia, PA

**Project Title:** Alterations in Corticostriatal Control of Cocaine Seeking in HIV Infection

**Research:** Behavioral Research

**Research Area:** Addiction, Compulsivity, Cocaine, Prefrontal Cortex, Striatum, Cell Adhesion Molecules, Dopamine, HIV, Neurohiv, Mouse Models, Behavioral Neuroscience, Neuroscience, Learning and Memory

**Earliest Start Date:** 5/4/2020

**Housing:** Campus

**Student Qualifications:** Prior research experience is not necessary. The intern must be comfortable working with living mice and with mouse tissue. Some aspects of the research plan require that the intern is at least 18 years old.

**Project Description:** Drug use frequently co-occurs with HIV infection. This co-occurrence is associated with impaired cognitive function and reduced control over behavior. This project will use a humanized mouse model to investigate (1) whether progressive HIV infection increases "compulsive-like" cocaine seeking and (2) changes in protein expression in brain regions that regulate control over drug seeking. Specifically, the intern will work with a team to investigate changes in neural cell adhesion molecule expression and modifications in the prefrontal cortex and the striatum in HIV-infected mice with humanized immune systems.
<table>
<thead>
<tr>
<th><strong>Pennsylvania</strong></th>
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<tr>
<td><strong>Investigator:</strong> Daniel Morgan, Ph.D.</td>
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<td><strong>Institution:</strong> Penn State University College of Medicine</td>
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<td>Hershey, PA</td>
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<td><strong>Project Title:</strong> Mechanisms of Cannabinoid Tolerance</td>
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<td><strong>Research:</strong> Basic Research</td>
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<td><strong>Research Area:</strong> Cannabinoid; Pain; Marijuana; THC; Addiction; Tolerance</td>
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<td><strong>Earliest Start Date:</strong> 5/26/2020</td>
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<td><strong>Housing:</strong> Campus</td>
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**Student Qualifications:** We are open to student education, major, and research background but would give preference to students with previous experience working with mice. Students with previous coursework in molecular, cellular, and systems neuroscience background would be a good fit with our group. Students in our group will be looking at cannabinoid tolerance in genetically modified mice and transfected HEK-293 cells. Students interested in pursuing further PhD or MD/PhD training would be an ideal fit.

**Project Description:** Summer interns in the Morgan laboratory will have the choice to pursue several possible projects aimed at understanding the mechanisms of cannabinoid tolerance and the role of sex in mediating cannabinoid response and tolerance. Interns will learn to assess the analgesic effects of delta-9-THC, the main psychoactive ingredient in marijuana, on both sensory and affective components of chronic chemotherapy and nerve-injury-induced neuropathic pain. Students in the Morgan group will also have the option to perform Western blot analysis of c-Jun N-terminal Kinase activation in cells and mice treated with delta-9-THC.
Pennsylvania

Investigator: Mathieu Wimmer, Ph.D.
Institution: Temple University
Philadelphia, PA
Project Title: Unraveling Epigenetic Mechanisms of Opioid Addiction Susceptibility Using Multigenerational Animal Models
Research: Basic Research
Research Area: Epigenetics, Addiction, Multi-Generational, Opioid, Self-Administration.
Earliest Start Date: 6/1/2020
Housing: Subsidized

Student Qualifications: The intern should be willing to work with animals and interested in learning molecular biology techniques. A strong biology background is recommended but not necessary. This research requires working with animals and tissue samples.

Project Description: My lab is interested in the impact of drug exposure in fathers (sires) on addiction-like behavior in the next generation. We use the drug self-administration model in rats to study addiction-like behaviors in the offspring of morphine-taking sires. The goal of our research is to 1) identify epigenetic mechanisms in the germline responsible for the transmission of drug exposure to the next generation and 2) define changes to the epigenetic landscape in the brain of offspring produced by drug-treated sires. The ultimate objective of my research program is to delineate mechanisms predictive of addiction vulnerability using multi-generational models of drug exposure.
Investigator: Wenzhe Ho, M.D., M.P.H.
Institution: Temple University
Philadelphia, PA
Project Title: Role of miRNA in Methamphetamine/HIV-Mediated Immune Activation
Research: Other
Research Area: Host Innate Immunity; HIV; Opioids; Methamphetamine; Antiviral Natural Products
Earliest Start Date: 6/1/2020
Housing: Campus

Student Qualifications: Prefer to have students with a biology major, having a great interest and passion in research (with or without experience, although research experience is preferred). Students are expected to be a good listener and observer who can follow instructions, pay attention to details and get along with others. They should have the ability to organize/present experimental data. In addition, students should have excellent communication skills, and are able to read research papers and write in English.

Project Description: The Ho Laboratory studies the impact of abused drugs on the host innate immunity and viral infections, particularly HIV. The Lab uses in vitro, ex vivo models and clinical specimens to address three key questions: A. Are drugs of abuse a negative factor that suppresses the host innate immunity against HIV infection? B. Are non-immune cells at the primary HIV infection sites involved in the host innate immunity against HIV? C. How does HIV infect and stay in the macrophages, a reservoir for the virus? The research project will be focused on the following areas,
1. To study whether the abused drugs (opioids and methamphetamine) impair the host innate immunity and facilitate HIV infection. The lab has documented that drugs such as heroin, morphine, and methamphetamine compromise the host antiviral immunity and enhance HIV infection/replication.
2. To examine the immune and non-immune cells-mediated innate immunity specifically antiviral sensors (TLR3, RIG-I, and DNA sensors). The cells under examination include the immune cells (T cells, monocytes/macrophages, and microglia) and non-immune cells in the CNS (neurons and astrocytes), gastrointestinal and female reproductive tracks (endothelial cells and epithelial cells). The lab was among the firsts to demonstrate that the non-immune cells express functional viral sensor (TLR3), activation of which induces the production of IFNs and the multiple cellular HIV restriction factors.
Pennsylvania

Investigator: Servio Ramirez, Ph.D.
Institution: The Lewis Katz School of Medicine at Temple University
           Philadelphia, PA
Project Title: Brain Endothelial EVs Role in the Neuropathology of Drugs
              of Abuse and HIV
Research: Basic Research
Research Area: NeuroInflammation, Blood-Brain Barrier, Neurovascular
              Unit, Drugs of Abuse, Extracellular Vesicle Biology, Animal
              Models of Disease
Earliest Start Date: 6/3/2020
Housing: Campus

Student Qualifications: - The student should be enrolled in an undergraduate major related to
the life sciences (Biology, Biochemistry, Neuroscience, Microbiology etc.) or Biomedical
Engineering related fields.

- Ability to interact with a diverse population of students, faculty, and staff.
- Highly motivated individual capable of working independently or as part of a team.
- Willing to work with animals if necessary.

Project Description: Previous studies in our lab have shown that brain inflammation induces
the release of extracellular vesicles (EVs). These small membranes bound vesicles are
generated by the vasculature of the brain in response to neuroinflammation (such TBI, sepsis,
substance abuse and CNS infection). Persistent inflammation from brain capillaries disrupts
the Blood-Brain Barrier (BBB) which leaves neuronal networks vulnerable to injury. Because
EVs carry proteins important for BBB homeostasis, ongoing release of EVs from the brain
endothelium compromises the BBB. Therefore, the research goals for summer 2020, is to
evaluate the possibility of inhibiting EV release by using a novel, pyrazolopyrimidine based
compounds in order to protect the BBB against neuroinflammation. To test this notion, blood
vessels from the brains of animals exposed to various drugs of abuse treated with or without
test compounds will be isolated and evaluated for status of BBB integrity. These analyses will
involve immunofluorescence imaging and image analysis. Other aspects of the project will
include determination of BBB permeability and particle analysis to measure EV
concentrations present in the blood of experimental animals. We hypothesize that these
studies will offer the first proof-of-concept demonstration that EV inhibition can be a strategy
for vascular and BBB protection during neuroinflammation triggered by drugs of abuse.
Pennsylvania

Investigator: Mudit Tyagi, Ph.D.
Institution: Thomas Jefferson University
Philadelphia, PA
Project Title: Characterization of Cocaine Induced Signaling Pathways that Enhances HIV Transcription
Research: Basic Research
Research Area: Drugs of abuse, Cocaine, HIV Latency, Transcription, Replication, Epigenetics, Signaling Pathways
Earliest Start Date: 1/28/2020
Housing: Campus

Student Qualifications: We are looking for a motivated person, who is interested in research. Individual(s) with prior familiarity with instruments normally used in molecular biology labs, which include ability to operate micropipettes, have concept and know how to work aseptically with basic knowledge of personal protective equipment, such as lab coats, gloves, face-masks, goggles etc.
The study involves human samples from both cocaine-using and HIV-infected individuals.

Project Description: Overall goal of the project is to understand the underlying mechanisms through which cocaine use further accelerates the aging process in HIV infected individuals by enhancing immune activation and inflammation. Current anti-HIV therapy is unable to restrict HIV protein production. Certain HIV proteins are toxic, especially to the CNS, as they stimulate pro-inflammatory cytokines and immune activation. Cocaine further enhance HIV protein production. The investigation proposed in this application will establish that cocaine accelerates the aging process by comparing cocaine-using HIV infected subjects with those not using cocaine.

STUDY POPULATION:
Group 1) HIV-infected subjects aged between 25-50 years, who regularly use cocaine.
Group 2) HIV-infected subjects aged between 25-50 years, who do not use any illicit drug.
Group 3) Uninfected subjects aged between 25-50 years, as controls
Group 4) Uninfected subjects aged between 25-50 years, who regularly use cocaine.

METHODOLOGY:
Aim 1A: Analysis of cell surface markers of immune activation and inflammation, triggered by cocaine among different subject Groups
Aim 1B: Investigate the potential impact of cocaine exposure on cell senescence
Aim 1C: Determine the cocaine effect on cell exhaustion
Aim 2: Define the plasma markers of immune activation and inflammation following cocaine use
Aim 3: Examine the impact of cocaine on telomere length, telomerase transcript, protein and activity.
Pennsylvania

Investigator: Kyle Kampman, M.D.
Institution: University of Pennsylvania
Philadelphia, PA
Project Title: Combining Pregabalin (LYRICA®) with Lofexidine (LUCEMYR®): Can it Increase the Success of Transition to Naltrexone
Research: Clinical Research
Research Area: Double-Blind Placebo-Controlled Medication Research-Phase II
Earliest Start Date: 6/1/2020
Housing: Campus

Student Qualifications: Qualifications would include interest in behavioral sciences, possibly medication development in a behavioral research setting. Laboratory experience is not required but is a plus.

Project Description: 90 subjects will be randomized to two groups to receive a medication for 2 weeks for opioid addiction treatment (one with placebo/one without.
-or-
Imaging research for substance abuse in human subjects
### Pennsylvania

**Investigator:** Xinyan Tracy Cui, Ph.D.  
**Institution:** University of Pittsburgh  
Pittsburgh, PA  
**Project Title:** Ultra-Sensitive and Flexible MEAs For Chronic Dopamine Detection at Both Tonic and Phasic Levels  
**Research:** Other  
**Research Area:** Neurotechnology, Implantable Sensors and Microelectrode Arrays for Measuring Brain Concentration of Neurochemicals Such as Dopamine, Serotonin, Cocaine Etc...  
**Earliest Start Date:** 6/1/2020  
**Housing:** Subsidized

**Student Qualifications:** Rising sophomore and junior in bioengineering, chemistry and neuroscience majors, with basic knowledge of biology, chemistry, math. No prior research experience is required. Majority of the experiments are in vitro, with the opportunities to work with small animals.

**Project Description:** We are interested in developing implantable micro-sensors that can be used to monitor the neurotransmitters or drug concentration in the brain in order to understand the function of these chemicals in normal and diseased brain. The summer intern is expected to participate in the project by conducting sensor calibration and evaluation test on the bench using electrochemical experimental techniques and assist in vivo sensor implantation and evaluation of the detection capability.
Puerto Rico

Investigator: Carmen Albizu-Garcia, M.D.
Institution: University of Puerto Rico
San Juan, PR
Project Title: Assessing Disaster Related Stressors and Resiliency Factors in a Criminal Justice Population
Research: Epidemiology Research
Research Area: Disaster Stressors, Morbidity, Mortality, Resilience, Substance Use Disorders, Criminal Justice Population
Earliest Start Date: 6/13/2020
Housing: Subsidized

Student Qualifications: The student must have basic skills in computer use, database searches, and, basic knowledge in MS Office. Experience with spatial studies is desirable.

Project Description: There is significant policy interest in studies to increase understanding of community resilience, or what contributes to the sustained ability of a community to withstand or recover from adversity. We explore individual and organizational factors that contribute to resilience in the community of participants and providers of community supervision programs within the criminal justice system in Puerto Rico. The large population under criminal justice community supervision is disproportionately poor, faces a disparate burden of substance use disorder (SUD) and other chronic health conditions, barriers to obtaining healthcare, employment, housing, and social services, due to their criminal records, and many reside in communities with limited health promoting resources. Hurricanes Irma and Katrina devastated the Island in September,2017. The study applies an ecologic model, a mixed-methods design, and geocoding to help close the knowledge gap on the impact of natural disasters on this population, assess risks and protective factors associated with health and social outcomes, as well as capability to comply with community sentence conditions to reduce the likelihood of sentence revocation and subsequent incarceration.
Rhode Island

Investigator: Anthony Spirito, Ph.D.
Institution: Brown Medical School
Providence, RI
Project Title: Brief Individual and Parent Interventions for Marijuana Misuse in Truant Adolescents
Research: Clinical Research
Research Area: Adolescents, Juvenile Justice, Marijuana, Brief Intervention
Earliest Start Date: 6/3/2020
Housing: Subsidized

Student Qualifications: At least one year of college; psychology major preferred; strong interpersonal skills required to interact with stressed families.

Project Description: Adolescents who use marijuana and are truant from school are a high-risk population with increased likelihood of substance use disorders, criminal justice involvement, and long-term impairments in vocational, family, and peer domains. This application is testing a theory-driven intervention for early adolescent marijuana using, truant youth identified through Rhode Island Truancy and Family Courts. It will compare two intervention conditions, while simultaneously gathering data on factors that will impede or facilitate implementation. A total of 150 truant, marijuana using, adolescents who are involved in the juvenile justice system through either Truancy Court or Family Court. Adolescents will be randomly assigned to one of the 2 conditions: motivational enhancement therapy (MET) plus the Family Check-Up (FCU), a parent-based MET, to adolescent and parent psychoeducation (PE). This application is innovative and has the potential to advance the field by: evaluating an integrated model (simultaneously targeting two problems and both parent and teen risk factors), using a brief and highly disseminable approach, examining putative mechanisms of action, and testing effectiveness of the interventions under real-world conditions.
**Rhode Island**

**Investigator:** Sara Becker, Ph.D.

**Institution:** Brown University School of Public Health
Providence, RI

**Project Title:** Implementing Contingency Management in Opioid Treatment Centers Across New England: A Hybrid Type 3 Trial

**Research:** Clinical Research

**Research Area:** Opioid; Implementation; Contingency Management

**Earliest Start Date:** 6/1/2020

**Housing:** Subsidized

**Student Qualifications:** Previous research experience is not required. Interest in opioid misuse or addiction, implementation science, and community partnerships preferred. Strong interpersonal skills, time management, and attention to detail required. Applicants with interest in applying to clinical-related graduate programs (e.g., clinical psychology, social work) are encouraged to apply. Opportunities to contribute to manuscripts or conference presentations could be available for students with strong writing skills.

**Project Description:** The summer intern will be contributing to a large-scale implementation project with 30 opioid treatment programs throughout New England. The project test two different implementation strategies to help opioid treatment programs deliver an evidence-based intervention called contingency management (CM). CM is one of the most effective interventions for the treatment of opioid use disorders, but it is rarely delivered in community opioid treatment programs. The primary outcomes examined in the trial will be the consistency, skill, and duration of CM delivery by front-line treatment providers after training. Secondary outcomes include patient abstinence from opioids and patient attendance at treatment sessions.
Student Qualifications: A background in Causal Inference and/or Network Science is beneficial, but not imperative because these courses are offered at URI and the student will be required to study these topics. Proficiency in R programming and completion of human subjects training is also beneficial, but the intern can also spend the two weeks prior to starting the position completing these tasks.

Project Description: The goal of this project is to conduct innovative research to develop causal inference methodology combined in novel ways with network science to solve challenges in network-based studies of HIV treatment and prevention among people who use drugs. We are interested in considering spillover effects and including networks structures in the analysis. Spillover or disseminated effects are when one person's exposure affects another person's health outcome. We are extending our approach to evaluate if the effects of interest differ by network structures.
South Carolina

Investigator: Lindsay Squeglia, Ph.D.
Institution: Medical University of South Carolina
            Charleston, SC
Project Title: 13/13 ABCD-USA Consortium: Research Project
Research: Clinical Research
Research Area: Neuroimaging, Neuropsychology, Child and Adolescent
              Brain Development, Alcohol, Marijuana
Earliest Start Date: 5/1/2020
Housing: Subsidized

Student Qualifications: Preferred interest in clinical research with children and adolescents. No requirements on major or specific skill sets.

Project Description: “The Adolescent Brain Cognitive Development (ABCD) Study is the largest long-term study of brain development and child health in the United States. The ABCD study recruited 11,878 children ages 9-10 across 21 sites around the country who will be followed for 10 years into young adulthood.

This study will examine childhood experiences that affect brain, social, emotional, and cognitive development. Some of the areas to be studied include alcohol and cannabis use, sleep, attention, physical activity, screen time, and sports injuries. Understanding the relationships among these experiences and their effects on the developing brain will provide answers that can inform and, ultimately, improve the health and success of our youth.”
South Carolina

Investigator: Michael Shtutman, Ph.D.
Institution: University of South Carolina
Columbia, SC
Project Title: Impact of Dead Box RNA Helicase 3 Signaling on HIV-1 Tat- and Cocaine-Induced Neurotoxicity
Research: Basic Research
Research Area: HIV; HAND; HIV-Associated Neurodegenerative Disease; Cocaine; DDX3; Dad Box RNA Helicase; Artificial Intelligence; Machine Learning
Earliest Start Date: 5/11/2020
Housing: Campus

Student Qualifications: Minimum skill sets; General molecular biology/biochemistry lab training and/or bioinformatics with knowledge in R. Preferred skillset: Fluorescent Microscopy; Cell staining; Tissue culture and/or Experience in statistics, Bioinformatics, Image analysis, Students will not be required to work with animals

Project Description: HIV-1 Associated Neurocognitive Disorder (HAND) is a common and clinically detrimental complication of HIV infection. Viral proteins, including Tat, released from infected cells, cause neuronal toxicity. Substance abuse in HIV-infected patients greatly influences the severity of neuronal damage. To uncover potential targets for anti- HAND therapy, we employed an AI-based literature mining system we developed called MOLIERE: Automatic Biomedical Hypothesis Generation. The MOLIERE employed to reveal previously unknown associations of the human genes with the HAND. Evaluation and prioritization of the highest-scoring genes potentially associated with HAND showed several drugs approved by the FDA or in clinical trials for other applications, like cancer or allergies. These drugs protect the neurons from combined neurotoxicity of HIV TAT and cocaine and therefore is the right candidate for re-purposing for the HAND treatment. The goal of the project to determine the molecular mechanism of the drugs neuroprotection by the combination of cell-biology and next-generation and signal-cell sequencing applications.
Investigator: Yong Yang, Ph.D.
Institution: University of Memphis
Memphis, TN
Project Title: Modeling the Impact of Flavor Bans Among Young Adult Tobacco Users Using Discrete Choice Experiments and Agent-Based Modeling
Research: Behavioral Research
Research Area: Flavor, Young Adults, Tobacco Use, Discrete Choice Experiments, Agent-Based Modeling
Earliest Start Date: 6/1/2020
Housing: Subsidized

Student Qualifications: Skill on multi-nominal logit regression.

Project Description: Discrete choice experiments (n=600) will be conducted online to estimate the impact of hypothetical flavor bans on the demand for tobacco/ENDS products. We will examine multiple flavor ban policies by various combination of bans on menthol cigarette and flavored ENDS. Multinomial logistic regression models will be used to estimate the effect and trade-off of attributes including product, flavor, price, nicotine content, and harmfultness on the smoker’s choice.
**Tennessee**

**Investigator:** Santosh Kumar, Ph.D.

**Institution:** University of Tennessee Health Science Center Memphis, TN

**Project Title:** Monocytic and Exosomal Cytochrome P450s In Smoking-Mediated HIV-1 Pathogenesis

**Research:** Basic Research

**Research Area:** HIV, Tobacco Smoking, Exosomes, Cytochromes P450

**Earliest Start Date:** 5/15/2020

**Housing:** Subsidized

**Student Qualifications:** Skill set: Tissue culture, Western blot (preferred); Education major: Biology/Chemistry, Career interest: PhD of any other health science professional degree; The student will work with cell culture and blood samples from humans. The student will NOT work with animals and human.

**Project Description:** The summer intern will be isolating extracellular vesicles (EV)/exosomes from the media upon exposure to smoking constituents and/or HIV as well as from the plasma of HIV-infected individuals and/or tobacco smokers. The person will then characterize them using various biophysical (zetasizer, transmission electron microscope) and biophysical (Western blots, enzyme activity, staining) methods. The person will then determine the role of these EVs/exosomes on smoking-induced HIV pathogenesis and/or neuronal damage. We will be using various monocytic, microglial, and/or neuronal cell lines as well as primary cells for these experiments. The intern will then write a 3-4 pages report on their findings that also includes introduction on the subject and discussion of results. The intern will also make a 10-15 min presentation on their project.
Texas

Investigator: Samikkannu Thangavel, Ph.D.
Institution: Texas A&M University
Kingsville, TX
Project Title: Cocaine and HIV Influence Mitochondrial Epigenetics in Astrocytic Networks
Research: Basic Research
Research Area: NeuroAIDS
Earliest Start Date: 6/15/2020
Housing: Subsidized

Student Qualifications: Life Sciences and Biology.

Project Description: Human immunodeficiency virus (HIV) infection and drug abuse are major causes of human death and it will affect the central nervous system. Further it induces oxidative stress, redox modification and mitochondrial bio-genesis affects epigenetic modification of DNA Methylation. We are investigating mechanistic study to understand the metabolic dysfunction activates mitochondrial biogenesis and epigenetic modification, pattern and other pathogenic mechanisms of HIV infection associated drug abuse model (In vitro and In vivo).
Texas

Investigator: Josee Guindon, DVM, Ph.D.
Institution: Texas Tech University Health Sciences Center
Lubbock, TX
Project Title: Mechanisms of Cannabinoid Tolerance
Research: Basic Research
Research Area: Delta-9-Tetrahydrocannabinol (Δ-9-THC) And Cannabis-Like Compounds Have Been Used by Cancer Patients for its Analgesic/Anti-Emetic Effects. This Study Will Address Agonist and Sex-Specific Mechanisms of Cannabinoid Tolerance to The Antinociceptive Effects in Chronic/Chemotherapy-Induced Pain Models.

Earliest Start Date: 6/1/2020
Housing: Campus

Student Qualifications: The students should be interested in working with mice and learning about behavioral and molecular pharmacology since this project requires students to work with animals and tissue samples. No past behavioral pharmacology experiences are required since the PI holds a veterinary degree as well as a Ph.D. and has successfully trained several trainees unfamiliar with behavioral pharmacology testing. However, a strong desire to learn about behavioral and molecular pharmacology is highly encouraged.

Project Description: The student will be exposed behavioral pharmacology and molecular biology during the summer internship. Students will learn about chemotherapy-induced pain models (paclitaxel and cisplatin) as previously published and optimized by Dr. Guindon. Behavioral testing using mechanical (digital electro von Frey) and cold (acetone) allodynia (Guindon and Hohmann, 2013) will be used to assess the sensory component of pain by the students. The students will also learn to evaluate the affective component of pain by using elevated-plus maze (EPM) and open-field (OPF) tests. The first part of the project will be to test development of mechanical and cold allodynia as well as EPM and OPF tests from day 0 to day 26. At day 8, we will start the administration of cannabinoids compounds Δ-9-THC (6 mg/kg ip), WIN 55,212-2 (10 mg/kg ip), and CP55,940 (0.3 mg/kg ip) alone or in combination with JNK inhibitors (SU 3327 3 mg/kg ip in males and 10 mg/kg ip in females) in wild-type (WT mice) or in disrupted GRK phosphorylation of CB1 (S426A/S430A mutants) using chemotherapy-induced pain models. The NIDA intern last summer has a manuscript in preparation on sex-specific differences on the antinociceptive effects of JNK inhibitors in male/female mice. For the second part and following chronic treatment with cannabinoid agonists alone or in combination, we will used tissue collections to perform molecular pharmacology techniques such as western blot, PCR and quantitative PCR.
Texas

Investigator: Consuelo Walss-Bass, 
Institution: University of Texas Health Science Center at Houston Houston, TX
Project Title: Gene-environment interactions in COCCaINE Use Disorder: Collaborative Case- Control Initiative in Cocaine Addiction
Research: Basic Research
Research Area: Gene-Environment Interactions, DNA Methylation, Postmortem Brain, Single Cell Analysis, Human-Induced Pluripotent Stem Cells
Earliest Start Date: 5/31/2020
Housing: Subsidized

Student Qualifications: Students will work with postmortem brain tissue, induced pluripotent stem cells, and blood. Students majoring in any biological science and that have basic skills in laboratory techniques such as pipetting are preferred.

Project Description: Student will learn to perform in-depth genome-wide characterization of the influences of epigenetic modifications on gene expression in an existing cohort of addiction brain samples, from cocaine overdose and opioid overdose subjects. Student will assess DNA methylation utilizing Illumina arrays and gene expression by RNA sequencing in brain tissue from 50 subjects (25 cases and 25 controls) in 2 addiction-related brain regions (nucleus accumbens and amygdala). Student will perform integrated methylation and expression analyses to identify region-specific gene expression and methylation differences in cases compared to controls and will correlate genomic changes with behavioral measures related to addiction, such as impulsivity and self-regulation (obtained via a detailed psychological autopsy), as well as with exposure to stressful life events. Student will also perform preliminary studies of genomic measures on single-cell types isolated from postmortem brain, and on human-derived cell lines generated from iPS cells from addiction subjects.
Texas

Investigator: Donald Dougherty, Ph.D.
Institution: University of Texas Health Science Center at San Antonio
San Antonio, TX
Project Title: Consequences of Substance Use on the Development of Impulse Control
Research: Behavioral Research
Research Area: Family History of Substance Use Disorder; Impulsivity; Sensation Seeking; Stress; Adolescent; Emerging Adulthood; Substance Initiation
Earliest Start Date: 6/8/2020
Housing: Subsidized

Student Qualifications: Previous research experience is not required. Background in psychology, sociology, or training in STEM field is preferred. This project is suitable for students with career interests in mental health, youth development, and substance use involvement.

Project Description: A defining feature of healthy development is an increasing ability to control impulsive behavior. What cannot be determined from previous studies is whether poor impulse control contributes to, or is a result of, substance use involvement, and whether these factors interact in adolescence and yield increasingly negative outcomes by early adulthood. We are examining how specific components of impulse control develop and relate to substance use development. Importantly, we also test, refine, and extend the Dual Systems model of adolescent risk taking by addressing whether processes in the model are independent or interdependent, how they develop in non-normative samples to explain problematic patterns of substance use, and whether processes in the model are affected by social/environmental factors related to risk and resiliency. This study tests bi-annually a cohort of youth with and without family histories of substance use. Parents and their children: (a) completed an initial assessment battery at study entry (self-report, interview, and laboratory-behavioral measures), and (b) have been re-assessed every 6 months to monitor changes in impulse control, substance use involvement, psychiatric status, family and environmental stressors, and physical maturation. Data collection include questionnaire, interview, and laboratory behavioral assessments.
Texas

Investigator: Kathryn A. Cunningham, Ph.D.
Institution: University of Texas Medical Branch
Galveston, TX
Project Title: Targeting the Ghrelin System for Novel Opioid Use Disorder Therapeutics
Research: Basic Research
Research Area: Addiction Research; Addiction Sciences; Pharmacology; Toxicology; Neuroscience;
Earliest Start Date: 5/31/2020
Housing: Campus

Student Qualifications: Excitement about science; Team Player; preferred background in Neuroscience, Psychology, Pharmacology, or Behavioral Science; Understanding of the importance of animal research to advancing our understanding of addiction.

Project Description: The University of Texas Medical Branch at Galveston houses The Center for Addiction Research (CAR), a center focused on uncovering the biological, behavioral and chemical determinants of Substance Use Disorders (SUDs). The CAR research teams use a multi-pronged approach to be at the frontier of SUD research and provide a sustainable training environment for future scientists.

A summer research intern can expect to explore the “hunger hormone” ghrelin and the growth hormone secretagogue receptor 1α (GHS1αR) in preclinical models of opioid use disorder (OUD). In particular, our laboratory is investigating the role of the GHS1αR to regulate opioid intake and opioid-seeking behavior, and we are evaluating the efficacy and abuse liability of a potential therapeutic compound that targets this receptor. The innovative nature of this project requires a multidisciplinary research team to which the summer research intern will get to experience. The long-term mission is to provide a rich training environment and develop therapeutics to reduce OUD.
Utah

Investigator: Adam J. Gordon, M.D., M.P.H.
Institution: University of Utah
Salt Lake City Utah
Project Title: Greater Intermountain Node
Research: Clinical Research
Research Area: Substance Use Disorder; Opioid Use Disorder; Clinical Trials; Addiction Health Research; Implementation Science
Earliest Start Date: 6/1/2020
Housing: Campus

Student Qualifications: 1. Proficient writing and oral communication skills; 2. A basic understanding of human clinical research studies; 3. Versed in Microsoft Suite (Word, PowerPoint, Excel)

Project Description: The Greater Intermountain Node (GIN) was founded in 2019 to expand the existing National Institute of Drug Abuse (NIDA) Clinical Trial Network infrastructure to grow the settings for research and bring new research expertise to the Network. The GIN investigators possess expertise in three areas of addiction research: 1) research within non-addiction specialty health care settings, 2) addiction and opioid research within large health systems of care, and 3) implementation science and approaches to bring addiction evidence-based research to practice. Our team is looking for an intern willing to assist on two projects housed within the GIN. First, the Emergency Department-Initiated Buprenorphine Validation Network Trial (ED-INNOVATION) which will test an implementation strategy to guide the development of emergency department (ED)-initiated treatment of opioid use disorder with buprenorphine at 30 sites across the US. Second, the Medication Treatment for Opioid Use Disorder in Expectant Mothers (MOMs) a pragmatic randomized trial comparing two buprenorphine formulations. The GIN is housed within the Program for Addiction Research, Clinical Care, Knowledge, and Advocacy (PARCKA) within the Division of Epidemiology within the Department of Internal Medicine within the University of Utah School of Medicine in Salt Lake City, Utah. PARCKA provides addiction-related clinical care, advocacy, research, and education across the University and local community.
Utah

Investigator: Fares Qeadan, Ph.D., MS
Institution: University of Utah
Salt Lake City, UT
Project Title: Opioid Use Disorder and Overdose
Research: Epidemiology Research
Research Area: Opioid, Tribal Health, and Electronic Medical Record (EMR)
Earliest Start Date: 6/1/2020
Housing: Campus

Student Qualifications: Students with an interest in public health, epidemiology, tribal health, and opioid research are preferred. Basic computer proficiency is required, and experience with literature review and writing is preferred. Prior coursework in statistics is a plus.

Project Description: The project investigates improving data quality in opioid overdose surveillance through the use of geocoding and data linkages to address the need for tribe-specific data and analyses on opioid use disorder and opioid overdose. We aim, using improved EMR data, to (1) obtain accurate estimates of opioid use disorders and fatal and non-fatal opioid overdose, and (2) complete predictive modeling for opioid use disorders and fatal and non-fatal overdose that estimate the role of modifiable risk and protective factors.
Vermont

Investigator: Hugh Garavan, Ph.D.
Institution: University of Vermont
Burlington, VT
Project Title: ENIGMA- Addiction: Pooling of Existing Datasets to Identify Brain and Genetic Correlates of Addiction
Research: Basic Research
Research Area: Neuroimaging; Addiction; Meta-analysis
Earliest Start Date: 6/1/2020
Housing: Campus

Student Qualifications: Interns will work with neuroimaging (fMRI) data but can also gain experience testing human participants at the MRI scanner if they wish. A background in Psychology or Neuroscience, or in Mathematics, Computer Science, or Engineering would be suitable. Comfort with data analyses is a must, experience with programming is not necessary but highly desirable.

Project Description: The lab conducts research on the neurobiology of substance abuse. For the ENIGMA-Addiction project we work with large datasets contributed from consortium members around the globe. The primary analyses are on brain structure, but we will extend into analyses of brain function. In addition, we work with several large longitudinal datasets including IMAGEN (https://imagen-europe.com) and ABCD (https://abcdstudy.org). There is very rich psychological characterization in these datasets so interns can typically choose a topic of particular interest to themselves.
Virginia

Investigator: Fatah Kashanchi, Ph.D.
Institution: George Mason University
Manassas, VA
Project Title: Role of Extracellular Vesicles in Methamphetamine and HIV Induced Neurotoxicity
Research: Basic Research
Research Area: Drug Abuse; Exosomes; HIV/AIDS; HIV-1 Transcription; CNS Infection; Apoptosis; Treatment
Earliest Start Date: 6/8/2020
Housing: Subsidized

Student Qualifications: GPA = 3.5; Prerequisite courses: Chemistry, Biology, Microbiology, Cell Biology, and Biochemistry.

Project Description: These experiments will address if Nef and its mutants (HIV viral protein) is responsible for increasing Extracellular vesicle (EV) release after HIV infection in relation to Methamphetamine abuse. EVs will be isolated and separated from HIV virions using Dr. Kashanchi’s gradient purification and nanotrap based isolation and separation method as well as differential centrifugation. EVs from different conditions (uninfected immune cells, +/- Meth; HIV (Nef+and Nef- deletion mutant initially) infected immune cells, +/- Meth, will be examined for particle number, size and shape using Nanoparticle Tracking Analysis (NTA), and Electron Microscopy. We have also very recently been able to isolate small, medium, and large EVs to decipher their function.
Virginia

Investigator: Ku-Lung Hsu, Ph.D.
Institution: University of Virginia
Charlottesville, VA

Project Title: Endocannabinoid Biosynthesis in Inflammation and Pain
Research: Drug Development Research
Research Area: Chemical Biology, Lipid Metabolism, Mass Spectrometry, Pain, Endocannabinoid, Inflammation

Earliest Start Date: 6/1/2020
Housing: Campus

Student Qualifications: Curiosity and enthusiasm for science. General lab experience including pipetting. Desire to learn new skills.

Project Description: The goal of the summer research project is to explore diacylglycerol lipase-beta (DAGLβ) as a novel drug target for developing non-addictive pain medication. DAGLβ is an enzyme that hydrolyzes lipid (fat) molecules to produce chemical signals that control function of a specific immune cell known as macrophages.
Investigator: Wendy Lynch, Ph.D.
Institution: University of Virginia
Charlottesville, VA
Project Title: A Novel Nutrition-Based Anti-Relapse Intervention for Cocaine Addiction
Research: Behavioral Research
Research Area: Sex Differences, Cocaine Addiction, Rat Model, Nutrition, Intervention, Relapse
Earliest Start Date: 6/1/2020
Housing: Campus

Student Qualifications: Students will need to undergo animal handler training prior to starting in the laboratory. Prior laboratory handling skills would be beneficial but are not required.

Project Description: Relapse to drug seeking after abstinence is a major challenge in treating substance use disorder. Abstinent drug users remain at risk of relapse even after extended drug-free periods. Exposure to drug associated cues or stress during abstinence can trigger intense craving and precipitate relapse. New and more effective anti-relapse interventions are critically needed, particularly for cocaine since no effective treatment is available. We discovered that a nutritional supplement we developed as part of a nutritional approach for managing substance use disorder had the benefit of being a potentially robust anti-relapse therapy. This supplement, SMAASH-C, contains a combination of vitamins, minerals, omega-3 fatty acids, and amino acids that are known to be depleted by chronic cocaine exposure. The goal of this project is to determine the efficacy of SMAASH-C at reducing cocaine-seeking in response to two of the most common triggers of craving and relapse in humans: drug-associated cues and stress.
**Virginia**

**Investigator:** Kathryn Polak, M.S.  
**Institution:** Virginia Commonwealth University  
Henrico, VA  
**Project Title:** Using Mobile-Based Contingency Management to Promote Daily Self-Monitoring of Pain Severity and Prescription Opioid Use in a Primary Care Sample of Chronic Pain Patients.  
**Research:** Clinical Research  
**Research Area:** Chronic Pain; Pain Management; Prescription Drug Misuse; Prescription Drug Overuse; Drug Misuse; Analgesics, Opioid; Narcotics; Opioid-Related Disorders; Contingency Management; Mobile Applications  
**Earliest Start Date:** 5/1/2020  
**Housing:** Campus  

**Student Qualifications:** Required: A curious mind and motivation to learn and work hard on the research project. Must maintain at least a 3.0 GPA. Desired: Some science background (e.g., a high school level course in biology, psychology, and/or chemistry).

**Project Description:** Responsible opioid prescribing depends on effective identification of prescription (Rx) opioid misuse as well as an understanding of clinically-relevant variables (e.g., pain). Remote self-monitoring is a promising, practical, and readily available method for tracking these variables; however, low rates of adherence have impeded the use of remote self-monitoring among chronic pain patients, limiting the potential beneficial effects. The present study is examining the efficacy and feasibility of contingency management (CM; as delivered by an innovative CM app) for improving self-monitoring of clinically-relevant variables among chronic pain patients, which will inform future research on effective pain management, early identification of Opioid Use Disorders, and adherence across a variety of medical conditions.
Investigator: Chenming Zhang, Ph.D.
Institution: Virginia Tech
Blacksburg, VA
Project Title: Novel Nanovaccines Against Opioid Use Disorders
Research: Drug Development Research
Research Area: Vaccines; Nanotechnology; Biomolecular Processing; Immunogenicity; Opioids
Earliest Start Date: 6/1/2020
Housing: Campus

Student Qualifications: Education: junior or senior undergraduate students; Major: chemical engineering, bioengineering, biological systems engineering Career interest: PhD degree after BS Skill sets: experience in wet lab;

Project Description: This summer intern will learn to fabricate biodegradable nanoparticles and assemble various biomolecules around the nanoparticles. He/she will also learn to carry out experiments to characterize the fabricated hybrid-nanoparticles using different microscopic methods, such as scanning electron microscopy. If time allows, he/she will carry out experiments to study the uptake of the hybrid nanoparticles by antigen presenting cells.
**Washington**

**Investigator:** Mary Hatch-Maillette, Ph.D.

**Institution:** University of Washington
Settle, WA

**Project Title:** Clinical Trials Network - Pacific Northwest Node
**Research:** Clinical Research
**Research Area:** Addiction Treatment, Clinical Research, Implementation Science, Clinical Trials, Substance Abuse, HIV, Opioid Use Disorder, Emergency Department

**Earliest Start Date:** 6/22/2020

**Housing:** Campus

**Student Qualifications:** This internship is geared toward undergraduates who are interested in seeing how addiction and related issues (opioid use, HIV, sexual risk, etc.) are treated and researched in real world settings. Interns will not be working directly with patients or participants but will shadow those who are. Students who are considering careers in medicine, psychology, social work, or public health will be a good fit.

**Project Description:** The Pacific Northwest Node of the NIDA Drug Abuse Treatment Clinical Trials Network (CTN), housed at the University of Washington (UW), Alcohol & Drug Abuse Institute (ADAI), welcomes a NIDA Summer Intern to learn about substance abuse treatment clinical research. This 5-week internship will involve the intern working with a lead investigative team based at ADAI, focusing on an implementation survey study to assess Pre-Exposure Prophylaxis (PrEP) and opioid use-related service availability for men who have sex with men (MSM) and people who use opioids (PWUO) in high-HIV-incidence Southeastern cities (CTN0082); and others will include the intern shadowing staff at Harborview Medical Center, focusing on improving buprenorphine treatment access for opioid use disorder in the Emergency Department (ED) (CTN0069); and/or at Swedish Medical Center, evaluating the impact of treating opioid use disorder in pregnant women (CTN0080). Specific projects might be working with the lead investigative team to develop a coding manual for qualitative interviews of directors whose agencies serve those at high HIV risk, learn about multi-site clinical trial project coordination and management, or help organize attitudinal surveys developed for MSM, PWUO, and treatment providers. The intern will also gain exposure and experience with addiction clinical research via a variety of experiences such as touring community treatment programs, participating on conference calls, and attending webinars.
# Washington

**Investigator:** Kevin Michael King, Ph.D.

**Institution:** University of Washington  
Seattle, WA

**Project Title:** Ecological Momentary Assessment of Negative Urgency's Effects on Alcohol and Marijuana Misuse

**Research:** Behavioral Research

**Research Area:** Self-Regulation, Alcohol Use, Marijuana Use, Impulsivity, Ecological Momentary Assessment, Ambulatory Assessment, Self-Control, Emotion Regulation

**Earliest Start Date:** 6/20/2020

**Housing:** Campus

**Student Qualifications:** Psychology, Sociology or related major preferred, and have completed a class in research methods. Interns will work with human subjects. No prior research experience required. Prefer interns with an interest in a graduate research career.

**Project Description:** This project will describe individual differences in impulsive responses to negative emotions in the real-world. We will test what situational factors and emotion regulation skills make some people more or less impulsive in the face of negative emotions, and how the interplay between negative emotions and impulsive behaviors could lead to alcohol and marijuana misuse in the real world. This project will be able to elucidate when, how and for whom impulsive responses to emotion leads to alcohol and marijuana misuse. In Summer 2020, the project will be actively recruiting subjects, young adults age 18 - 22 who are regular marijuana or alcohol users. Participants will complete a 2-month period of ecological momentary assessment (EMA), or short cell phone surveys multiple times a day, to report on their emotional experiences, self-regulation behaviors, and substance use.
Washington

Investigator: Garret Stuber, Ph.D.
Institution: University of Washington
Seattle, WA

Project Title: Neural Circuit Elements That Orchestrate Cue-Reward Associations

Research: Basic Research
Research Area: Optogenetics, Calcium Imaging, Behavior, Mouse, Reward Seeking, Cortex, VTA, Accumbens

Earliest Start Date: 5/1/2020
Housing: Subsidized

Student Qualifications: Background in Neuroscience is preferred. The applicant should have some familiarity with programming in either Matlab or Python but need not be an expert. The applicant will be required to work with behaving animals (mice) for this project.

Project Description: This Summer Research Project is geared towards undergraduate researchers. The applicant will learn to conduct behavioral experiments in rodents that are trained in various reward seeking paradigms. This will be combined with in vivo two photon imaging to study neural circuit activity in either the prefrontal cortex, nucleus accumbens, or hypothalamus. The intern will be exposed to state-of-the-art microscopy techniques and in vivo circuit manipulations (optogenetics).
Investigator: Jashvant Unadkat, Ph.D.
Institution: University of Washington
Seattle, WA
Project Title: Mechanisms of Drug Disposition During Pregnancy
Research: Basic Research
Research Area: Pharmacokinetics of Drugs, Pregnancy, Maternal-Fetal Exposure to Drugs, Mechanisms of Changes in Pharmacokinetics, PBPK Modeling and Simulations
Earliest Start Date: 6/1/2020
Housing: Campus

Student Qualifications: Students who will best fit as interns will be those who have some laboratory research experience and do not have objections to working with animals or animal/human tissues. Students should be enrolled in four-year college and should be sophomores, juniors or seniors majoring in a biological science or engineering.

Project Description: This program project will study the mechanisms of disposition of drugs THC. Human, animal and in vitro studies in cells will address the aims stated in each of the three projects. A physiological model will also be created to predict the disposition of these drugs in the human maternal-fetal unit. A student who is interested in working on this project will be involved in research conducted by any one of the three projects of this grant. These projects are focused on systematic investigation of hepatic/intestinal/lung/placental metabolism & transport of THC to predict maternal-fetal disposition of THC and its metabolite, 11OHTHC.
**Washington**

**Investigator:** Ming Xian, Ph.D.

**Institution:** Washington State University, Pullman
Pullman, WA

**Project Title:** Understanding Opioid Dependence and Hydrogen Sulfide

**Research:** Basic Research

**Research Area:** Organic Chemistry, Synthesis, Fluorescent Sensors, Chemical Biology

**Earliest Start Date:** 5/12/2020

**Housing:** Campus

**Student Qualifications:** The preferred intern should have some background in chemistry. He/she should have taken and passed related courses in chemistry, in particular analytic chemistry, biochemistry, and two semesters’ organic chemistry. Having some research experience is a plus. This research does not involve animal or human samples.

**Project Description:** Opioids are used in treating chronic pain but have adverse effects including problematic issues of tolerance, dependence, and opioid-induced hyperalgesia. The best-established mechanism of opioid dependence is the up-regulation of adenylate cyclase (AC)/cAMP pathway. Recent studies revealed that hydrogen sulfide (H2S) can effectively attenuate the development of opioid dependence via down-regulation of the AC/cAMP pathway. However, H2S’s exact mechanisms of action are still unclear, and the actual H2S concentration and flux which exhibit the optimal inhibition of opioid dependence have yet to be determined. This lack of knowledge presents a major burden in the development of H2S based therapy. In this summer internship project, the student will work with a senior graduate student in my lab to synthesize and evaluate several novel and highly sensitive H2S fluorescent sensors. The most promising sensor(s) will be used to determine H2S concentration changes in cell models of opioid dependence. We expect the optimal H2S flux causing effective inhibition of opioid dependence will be identified.
Wisconsin

Investigator: Christopher Olsen, Ph.D.
Institution: Medical College of Wisconsin
Milwaukee, WI
Project Title: Environmental Modulation of Cocaine Seeking
Research: Basic Research
Research Area: Addiction, Cocaine, Ensemble
Earliest Start Date: 5/27/2020
Housing: Campus

Student Qualifications: Primary qualifications are motivation, desire to learn, and patience. The student should have an interest in neuroscience, a biology background is desirable. The student should feel comfortable with working with live mice (we will provide training in animal handling), learning to conduct surgical procedures, and working with fresh or preserved tissue (e.g., brain).

Project Description: Psychosocial enrichment has been shown to diminish cocaine craving and activation of the medial prefrontal cortex (mPFC) in response to drug-related stimuli, and in a rodent model, environmental enrichment (EE) also reduces cocaine seeking and the ability of drug-related stimuli to activate the mPFC. Despite the robust ability of environmental factors to reduce behavioral and physiological responses to drug stimuli, the mechanisms of this phenomenon are not known. It is possible that EE directly modulates a specific ensemble of neurons that is engaged by exposure to a previous drug-taking environment. One such drug-seeking ensemble resides in the mPFC, a region where enrichment reduces drug stimuli-elicited activity. Our studies will focus on these ensemble neurons to determine if EE affects their ability to become re-activated by exposure to a drug environment, if EE alters cocaine-associated plasticity in these neurons, and if inhibition of this ensemble alters other mPFC-dependent behaviors.
Wisconsin

Investigator: Julia Dickson-Gomez, Ph.D.
Institution: Medical College of Wisconsin
Milwaukee, WI

Project Title: Effects of State Laws to Reduce Opioid Diversion on Transition to Injection Drug Use and HIV/HCV Transmission

Research: Behavioral Research
Research Area: Opioids, Injection Drug Use, Law, Policy, Social Network, Qualitative, Quantitative, Harm Reduction, Medication Assisted Therapy

Earliest Start Date: 5/11/2020
Housing: Subsidized

Student Qualifications: Course work or major in sociology, anthropology, or psychology is preferred.

Project Description: In response to rising rates of opioid dependence and fatal poisonings, virtually every US state has incorporated laws to reduce the availability of medical opioids for diversion. However, little research has examined the effects of these laws on the transition to injecting opioids or heroin. Forty-nine states have implemented prescription drug monitoring programs (PDMPs) which are state-based data collection systems that record controlled medications. However, state PDMPs differ considerably, including the extent to which physicians are required to access PDMPs before prescribing opioids. While some research has suggested that PDMPs have reduced admissions to drug treatment programs for opioid misuse, research that compares the effects of particular components of state PDMPs is rare. In addition, no research to date has compared the effects of different state PDMP systems on the transition to injection drug use. PDMPs may make prescription opioids more expensive or harder to obtain, leading to injecting these substances to produce the same effects, or turning to heroin. On the other hand, decreased opioid availability may decrease initiation of non-medical opioid use and consequently decrease transition to injection or heroin. Other laws states have introduced to help decrease the diversion of prescription opioids include regulation of pain clinics. Medicaid and private insurance companies, that also vary by state, have implemented practices to detect “doctor shopping” and excessive prescription of opioids and to reduce prescription opioid misuse that might affect transition to opioid injection or heroin use. State Medicaid policies also play a role in patients’ access to and use of Medication Assisted Therapy (MAT) such as buprenorphine or methadone. Such policies may increase or reduce the accessibility of MAT and increase the probability of injection. The proposed research will explore the influence of laws in three different states, Connecticut, Kentucky and Wisconsin, selected to represent differences in PDMPs, Medicaid restrictions on opioid prescription, and pain clinic regulation. We will also examine the effects of the local context (drug use networks, syringe availability, harm reduction services, relative price and quality of heroin) on the transition to injecting non-prescription opioids and /or heroin injection in three local areas, an urban area, a smaller metropolitan area or suburb, and a rural town and surrounding county, chosen to reflect areas with higher rates of opioid prescription and opioid overdoses.
Wisconsin

Investigator: Todd Molfenter, Ph.D.
Institution: University of Wisconsin
Madison, WI
Project Title: Testing A Patient-Centered E-Health Implementation Model in Addiction Treatment
Research: Other
Research Area: Implementation Science; Technology Implementation
Earliest Start Date: 5/20/2020
Housing: Subsidized

Student Qualifications: Qualifications are a self-starter (and we will provide this student with needed support). At least a master’s degree.

Project Description: We are implementing a recovery APP in 42 addiction treatment sites. We have a need for a researcher to look at, quantitatively, the use rates of the APP as well as how the APP is being used based on page views as well as, qualitatively, based on user interviews (staff and patient). This internship is for someone who is interested taking a deeper dive into how the implementation of a patient-centered technology, being implemented in community clinic, is occurring.
Wisconsin

Investigator: Lauren Papp, Ph.D.
Institution: University of Wisconsin-Madison
Madison, WI
Project Title: Real-Time Predictors of Prescription Drug Misuse by College Students and Assessment of Misuse on Their Developmental Trajectories
Research: Behavioral Research
Research Area: Prescription Drug Abuse; Ecological Momentary Assessment; Interpersonal Relations; College; Stressor; Interpersonal Relations; Emotions; Development
Earliest Start Date: 5/31/2020
Housing: Campus

Student Qualifications: The research requires students to work with data collected from human participants. The research is relevant to students with interests or experience in psychology, human development, social work, public health, and counseling. Interns should be comfortable working with research staff and fellow students in a group environment. Dependability and thoroughness are valued traits. Previous research experience is desirable but not required. Completion of a research methods course is preferred.

Project Description: Personal and group characteristics that place some individuals at higher risk of engaging in prescription drug misuse compared to their peers have been established; however, among those who misuse, researchers have not systematically discovered in-the-moment antecedents of misuse behavior in real-world environments. Until we do so, society’s ability to prevent young adults—who display the highest misuse rates and experience increasingly costly health and well-being impacts—from misusing prescription drugs will likely remain beyond reach. Building on the team’s pilot work, 355 college students oversampled for elevated risk of prescription misuse completed ecological momentary assessment (EMA) procedures for 28 days. The design consisted of signal-based (scheduled across the day) and event-based (self-initiated) prompts. EMA collected ratings of theoretically-driven contextual triggers and real-time prescription drug misuse in day-to-day environments. EMA and survey data will be collected during T1. Longitudinal follow-up assessments are ongoing and occur every 6 months for 2 years. Quantitative modeling will be employed to identify real-time predictors of prescription drug misuse in college students’ daily lives and determine longer-term health and well-being outcomes. Resulting contributions will be significant because a person-focused and contextual understanding of prescription drug misuse is expected to have broad translational importance in basic and applied fields.