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 serve 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:

**Social Cognition and Addiction Neuroscience: (Bruce D. Bartholow).** The overall aim of projects in Dr. Bartholow’s lab is to understand processes that increase risk for alcohol use disorder. This is achieved mainly in two types of studies: (1) examining acute effects of alcohol on brain and behavioral responses related to self-regulation, and (2) studying individual differences in subjective and neurophysiological responses to alcohol and alcohol-related cues. Interns will learn generally about the conduct of psychological and psychophysiological research to investigate effects of alcohol on brain and behavioral responses and to examine alcohol cue-reactivity. Interns will learn about experimental laboratory techniques used to test cognitive processes, and will learn about the importance of experimental control. Interns who show considerable promise and initiative will be invited to assist with conference presentations pertaining to project data.

**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.

**Health Neuroscience Center (HNC) (Brett Froeliger).** The focus of the HNC is on identifying biobehavioral 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.

**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 dependence and related behavioral traits (e.g., impulsivity) and 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.
**Alcohol Cognitions Lab (Denis McCarthy).** Research in the lab focuses on the acute effects of alcohol on decision making, impulsivity, working memory, and perceptions of problem behaviors associated with alcohol use (e.g., driving after drinking, risky sexual behavior). Interns will get experience with the procedures of alcohol administration in humans. In addition, interns will learn the logistics of decision making tasks, behavioral task measures of impulsivity, and the assessment of attitudes and cognitions about substance use. Finally, an ongoing collaboration project between this lab and the Personality and Emotion Laboratory (Trull) will combine laboratory and EMA methods for examining driving after drinking – interns can also be exposed to basics of EMA methods as part of this joint project.

**Health Intervention and Treatment Research Lab (Mary Beth Miller).** The Health Intervention and Treatment Research Lab conducts clinical research to enhance our understanding of how and why people change their health behaviors. Our research focuses primarily on addictive behaviors (e.g., alcohol and other drug use) but also targets other health behaviors, such as sleep and nutrition. Our goal is to improve the effectiveness and efficiency of prevention and treatment among high-risk populations (e.g., young adults, Veterans). We are particularly interested in electronic interventions that can be widely disseminated to increase the reach of public health promotion and prevention efforts. We collaborate closely with Dr. Christina McCrae’s Mizzou Sleep Research Lab and have several ongoing projects examining change in sleep as a mechanism of change in alcohol-related problems. Interns will learn the logistics of randomized controlled trials and gain experience with daily, cognitive, and physiological assessments.

**Drug Motivation Laboratory (Thomas M. Piasecki).** Research in this lab focuses on using Ecological Momentary Assessment methods to examine alcohol and tobacco use. Interns in this lab can get experience conducting secondary analyses of data from diary studies involving real-time assessments of alcohol and tobacco use. The data sets permit investigation of the event-level correlates and consequences of alcohol use and investigation of moderating contextual and person-level factors. Interns will receive training in the logic and analysis of electronic diary data. In consultation with the supervisor, interns will identify specific research questions that can be addressed with existing diary data, read and discuss relevant scholarly articles, conduct statistical analyses, and prepare scientific reports.

**Alcohol Health and Behavior Lab (Kenneth J. Sher).** Ongoing work in the Sher lab is aimed at characterizing the predictors and consequences of heavy alcohol use in young adults. We utilize several different sources of data including data sets from studies conducted here at the University of Missouri as well as national, public-use data sets. We are particularly interested in how individual vulnerability interact with various kinds of environmental contexts to determine the degree to which young men and women drink heavily and the effects of such heavy drinking on health, relationships, and role functioning. We also study various ways to improve the diagnosis of alcohol use disorders. Interns will learn about the epidemiology of drinking and alcohol use disorders in young adulthood and major etiological theories of alcoholism. Interns will develop their skills in bibliographic research, data analysis and use of statistical software, and the preparation of scientific reports.

**Genetic Epidemiology Lab (Wendy S. Slutske).** Research in this lab focuses on the epidemiology and behavioral genetics of alcohol use disorder and other addictive disorders. We utilize several different sources of data including data from several large national twin studies as well as national public-domain data. We have recently been particularly interested in using the discordant twin design to identify potential causal influences of a putative environmental risk or protective factor (e.g., early age of initiation of drinking, being married) for developing an alcohol use disorder. Interns will learn the rationale of the discordant twin study and become familiar with the literature that has employed this technique. Participating interns will develop a research question, learn how to use statistical packages such as SPSS or SAS to conduct analyses of a discordant twin study, and will learn how to prepare a report to summarize their findings.

**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, MPlus, as well as smartphone and wireless sensor technology.