Recruitment & Training Program for Under-Represented Populations 2019

Deadline March 1, 2019

PERSONAL INFORMATION—PRINT CLEARLY	
First Name: **Middle Initial:** **Last Name:**	**E-mail:**
Permanent Address:	**Parent's/Guardian's E-mail*:**
Current Phone:	**Date of Birth:**
Are you 16 yrs old or older? ☐ YES ☐ NO	**Last 4 digits of SSN:**
Race:	**Sex:** ☐ **Male** ☐ **Female**
City of Birth: **State of Birth:**	**Country of Birth:**
U.S. Citizen or Permanent Resident? ☐ Citizen ☐ Permanent Resident ☐ No	

ACADEMIC INFORMATION	
School Presently Attending: _____	**I will have completed year #** _____
☐ **High School** ☐ **College/University** ☐ **Medical School** ☐ **Graduate School**	**Select:** ☐ **Freshman** ☐ **Sophomore** ☐ **Junior** ☐ **Senior**
Major:	**Minor:**
List Courses:	**List Courses:**
GPA for Major:	**Cumulative GPA:**

ACADEMIC OR PERSONAL REFERENCES	
Name:	**Name:**
Title:	**Title:**
Place of Work:	**Place of Work:**
Phone or e-mail:	**Phone or e-mail:**

Start Date: ☐ **June 3, 2019 Orientation Group I** (program ends August 9th)*
☐ **June 17, 2019 Orientation Group II** (program ends August 9th)*

***Pick one date. <u>There are no exceptions to the start date.</u> If you cannot attend Orientation (Start Date listed), you will <u>not</u> be able to participate in the summer program.**

RESEARCH EXPERIENCE	
Describe any previous research experience:	
Describe your technical expertise in the following areas:	
Computers:	
Research Design/Statistics:	
Laboratory Skills:	
Handling Animals:	
List Courses taken that include a laboratory component, describe the nature of the lab work.	
List any publications or paper/poster presentations at conferences:	
Describe your current research interests and expertise:	
What do you expect from this program?	

If you are interested in a specific mentor, section, or branch. Please review the organizational structure and principal investigators at: https://irp.drugabuse.gov/organization/ and list below.

PI: _____

Section: _____

Branch: _____

Branches and Section are listed below. Please indicate which laboratory you would be interested in working. If you choose one laboratory simply put a check mark beside it. If you choose more than one lab, rank order your choices (1=1st choice, 2=2nd choice, 3=3rd choice) Please note you may be placed in a group that you have not marked if other labs are full and it is determined that you have the appropriate background courses to work competently in that group.

Cellular Neurobiology Research Branch Chief: Geoffrey Schoenbaum, M.D., Ph.D	
The Branch studies central nervous system (CNS) function at the cellular level, including physiological properties of cells, biochemical mechanisms and pathways, effects of neurotrophic factors, neuroanatomical methods, electrophysiology, animal models of drug effects and neurodegeneration, and drug effects on human cells.	
	Behavioral Neurophysiology Neuroscience Section Section Chief: Geoffrey Schoenbaum, M.D. Ph.D.
	Our lab is interested in the neural circuits mediating associative learning and decision making and how alterations in those circuits contribute to maladaptive behaviors in neuropsychiatric disorders such as addiction. We use rats as a model system to study behaviors and neural circuits that we believe have direct relevance to understanding the human brain.
	Synaptic Plasticity Section Section Chief: Antonello Bonci, M.D.
	Investigate drug-induced neuroadaptations in excitatory transmission within key reward circuits.Investigate cellular mechanisms underlying drug-induced changes in neuronal intrinsic properties in key reward circuits. Using optogenetic technology to identify the role of specific circuits in reward-learning behaviors.
	Electrophysiology Research Section Section Chief: Carl R. Lupica, Ph.D.
	Mechanisms of action of abused drugs on synaptic neuronal circuitry: Dopamine neuron degeneration and early physiological events
	Neuronal Circuits and Behavior Unit Unit Chief: Yeka Aponte, Ph.D.
	This unit uses a combination of state-of-the-art optogenetic, electrophysiology, two-photon fluorescence endoscopy, and behavioral assays to elucidate the neuronal basis of goal-directed behaviors, such as feeding, and determine how these behaviors are disrupted in eating disorders and drug addiction.
Molecular Neuropsychiatry Research Branch Chief: Jean Lud Cadet, M.D.	
The Branch investigates cellular and molecular mechanisms of neurodegeneration and regeneration. We are also investigating the role of epigenetic modifications in methamphetamine (METH) addiction.	
	Molecular Neuropsychiatry Section Section Chief: Jean Lud Cadet, M.D.
	Research in our section focuses on studies the molecular and cellular mechanisms of psychostimulant addiction and toxicity.
	Psychobiology Section Section Chief: Jonathan L. Katz, Ph.D.
	Behavioral analysis of drug abuse using various procedures with animals, including intravenous drug self-administration, drug discrimination, and conditioned place preference. These procedures are used to assess mechanisms involved in the abuse of drugs.
Molecular Targets and Medications Discovery Branch Chief: Amy Hauck Newman, Ph.D.	
The Molecular Targets and Medications Discovery Branch investigates behavioral and pharmacological mechanisms underlying the effects of drugs, such as cocaine and methamphetamine that lead to their abuse and to drug dependence. Studies of the behavioral effects of drugs, including their reinforcing and subjective effects, are designed to provide new insights into the functioning of psychoactive agents in the central nervous system (CNS), and how those actions may lead to drug abuse.	
	Medicinal Chemistry Section Chief: Amy Hauck Newman, Ph.D. Our research effort is focused on the design and synthesis of novel ligands to study the function of selected G-protein coupled receptors and monoamine transporters in the

	central nervous system. Highly selective compounds are designed and synthesized for characterization of these molecular targets and to develop structure-activity relationships.
	Computational Chemistry and Molecular Biophysics Unit **Unit Chief: Lei Shi, Ph.D.**
	Research interests in the lab are focused on identifying common and specific structural basis of Membrane Protein functions to advance the mechanistic understanding of key cellular processes, from the disparate yet intertwined perspectives of functional mechanisms and molecular recognition. Using a combined approach of computational and experimental analysis, we are interested in elucidating the atomistic details of allosteric conformational transitions and propagations during signal transduction and transport processes. In particular, we investigate the critical structural and dynamic elements that determine ligand binding specificities, the interactions among MP and their coupled proteins, and the associations of MP with the lipid bilayer. The findings allow us to rationally optimize existing and develop new compounds that shift the conformational equilibrium of MP, which will facilitate functional studies and lead to novel drug discovery.
	Integrative Neurobiology Section **Section Chief: Sergi Ferré, M.D., Ph.D.**
	Projects include: Functional and pharmacological significance of neurotransmitter receptor heteromers with in vivo approaches. Molecular interactions involved in the quaternary structure and function of neurotransmitter receptor heteromers (cellular and molecular approaches).
	Designer Drug Research Unit **Chief: Michael Baumann, Ph.D.**
	Pharmacology of newly-emerging designer drugs of abuse, such as “bath salts” stimulants and “K2/Spice” cannabinoids; Structure-activity relationships for ligands interacting at monoamine transporter proteins; Mechanisms underlying neurotoxic effects of stimulant drugs of abuse.
	Drug Design and Synthesis Section **Section Chief: Kenner C. Rice, Ph.D.**
	Our major research direction is the elucidation of the structure and function of neurotransmitter systems in the mammalian central nervous system (CNS) in normal, drug-altered, and pathological states and the molecular mechanism of action of CNS active drugs.
	Neuropsychopharmacology Section **Section Chief: Eliot L. Gardner, Ph.D.**
	Basic brain mechanisms underlying drug addiction, craving, and relapse, Drugs acting on the endocannabinoid brain system
Neuroimaging Research Branch **Chief: Elliot Stein, Ph.D.**	
The goal of the Neuroimaging Research Branch (NRB) is to better understand the neurobiological antecedents of illicit drug use and abuse, the neuronal consequences of short and long-term drug use and the potential reversibility of these neuroadaptations. The major paradigm employed towards this goal is the development and application of novel neuroimaging tools, predominantly MRI based but also employing PET and EEG, applied together with behavioral, cognitive and pharmacological manipulations and genetic investigations in both preclinical and human based protocols.	
	Section of Cognitive Neuroscience and Psychopharmacology **Section Chief: Elliot Stein Ph.D.**
	To apply multimodal imaging technologies (DTI, fMRI, PET, MRS, EEG) to understand the neurobiological substrates of human drug abuse. Specifically, we are examining the effects of nicotine, cocaine, marijuana and ecstasy on, among other constructs, response inhibition, reward processes, decision making, attention, and working memory; to understand the neurobiological substrates and behavioral consequences of drug related cues; to develop real time fMRI biofeedback to understand the localization of and circumstances under which regional brain signals can come under individual control.
	Section of Magnetic Resonance Imaging and Spectroscopy **Section Chief: Yihong Yang, Ph.D.**

	Research projects: To develop functional magnetic resonance imaging (fMRI) techniques to measure evoked and resting activity of the brain. In evoked-fMRI, brain activation is detected using multiple parameters that provide complementary and quantitative measurements. In resting-state fMRI, new acquisition and analysis strategies are being developed to assess alterations of brain circuitry in drug users.
	Preclinical (Translational) Imaging Unit **Investigators: Hanbing Lu, Ph.D.**
	Research projects: To determine, at a systems level, the neurobiological consequences following acute and chronic administration of, and withdrawal from, psychostimulant drugs such as nicotine and cocaine in preclinical models of drug dependence.
Behavioral Neuroscience Research Branch **Chief: Yavin Shaham, Ph.D.**	
The mission of the Behavioral Neuroscience Branch is to characterize the behavioral and neurobiological mechanisms of drug reward and relapse to drug use, as assessed in animal models.	
	Neurobiology of Relapse Section **Section Chief: Yavin Shaham Ph.D.**
	We use rat models to study the cellular and neuroanatomical mechanisms that underlie relapse to drug and palatable food seeking induced by stressors and drug-associated or food-associated cues (Yavin Shaham group). We also study neurophysiological mechanisms of addictive drugs and motivated behavior (Eugene Kiyatkin group).
	Neurocircuitry of Motivation Section **Section Chief: Satoshi Ikemoto, Ph.D.**
	Projects include: Optogenetic investigations of reward and approach-withdrawal motivation in rodents, Brain reward circuitry investigated by self-administration and place conditioning induced by intracranial drug injections, Forebrain-brainstem interaction detected by multi regional recordings of units and local field potentials in motivation and reward
	Neuronal Ensembles in Drug Addiction **Section Chief: Bruce T. Hope, Ph.D.**
	When using drugs of abuse, learned associations are formed between the drugs and stimuli present in the drug-taking environment. With continued use, these stimuli can become cues that promote drug relapse. Our research is focused on figuring out how these memories are stored in the brain.
Integrative Neuroscience Research Branch **Chief: Marisela Morales, Ph.D.**	
The Integrative Neuroscience Branch conducts research at the cellular, molecular, and systems levels to identify the neural substrates upon which drugs of abuse act to produce long-term alterations in behavior and brain function.	
	Neuronal Networks Section **Section Chief: Marisela Morales Ph.D.**
	We are investigating the molecules, cells and neuronal pathways central to the neurobiology of drug addiction. Towards this end, we apply anatomical, cell molecular, cell biological and electrophysiological experimental approaches.
	Cellular Pathobiology Section **Section Chief: Tsung-Ping Su, Ph.D.**
	Studies of cellular biological processes underlying addiction and related pathobiological disorders; Examination of signaling processes through which drugs of abuse alter neuronal structure and function; Biological and biochemical characterization of sigma receptors

	Structural Biology Unit **Unit Chief: Amina S. Woods, Ph.D.**
	The study of the mechanisms of molecular interactions, mainly between neuroreceptors proteins using bioinformatics, protein modeling, pull down techniques and mass spectrometry
Clinical Pharmacology and Therapeutics Research Branch **Chief: Kenzie Preston Ph.D.**	
The goals of our research are to develop and test the efficacy and safety of new treatments for drug abuse and to understand the individual and environmental factors that affect drug taking and relapse. Our primary focus is on evaluating treatments for cocaine and opioid abuse, including both pharmacologic and non-pharmacologic (psychosocial and behavioral) treatments.	
	Treatment Section **Chief: Kenzie Preston Ph.D.**
	Evaluation of treatments of opioid and cocaine dependence; evaluation of treatments of drug dependence in HIV infected patients; psychological and methodological issues in substance abuse treatment/research; quantifying exposure to illicit drugs & psychosocial stress in real time, prevention of relapse in addiction
	Chemistry and Drug Metabolism Section **Section Chief: Marilyn A. Huestis, Ph.D**
	Neurobiology and pharmacokinetics of acute MDMA administration, Pharmacodynamics and pharmacokinetics of drugs of abuse
	Neurobiology of Addiction Section **Chief: George Koob Ph.D.**
	The Neurobiology of Addiction Section conducts research towards understanding the neurobiological bases for altered motivational states associated with drug addiction at the neurocircuitry, cellular and molecular level and using these studies as a heuristic approach to the study of emotions. In addition, the section conducts research on the relationship between pain and emotional systems in the context of the same neurocircuitry. The ultimate goal of the section is to understand how cellular and molecular changes produce changes in particular neurocircuits to convey negative emotional states that contribute to the motivation to seek drugs.
CORE LABS	
	Optogenetics and Transgenic Technology Core **Director: Brandon Harvey, Ph.D.**
	Facilitate research on the molecular and cellular functions of neurons in cognition, behavior and disease; Develop transgenic animals (rats) and gene delivery vehicles (viral vectors) for spatial and temporal manipulation of genetically-encoded reporters and modulators of neuronal activity
	Optical Imaging Core **Director: Da-Ting Lin, Ph.D.**
	Facilitate drug addiction research using optical imaging techniques; Provide basic optical imaging support including user training, consultation of experimental design, data acquisition, and data analysis. Develop custom imaging systems for in vitro and in vivo imaging purpose.