MU-ARTSS Labs: Mentors and Descriptions

Based upon individual interests, students will be assigned to labs at the University that focus on one or more of the following areas: human genetics; psychiatric and genetic epidemiology; cognitive neuroscience; behavioral pharmacology; behavioral and clinical assessment; intervention; and statistical modeling. MU-ARTSS interns will work alongside other interns, graduate students, postdoctoral fellows, and faculty members to gain experience in contemporary alcohol research topics and methods. A primary goal of the program is to provide interns with "hands-on" research experiences that serves as an introduction to graduate training in alcohol and addiction research. Research projects and work environments vary across labs, with some labs conducting ongoing projects collecting behavioral and psychophysiological data with human subjects, to laboratory studies involving the administration of alcohol, to computer labs that focus on secondary data analysis or computer simulation.

DESCRIPTION OF LABS:

***Learning and Memory Psychophysiology Lab* (*Roberto Cofresí*).** The Cofresí lab uses experimental behavioral conditioning procedures and psychophysiological methods, especially EEG and fMRI, to map the affective and cognitive correlates of learning and memory about ingested rewards like foods, drinks, and addictive drugs like alcohol in humans. Interns will meet regularly with Dr. Cofresí and work side-by-side with students and staff across the summer. Internship activities will involve guided readings (60%) about key constructs and methods as well as hands-on training (40%) in psychophysiological data collection, processing, and analysis.

***Behavioral Decision Making Lab* (*Clint Davis-Stober*).** Dr. Davis-Stober's lab conducts research within the emerging field of behavioral decision-making. Work in this lab examines how individuals integrate multiple pieces of information when making a decision, the rationality of various decision strategies, and the performance of various decision rules in the context of the linear model. In collaboration with Dr. McCarthy's lab, Dr. Davis-Stober's lab has several ongoing projects focused on addiction-relevant decision making: (1) the development of new mathematical models of how individuals choose whether or not to drive under alcohol intoxication, (2) modeling risky sexual decision making, and (3) investigating fundamental changes in choice behavior under alcohol intoxication. Interns working with Dr. Davis-Stober will gain training in mathematical modeling and statistical analyses. In addition, trainees will be exposed to the latest research in behavioral economics and choice modeling as it pertains to addiction research.
https://www.davis-stober.com/

***Health Neuroscience Center* (*Brett Froeliger*).** The focus of the HNC is on identifying biohehavioral mechanisms that maintain drug-use behaviors and developing new treatments for substance use disorders. We combine fMRI, lab-based assessments and mHealth to evaluate the potential benefit of novel pharmacotherapies, behavioral interventions and non-invasive neural stimulation for treating addiction pathophysiology. We approach this work by collaborating with preclinical researchers and clinical trialists, with the goal of the HNC to provide the translational bridge between fundamental neuroscience and treatment outcomes. Interns will learn about theory and techniques for translating between neuroscience, cognitive and clinical models of addiction.
https://www.healthneurosciencecenter.com/

***Gene-Brain-Behavior Relations Lab* (*Ian R. Gizer*).** Research in the lab focuses on genetic contributions to the development of externalizing spectrum disorders, including substance use disorders. Current projects in the lab aim to identify genetic variants associated with alcohol use disorder and related behavioral traits (e.g., impulsivity) and the use molecular genetic data to

understand the relations between such traits. Interns will learn about current molecular genetics methods and how such data can be used to inform our understanding of the biological mechanisms that contribute to the etiology of addictive behaviors. Using existing datasets, interns will gain hands-on experience formulating and conducting molecular genetic analyses beginning with preliminary quality control analyses to conducting tests of genetic association between individual variants and biological pathways and alcohol and other substance use disorders. Lab duties will include conducting literature reviews, learning and conducting data cleaning, data management, and data analysis, and preparing research results for presentation.

***Addiction Science Dissemination and Implementation Lab** (Ashley Helle).* This lab applies dissemination and implementation (D&I) science to understanding and improving the adoption and sustainment of evidence-based interventions for risky alcohol and substance use. Our current primary project centers on understanding how providers select alcohol prevention strategies for their college campuses, with the goal of developing a support program to enhance their efforts and reduce barriers. Interns working with Dr. Helle will learn about evidence-based approaches to alcohol intervention and will have the opportunity to craft a research question using either provider and/or student. Lab duties will include conducting literature reviews, learning mixed methods approaches to data collection, analysis, and interpretation, scientific writing, collaborating with community partners, and preparing research findings for presentation (in the form of a poster presentation and 1-2 page written research brief for practitioners and community members). https://hellea.mufaculty.umsystem.edu/home

***Regulation of Emotion, Addiction, and Conflict Trajectories Lab** (Sean Lane).* Research in the REACT lab focuses on the development of quantitative models of personality and psychopathology at both the diagnostic and experiential levels. Many projects focus on the role of emotion (dys)regulation in the development and maintenance of substance use, interpersonal relationships, and well-being. Mechanisms of interest include, impulsivity, craving, differentiation, coping, as well as time perception. We leverage epidemiological (surveys, interviews), experimental (laboratory), and ecological (smartphone) data to connect and understand these processes across time scales. Interns will gain experience in the design, implementation, management, and analysis of such data structures. Depending on individual interests, interns can participate in lab activities that span assisting in study material development using novel technologies to results dissemination from simulation, dynamic systems, and machine learning analyses. Interns will meet with Dr. Lane regularly and collaborate with students and staff on literature reviews, study participation monitoring, and data collection, cleaning/management, and analysis, throughout the summer. https://reactlab.wixsite.com/reactlab

***Alcohol Cognitions Lab** (Denis McCarthy).* Research in the lab focuses on the acute effects of alcohol on decision making, impulsivity, and perceptions of problem behaviors associated with alcohol use (with a focus on driving after drinking). Ongoing projects in the lab include both laboratory alcohol administration and ecological momentary assessment (EMA) studies, while assessment procedures include decision making tasks, behavioral task measures of impulsivity, and psychophysiological assessment (EEG). Interns can learn principles of data management and statistical analyses, and can elect to gain experience in conducting alcohol administration protocols, cognitive and psychophysiological assessment, and EMA methods. https://sites.google.com/umsystem.edu/mccarthydm/home

***Health Intervention and Treatment Research Lab** (Mary Beth Miller).* The HIT Research Lab conducts clinical research to enhance our understanding of how and why people change their health behaviors. Our goal is to improve the effectiveness and efficiency of prevention and treatment among high-risk populations (e.g., young adults, Veterans). Ongoing projects target sleep as a mechanism of change in substance use behaviors. We are also developing electronic interventions for alcohol-induced memory impairment (blackout). The intern's primary responsibility is to develop an independent research question (e.g., conducting literature reviews, creating an annotated bibliography, formulating a novel and clinically-relevant hypothesis). In addition, interns will learn the logistics of randomized

controlled trials; receive hands-on training in Cognitive Behavioral Therapy for Insomnia and clinical interviewing; administer alcohol assessments (Timeline Followback interviews); and gain experience with daily, cognitive, and physiological assessments (e.g., daily diaries, Fitbit data).
https://medicine.missouri.edu/centers-institutes-labs/hit-research-lab

Cost Effective Sampling for Social Network Data to Minimize Measurement Error (Douglas Steinley). Research in this lab focuses on key methodological challenges associated with social network analysis, especially as applied to alcohol use. These include (a) the assessment of the sensitivity of network statistics and model parameters to various types of missing data under different sampling schemes, (b) develops the first notions of effect sizes and power analysis for social network methodology, and (c) cost-effective sampling schemes. The methodology involves computer simulations coupled with advanced combinatorial data analytic approaches. Depending upon the qualifications and interests of the intern, he or she could be involved in conducting computer simulations (primarily on a MATLAB platform) or implementing recommendations that stem from the simulations on available social network data sets.

Personality and Emotion Laboratory (Tim Trull). The overall aim of ongoing work in this lab involves a series of NIH-funded projects assessing alcohol use, cannabis use, and self-harm as emotion regulation strategies among individuals high in affective instability/emotion dysregulation. Studies also assess craving, pain, mood, impulsivity, and dysregulated behavior in daily life. Interns will gain valuable experience interacting with self-report, physiological, and behavioral data collected in daily life from clinical participants. Participating interns can expect to learn more about the data collection process of a research study and ethical treatment of human subjects. Further, interns will become familiar with statistical packages such as SAS, SPSS, and MPlus, as well as smartphone and wireless sensor technology.
https://sites.google.com/view/personalityandemotionlab/

Substance Use in Daily Life Lab (Andrea Wycoff). We use daily-life (ecological momentary assessment; EMA) and complementary methods to understand alcohol use and its co-use with other substances, especially cannabis, in everyday life. By studying substance use as it naturally unfolds in individuals' natural environments, we can learn how problematic patterns of use are reinforced and identify malleable targets for treatment. We often focus on associations between variables such as substance use motives, craving, emotions, and subjective experiences of substance use. Interns will gain experience with ongoing data collections and can hone skills in project management, participant screening, data management, literature review, open science, data analysis, and preparing results for presentation. Interns will lead a project focused on alcohol, cannabis, or their co-use.
https://medicine.missouri.edu/faculty/andrea-wycoff-phd