NIH **Blueprint** for Neuroscience Research

5th Annual NIH-BP ENDURE Meeting

Enhancing Neuroscience Diversity through Undergraduate Research Education Experiences (ENDURE)

2015 ENDURE Meeting

October 17, 2015

Chicago, IL

The NIH Office of the Director and these NIH Institutes and Centers participate in the NIH Blueprint for Neuroscience Research:

- NCATS
- NCCAM
- NEI
- NIA
- NIAAA
- NIBIB
- NICHD
- NIDA
- NIDCD
- NIDCR
- NIEHS
- NIGMS
- NIMH
- NINDS
- NINR
- OBSSR

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ENDURE Program Goals

The Blueprint initiative "Enhancing Neuroscience Diversity through Undergraduate Research Education Experiences (ENDURE)" aims to raise interest and opportunities in neuroscience research for individuals who are typically underrepresented in the neurosciences. The goal is to provide such individuals with training at the undergraduate level, so that they are prepared to enter and successfully complete neuroscience Ph.D. programs. ENDURE provides undergraduate training through partnerships between research-intensive institutions and institutions with a substantial enrollment of neuroscience majors from diverse groups. This includes individuals from underrepresented racial and ethnic groups; individuals with disabilities; and individuals from economically disadvantaged backgrounds. ENDURE undergraduate training programs support a range of activities to increase student interest and involvement in the neurosciences, including research experiences, core and advanced neuroscience courses, seminars, and journal clubs. In FY 10, five ENDURE awards were granted. In FY 15, six ENDURE awards were granted.

Meeting Goals

As issued, the RFA (RFA-NS-14-010) cites "it is a goal of this initiative that the NIH Blueprint Institutes will convene an annual meeting that will bring together BP-ENDURE program directors and participating students." The purpose of the meeting will be to discuss best practices and provide a forum for student scientific and academic enhancing activities. An additional goal and outcome for this annual meeting is to provide linkage and opportunity for collaboration with existing diversity (example Neuroscience Scholars Program) and undergraduate (example Faculty for Undergraduate Neuroscience) programs already at Society for Neuroscience. The students will enhance their networks with other ENDURE participants, peer mentoring from diverse graduate students, and T32 program directors.

The Organizing Committee

Dr. Michelle Jones-London (NIH)

Dr. Mark Chavez (NIH)

Ms. TaRaena Yates (*Synergy Enterprises, Inc.)*

Ms. Jolearra M. Tshiteya (*Synergy Enterprises, Inc.)*

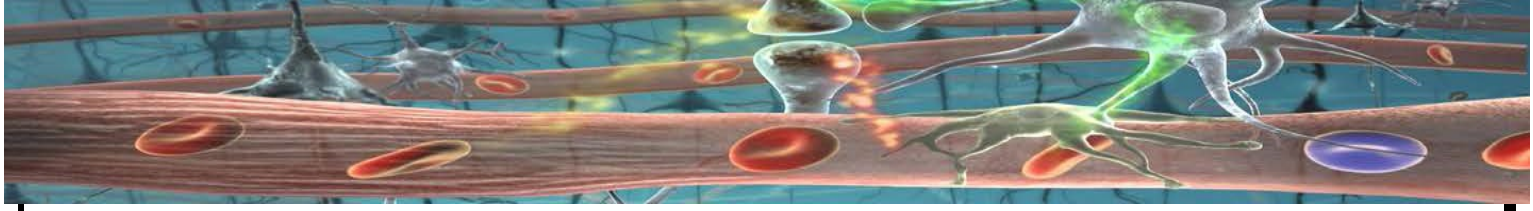
Dr. Edgardo Falcon-Morales (NIH)

For further information about the program and its training sites:
http://neuroscienceblueprint.nih.gov/bp_nih-supported_training/endure_programs.htm

New for ENDURE trainees and Alumni

Visit and Like the ENDURE Facebook Page: An ENDUREing Network

www.facebook.com/BP.ENDURE



ENHANCING NEUROSCIENCE DIVERSITY THROUGH UNDERGRADUATE RESEARCH EDUCATION EXPERIENCES
(ENDURE) 5TH ANNUAL MEETING
HYATT REGENCY CHICAGO DOWNTOWN
CRYSTAL BALLROOM B & C
OCTOBER 17TH, 2015

7:00 – 7:30 AM **REGISTRATION**

7:30 – 7:40 AM **ENDURE MEETING GOALS AND INTRODUCTION**

DR. MICHELLE JONES-LONDON, DIRECTOR OF DIVERSITY TRAINING AND WORKFORCE DEVELOPMENT, NATIONAL INSTITUTTE FOR NEUROLOGICAL DISORDERS AND STROKE (NINDS)

7:40 – 8:10 AM **NIH BLUEPRINT WELCOME AND SCIENTIFIC PRESENTATION**

DR. WALTER J. KOROSHETZ, NATIONAL INSTITUTE OF NEUROLOGICAL DISORDERS AND STROKE (NINDS), INSTITUTE DIRECTOR - *Q&A*

8:10 – 9:30 AM **PANEL ON "PATHWAYS AND PERSPECTIVES ON BEING A RESEARCHER"**

CHAIR AND PANEL INTRODUCTIONS: DR. MARK CHAVEZ, DIVISION OF ADULT TRANSLATIONAL RESEARCH AND TREATMENT DEVELOPMENT, NATIONAL INSTITUTE OF MENTAL HEALTH (NIMH)

A DISCUSSION FRAMED BY SEVERAL SPECIFIC QUESTIONS: WHAT SHOULD A GRADUATE STUDENT EXPECT BOTH OF THE SCHOOL AND THEMSELVES? HOW DO I IDENTIFY A GOOD MENTOR? WHY IS A CAREER IN NEUROSCIENCE RESEARCH FULFILLING? HOW DO I PREPARE FOR AND NAVIGATE SOME OF THE CHALLENGES OF GRADUATE SCHOOL?
EACH ACCOMPLISHED RESEARCHER WILL SHARE THEIR RESEARCH BACKGROUND AND ANSWER GENERAL QUESTIONS FROM THEIR RESPECTIVE LENS INCLUDING EARLY LESSONS FROM GRADUATE SCHOOL, BEING A DIVERSE SCIENTIST, AND THE BIG PICTURE VIEW OF A RESEARCH CAREER

- MS. EDITH BRIGNONI-PÉREZ – PH.D. CANDIDATE, GEORGETOWN UNIVERSITY, INTERDISCIPLINARY PROGRAM IN NEUROSCIENCE
- DR. DANIEL RAMIREZ-GORDILLO – POSTDOCTORAL FELLOW, UNIVERSITY OF COLORADO, DENVER – ANSCHUTZ MEDICAL CAMPUS, CELL AND DEVELOPMENTAL BIOLOGY
- DR. KETEMA PAUL – ASSOCIATE PROFESSOR, MOREHOUSE SCHOOL OF MEDICINE, NEUROBIOLOGY

9:30 – 11:00 AM **CONCURRENT NETWORKING SESSIONS**

(A) **T32 RECRUITMENT FAIR AND NETWORKING** – INSTITUTIONS WITH A STRONG RECORD OF NEUROSCIENCE TRAINING AND INTERESTED IN RECRUITING FOR PREDOCTORAL RESEARCH PROGRAMS

(B) **ENDURE ALUMNI NETWORKING ROOM** - A PRESENTATION OF NIH FUNDING OPPORTUNITIES FOLLOWED BY ROUND TABLE DISCUSSIONS OF VARIOUS RESEARCH AND PROFESSIONAL DEVELOPMENT TOPICS

PRESENTERS: DR. ALBERT AVILA, NATIONAL INSTITUTE ON DRUG ABUSE (NIDA) AND DR. STEPHEN KORN (NINDS); *ROUND TABLE EXPERTS: MS. LYNN MORIN (NIAAA), DR. RICHARD BAIRD (NIBIB), DR. MICHAEL SESMA (NIGMS), AND DR. ERICA ROSEMOND (NIMH)*

BIOGRAPHICAL SKETCHES

Walter Koroshetz, M.D.
Director, National Institute of Neurological Disorders and Stroke
National Institutes of Health

Walter J. Koroshetz, M.D. was selected Director of NINDS on June 11, 2015. Dr. Koroshetz joined NINDS in 2007 as Deputy Director, and he served as Acting Director from October 2014 through June 2015. Previously, he served as Deputy Director of NINDS under Dr. Story Landis. Together, they directed program planning and budgeting, and oversaw the scientific and administrative functions of the Institute. He has held leadership roles in a number of NIH and NINDS programs including the NIH's BRAIN Initiative, the Traumatic Brain Injury Center collaborative effort between the NIH intramural program and the Uniformed Health Services University, and the multi-year work to develop and establish the NIH Office of Emergency Care Research to coordinate NIH emergency care research and research training.

Before joining NINDS, Dr. Koroshetz served as Vice Chair of the neurology service and Director of stroke and neurointensive care services at Massachusetts General Hospital (MGH). He was a professor of Neurology at Harvard Medical School (HMS) and led neurology resident training at MGH between 1990 and 2007. Over that same period, he co-directed the HMS Neurobiology of Disease Course with Drs. Edward Kravitz and Robert H Brown.

A native of Brooklyn, New York, Dr. Koroshetz graduated from Georgetown University and received his medical degree from the University of Chicago. He trained in internal medicine at the University of Chicago and Massachusetts General Hospital. Dr. Koroshetz trained in neurology at MGH, after which he did post-doctoral studies in cellular neurophysiology at MGH with Dr. David Corey, and later at the Harvard neurobiology department with Dr. Edward Furshpan, studying mechanisms of excitoxicity and neuroprotection. He joined the neurology staff, first in the Huntington's Disease (HD) unit, followed by the stroke and neurointensive care service. A major focus of his clinical research career was to develop measures in patients that reflect the underlying biology of their conditions. With the MGH team he discovered increased brain lactate in HD patients using MR spectroscopy. He helped the team to pioneer the use of diffusion/perfusion-weighted MR imaging and CT angiography/perfusion imaging in acute stroke.

Active in the American Academy of Neurology (AAN), Dr. Koroshetz chaired the professional organization's Public Information Committee, led the AAN's efforts to establish acute stroke therapy in the US, founded the Stroke Systems Working Group, and was a member of the AAN Board of Directors.

PANEL SPEAKERS

Each accomplished researcher will share their research background and answer general questions from their respective lens including early lessons from graduate school, being a diverse scientist, and the big picture view of a research career.

Ketema N. Paul, Ph.D.
Associate Professor
Department of Neurobiology
Morehouse School of Medicine

Dr. Ketema Paul, Associate Professor of Neurobiology at the Morehouse School of Medicine (MSM), studies the genetic, molecular, and neural underpinnings of sleep. His primary interests are comprised of uncovering the mechanisms responsible for the negative effects of sleep deprivation and developing biomarkers for sleep loss. He also probes the origins of gender differences in the ability to recover from sleep loss. After receiving a bachelor's degree in biology from Howard University he went on to study neurobiology and circadian biology at Georgia State University in Atlanta where he received his doctorate in 2003. Dr. Paul completed a postdoctoral fellowship at Northwestern University in Evanston, Illinois in 2006 at the Center for Sleep and Circadian Biology, after which he accepted a faculty position at the MSM. Dr. Paul has published extensively in well-regarded journals and has received a number of awards and accolades for his research program. His current research involves applying a forward genetics approach to uncover the core genes responsible for sleep-wake regulation and the impairing effects of sleep loss. Effective treatments for common sleep-wake disorders have been elusive. Dr. Paul conducts a forward genetics approach to facilitate gene identification that takes advantage of natural variation occurring in sleep-replete and sleep-deprived mice. This approach applies the most cutting edge genome mapping, positional cloning, and DNA sequencing techniques to identifying the genetic origins of unique sleep phenotypes in transgenic mouse models. These studies are expected to identify novel sleep regulatory genes and lead to the development of new therapeutic targets and improved treatments for sleep disorders.

Daniel Ramirez-Gordillo, Ph.D.
Postdoctoral Research Fellow
Department of Neuroscience
University of Colorado – Anschutz Medical Campus

Dr. Daniel Ramirez-Gordillo is a Post-Doctoral Fellow in the Neuroscience department at the University of Colorado Anschutz Medical Campus. His current project involves understanding the role of noradrenaline in learning and memory. He attended both undergraduate and graduate school at New Mexico State University (NMSU). As an undergraduate student, Dr. Ramirez-Gordillo graduated with honors with a Bachelor's of Science in biology, Bachelors of Arts in Spanish, and a supplementary in Latin American Studies. As a graduate student he worked on a project that focused on characterizing the calcium and voltage activated potassium channel known as maxi K "Heterologous expression of *Xenopus* BK channel alpha and beta subunits in Chinese hamster ovary (CHO) and *Xenopus laevis* kidney A6 cells." As a graduate PhD student, he worked on a project that combined bioinformatics with high throughput technologies to identify human deafness and vestibular disorder orthologous genes in *Xenopus* and genes linking hearing loss and Alzheimer's disease "High throughput analysis of Xenopus genes for inner ear and neuronal disorders." He has presented his research in conferences in the US, Latin America, and Europe.

Dr. Ramirez-Gordillo believes in giving back to his community, he has been active participating in student panels that talk to students about the importance of getting an education and the organization of events to expose undergraduate students to science. His research interests include diseases that affect the inner ear and olfaction, neurodegenerative diseases, and cancer.

Edith Brignoni-Pérez
Graduate Student
Georgetown University

Edith is a graduate student in the Interdisciplinary Program in Neuroscience at Georgetown University (GU) since 2014. She pursues her thesis research studying functionally connected brain networks for reading in children bilinguals at the Center for the Study of Learning under the mentorship of Dr. Guinevere F. Eden.

Edith was born and raised in Puerto Rico, where she attended the University of Puerto Rico (UPR), Río Piedras Campus and graduated in 2013 with a B.A. in Psychology. From 2011 to 2013, as an NIH BP-ENDURE fellow, she worked in the Fear Learning Lab at the UPR, Medical Sciences Campus under the mentorship of Dr. Gregory J. Quirk. Edith's research dealt with exploring the neural circuits of active-avoidance expression in rats using pharmacological inactivation during a novel platform-mediated avoidance task. In summer 2012, she studied the influence of acute stress on extinction recall in humans at New York University in the Neuroscience of Affect, Learning, and Decisions Lab directed by Dr. Elizabeth A. Phelps. After graduation, Edith completed her one-year NIH PREP fellowship in the Brodkin Lab at the University of Pennsylvania. She explored a glutamatergic role in the development of social behaviors in transgenic mouse models relevant to negative symptoms of Schizophrenia.

In addition to her passion for research, since high school Edith has been involved in several outreach efforts, such as educational collaborations with non-profit organizations, students' professional development, recruitment, school- and college-students mentoring, elementary school-students science teaching, and science-into-the-community initiatives. For example, she organized and led the 1st Annual GU Free Neuroscience Public Lecture in collaboration with the NeuroPolicy Affinity Group of the American Association for the Advancement of Science as part of the 2015 Brain Awareness Week outreach events. While at GU, she has served as the communications officer of the GU Medical Center Graduate Student Organization, the secretary of the Society for Neuroscience Washington, D.C. Metro Area Chapter, and program representative for students' recruitment in graduate school fairs.

T32 Recruitment Fair Participants

University/School	Representative
BROWN UNIVERSITY	**Anne C. Hart, PhD** Professor of Biology **Diane Lipscombe, PhD** Professor of Neuroscience
COLUMBIA UNIVERSITY	**Darcy B. Kelley, PhD** Professor, Biological Sciences **Anita Burgos** Graduate Student
GEORGETOWN UNIVERSITY	**Patrick Forcelli, PhD** Instructor in Pharmacology **Ludise Malkova, PhD** Associate Professor **Edith Brignoni-Pérez** Graduate Student
HARVARD MEDICAL SCHOOL	**Rosalind Segal, MD, PhD** Professor of Neurobiology **Corey Harwell, PhD** Assistant Professor
JOHNS HOPKINS UNIVERSITY SCHOOL OF MEDICINE	**Gul Dolen, MD, PhD** Assistant Professor of Neuroscience Director of Minority Affairs **Anna Chang** Graduate Student
MICHIGAN STATE UNIVERSITY	**Cheryl Sisk, PhD** University Distinguished Professor
NEW YORK UNIVERSITY	**Lynne Kiorpes, PhD** Professor of Neural Science and Psychology **Bernardo Rudy, MD, PhD** Professor of Anesthesiology and Neuroscience and Physiology **Heather McKellar, PhD** Program Manager, Neuroscience Institute
OHIO STATE UNIVERSITY COLLEGE OF MEDICINE	**Denis Guttridge, PhD** Professor Director, Center for Muscle Health and Neuromuscular Disorders
OREGON HEALTH & SCIENCE UNIVERSITY	**Gary Westbrook, MD** Senior Scientist and Co-Director, Vollum Institute Director, Neuroscience Graduate Program
PRINCETON UNIVERSITY	**Ken Norman, PhD** Professor of Psychology
STANFORD UNIVERSITY	**John Huguenard, PhD** Professor of Neurology and Neurological Sciences
TEMPLE UNIVERSITY	**Lynn Kirby, PhD** Associate Professor Center for Substance Abuse Research
UNIVERSITY OF ALABAMA at BIRMINGHAM	**Farah D. Lubin, PhD** Associate Professor, Dept. of Neurobiology **Lori L. McMahon, PhD** Jarman F. Lowder Professor of Neuroscience
UNIVERSITY OF CALIFORNIA, DAVIS	**Cameron S. Carter, MD** Professor of Psychiatry and Psychology

University/School	Representative
UNIVERSITY OF CALIFORNIA, SAN DIEGO	**Timothy Gentner, PhD** Professor, Department of Psychology **Stefan Leutgeb, PhD** Associate Professor, Division of Biological Sciences, Neurobiology Section **Bradley Voytek, PhD** Assistant Professor, Department of Cognitive Science
UNIVERSITY OF COLORADO DENVER	**Diego Restrepo, PhD** Professor, Cell and Developmental Biology Director, Center for NeuroScience (CNS) **Sukumar Vijayaraghavan, PhD** Professor Director of Neuroscience Graduate Program
UNIVERSITY OF IOWA	**Michael Dailey, PhD** Associate Professor, Biology Associate Director, Interdisciplinary Neuroscience Graduate Program **Andy Frank, PhD** Assistant Professor, Molecular and Cell Biology Admissions Chair, Interdisciplinary Neuroscience Graduate Program
UNIVERSITY OF MARYLAND	**Jessica A. Mong, PhD** Associate Professor Department of Pharmacology Director of Graduate Education, Program in Neuroscience
UNIVERSITY OF MICHIGAN	**Audrey Seasholtz, PhD** Professor, Biological Chemistry **Edward Stuenkel, PhD** Professor, Molecular & Integrative Physiology Director, Neuroscience Graduate Program
UNIVERSITY OF PENNSYLVANIA	**Kelly L. Jordan-Sciutto, PhD** Professor of Pathology
UNIVERSITY OF TEXAS HEALTH SCIENCE CENTER SAN ANTONIO	**David Morilak, PhD** Professor and Director, Neuroscience Graduate Program
UNIVERSITY OF UTAH	**Kristen A. Keefe, PhD** Professor, Pharmacology and Toxicology **Megan Williams, PhD** Assistant Professor of Neurobiology & Anatomy
VANDERBILT UNIVERSITY	**Mark T. Wallace, PhD** Professor and Director, Neuroscience Graduate Program **Douglas McMahon, PhD** Stevenson Chair and Professor of Biological Sciences; Professor of Pharmacology
YALE UNIVERSITY	**Michael Crair, PhD** Professor and Director, Graduate Studies **Charles A. Greer, PhD** Professor and Director, Interdepartmental Neuroscience Graduate Program
WAKE FOREST UNIVERSITY	**Carol Milligan, PhD** Professor, Neurobiology and Anatomy
WASHINGTON UNIVERSITY IN ST. LOUIS	**Erik Herzog, PhD** Professor, Department of Biology

MENTORING RESOURCES AND PROFESSIONAL CONFERENCES

"MENTOR: SOMEONE WHOSE HINDSIGHT CAN BECOME YOUR FORESIGHT"

Society for Neuroscience Mentoring Program
http://www.sfn.org/careers-and-training/neurojobs-career-center/mentoring-program

How to Get the Mentoring You Want: A Guide for Graduate Students at a Diverse University
http://www.rackham.umich.edu/downloads/publications/mentoring.pdf

Making the Right Moves and Training Scientists to Make the Right Moves
http://www.hhmi.org/programs/resources-early-career-scientist-development

Individual Development Plan (IDP), a Web-based career-planning tool created to help graduate students and postdocs in the sciences define and pursue their career goals
http://myidp.sciencecareers.org/

JustGarciaHill: A Virtual Community for Minorities in Sciences
http://justgarciahill.org/

The Leadership Alliance
http://www.theleadershipalliance.org/

NIDA Mentoring Guide
http://www.drugabuse.gov/sites/default/files/mentoringguide.pdf

PROFESSIONAL CONFERENCES

Venues for professional development activities, scientific presentations and networking opportunities with diverse peers, faculty and academic biomedical research Institutions

Association of American Indian Physicians (AAIP)

Annual Biomedical Research Conference for Minority Students (ABRCMS)

Association of Minority Health Professions Schools, Inc. (AMHPS)

Hispanic Association of Colleges and Universities (HACU)

Society for the Advancement of Chicanos and Native Americans in Science (SACNAS)

Neuroscience Scholars Program (NSP) at Society for Neuroscience

BP-ENDURE AT HUNTER COLLEGE

HUNTER COLLEGE
Principal Investigator: *Dr. Regina Miranda*
Principal Investigator: *Dr. Vanya Quinones-Jenab*

Partner Institution: New York University

PROGRAM DESCRIPTION: Hunter College of the City University of New York (CUNY) recognizes that increasing the number of highly qualified neuroscientists from these underrepresented populations is integral to our future as an academic and research institution. Hunter College aims to increase the number of well-trained, diverse neuroscientists. The overall goal of this application is to develop a neuroscience training program at Hunter that will encourage and prepare students from diverse backgrounds to enter into and succeed in PhD programs in the neurosciences.

Hunter has developed a research-educational partnership with four outstanding T32-awarded universities-New York University, Brown University, University of Michigan, and Vanderbilt University. This partnership will expose 12 BP-ENDURE-trainee students per year to a research-intensive curriculum and an environment of excellence and active research. Moreover, because of the diversity of the proposed mentors, students will be exposed to a broad spectrum of researchers, including basic neuroscientists interested in central nervous system (CNS) issues and applied neuroscientists from the areas of clinical, social, health, developmental, and cognitive neuropsychology.

To achieve our goals, the following aims are proposed: (1) To develop an outstanding group of undergraduate students with diverse backgrounds dedicated to neuroscience research; (2) To provide scientific skill and research experiences to our trainees through research placement with actively funded neuroscientists; (3) To develop academic development and curriculum enhancement activities rooted in the student's research activities; (4) To maintain an effective Administrative Core to support our students' needs and development.

Our measurable objectives during the requested funding period include: (1) 85 to 90% acceptance of trainees to graduate school programs in neuroscience; (2) improvement of our students in quantitative skills and academic achievements, as well as their (3) scientific writing and oral presentations. Outcome from evaluations of the Steering Committee, the external evaluator, and the Administrative Core will guide future modifications to our training initiatives.

ADDITIONAL PROGRAM TEAM MEMBERS:

Dr. Chiye Aoki – Program Director, New York University
Dr. Marianne Weierich – Program Co-Director, Hunter College
Ms. Kizzy Vazquez - Program Administrator, Hunter College
Dr. Heather McKellar – Program Manager, New York University

ENDURE TRAINEE ABSTRACT

RUKA ADEROGBA

Home Institution and State: **Hunter College, New York**
Email: **ruka.aderogba@gmail.com**
Undergraduate Academic Level: **Senior**
Undergraduate Major and Expected Graduation Date: **Biochemistry, 2016**
Mentors/Advisors at Home Institution: **Chiye Aoki, Regina Miranda and Vanya Quinones-Jenab**

ENDURE Trainee Scientific Interest:

To pursue a career in Neuroscience with a concentration in adolescence, gut microbiome and the development of the nervous system.

ENDURE Trainee Career Goals and Plan:

I want to matriculate from an MD/PhD program and run my own lab.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **Brown University**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Anne Hart Ph.D.**

ENDURE Research Project Title: **Social Isolation during Adolescence Alters Dendritic Branching and Spine Density of Pyramidal Neurons in the Hippocampal CA1 of Adolescent Female Rats**

Social isolation during the vulnerable period of adolescence produces behavioral, physical, and biochemical alterations but changes in the hippocampal CA1 has not been compared across the functional sub-regions or layers. Also, most studies examine males, only. We tested the effects of social isolation during adolescence (postnatal days 36-44) on 8 Sprague-Dawley female rats vs. 8 age-matched pair-housed female rats. We conducted 3-D Sholl analysis of pyramidal neurons after the Golgi procedure, to quantify dendritic branching, followed by spine density analysis, using the Neurolucida system. Social isolation evoked no change in stratum lacunosum-moleculare (SLM) but altered stratum radiatum (SR). Pyramidal neurons in SR of control rats exhibited greater dendritic branching in rostral-dorsal sub-region than of the caudal-ventral sub-region. This sub-regional difference was absent within the SR of singly housed rats, due to decreased branching in the rostral-dorsal subdivision and increased branching of the caudal-ventral region. Moreover, spine density was decreased in SR by social isolation in both sub-regions. Since the rostral-dorsal hippocampus preferentially mediates spatial learning and contextual memory while caudal-ventral hippocampus preferentially regulates anxiety, the morphological changes evoked by social isolation may contribute to reduced spatial and contextual memory performance but improved anxiety regulation.

ENDURE TRAINEE ABSTRACT

STEPHEN BRAREN

Home Institution and State: **Hunter College, New York**
Email: **stephen.braren@gmail.com**
Undergraduate Academic Level: **Senior**
Undergraduate Major and Expected Graduation Date: **Psychology and Public Policy, 2016**
Mentors/Advisors at Home Institution: **Elizabeth Phelps**

ENDURE Trainee Scientific Interest:

I am interested in studying the social cognitive neuroscience of learning in humans. That is, I hope to better understand how learning in the broadest sense as a dynamic, reciprocal, and life-long process of cognitive development, is affected by social factors, such as context, culture, and interpersonal relations. To investigate this relationship, I intend to use various neuroscientific methods, such as EEG and fMRI to evaluate theories and constructs in social and developmental psychology. Furthermore, I hope to translate research findings to the real world by influencing education and mental health policy, such that by better understanding the complexity and intricacy of cognitive development, we may enhance the benefits of learning for everyone, even beyond the classroom.

ENDURE Trainee Career Goals and Plan:

Upon obtaining a BA in Psychology and Certificate in Public Policy from Hunter College in 2016, I will pursue a PhD in Social and Cognitive Neuroscience, and embark upon a career as a research scientist, college professor, and education policy reformer.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **New York University**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Elizabeth Phelps**

ENDURE Research Project Title: **The effect of unconditioned stimulus intensity on fear learning and generalization in humans**

Pavlovian fear conditioning studies in animals have been crucial to our understanding of anxiety-related pathologies, such as PTSD. Such studies postulate that increases in the intensity of conditioning stimuli produce increases in conditioned fear responses and lead to fear generalization. However, the translation of these animal models to human studies remains largely unexplored. Thus, the purpose of the present study was to investigate the effect of unconditioned stimulus (US) intensity on fear learning and generalization in humans. US intensity was varied

between a high, medium, and low group. Participants were first conditioned to a 1000 Hz tone (CS+) paired with the US. Subsequently, six additional tones were presented to measure generalization. Skin conductance response (SCR) was the main dependent variable in addition to subjective ratings. Results show that varying US intensity did not affect conditioning of a fear response, but did affect fear generalization and subjective ratings of fear and intensity. Furthermore, there was no correlation between physiological measures and subjective measures. These findings indicate that the subjective intensity of fear differs from the actual, physical intensity, which may have implications for models of PTSD.

ENDURE TRAINEE ABSTRACT

ANDREA CUMPELIK

Home Institution and State: **New York University, New York**
Email: **acumpelik@nyu.edu**
Undergraduate Academic Level: **Junior**
Undergraduate Major and Expected Graduation Date: **Neuroscience, 2017**
Mentors/Advisors at Home Institution: **Lucas Sjulson, MD, PhD; Chiye Aoki, PhD; Vanya Quinones, PhD; Regina Miranda, PhD; Margarita Kaplow, PhD**

ENDURE Trainee Scientific Interest:

I am interested in studying larger neural systems underlying complex behaviors such as reward seeking and drug addiction. At my home institution I am working in the Buzsaki lab, which focuses on neural mechanisms important for memory. I am assisting with a project which focuses on mapping the mechanism underlying conditioned place preference in a mouse model, specifically the interaction between the nucleus accumbens and the hippocampus. For my summer research I chose a lab that studies the role of incentive motivation in reward seeking and drug addiction. There my project focused on the role of the central nucleus of the amygdala in biasing choice towards one reward over another.

ENDURE Trainee Career Goals and Plan:

My current experience has enabled me to learn various techniques that will come in useful for the future; for example in vivo recording methods, modulation techniques such as optogenetics, and basic data analysis. During undergrad I hope to expand my knowledge of programming in order to gain independence in designing and running experiments, and become proficient in animal surgeries such as probe implantation or viral infusion. In my senior year I hope to develop a thesis project of my own, perhaps taking more time after graduation to complete it. After my B.S., I plan to continue on to graduate school to pursue a career in neuroscience research. I intend to continue studying brain-wide interactions which produce addictive behaviors.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **University of Michigan**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Kent Berridge, PhD Shelley Warlow, BS**

ENDURE Research Project Title: **The role of the amygdala in focusing incentive motivation**

An important part of survival is being able to seek out rewarding stimuli and avoid aversive stimuli,

and abnormality in the processing of rewards is characteristic of several mental illnesses. In addiction, drugs become single-mindedly pursued, while other rewards are ignored. The amygdala has traditionally been known for mediating aversive behavior, for example in fear conditioning, but is also heavily involved in incentive motivation. This project is based off of previous results which demonstrated that optogenetic stimulation of the central nucleus of the amygdala (CeA) induces intense preference for one of two identical sucrose pellets which is paired consistently with laser, in order to test whether the same mechanism that biases choice for natural rewards also acts on drugs of abuse. We are using a similar paradigm where instead of sucrose the animal chooses between two cocaine rewards, one of which is paired with CeA stimulation. Preliminary results demonstrate that pairing CeA stimulation with a cocaine reward leads to increased attraction of the laser-paired cocaine at the expense of the non-laser cocaine. This suggests that CeA activation is sufficient to produce narrowing of preference toward a cocaine reward, which is evidence for the role of the CeA in addiction.

ENDURE TRAINEE ABSTRACT

KELVIN DE LEON

Home Institution and State: **Hunter College, New York**
Email: **kelvin.deleon71@hunter.cuny.edu**
Undergraduate Academic Level: **Junior**
Undergraduate Major and Expected Graduation Date: **Psychology, 2016**
Mentors/Advisors at Home Institution: **Maria E. Figueiredo-Pereira**

ENDURE Trainee Scientific Interest:

I have many fields of interest in neuroscience, and neuroinflammation is one of the many. I want to be able to understand and develop techniques that intervene in the learning disabilities that affect HIV-infected children. For example, I am interested in understanding the effect of the immunodeficiency virus on the inflammation of Wernicke's and Broca's areas in a way that will improve interventions for HIV-infected children.

ENDURE Trainee Career Goals and Plan:

Once I have completed my PhD and proper trainings, my career goals are to attain a position in academia as a researcher, I will then be able to gain understanding of the behavioral characteristics of the Human Immunodeficiency Virus (HIV).

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **Brown University**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Tara L. White**

ENDURE Research Project Title: **Biphasic Alcohol Effects on Emotion and Amygdala fMRI Response**

Heavy drinking individuals, per NIAAA criteria, tend to experience greater stimulant and rewarding responses and lower sedative responses than light drinkers as demonstrated in previous studies. In this research we investigated how ascending and descending breath alcohol concentrations (BrAC) correspond to brain responses, mood and subjective responses in healthy adults. Thirty two (32) healthy male and female volunteers (ages 21-55) participated in a three-session study involving a within-subjects design, counterbalanced for order of alcohol administration, with a 40 minute functional MRI session at the peak period of alcohol effects. We assessed subjective alcohol effects using the Biphasic Alcohol Effects Scale (BAES), a Likert-type scale with Stimulation (STIM) and Sedation (SED) effects subscales. On each occasion, the alcohol dose calculated for peak BrAC of .06 was administered as 95% alcohol (vodka) in juice and ingested over 5 minutes. Ascending and descending limbs of BrAC and fMRI were assessed on separate days, with the placebo session

serving as a within-subjects control. The pattern of BrAC differed by time on each study day, $F = 105.8$, $p < .001$. BrAC was flat on the placebo day, rose by time point 2 on the day of the 'descending' scan, and rose by time point 7 on the day of the 'ascending' scan. Self-reported stimulation ratings decreased, $F = 16.2$, $p < .001$, while sedastion ratings increased, $F = 5.1$, $p = .001$, over the test sessions. In this functional MRI study of alcohol effects, we found a significant biphasic effect of alcohol on physiological measures of breath alcohol content (BrAC) outside the scanner. Blood-oxygen-level-dependent (BOLD) activity in the left amygdala showed a significant interaction of alcohol phase and the drinking status reported at intake. These findings suggest that heavy drinkers may be more responsive or sensitive to reinforcing effects of alcohol.

ENDURE TRAINEE ABSTRACT

ILANA DEYNEKO

Home Institution and State: **Hunter College, New York**
Email: **ilanadeyneko63@gmail.com**
Undergraduate Academic Level: **Junior**
Undergraduate Major and Expected Graduation Date: **Biology, 2017**
Mentors/Advisors at Home Institution: **Dr. Carmen Melendez-Vasquez**

ENDURE Trainee Scientific Interest:

I am interested in the roles of neurotransmitters and modulators in the central nervous system as well as potential regeneration of neurons in the peripheral and central nervous systems. In my current research I am studying the mechanisms underlying myelination in order to see if there are ways to restart the process in areas that have been damaged.

ENDURE Trainee Career Goals and Plan:

After my graduation in 2017, I will apply for an MD/PhD or a PhD program in Neuroscience. In the meantime I will continue working in Dr. Melendez-Vasquez's lab as well as participating in next summer's BP-Endure internship.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **Vanderbilt University**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Anita Disney**

ENDURE Research Project Title: **Stereological Counts of Parvalbumin- and Calretinin-Immunoreactive Neurons in Visual Areas MT and V4 of the Macaque Monkey**

Cortical circuits are comprised of structurally and functionally diverse interneurons. The classification of these interneuron populations can be achieved by examining immunocytochemical expression. Previously, two classes of calcium binding proteins, parvalbumin (PV) and calretinin (CR), have been found to comprise non-overlapping interneuron populations in the cortex of various mammals. In the primary visual cortex of the macaque monkey, PV makes up the largest portion of calcium binding proteins, however, in frontal areas, CR makes up the largest population. This significant change in proportion suggests that the number of each cell type is important to quantify for different cortical areas. In this study, we stereologically counted cells expressing PV or CR in two visual areas, V4 and MT, of two macaque monkeys. These two areas were chosen because they provide a sample of cell numbers for mid-level areas in the dorsal (MT) and ventral

(V4) visual pathways. Overall, quantifying these populations across different cortical areas may provide insight to their underlying function. The results demonstrated that PV and MT populations varied between the two areas we studied and the two from past research. Specifically, MT had a similar number of PV and CR, and V4 had slightly more CR than PV.

ENDURE TRAINEE ABSTRACT

AJA EVANS

Home Institution and State: **New York University, New York**
Email: **aqe200@nyu.edu**
Undergraduate Academic Level: **Senior**
Undergraduate Major and Expected Graduation Date: **Neuroscience, 2016**
Mentors/Advisors at Home Institution: **Chiye Aoki**

ENDURE Trainee Scientific Interest:

My fascination in the neuroscience field started with an interest in investigating how experiences and environments can influence development and behavior, and ultimately change neurons and their connections at the molecular level. The research experience I have had has only strengthened this interest. I have worked in the Aoki lab at New York University investigating the development during the adolescent stages of life by analyzing hippocampal dendrites in female rats. I also completed a summer program in the Badre lab at Brown University working on a project examining the transfer of cognitive control policies from past experiences to new situations. Both projects have evoked me to focus my interests in investigating how our experiences can shape how we think and orient our actions in our constantly changing world.

ENDURE Trainee Career Goals and Plan:

My goal is to enter into a PhD program to receive the training and experience necessary to become an independent scientist. I pride myself on my out of the box approach to all projects I am presented with and hope to continue to utilize my creativity to ask new questions and create new approaches to investigate the brain. Additionally I hope to work to make research findings more accessible to non-academics as well as promote brain health and its importance in our every action.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **Brown University**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **David Badre, Apoorva Bhandari, Theresa Desrochers**

ENDURE Research Project Title: **Learning and Transfer of Sequential Task Control Policies**

Humans can adapt rapidly to novel tasks, with relatively little practice, partly by transferring knowledge from previous experiences to inform our behavior in a novel context. One aspect of this knowledge are 'rules' that can serve as abstract guides to decision making. Previous studies have examined the acquisition and transfer of such rules. Successful task performance, however,

requires cognitive control. Few studies have investigated how cognitive control policies are learned and transferred to novel contexts. Using a rule-based, sequential task, we examined the learning of task control policies and their transfer to novel task contexts. Adults, ages 18-35, viewed sequences of three items on a computer and had to identify one of the three items as the target, based on the rules that remained the same throughout the experiment. The only change made was the order in which the items were presented, which were manipulated so that the target could only be identified using specific control policies. We report evidence that task control policies are learned and transferred to novel task context structures independently of the rules of the task. The study reveals an important new aspect of the cognitive processes involved in behavioral adaptation to novel tasks.

ENDURE TRAINEE ABSTRACT

DESIREE GORDIAN

Home Institution and State: **Hunter College, New York**
Email: **desiree.gordian96@myhunter.cuny.edu**
Undergraduate Academic Level: **Senior**
Undergraduate Major and Expected Graduation Date: **Psychology, 2017**
Mentors/Advisors at Home Institution: **Dr. Nesha Burghardt**

ENDURE Trainee Scientific Interest:

I am interested in the study of behavioral neuroscience. I hope to contribute to our understanding of neurodegenerative diseases. Other topics of interest are neuropharmacology and development which I believe will help me better understand neurodegenerative diseases. I want to explore possible preventive measures.

ENDURE Trainee Career Goals and Plan:

I plan to pursue a PhD in behavioral neuroscience because I want to become an experienced and knowledgeable scientist. I want to be able to contribute ideas and discoveries.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **University of Michigan**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Kent C. Berridge**

ENDURE Research Project Title: **Optogenetic Modulation of the Insular Cortex Hedonic Hotspot**

Hedonic hotspots, responsible for enhancing the hedonic impact of taste stimuli, have been identified in rostral nucleus accumbens, caudal ventral pallidum, and the parabrachial nucleus. Castro et al. (2014) suggested the existence of two hotspots in the cortex, where mu opioid or orexin stimulation enhanced orofacial 'liking' reactions to sweet taste: the rostromedial orbitofrontal cortex (OFC) and caudal insula (IC). Using optogenetics, we explore whether hedonic amplification of the IC hotspot occurs via direct stimulation or inhibition of neurons in this region. Sixteen Sprague Dawleys rats were bilaterally microinjected with either channelrhodopsin-2, halorhodopsin or enhanced yellow fluorescent protein. Taste reactivity orofacial responses to sucrose were assessed to determine whether direct stimulation or inhibition of neurons in the caudal hotspot has a direct influence on hedonic impact. Furthermore, we sought to determine whether stimulation or inhibition of these neurons influenced other appetitive behaviors, such as

food consumption, laser self-stimulation, and induction of a paired place or flavor preference. The data suggest that neural stimulation in the IC hotspot at 20 Hz may decrease the number of hedonic reactions to sucrose taste. We found no effects of IC optogenetic manipulations on taste reactivity, food intake, self-stimulation, nor conditioned place or flavor preference.

ENDURE TRAINEE ABSTRACT

HALA HADDAD

Home Institution and State: **Hunter College, New York**
Email: **halahaddad4@gmail.com**
Undergraduate Academic Level: **Senior**
Undergraduate Major and Expected Graduation Date: **Psychology, 2016**
Mentors/Advisors at Home Institution:

ENDURE Trainee Scientific Interest:

My research interests range from behavioral neuroscience to molecular physiology. I am mainly interested in how the brain impacts different neurological disorders ranging from the molecular to the behavioral level.

ENDURE Trainee Career Goals and Plan:

I am planning on earning a Ph.D. in Behavioral Neuroscience and my long-term goal is to work in academia in order to help college students understand challenging concepts in the scientific field, as well as to continue working in research.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **Vanderbilt University**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Roger Colbran, Brian Shonesy**

ENDURE Research Project Title: **Roles of endocannabinoids in specific striatal neuron subtypes in Parkinson's disease and autism spectrum disorders**

Disruptions in synaptic transmission involving the endocannabinoid system in the striatum are believed to contribute to a variety of neurological and psychiatric disorders, like Parkinson's disease and autism spectrum disorders. The endocannabinoid system physiologically modulates synaptic transmission through retrograde signaling within cortico-striatal pathways. The most abundant striatal endocannabinoid 2-arachidonoylglycerol (2-AG) mediates the depression of both excitatory and inhibitory neurotransmission and is synthesized "on-demand" by diacylglycerol lipase α (DGLα), which is activated by metabotropic glutamate receptors (mGluRs) and/or calcium influx. Specifically, in the striatum, endocannabinoids are important for mediating long-term depression at medium spiny neuron (MSN) synapses. MSNs can be sub-divided into two striatal output targets, the direct and indirect pathways. The specific role of 2-AG signaling in each of these

pathways is not well understood. Therefore, we utilized a mouse line where DGLα was conditionally deleted from direct or indirect pathway neurons under the direction of the Dopamine-1 (D1) or adenosine (A2a) receptor promoters respectively. We tested a range of striatal-based behaviors including motor performance, as well as habitual and repetitive behaviors under normal conditions. With this approach, we hope to better understand the effects of endocannabinoids on the striatum in Parkinson's disease and autism spectrum disorders.

ENDURE TRAINEE ABSTRACT

ALEJANDRA PATINO

Home Institution and State: **New York University, New York**
Email: **avp282@nyu.edu**
Undergraduate Academic Level: **Junior**
Undergraduate Major and Expected Graduation Date: **Neuroscience, 2017**

ENDURE Trainee Scientific Interest:

The area that interests me is memory and neurodegenerative disease, specifically Alzheimer's. The fact that we do not fully understand such rampant diseases that slowly kill our brain structure/function is thoroughly troubling. Memory makes up such an integral part of life, and who we are as individuals; the process of losing memories, and inherently ourselves, through this disease is intriguing.

ENDURE Trainee Career Goals and Plan:

After finishing my undergraduate years and getting my B.S in Neural Science, I hope to pursue either an MD/PhD or a PhD. I would love to further explore not only memory and how it formed and maintained in the brain, but also the process of neurodegeneration so that I can assist in the pursuit of finding ways to cure or ameliorate the effects of this disease.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **Vanderbilt University**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Frank Tong**

ENDURE Research Project Title: **Visual Working Memory Capacity for Orientation Depends on Stimulus Form**

The goal of this study was to compare visual working memory (VWM) performance for bars and gratings, as we hypothesized that processing multiple bars might benefit from perceptual grouping that can take place across items. Using finely tuned behavioral methods: a continuous report task and the mixture model of VWM, which accounts for the distribution of errors of the response values, we investigated the precision and capacity of VWM. On each trial, displays of bars or gratings were presented, followed by a delay, and finally a probe at one of the item's locations. The task was to accurately remember as many items possible, in order to successfully match the orientation of the item being probed to that of the original stimulus. We found that capacity for bars was significantly larger than that of gratings across all conditions, and that there was variance in precision depending on the parameters being tested (stimulus type, encoding time, set size). We ruled out any advantage that bars might have in terms of the number of items to be remembered, the encoding time, or retinal after image formation suggesting that VWM capacity for orientation is dependent on the format in which it is presented.

ENDURE TRAINEE ABSTRACT

RICHARD PEREZ

Home Institution and State: **New York University, New York**
Email: **rkp260@nyu.edu**
Undergraduate Academic Level: **Senior**
Undergraduate Major and Expected Graduation Date: **Neuroscience, 2016**
Mentors/Advisors at Home Institution: **Dr. Romesh Kumbhani , Dr. J.A. Movshon**

ENDURE Trainee Scientific Interest:

I am mainly interested, at this point in my research career, in visual neural science specifically in the fields of motion and perception.

ENDURE Trainee Career Goals and Plan:

After university, I hope to pursue an MD-PhD and eventually focus my research efforts in translational medicine, specifically with neurological diseases.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **New York University**

ENDURE Research Project Title: **Contrast and context effects on motion coherence**

Multistable perception arises from stimuli that contain insufficient information to specify one percept over the others. Multistable stimuli can be excellent tools to access the mental state of an observer since different percepts reflect internally generated brain activity. One such multistable percept in the motion domain is the triplaid, a stimulus composed of 3 overlaid gratings drifting 120˚ apart in direction, which results in three motion percepts. By manipulating the contrast of one of the component gratings, it is possible to bias the probability of seeing each of the percepts. Intriguingly, when multiple triplaids are presented across visual space, they have a coherent motion percept, indicating motion perception occurs on a global scale. However, can the motion percept of a triplaid be biased by its surrounding context? To answer this, three experiments were conducted: 1. To determine the contrast sensitivity of the observer, 2. To determine the change in contrast of a component grating needed to bias the observer's reports of a triplaid, 3. To determine whether contrast manipulation of one triplaid can bias the observer's reports for another triplaid. Our results show that all participants were sensitive to the contrast ratios used in the experiment. Additionally, the observer's reports showed that contrast manipulation of one component grating could bias the motion percept of a triplaid. Finally, the majority of subjects showed that an observer's report of a triplaid was contextually influenced by the contrast manipulation of surrounding triplaids. The degree of contextual influence differed across subjects and appeared to weaken as the surrounding triplaids became less multistable.

ENDURE TRAINEE ABSTRACT

FARANGIS TOLIBZODA

Home Institution and State: **Hunter College, New York**
Email: **farangis.tolibzoda@gmail.com**
Undergraduate Academic Level: **Senior**
Undergraduate Major and Expected Graduation Date: **Psychology, 2016**
Mentors/Advisors at Home Institution: **Dr. Tracy Dennis**

ENDURE Trainee Scientific Interest:

I am interested in the synaptic potentiation, synaptogenesis and neurogenesis processes that take place in the brain. In Dr. Sames' lab I have been investigating the processes of synaptogenesis and neurogenesis induced by brain derived neurotrophic factor (BDNF) and candidate small molecule agonists of its receptor TrkB. By using a combination of immunohistochemical and histological assays we assess the extent of induction of these processes in rats and mice. In Dr. Dennis' lab I have been looking into the potential of curcumin to affect fear memory consolidation process as well as its potential to reduce anxiety in people. By using a combination of questionnaires and behavioral tasks we look into whether curcumin treatment allows participants to have reduced anxiety and reduced potential to consolidate fear memory.

ENDURE Trainee Career Goals and Plan:

As my future career plans I would like to looks into mechanisms of neurodegenerative disease and potential treatments that would allow us to fight them. Specifically I would like to investigate reduced neurogenesis and synaptogenesis in people with Alzheimer's, Parkinson's, and Huntington's to be able to better understand the underlying causes of the reduction in these key processes. I believe that training as an MD/PhD will allow me to gain the necessary experience and will allow me to become more opt at investigating the problem.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **University of Michigan**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Catherine Collins**

ENDURE Research Project Title: **Mitochondrial dynamics in an injured axon**

Neurons are particularly reliant on the function of mitochondria for their long term maintenance and survival. Several studies suggest that mitochondria may play a role in directing shape changes during development and axon growth. However the mechanism by which mitochondria direct the shape changes is not well understood. Here we studied mitochondrial dynamics with respect to

axon sprouting and outgrowth during axon regeneration of motoneurons after nerve crush injury. We asked whether the position or motility of mitochondria is predictive of axonal growth and sprouting in regenerating axons. Our analysis at different time points after injury indicate that mitochondria progressively accumulate at the tip of regenerating axons, concomitant with the increase in axonal membrane. We then compared uninjured to injured axons at different time points, and noticed a striking increase in mitochondrial motility within proximal axons, in both anterograde and retrograde directions within 24 hours. We further analyzed mitochondria motility within neurites in regenerating growth cones within acute (10' to 30') live imaging sessions. Our preliminary analysis suggests that the motility of mitochondria into neurites strongly correlates with stability and growth.

ENDURE TRAINEE ABSTRACT

ELYCE WILLIAMS

Home Institution and State: **Hunter College, New York**
Email: **Elyce.Williams80@myhunter.cuny.edu**
Undergraduate Academic Level: **Senior**
Undergraduate Major and Expected Graduation Date: **Psychology, 2016**
Mentors/Advisors at Home Institution: **Dr. Michael Siller**

ENDURE Trainee Scientific Interest:

Elyce is interested in studying neurodevelopmental disorders such as autism, as well as the neural implications of learning disorders such as dyslexia, dyscalculia, and other factors that might inhibit proper reading comprehension skills. She is also interested in understanding how pedagogy can be shaped as a result of understanding the most ideal methods for learning, information retention and comprehension in typically developing children.

ENDURE Trainee Career Goals and Plan:

Elyce is currently in the process of applying to PhD programs for the fall 2016 school year that pertain to her research interests in the role of neuroscience in learning and cognitive function in children and adolescents, as well as the implications of these findings for pedagogy and education policy.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **Brown University**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Joo-Hyun Song**
Christine Gamble

ENDURE Research Project Title: **The Effects of Unconscious Awareness on Size-Depth Visual Illusions**

We examined whether the Ponzo illusion, in which size and depth visual cues induced by the background cause two identical circles to appear to be different sizes relative to each other persists when the context is suppressed to conscious awareness. We hypothesized that the illusion would persist through the suppression of the background to conscious awareness, meaning participants would give either explicit or implicit responses consistent with the perceived size differences induced by the illusion. We presented the illusion to one eye, and simultaneously suppressed participants' awareness of the illusion background by using a method called continuous flash suppression (CFS), a presentation of colorful, flashing geometric patterns to the other eye. Past studies using CFS have found that conscious awareness of the context is needed for perception of

some illusions, while for others it is not. In this study, participants recruited from the Brown University campus (n = 12) were asked to make size judgments by identifying the smaller or larger of two circles given two illusion conditions, perceptually enlarged or perceptually reduced and four physical target sizes. Results showed that for the Ponzo illusion conscious awareness of the context is necessary for perception.

ENDURE TRAINEE ABSTRACT

LESLIE ZHEN

Home Institution and State: **Hunter College, New York**
Email: **Leslie.zhen@macaulay.cuny.edu**
Undergraduate Academic Level: **Senior**
Undergraduate Major and Expected Graduation Date: **Psychology, 2016**
Mentors/Advisors at Home Institution: **Peter Moller**

ENDURE Trainee Scientific Interest:

I am a senior majoring in psychology with concentration in behavioral neuroscience and minoring in biology at the Macaulay Honors College at Hunter College. My interests range broadly from behavioral psychology to clinical neurobiology. My specific interests are in the mechanisms of learning and memory and its behavioral implications. I am also interested in pharmacological studies with implications to memory-related neuropsychiatric disorders.

ENDURE Trainee Career Goals and Plan:

I am completing my honors thesis research in Dr. Peter Moller's laboratory at Hunter College, where we study the effects of methamphetamine on spatial memory in Gnathonemus petersii weakly electric fish. Following undergraduate studies, I will pursue a Ph.D. to practice and conduct research in clinical neuropsychology. I hope to specialize in memory and neurologic disorders.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **Vanderbilt University**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Donna Webb**

ENDURE Research Project Title: **17α-Methyltestosterone affects anal-fin morphology, electric organ discharge, and spatial memory in weakly discharging electric fish, Gnathonemus petersii**

Hormones, endocrine disruptors, and many drugs can influence learning and memory acquisition and contribute to physiological changes. It is vital to understand their effects on living organisms, as shown by the memory-enhancing effects of testosterone in older males. The focus of this study was to examine the effects of hormonal steroids on morphology and spatial memory in juvenile female Gnathonemus petersii, African weakly electric fish. The goal was to characterize hormone-related morphological and behavioral changes. Fish were tested in a spatial maze task for 3 days following incremental doses of 17α-methyltestosterone (17α-MT) for 4 weeks. The fish's locomotive and electric organ discharge behaviors were recorded. 17α-MT masculinized the fish's secondary sexual characteristics. There was a noticeable expansion of the anal fin ray and marked

increase in duration for both major phases of their electric organ discharge typical of adult males. Post-mortem analysis revealed expedited development of ovaries in hormone-treated fish. Surprisingly, 17α-MT treated fish completed the spatial maze task slower than did untreated fish, although this difference was not significant. These results identify the potential influence of testosterone on physiology and behavior.

BUILDING RESEARCH ACHIEVEMENT IN NEUROSCIENCE (BRAiN)

UNIVERSITY OF COLORADO DENVER
Principal Investigator: *Dr. Diego Restrepo* - University of Colorado Denver
Principal Investigator: *Dr. Barbara Lyons* – New Mexico State University
Principal Investigator: *Dr. Sondra Bland* – University of Colorado Denver Downtown Campus
Partner Institution: New Mexico State University

PROGRAM DESCRIPTION: Student Training through Institutional Partnerships will bridge the Neuroscience research participation gap by preparing diverse undergraduates in the Rocky Mountain and Southwest Region for successful entry to Neuroscience Ph.D. programs.

BRAiN unites preexisting formal research and education programs at diverse institutions: the Neuroscience Graduate Program at the University of Colorado Denver in the Anschutz Medical Campus (NSP at UCD-AMC), home to a T32 Neuroscience Training Grant; the RISE to Excellence biomedical research education program at New Mexico State University (NMSU), a Hispanic serving minority institution; and the undergraduate Brain and Behavior program of the Department of Psychology at the University of Colorado Denver downtown campus (UCD-DT). BRAiN aspires to expand through developmental partnerships with Colorado State University-Pueblo and other colleges in the region.

Broad participation in the Ph.D. Neuroscience/Behavior pipeline will be enabled through pursuit of three specific aims: (1) Recruitment of 67 BRAiN Scholars from diverse demographic groups that are nationally underrepresented in biomedical and behavioral neuroscience research; (2) Development of the Neuroscience/Behavior research expertise and professional skills of BRAiN Scholars; (3) Retention of BRAiN Scholars in Neuroscience/Behavior research through enrollment in postgraduate programs.

BRAiN will provide intensive training that combines mentored independent research with student development of a rich knowledge base in Neuroscience core concepts. Curriculum integration will be achieved through a common Neuroscience Seminar Series and a Neuroscience Core Course. Emphasis will be placed on enhancement of mentorship skills through activities such as the Neuroscience Mentor Academy where faculty will meet to discuss student training, program evaluation, and curriculum reform. Taken together, proposed activities will provide an integrated research and professional development experience across multiple sites that leverages 21st century resources for scientific investigation and is responsive to practical aspects of contemporary student life.

ADDITIONAL PROGRAM TEAM MEMBERS:
Dr. Elba Serrano – New Mexico State University
Dr. Ernesto Salcedo – University of Colorado Denver Anshutz Medical Campus
Mr. Issac del Rio – Research Education Facilitator, New Mexico State University

ENDURE TRAINEE ABSTRACT

LAURA BELL

Home Institution and State: **University of Colorado, Colorado Springs, Colorado**
Email: **lbell3@uccs.edu**
Undergraduate Academic Level: **Senior**
Undergraduate Major and Expected Graduation Date: **Biology, 2016**
Mentors/Advisors at Home Institution: **Genia Olesnicky Killian**

ENDURE Trainee Scientific Interest:

I am interested in developmental neuroscience. One of the most fascinating things in science is how a single fertilized cell can give rise to the extraordinary complexity of the nervous system.

ENDURE Trainee Career Goals and Plan:

My goal is to continue with research in developmental neuroscience by pursuing a PhD program in neuroscience.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **University of Colorado Denver - Anschutz Medical Campus**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Wendy B. Macklin, Tanya L. Brown**

ENDURE Research Project Title: **The Role of Integrin-Linked Kinase in Oligodendrocyte Development**

I was able to develop an in vivo method for studying the regulation of oligodendrocyte development in the central nervous system using zebrafish (Danio rerio). A protein called integrin-linked kinase (ILK) is a scaffolding protein that has been shown in cell culture and mice to have a role in oligodendrocyte development. I was able to create three DNA constructs designed to express ILK with a specific point-mutation of interest and then inject those into single-cell transgenic embryos. I was then able to image and visualize oligodendrocytes expressing the ILK-mutant construct live in the spinal cord of developing zebrafish embryos.

ENDURE TRAINEE ABSTRACT

VICTOR CARRASCO

Home Institution and State: **New Mexico State University, New Mexico**
Email: **rendonv@nmsu.edu**
Undergraduate Academic Level: **Senior**
Undergraduate Major and Expected Graduation Date: **Psychology, 2016**
Mentors/Advisors at Home Institution: **Dr. Mary Alice Scott**

ENDURE Trainee Scientific Interest:

My interest in science is specifically psychological research and human health. My specific area of interest is clinical psychology.

ENDURE Trainee Career Goals and Plan:

Future plans are to become a licensed clinical psychologist and work in the treatment and prevention of depression to understand and treat anxiety disorders with motivational interviewing and positive psychology.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **University of Colorado School of Medicine**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Diego Restrepo**

ENDURE Research Project Title: **Auditory associative learning in a mouse model of schizophrenia**

The heterozygous CaMKIIα knock-out mice have shown a schizophrenia-like phenotype including increased aggression, reduced fear response and deficient working memory, making it a worthy candidate for developing an animal model. The aim of this study is to test these mice for the schizophrenic phenotype related to sensory discrimination in order to develop a mouse model for these cognitive deficiencies. Our hypothesis is that CaMKIIα mice will differ in performance from the wild type control group in discriminating between two different stimuli. Our future directions are to compare experimental and control group performance in the apparatus with odors and continue with an auditory stimulus. The results gathered from this study can ultimately support or weaken the possibility of CaMKIIα being related to the negative symptoms of schizophrenia.

ENDURE TRAINEE ABSTRACT

MARK D. HOLLOMAN

Home Institution and State: **University of Colorado, Denver, Colorado**
Email: **mark.holloman@ucdenver.edu**
Undergraduate Academic Level: **Senior**
Undergraduate Major and Expected Graduation Date: **Psychology, 2016**
Mentors/Advisors at Home Institution: **Dr. Mitch Handlesman, Dr. Sondra Bland, Dr. Jim Grigsby, Dr. Dave Albeck**

ENDURE Trainee Scientific Interest:

Clinical Psychology Cognitive Neuroscience Traumatic Brain Injury

ENDURE Trainee Career Goals and Plan:

I plan to attend a Graduate school/Ph.D program to conduct research in Clinical Psychology/Cognitive Neuroscience/Traumatic Brain Injury.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **University of Colorado Anshutz Medical Campus**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Achim Klug, Dr. Anna Dondzillo, Dr. Diego Restrepo, Dr. John Thompson, Dr. Jennifer Stratford**

ENDURE Research Project Title: **Mapping the Medial Nucleus of the Trapezoid Body in the Mongolian Gerbil Brain**

Mapping the Medial Nucleus of the Trapezoid Body in the Mongolian Gerbil Brain The Medial Nucleus of the Trapezoid Body (MNTB) is an auditory brainstem nucleus directly involved in the sound source localization pathway of the Mongolian Gerbil. The MNTB receives excitatory input from globular busy cells (GBC) located in the contralateral cochlear nucleus of each ear. Axons extending from the GBC's travel along the acoustic stria, cross the mid-line within the trapezoid body and terminate on principal cells in the MNTB via "Calyx" type endings known as the Calyx of Held. These Calyx's are found only in the MNTB, and because the size and strength of the synapse at the Calyx of Held is comparatively larger to other synapses in the brain, this structure is distinctly recognizable through conventional Immunohistochemistry (IHC) technique using SV2 secondary antibody labeling. This makes identifying the exact location of the MNTB clear in the traditional the coronal aspect of the brain. However, the standard protocol of labeling the Calyx of Held with IHC technique can be somewhat time consuming, and when locating this collection of nuclei in the other aspects of the brain is required, an alternative method of identifying the MNTB is necessary.

In this project we aimed to develop an alternative system of location in order to reliably identify the position of the MNTB in the Horizontal and Sagittal planes without the use of immunohistochemistry antibody labeling technique.

ENDURE TRAINEE ABSTRACT

BELKIS JACQUEZ

Home Institution and State: **New Mexico State University, New Mexico**
Email: **yobelkis@nmsu.edu**
Undergraduate Academic Level: **Junior**
Undergraduate Major and Expected Graduation Date: **Biochemistry, 2017**
Mentors/Advisors at Home Institution: **Erik Yukl**

ENDURE Trainee Scientific Interest:

My primary research interest is to further understanding of neurological conditions and disorders. My interests in biochemistry and neuroscience allow for a diverse approach to researching the brain. Through a broad range of biomedical research, including molecular and cellular neuroscience, proteomics, and protein structure-function, more can be learned about the brain dysfunctions and the chemistry dictating them. My emphasis of research will be pharmaceutical development.

ENDURE Trainee Career Goals and Plan:

A principal career goal is to complete my undergraduate in Biochemistry. Throughout my undergraduate career, I plan to continue accumulating laboratory experience and undertaking more research projects. In addition to the required chemistry classes, I will enroll in neuroscience and biology classes that will foster my interest in health and disease. Upon graduating, I plan to continue to a MD/PhD program. My goal is to become a practicing physician as well as an avid researcher in the field of neuroscience.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **University of Colorado Denver Anschutz Medical Campus**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Linda A. Barlow**

ENDURE Research Project Title: **Renewal of Adult Taste Buds Controlled by Hedgehog Signaling and Sox2-Regulation**

Taste cells continually turnover throughout adulthood via proliferation of progenitor cells adjacent to taste buds generating taste precursors that enter taste buds and differentiate. Previous studies have demonstrated that Sonic Hedgehog (Shh) taste precursor cells signal to regulate progenitor cells adjacent to taste buds and renew taste cells. Cancer patients treated with chemotherapeutics targeting the Shh pathway often suffer from taste dysfunction, suggesting that Shh is required for taste bud renewal. Another regulator of tongue homeostasis is Sox2, which is expressed at low

levels throughout the basal epithelium and at high levels in taste bud progenitor cells and in mature taste cells. In our research, Sox2-GFP mice were treated with a Shh antagonist (HhAntag) to inhibit Shh signaling and determine the effect on taste bud formation and Sox2 expression. We show that HhAntag treated mice have fewer and smaller taste buds. Furthermore, Sox2-GFP expression is lost in taste receptor cells as well as in progenitor cells, consistent with the hypothesis that taste cell differentiation depends on Shh regulation of Sox2. In conclusion, our data suggest that Shh-dependent fine-tuning of Sox2 is required for adult taste bud differentiation.

ENDURE TRAINEE ABSTRACT

MAGGIE SABIK

Home Institution and State: **New Mexico State University, New Mexico**
Email: **msabik@nmsu.edu**
Undergraduate Academic Level: **Senior**
Undergraduate Major and Expected Graduation Date: **Psychology, 2016**
Mentors/Advisors at Home Institution: **Dr. Michael Hout**

ENDURE Trainee Scientific Interest:

I am interested in severe neurological disorders that affect the general population. In the future, I would like to continue studying psychology, with a stronger focus on the treatment of mental disorders. There is a great potential for research development and improvement in the field of clinical psychology, providing a considerable opportunity to make a substantial difference in the lives of people living with mental illness through neurological research and therapy.

ENDURE Trainee Career Goals and Plan:

My plan is to continue my education in the field of clinical psychology. I aspire to work directly with the people that suffer from severe mental disorders. Schizophrenia in particular has caught my interest because of the severity of the symptoms as well as the fact that so little is known about it. Research to treat the cognitive dysfunction associated with schizophrenia is on the rise, in the hopes that more than just the positive and negative symptoms can be treated. Ideally, I will combine my clinical inclination with my desire to conduct research and teach in an academic setting.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **University of Colorado Denver Anschutz Medical Campus**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Amanda Law**

ENDURE Research Project Title: **Akt1 in brain development and function: Implications in psychiatric disorders of neurodevelopmental origin**

Our lab focuses on various candidate genes for neurological disorders. One of these genes is AKT, as the AKT signaling pathway has been linked to neurological dysfunction. Several studies have found that reduced AKT1 expression may contribute to frontal cortical and hippocampal dysfunction, so we continued the investigation of the role of Akt1 in brain development and function using a mouse model of Akt1 deletion and a series of behavioral tasks. These tasks helped us assess the mice in several areas, including locomotor activity, the presence of an anxiety-like

phenotype, habituation, and prepulse inhibition. My primary role was to analyze the data. Our results suggest that Akt1 does not affect locomotor activity or anxiety-like behaviors in mice, but may play a role in the development in the neuronal inhibitory network because of the effect Akt1 deletion has on prepulse inhibition. Further behavioral tasks will be conducted to assess how Akt1 deficiency influences behavior.

ENDURE TRAINEE ABSTRACT

DEVIN TAUBER

Home Institution and State: **University of Colorado Denver, Colorado**
Email: **devin.tauber@ucdenver.edu**
Undergraduate Academic Level: **Senior**
Undergraduate Major and Expected Graduation Date: **Biochemistry and Psychology, 2016**

ENDURE Trainee Scientific Interest:

My research interests include receptor protein/ligand interactions of pharmaceuticals and subsequent intracellular signaling cascades, pharmacokinetics of pharmaceuticals, and organic chemical synthesis. Currently I am working on determining the effects of increased 2-Arachidonoyl glycerol concentration on mTOR expression in neurons and glia via the monoacylglycerol lipase inhibitor MJN110.

ENDURE Trainee Career Goals and Plan:

I hope to eventually enter a graduate school program focused on pharmacology or structural biology and plan to continue researching the neurochemistry of the brain. I hope to combine organic synthesis with behavioral neuroscience in order to further our knowledge of how the brain functions chemically.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **Universitry of Colorado, Denver**
ENDURE Research Project Title: **Expression of pmTOR in Amygdala After MJN110 Administration**

My current research in the laboratory of Dr. Bland has consisted of determining the effects of MJN110 administration on phosphorylated mitogen target of rapamyacin (pmTOR) expression in the amygdala of the rat brain. The amygdala is an important region of the brain that is involved in emotional responses and learning. MJN110 is a monoacylgycerol lipase inhibitor that prevents the breakdown of the endocannabinoid 2-arachidonoyl glycerol (2-AG). mTOR is phosphorylated at serine 2448 by the G protein Rheb downstream of the Akt pathway. Akt becomes phosphorylated via the IP3K pathway after activation of G protein coupled cannabinoid receptor 1. By studying if MJN110 dosage affects pmTOR expression significantly, areas of cannabinoid signaling in the amygdala could be determined. Results of immunohistochemical staining for pmTOR showed that neurons in the basolateral amygdala had a dose dependant increase in pmTOR expression. The same results were found in the central amygdala but with about half the amount of pmTOR expressing neurons as the basolateral portion (this is consistent with higher cannabinoid receptor density in the basolateral amygdala). In regards to glia, no significant effect of dose on pmTOR expression was found in the basolateral portion. However, the central amygdala did show a significant increase in pmTOR expression.

ENDURE TRAINEE ABSTRACT

ELIJAH WADE

Home Institution and State: **New Mexico State University, New Mexico**
Email: **eliwade@nmsu.edu**
Undergraduate Academic Level: **Senior**
Undergraduate Major and Expected Graduation Date: **Chemical Engineering, 2016**
Mentors/Advisors at Home Institution: **Dr. Reza Foudazi**

ENDURE Trainee Scientific Interest:

I am interested in biomedical engineering, namely tissue engineering and neuroprosthetics. I enjoy learning about all the new developments in the prosthetics field and hope to be part of the next big breakthrough. In cell scaffolding, I would like to look further into how the neural cell types rely on the extracellular matrix, and how to better mimic those characteristics for more effective neural cell growth.

ENDURE Trainee Career Goals and Plan:

I wish to pursue my doctorate degree in Biomedical Engineering, focusing in applied neuroscience. I would like to develop a product that can be used commercially. Ultimately, I wish to be part of a research group that is dedicated to making lives better.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **New Mexico State University**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Reza Foudazi**

ENDURE Research Project Title: **Tunable cell scaffold synthesis using high internal phase emulsion polymerization**

My summer project goal was to develop a reliable, repeatable method for polyHIPE synthesis to be used for neural cell scaffolding. Although I did not get the chance to test cells on the scaffolds, I was able to repeat the process and found that the pore sizes between the two samples were within micrometers of each other. However, it was also found that the pore sizes were too small to use in cell scaffolding. The next step will be to solve the small pore size issue and learn more about the neurobiology of the cells he eventually plans to use. The end goal for the project is developing an extensive and comprehensive table of chemical compounds, volume ratios, initiators, and additives necessary to mimic the extracellular matrix characteristics in different types of neural cells in order to provide tunable three-dimensional cell scaffolds optimized for each particular cell type.

SOUTH TEXAS ADVANCED RESEARCH TRAINING: UNDERGRADUATE PROGRAM (START-UP)

UNIVERSITY OF TEXAS HEALTH SCIENCE CENTER, SAN ANTONIO
Principal Investigator: *Dr. Alan Frazer*
Principal Investigator: *Dr. David Morilak*
Partner Institutions: University of Texas, San Antonio; Lady of the Lake University; St. Mary's University; Trinity University; and University of the Incarnate Word

PROGRAM DESCRIPTION: The overall goal of our Program is to encourage and prepare junior and senior undergraduates from the San Antonio and South Texas Region to enter doctoral programs in neuroscience, to complete them successfully, and become well-trained and competitive neuroscientists. To accomplish this, a comprehensive program is proposed for students accepted into the program, involving extensive research experiences in the laboratories of successful neuroscientists, and opportunities to develop and improve their writing, speaking, and time management skills.

Students will be recruited into START-UP from five partner institutions in San Antonio, namely Our Lady of the Lake University, St. Mary's University, Trinity University, University of the Incarnate Word, and the University of Texas, San Antonio. Collectively these schools have 24,527 undergraduates who are URMs (based on ethnicity), of whom 2,947 are Science Majors. Also, these schools have a high number of students from low-income families, many of who are the first in their families to attend college. Faculty contacts have been established at each school to assist us in recruiting suitable students into START-UP. Thirty-one training faculty have been identified (including three from UTSA), who are appropriate to mentor these students in their laboratories. The students will participate in laboratory research for an average of 12 hours per week during the two academic semesters, and 40 hours/week during a 10-week intensive summer research exposure. Students will also have an opportunity to work in one of seven major neuroscience programs at institutions outside of San Antonio during the summer.

In addition to their laboratory research, the students will also attend seminars and journal clubs, research retreats, and have exposure to neuroscientists from other institutions. The students will all receive instruction on the responsible conduct of research. The Co-Directors of the Program are Drs. Alan Frazer and David Weiss, experienced scientists and administrators, who have run programs similar to START- UP previously. They will be members of an Executive Committee that will oversee all aspects of the Program. There is a formal evaluation plan for the Program, as well as an outcomes assessment process. Further, a plan is described to disseminate nationally all materials developed for the design and implementation of START-UP.

ADDITIONAL PROGRAM TEAM MEMBERS:

Dr. Timothy Raabe – St. Mary's University
Dr. James Hall – Our Lady of the Lake University
Dr. James Roberts – Trinity University
Dr. Cristy MacKinnon – University of the Incarnate Word
Dr. Edwin Barea-Rodriguez – University of Texas San Antonio

ENDURE TRAINEE ABSTRACT

MICHAEL HERNANDEZ

Home Institution and State: **Trinity University, Texas**
Email: **hernandezm27@uthscsa.edu**
Undergraduate Academic Level: **Junior**
Undergraduate Major and Expected Graduation Date: **Biology, 2017**
Mentors/Advisors at Home Institution: **Dr. James Roberts**

ENDURE Trainee Scientific Interest:

Treatments for traumatic brain injury that address the molecular basis of the pathologies that result from the trauma.

ENDURE Trainee Career Goals and Plan:

I'm hoping to pursue a career in the neurosciences, exploring neuroregeneration and the preservation of cognitive function following trauma and age related changes.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **University of Texas Health Science Center at San Antonio**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Lora Talley Watts**

ENDURE Research Project Title: **Melatonin as a Neuroprotective Agent in Traumatic Brain Injury**

Traumatic brain injury (TBI) is a leading cause of death and disability in the United States, with 2 million cases reported annually. Additionally, it has been estimated that 25% of ground troops from the Iraq and Afghanistan wars are inflicted with a TBI. In the hours and days following a TBI there is a progression of molecular changes that lead to mitochondrial dysfunction, edema formation, inflammation, and ultimately cell death. However, there are currently no clinical treatments that counteract damage or promote repair following brain injury. Therefore, this study focuses on the potential use of melatonin as a neuroprotective agent following TBI. Melatonin has been shown provide neuroprotection in models of stroke through decreasing reactive oxygen species production and acting as an antioxidant. We hypothesize that melatonin administered after a mild traumatic brain injury will reduce lesion volume and behavioral deficits by decreasing oxidative stress. A cortical impact model of TBI will be induced over the somatosensory cortex in rats and a combination of magnetic resonance imaging, immunohistochemical and behavioral tests will be performed longitudinally. Comparisons will be made between shams, TBI + vehicle and TBI + melatonin treated animals. The data will provide a potential novel treatment for TBI.

ENDURE TRAINEE ABSTRACT

CARLIE MCCARTNEY

Home Institution and State: **University of Texas at San Antonio, Texas**
Email: **mccartneyc@uthscsa.edu**
Undergraduate Academic Level: **Senior**
Undergraduate Major and Expected Graduation Date: **Biology, 2016**

ENDURE Trainee Scientific Interest:

To study psychiatric disorders, neurodegenerative diseases, and neuroplasticity.

ENDURE Trainee Career Goals and Plan:

After obtaining a B.S. in Biology (with a neurobiology concentration), I would like to enroll in a graduate program to obtain a Ph.D in neuroscience. Eventually, I would like to work in neuroscience research and teach neuroscience at the university level.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **The University of Texas Health Science Center at San Antonio**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. David Morilak, Dr. Sarah Bulin**

ENDURE Research Project Title: **Involvement of NMDA and AMPA Receptors in the Rat mPFC in Cognitive Set-Shifting**

Chronic stress is a known risk factor for many psychiatric disorders, including depression and PTSD. These stress-related psychiatric disorders are characterized by declined cognitive flexibility. To model these stress-related deficits in rats, our lab has developed a chronic unpredictable stress (CUS) treatment which compromises cognitive flexibility, as indicated in deficits in the attentional set-shifting test (AST). Our lab then showed how CUS treatment significantly attenuated glutamatergic afferent-activated c-fos induction in the mPFC when compared to controls. Thus, chronic stress could dysregulate cognitive flexibility by compromising glutamatergic function in the mPFC. To study the involvement of mPFC glutamate receptors in cognitive set-shifting, we directly blocked the NMDA or AMPA receptors in the mPFC and tested its effect on the mPFC-dependent set-shifting task of AST, the extradimensional (ED) task. On the day of testing, prior to the ED task, bilateral microinjections of vehicle (sterile saline), NMDA antagonist (D-AP5), or AMPA antagonist (NBQX) were made into the mPFC. Our results indicate that glutamate antagonist treatment increased trials to criterion on the ED task of AST when compared to controls. Taken together with previous data, we conclude that chronic stress could be dysregulating mPFC function by compromising glutamatergic function in the mPFC.

ENDURE TRAINEE ABSTRACT

ARNULFO TUNON-ORTIZ

Home Institution and State: **Trinity University, Texas**
Email: **atunon@trinity.edu**
Undergraduate Academic Level: **Senior**
Undergraduate Major and Expected Graduation Date: **Neuroscience, 2016**
Mentors/Advisors at Home Institution: **John Roberts, PhD; Kimberely Phillips, PhD**

ENDURE Trainee Scientific Interest:

I am interested in brain-computer interfaces, neuroprosthetics or cognitive research.

ENDURE Trainee Career Goals and Plan:

A career in the field of neuroscience research and perhaps later on become a professor.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **The University of Texas Health Science Center at San Antonio**

ENDURE Research Project Title: **Kynurenine metabolism alters microglial activation following lipopolysaccharide challenge**

Investigating the activation profile of microglia challenged by lipopolysacchirade and its interaction with the kynurenine pathway of tryptophan catabolism.

NEUROSCIENCE RESEARCH OPPORTUNITIES TO INCREASE DIVERSITY (NeuroID)

UNIVERSITY OF PUERTO RICO RIO PIEDRAS
Principal Investigator: *Dr. Jose Garcia-Arrarás*
Principal Investigator: *Dr. Carmen S. Maldonado-Vlaar*
Partner Institutions: Inter-American University of Puerto Rico at Bayamon Campus, Metropolitan University, Sacred Heart University of Puerto Rico

PROGRAM DESCRIPTION: Neuroscience Research Opportunities to Increase Diversity (NeuroID) from the University of Puerto Rico Rio Piedras Campus aims to increase the opportunities available for undergraduate students in the area of Neurosciences. The proposal makes use of the strong Neuroscience expertise among UPR investigators and fortifies the underlying neuroscience network that joins undergraduate students, island investigators and their collaborators in mainland institutions.

The training program consists of three major components: (1) Research Experience - An intense research experience during the academic year and a summer experience in a laboratory at an institution in the mainland USA, such as Harvard, Yale, Univ. Colorado Denver, Univ. of Vermont, Northwestern University, Univ. Miami, that have active T32 training grants in neuroscience and/or excellent track record in recruiting and training underrepresented minorities. (2) Academic training participation in seminars, workshops and selected courses to enhanced their knowledge in neurobiology, and understanding of a research career. (3) Student development activities - Participants will enter a mentoring program that includes community outreach activities, scientific writing and oral presentations and other professional enhancement activities.

The proposed activities together with an established mentoring program with members of the Neuroscience community will serve to increase the student competitiveness and enhance their interest in continuing a research career in neuroscience. The NeuroID program will extend the impact of other successful programs at the University of Puerto Rico, not only by focusing on the Neuroscience field but also by greatly expanding the number of possible mentors, increasing the pool of available applicants as well as providing an inclusive and broader training program.

ADDITIONAL PROGRAM TEAM MEMBERS:

Dr. Karen Gonzalez - Universidad Metropolitana, SUAGM
Dr. Armando Rodríguez - Interamerican University — Bayamón
Mrs. Agda E. Cordero Murrillo – Sacred Heart University of Puerto Rico
Ms. Zobeida Diaz – Program Administrator, University of Puerto Rico – Rio Piedras

ENDURE TRAINEE ABSTRACT

ROBERTO A. APONTE-RIVERA

Home Institution and State: **University of Puerto Rico Río Piedras Campus, Puerto Rico**
Email: **roberto.aponte@upr.edu**
Undergraduate Academic Level: **Senior**
Undergraduate Major and Expected Graduation Date: **Cellular & Molecular Biology, 2016**
Mentors/Advisors at Home Institution: **Jose Garcia-Arraras, Ph.D. Carmen S. Maldonado-Vlaar, Ph.D. Cristina Velazquez-Marrero, Ph.D.**

ENDURE Trainee Scientific Interest:

I'm interested in neuroscience and neurobiology, focusing on the integrative approach to the emergent properties of behavior. I have determined that understanding the fields of neuroplasticity, cellular and molecular neuroscience, behavioral neuroscience, theoretical neuroscience, and connectomics could help elucidate how it all comes together. Within my experience in the laboratory, I have witnessed different techniques and concluded that mastering electrophysiology, optogenetics, immuno imaging, and cell culture techniques would help me in my research goals. Utilizing drug or alcohol abuse as experimental models, I plan on studying how the neural circuitry created and the initial molecular changes determine the changes in behavior.

ENDURE Trainee Career Goals and Plan:

I have always been fascinated by the interaction between brain physiology and social behaviors. Due to personal and laboratory experience, I'm motivated to pursue a Ph.D. in neuroscience after graduating from my bachelor's degree in cell & molecular biology and applied statistics. I would be the first in my family to pursue an advanced degree in the STEM fields. I wish to study at a recognized research institution with a dedicated faculty and program that appeals to the wide scope of neuroscience like Stanford University, University of California San Francisco, Yale University, Harvard University, etc. After that I want to continue a career in scientific research in the field of neuroscience. Seeking a career in the neurosciences would be of great benefit to my community because I want to show them that neuroscience is relevant to their lives, fostering a greater interest and encouraging future scientists.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **Institute of Neurobiology, University of Puerto Rico Medical Sciences Campus**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Cristina Velazquez-Marrero, Ph.D.**

ENDURE Research Project Title: **Rapid Ethanol Exposure Facilitates Alcohol Consumption**

Social binge drinking is an increasing concern in adolescents and young adults. Research demonstrates that regular binge drinkers are more likely to develop alcoholism, though the causality remains unknown. Alcohol tolerance, a key behavioral component of alcohol addiction, leads to increased consumption. In the ventral striatum, molecular alcohol tolerance has been well studied focused on the Big Potassium (BK) channel membrane redistribution during rapid ethanol exposure, and it has been recently linked to the activation of the Wnt/Beta-catenin pathway and possible increased alcohol consumption. Utilizing the Drinking in the Dark (DID) paradigm, molecular ethanol tolerance was induced in male C57BL/6J mice via a series of intraperitoneal ethanol injections evenly spaced throughout 6hrs followed by a 24 hour withdrawal prior to the DID paradigm. Preliminary results show that experimental mice treated with the exposure protocol that induces molecular tolerance, drank significantly more when provided with restricted access 20%v/v ethanol, supporting the hypothesis that ethanol tolerance at the molecular level impacts alcohol consumption at the behavioral. Further experimentation will be done utilizing striatum Beta-catenin knockdown mice strains, and primary neuronal cell cultures to confirm the effects of the Wnt/Beta-catenin regulatory pathway on BK channel membrane redistribution and BK channel ethanol tolerance.

ENDURE TRAINEE ABSTRACT

ALMARIS FIGUEROA

Home Institution and State: **University of Puerto Rico, Rio Piedras, Puerto Rico**
Email: **almarissnhpr@gmail.com**
Undergraduate Academic Level: **Junior**
Undergraduate Major and Expected Graduation Date: **Biology, 2017**
Mentors/Advisors at Home Institution: **Dr.Annabell Segarra, Dr.Garcia Arraras**

ENDURE Trainee Scientific Interest:

My interest in the neurosciences began when I learned the impact of drug abuse in the brain. In my Interdisciplinary view of drug addiction class (2014), a pharmaceutical, from the ASSMCA Drug Treatment Center and Methadone of SJ, explained how brain regions may be integrated to form neural circuits that modulate aspects of drug abuse. Since then, I was fascinated with the neuroscience of addiction. I am truly interested behavioral changes in response to the drug, the signal transduction mechanisms involved, the neurochemical substrates that participate and mediate the reward pathway, changes in signal processing, and nervous system responses in drug users. The subjects matters and interest me because of the social, scientific and psychological applications that it carries.

ENDURE Trainee Career Goals and Plan:

With the knowledge and techniques that I am acquiring in the NIH-ENDURE NeuroID training program, in my junior year I will be prepared to apply to the most competitive summer internships, especially in the Neuropharmacology of drug abuse area. I aim to go to Stanford University, University of California-SD/SF, MIT, Harvard University, Yale or Johns Hopkins for summer research experience and more importantly for the contacts, mentors and directors that can lead me to graduate school opportunities. I aspire to earn a PhD in Neurobiology of drug abuse and pharmacologically find new ways to reduce/eliminate the drug effect and thus seeking behavior in users.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **University of Puerto Rico, Rio Piedras Campus**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Annabell Segarra, Dr. José García Díaz**

ENDURE Research Project Title: **Nandrolone administration during adolescence: Effect on ovarian and brain tissue of the rat**

Anabolic androgenic steroids (AAS) are synthetic compounds similar to testosterone. Since they bind to androgen receptors, high quantities can "shutdown" the hypothalamic-pituitary-gonadal (HPG) axis via negative feedback. In this study we will investigated the effect of nandrolone decanoate exposure during adolescence on the female reproductive system and hypothalamus using tissue from rats previously exposed to nandrolone and cocaine. Rats (n=36) from days 28-38, rats received a daily injection of nandrolone decanoate (20mg/kg/sc) or vehicle, and from days 42-46 and at days 54 and 64 rats received an injection of cocaine(15mg/kg/ip) or saline. At day 65 rats were euthanized, perfused with 4%paraformaldehyde and the brain, ovaries and uterus removed, weighed and frozen for cryosectioning. Brains and ovaries were assessed for the presence of androgen and estrogen receptors, as well as for aromatase, the enzyme that converts androgens to estradiol. Assessment was accomplished using tissue histology, immunohistochemistry, Western blots, and image analysis software (ImageJ). Preliminary results show that nandrolone during adolescence exerts long lasting effects on the rewarding and reproductive system of the female rat: decreases ovary weight, creates atretic follicles, distorts the round shape of the occyte and reduces the %positive estrogen cells in the ovary, while cocaine may recompense this ER lost.

ENDURE TRAINEE ABSTRACT

JOSE GORBEA

Home Institution and State: **University of Puerto Rico Río Piedras, Puerto Rico**
Email: **josejgorbea@gmail.com**
Undergraduate Academic Level: **Senior**
Undergraduate Major and Expected Graduation Date: **Biology and Chemistry, 2017**
Mentors/Advisors at Home Institution: **Dr. José Luis Agosto Rivera**

ENDURE Trainee Scientific Interest:

Jose is interested in neuroregeneration and understanding the mechanisms by which this can be induced in human nervous systems. Several neurodegenerative diseases can be treated by administration of drugs that intend to reverse their effects. Jose hopes to work in further understanding the underlying mechanisms of these maladies and optimizing treatments targeting key goals in order to induce neural regeneration in such environments. Given his chemistry background Jose is also fond of drug discovery, development and design and hopes to integrate this important aspect of research into his future works. At the moment he studies drug delivery strategies and sleep and neural homeostasis in Drosophila melanogaster, however he also has had other experiences in research focused on gene regulation, structural biology, and protein crystallography among others which have been of great benefit in his scientific development and have served to define his future goals in science.

ENDURE Trainee Career Goals and Plan:

Jose is interested in pursuing a career in academic research on neurobiology. In the short term, Jose is focused on completing coupled Bachelor's degrees in Biology and Chemistry at the University of Puerto Rico's Río Piedras campus. In a longer term, he plans on pursuing a PhD program in neurobiology, preferably focusing in neuroregeneration research and drug discovery, development and delivery. Jose is also very interested in science policy, advocacy and education and hopes in a later future to be able to have an impact on these issues.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **University of Puerto Rico at Río Piedras**

Mentors/Advisors at ENDURE Summer Research Experience Institution:

ENDURE Research Project Title: **Zirconium Phosphate Carbamazepine Drug Delivery System Effects in Drosophila melanogaster Sleep homeostasis**

Jose Gorbea is interested in studying the effects of a passive release zirconium phosphate drug

delivery system on neuronal homeostasis mechanisms in D. melanogaster; specifically, assaying the effect of intercalated carbamazepine drug in orally administered zirconium phosphate nanoparticles in sleep patterns of D. melanogaster. Carbamazepine is a drug used in the treatment of epilepsy and neuropathic pain; however, it has been shown to have several detrimental side effects some of which affect sleep. We therefore are interested in studying the mechanisms by which these effects are perpetuated and how they can be hopefully circumvented by potential drug delivery systems.

ENDURE TRAINEE ABSTRACT

MONICA A. LEFEBRE-RIVERA

Home Institution and State: **University of Puerto Rico, Rio Piedras Campus, Puerto Rico**
Email: **mlefebre@mit.edu**
Undergraduate Academic Level: **Senior**
Undergraduate Major and Expected Graduation Date: **Biology, 2016**
Mentors/Advisors at Home Institution: **Dr. Jose E. Garcia-Arraras**

ENDURE Trainee Scientific Interest:

My interests have focused on the area of Cellular and Molecular Neuroscience. I am intrigued in understanding complex mechanisms in the brain, mapping its molecular structure, cell to cell communication and neuroplasticity. I would like to take part in interdisciplinary research, combining my neuroscience and biology backgrounds with bioengineering approaches throughout my graduate studies and research.

ENDURE Trainee Career Goals and Plan:

I am currently applying to graduate programs in Cellular and Molecular Neuroscience or Bioengeneering with a biomedical approach to continue expanding my education and academic career. I would like to pursue a career in academia, teaching and mentoring the next generation of scientists by becoming a professor in a research oriented institution.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **Massachusetts Institute of Technology**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Eric A. Appel, Dr. Robert S. Langer**

ENDURE Research Project Title: **Engineering Functional Surfaces for Improved Cell Culture**

A major challenge in the field of cell-based tissue engineering is access to high quality cells. Many types of cells that may have important therapeutic benefits cannot be efficiently cultured in vitro. We are engineering substrates for robust in vitro expansion of mesenchymal stem cells (MSCs). These cells exhibit promising therapeutic benefits; however, there is currently no effective method for culturing sufficiently high numbers of cells for clinical translation. We employed macromolecular engineering principles to design, synthesize and/or modify substrates for improved cell culture. Manipulating structure and chemical properties at the molecular scale allows

us to impart advanced functionalities and mechanics. Two different approaches for functionalization were pursued. The first involved macromolecular engineering of polymeric substrates to allow for design of specific chemical and mechanical cues to cells during culture. The second involved chemical oxidation of polystyrene surfaces for improved adhesion and in vitro expansion of MSCs. In these studies we have identified specific conditions for oxidative treatments and the resulting chemical functionalities supporting cell proliferation in vitro. Optimized substrates were characterized by a variety of techniques, including water-contact-angle, FT-IR and XPS, and rheometry. Overall, this work demonstrates the development of facile techniques to engineer substrates for improved cell culture.

ENDURE TRAINEE ABSTRACT

SONYA J. MALAVEZ CAJIGAS

Home Institution and State: **University of Puerto Rico Rio Piedras Campus, Puerto Rico**
Email: **sonyamalavez17@yahoo.com**
Undergraduate Academic Level: **Junior**
Undergraduate Major and Expected Graduation Date: **Nutrition & Dietetics, 2018**
Mentors/Advisors at Home Institution: **José García Arrarás**

ENDURE Trainee Scientific Interest:

At present, my current research is nervous system regeneration in a model invertebrate and how these studies may serve to learn and improve this capacity on humans. I am also interested in locomotion and what occurs in our body in order for it to happen or how it can be affected by diseases. Finally, I am a major in nutrition and I am interested in exploring new research areas, in particular those that combine nutrition and neuroscience and study the effect of diet on neural physiology and behavior.

ENDURE Trainee Career Goals and Plan:

My main career goal is to develop myself as a professional researcher that will contribute to a more advanced society. I plan to pursue a PhD in Neuroscience or Neuroscience combined with Physiology. In order to get there, I am currently completing a major in Nutrition and Dietetics and a minor in Biology. Upon successful completion of my undergraduate studies, I plan on entering a Doctoral program in Neuroscience at a top-rated university.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **University of Puerto Rico Rio Piedras Campus**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **José García Arrarás**

ENDURE Research Project Title: **Effect of Gut Microbiota on the Enteric Nervous System of the Sea Cucumber**

The microbiota has been of great interest because of its vast effect on organism's well-being and health. We are now evaluating possible role of the intestinal microbiota on intestinal regeneration of the sea cucumber Holothuria glaberrima. The focus of the present work is the regeneration of the intestinal nervous system. Sea cucumbers regenerate most of their organs following evisceration, including the enteric nervous system. Our goal is to study the association between intestinal microbiota and the enteric nervous system. Initially, we have treated animals with the following antibiotics: Penicillin/Streptomycin, Erythromycin, Kanamycin and Neomycin to

modulate the microbiota. Eviscerated animals were placed in sea water with various antibiotic dilutions and after 10 days of regeneration were sacrificed. Tissue sections were used for immunohistochemical analyses using nervous system markers (antibody RN1 and Beta-tubulin). Preliminary results suggest that antibiotics have a negative effect on regeneration by delaying the process.

ENDURE TRAINEE ABSTRACT

GIAN CARLO MOLINA CASTRO

Home Institution and State: **University of Puerto Rico, Rio Piedras Campus, Puerto Rico**
Email: **gian12.mol@gmail.com**
Undergraduate Academic Level: **Sophomore**
Undergraduate Major and Expected Graduation Date: **Cellular & Molecular Biology, 2018**
Mentors/Advisors at Home Institution: **Dr. Carmen S. Maldonado-Vlaar**

ENDURE Trainee Scientific Interest:

Through the history of humanity, the understanding of the biological basis of brain function has been a great scientific question. My scientific and research interests in Neuroscience include cognitive and behavioral neuroscience where I can see me contributing to the development of effective treatments for neurological diseases. Also, I am interested in mastering concepts and techniques in Neuropharmacology and Neurophysiology in order to have a better understanding of the nervous system.

ENDURE Trainee Career Goals and Plan:

My goals include continuing to develop my own research project, being able to publish a paper and finish my Bachelor degree in Cellular/Molecular Biology. After this achievement, my plans are to obtain an MD/PhD from a biomedical research leading university where I can specialize in the most intriguing organ, the brain. This will guide me to face the challenges and attend the necessities of our society both in the research and clinical aspect. By this, I can contribute to advance the scientific knowledge and lead a transformation in the Neuroscience field.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **University of Puerto Rico, Rio Piedras Campus**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Carmen S. Maldonado-Vlaar**

ENDURE Research Project Title: **PKC γ actions related to mGluR5 within NAc shell on environment elicited cocaine conditioning**

The mGluR5 has been described as a critical component in cocaine seeking behavior. Recent studies show that protein kinase C (PKC) modulates different molecular pathways within the brain, leading to an increase in cocaine conditioning when it is overexpressed. Therefore, we hypothesized that inhibiting the activity of PKC γ will decrease the cocaine sensitization characterized by increased locomotor activity on environment elicited cocaine conditioning. For this study, cannulae within

the nucleus accumbens shell (NAc shell) were implanted in rats and the animals were exposed to a specific environment with visual and olfactory cues in locomotive activity chambers. Separate groups of animals received infusions directly to the NAc shell; either PKC Gamma inhibitor (10 µM Ro 31-8220 mesylate) or the vehicle during five consecutive days. Prior to placing the animals in the conditioning chambers, rats received systemic intraperitoneal cocaine injections during five consecutive sessions. On the test day (D7), animals were placed in the chambers without any pre-treatment, neither within the NAc shell or cocaine injection. Histological and locomotive activity data are being analyzed and these results could be a novel and vital component in further studies seeking cocaine addiction treatments.

ENDURE TRAINEE ABSTRACT

MARLIAN MONTESINOS-CARTAGENA

Home Institution and State: **University of Puerto Rico, Rio Piedras Campus, Puerto Rico**
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Undergraduate Academic Level: **Senior**
Undergraduate Major and Expected Graduation Date: **Biology, 2016**
Mentors/Advisors at Home Institution: **Gregory J. Quirk, Christian Bravo-Rivera**

ENDURE Trainee Scientific Interest:

The brain is a complex organ that encloses our thoughts, our personality and our emotions. It is fascinating how the biological and chemical processes occurring within it translate on how we perceive our environment, how we feel, and how do we act. This is why I am interested in studying the circuit of the brain. Particularly I would like to study the interaction between structures involved in emotional behavior. Moreover, I am interested in understanding how these circuits are affected in psychiatric disorders such as bipolar disorder and depression.

ENDURE Trainee Career Goals and Plan:

My career goal is to become a successful researcher in an academic setting. To accomplish that, I am going to join a neuroscience graduate program in the United States that provides me the training required to become a research leader.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **Massachusetts Institute of Technology**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Li-Huei Tsai, Omer Durak, Elizabeth Gjoneska**

ENDURE Research Project Title: **Prefrontal projections to amygdala and striatum activated in active avoidance**

Avoidance is a core symptom of anxiety disorders, and the underlying circuits remain to be characterized. We previously showed that inactivation of the prelimbic prefrontal cortex (PL), the ventral striatum (VS), or the basolateral amygdala (BLA) impaired expression of platform-mediated avoidance (Bravo-Rivera et al., 2014). Inactivation of the infralimbic prefrontal cortex (IL) impaired avoidance extinction. It remain unclear whether PL and IL modulate avoidance through projections to VS or BLA. To address this, we infused retrograde tracers in VS (Fast Blue) and BLA (CT-B), and immuno-labeled the activity marker c-Fos in prefrontal cortex after rats underwent avoidance reactivation or extinction. We found increased c-Fos labeling in IL in rats that underwent extinction

compared to reactivation controls. Compared to reactivation controls, the increased c-Fos in extinction was observed in both BLA-projecting and VS-projecting neurons. Reactivation induced more c-Fos labeling in prelimbic neurons projecting to VS than to BLA, suggesting that PL may mediate avoidance through projections to VS rather than to BLA. Taken together, these results suggest that whereas IL projections to both VS and BLA may mediate avoidance extinction, PL projections to VS seem to be recruited over projections to BLA in avoidance expression.

ENDURE TRAINEE ABSTRACT

ALAN MONTIEL-RAMOS

Home Institution and State: **University of Puerto Rico-Rio Piedras Campus, Puerto Rico**
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Undergraduate Academic Level: **Senior**
Undergraduate Major and Expected Graduation Date: **Cellular and Molecular Biology, 2016**
Mentors/Advisors at Home Institution: **Dr. Carlos Jimenez-Rivera**

ENDURE Trainee Scientific Interest:

Having family members and knowing that addiction is an immense social and health problem in Puerto Rico is what has fueled my interest in this particular field. My experience in Dr. Jimenez's cocaine addiction research laboratory has helped me begin to understand how the addicted brain works and I hope, in the future, my contributions to the field will enable a better understanding of what is being altered during the addictive process.

ENDURE Trainee Career Goals and Plan:

I plan to pursue a MD-PhD career and conduct research in an academic institution. I will continue to explore drug addiction in a clinical setting (with human subjects). With ENDURE's current support, I will have the competitive edge needed to excel in research oriented academic institutions. When I finally attain my career goal of being a professor and neuroscience researcher, I hope to make significant discoveries in the addiction field and serve as a role model for Hispanic scientists and researchers from underrepresented groups or countries.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **Medical University of South Carolina - Institute of Psychiatry**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Jacqueline Barker**

ENDURE Research Project Title: **Role of Infralimbic cortex's glutamatergic projections to the nucleus accumbens shell in the expression of habitual ethanol seeking**

Alcoholism is a type of addiction characterized, in part, by a transition from flexible, goal-directed drinking behavior to a habitual alcohol seeking. This behavioral change is defined by a reduced sensitivity to changes in action-outcome contingencies. Since mechanisms involved in habitual alcohol seeking have not been well elucidated, we investigated the neurocircuitry of habitual reward seeking. In particular, we focused on the role of glutamatergic projections from the

Infralimbic cortex (IfL) leading to the Nucleus accumbens shell (NAcS) in the expression of a goal-directed behavior. Our data suggest that regulation of glutamate release in the NAcS is required for the expression of a habitual food and alcohol seeking. In addition, inhibition of the IfL has been shown to restore goal-directed food seeking (Coutureau & Killcross, 2003). However, the role of the IfL has not been assessed in habitual alcohol seeking. We believed that inhibition of glutamatergic projection neurons in the IfL could restore a goal-directed behavior after the transition to a habitual behavior has been established. Our data suggests that glutamatergic projections from the IfL are required for the expression of habitual sucrose and ethanol seeking and that such mechanisms involved are independent of the substance consumed.

ENDURE TRAINEE ABSTRACT

ALEXANDRA MARIA OGANDO VELEZ

Home Institution and State: **University of Puerto Rico, Rio Piedras, Puerto Rico**
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Undergraduate Major and Expected Graduation Date: **Biology, 2017**
Mentors/Advisors at Home Institution: **Loyda Melendez, Yisel Cantres, Carmen Maldonado, Jose Garcia**

ENDURE Trainee Scientific Interest:

Throughout my research experience I have had the opportunity to learn about the human immunodeficiency virus (HIV), with a special interest in HIV-1-associated neurocognitive disorders (HAND). I am truly intrigued by how an infection that causes progressive failure in the immune system can play a significant role in the health and integrity of the central nervous system. Currently, I am in an on-going process of learning about how the protease cathepsin B and its regulators might be potential biomarkers for HIV-associated-dementia in HIV-seropositive patients and how they contribute to neural dysfunction when unregulated and secreted by HIV-infected macrophages. Hopefully, this will give us a better understanding of the neuropathology that affects many people infected with HIV and its similarities with other neurodegenerative diseases, such as the Alzheimer's disease.

ENDURE Trainee Career Goals and Plan:

Early in my life I developed a love for the sciences. For as long as I can remember, I have been intrigued by the different concepts that constitute the biological processes of life, as well as the chemistry behind them. I have also been very passionate about helping people and being a contribution to the well-being of my community. This is why I have chosen to pursue an MD/Ph-D program. Through it not only will I get to help save lives through medicine, but I will also get to explore, create, and contribute knowledge in the scientific fields that most interest me, such as neurodegenerative diseases. I am aware that these are highly competitive programs, which is why I am currently studying extremely hard and learning as much research techniques as possible. This, along with the help of my mentors, will hopefully help me achieve my ultimate goals.

ENDURE TRAINEE ABSTRACT

TARA MARINA ORTIZ-ITHIER

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Undergraduate Academic Level: **Junior**
Undergraduate Major and Expected Graduation Date: **Biology, 2018**
Mentors/Advisors at Home Institution: **Dr. Carlos A. Jimenez Rivera**

ENDURE Trainee Scientific Interest:

Drug availability has generated one of the biggest public health issues in Puerto Rico: substance use and abuse. Unfortunately, help for the approximately 60,000 drug dependent individuals is scarce. The situation is worsened by the popular belief that addiction is not a health problem, leading to the persistent systematic criminalization and social marginalization of addicts. This major health and social problem lead to my interest in addiction. Sponsored by ENDURE, I am currently integrated in a research laboratory that examines the pathophysiology of cocaine addiction. We observe for changes at the behavioral, electrophysiological and molecular levels during the development and expression of behavioral sensitization in rats. Hopefully our research will provide insights of the underlying mechanisms of addiction.

ENDURE Trainee Career Goals and Plan:

After I complete my biology major, I will pursue a neuroscience career in a research oriented academic institution. This research experience has solidified my goal of obtaining an M.D. Ph.D. focused on addiction research. I will actively address my professional and scientific development in order to become an accomplished scientific leader.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **University of Puerto Rico- Medical Sciences Campus**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Carlos A. Jimenez Rivera**

ENDURE Research Project Title: **Role of PKMz and PKCi in cocaine sensitization**

I am investigating the protein expression profile of PKMζ and PKCi/λ at different time points of the sensitization process. This will allow the observation of how their expression changes with time and allow comparisons with protein expression of animals treated with an inhibitor of these proteins (ZIP). It was previously showed that PKC □/ λremains u

system 24hrs after 5 days of cocaine administration. PKMζ expression increases in the Nucleus Accumbens (NAc) and the Hippocampus (Hipp). Here changes in expression after a withdrawal period were studied. Sprague Dawley Male Rats (250g) received intraperitoneal cocaine (15mg/kg) or 0.9% saline injections for 5 days and locomotor activity was recorded for 1hr. A 7 day withdrawal period was allowed. 24 hours later, rats were sacrificed and tissue micro punches of all four brain areas were subjected to protein extraction and western blot analysis. Preliminary data suggests an increase of PKMζ expression in the NAc and the Hipp. Further studies regarding PKCi/λ's role in LTP formation and if there is a dynamic interaction between PKCi/λ and PKMζ, will shed some light into the pathological mechanisms that underlie cocaine addiction.

ENDURE TRAINEE ABSTRACT

THIBAUT R. PARDO-GARCÍA

Home Institution and State: **University of Puerto Rico - Río Piedras Campus, Puerto Rico**
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Undergraduate Academic Level: **Senior**
Undergraduate Major and Expected Graduation Date: **Cell and Molecular Biology, 2016**
Mentors/Advisors at Home Institution: **Dr. Carmen S. Maldonado-Vlaar, Dr. José E. García-Arrarás**

ENDURE Trainee Scientific Interest:

My scientific interests focus the areas of Neuropsychopharmacology, Behavior and Neurological Diseases. However, I welcome the opportunity of exploring other neuroscience research topics.

ENDURE Trainee Career Goals and Plan:

My long-term future career goals are to obtain an MD/PhD degree, become a neurosurgeon and have my own neuroscience research laboratory. Throughout this time, I will also work to create a foundation, which will support the research done by undergraduate minorities with a passion for research in the neurosciences. I am also interested in organizing a group of volunteers with a wide range of skills with the purpose of assisting and getting involved in their community, from giving talks and orientations to helping does with special needs. With my future scientist-physician training, I will volunteer and give help where my skills and scientific background are needed around the globe and at home.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **University of Pennsylvania**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Irwin Lucki, Dr. Caroline Browne**

ENDURE Research Project Title: **The novel kappa opioid receptor antagonist LY2444296 elicited antidepressant-like effects in the mouse Forced Swim Test**

Conventional antidepressants, like SSRI's, have many drawbacks that include but are not limited to various side effects, 3-4 weeks before there is a notable behavioral effect and 30-40% of patients are resistant to their first treatment. In light of this, a different type of pathway, the opioid system, has been the target for the development of novel antidepressants. Key to this therapeutic strategy is the kappa opioid receptor (κ -ORs). Clinical studies have shown promise since patients as well as animals treated with κ -ORs antagonists have shown significant antidepressant and anxiolytic

effects. Unfortunately, κ -OR antagonists are not viable as therapeutics due to their long duration of action (nor-BNI elicits its behavioral effects during 28 days). However, due to the promise they have shown, my task was to understand the behavioral effects of a novel κ -OR antagonist LY2444296 and to elucidate its duration of action. Results showed that LY2444296 produced an antidepressant-like effect in the Forced Swim Test at 1 h post-injection but not at 24 h, suggesting that it's a short and not long acting compound. Tests involving Oprk1-/- mice and the Hot Plate test further evidenced LY2444296's action through the κ-ORs to produce its antidepressant-like effect.

ENDURE TRAINEE ABSTRACT

WILLIAM A. RAMOS-GUASP

Home Institution and State: **University of Puerto Rico - Rio Piedras, Puerto Rico**
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Undergraduate Academic Level: **Senior**
Undergraduate Major and Expected Graduation Date: **Cellular and Molecular Biology, 2016**
Mentors/Advisors at Home Institution: **Dr. Gregory J. Quirk**

ENDURE Trainee Scientific Interest:

As a scientist, my main research interest is to study the cellular and molecular basis underlying complex behavior in mammals. Specifically, I am interested in deciphering specific neural circuits and molecular pathways mediating cognitive and behavioral impairment in neurological and psychiatric disorders.

ENDURE Trainee Career Goals and Plan:

After I finish my baccalaureate studies at the University of Puerto Rico, my plan is to pursue an MD/Ph.D. dual degree. As a physician-scientist, my goal is twofold: (1) deepen the understanding of the human brain, hopefully contributing to the development of novel treatments for neurological and psychiatric disorders, and (2) provide some hope to the patients, by conveying back that there is progress being made, and by sharing the knowledge with them as it becomes available.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **Massachusetts Institute of Technology**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Kay M. Tye**

ENDURE Research Project Title: **Amygdala-prefrontal interactions during the competition of fear- and reward-related memories**

In nature, environmental stimuli signaling fearful or rewarding outcomes may be presented simultaneously, forcing animals to choose between behaviors that may be in competition with each other. However, the mechanisms underlying the competition and coordination of fear- and reward-related behaviors are not well understood. Here, we used multichannel single-unit recordings in freely-moving rats to examine interactions between the basolateral amygdala (BLA) and the prelimbic cortex (PL), which are highly interconnected structures implicated in both fear and reward learning. During a cue discrimination task in which one cue predicted electrical footshocks ("fear cue") and another cue predicted sucrose ("reward cue"), we detected populations of neurons in both structures that exhibited phasic changes in firing to either the fear

cue (BLA: 9%; PL: 25% of the recorded neurons) or the reward cue (BLA: 12%; PL: 15%). Furthermore, both structures showed populations of neurons that exhibited the same type of response (BLA: 10%; PL: 14%) or opposite responses (BLA: 8%; PL: 5%) to the fear and reward cues. Cross-correlation analysis showed strong correlated activity between the BLA and PL during both cues, suggesting potentially crucial interactions between the BLA and PL. To this end, using an optogenetic-mediated stimulation approach we found that photostimulation of BLA-to-PL projections reduced the latency to conditioned freezing (fear expression), especially during the "competition trials" in which rats were challenged by the simultaneous presentation of both cues (Competition Trials: laser-OFF, 7.7 s and laser-ON, 2.8 s, $p = 0.0043$; Fear Trials: laser-OFF, 1.6 s and laser-ON, 0.8 s, $p = 0.25$). Despite shorter latency to freezing, there was no detectable change in the total percentage of time that rats spent freezing during the cue (Competition Trials: laser-OFF, 8% and laser-ON, 11%, $p = 0.52$; Fear Trials: laser-OFF, 59% and laser-ON, 58%, $p = 0.74$). Meanwhile, photostimulation of this pathway had no effect in any reward-related behavior. Thus, while both the BLA and PL show strong correlates of fear and reward memories, our preliminary optogenetic results suggest that BLA projections to PL promote faster expression of fear responses, especially when the fear and reward memories are competing to control behavior.

ENDURE TRAINEE ABSTRACT

LUZIVETTE ROBLES CARDONA

Home Institution and State: **University of Puerto Rico, Río Piedras Campus**
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Undergraduate Academic Level: **Senior**
Undergraduate Major and Expected Graduation Date: **Cellular and Molecular Biology, 2016**
Mentors/Advisors at Home Institution: **Dr. Carmen S. Maldonado-Vlaar**

ENDURE Trainee Scientific Interest:

I am attracted to research focused to understanding the cellular and molecular mechanisms underlying perception, attention, sensory processing, learning and memory and decision-making. I also have a very special interest: the neuroscience of music perception. I find the phenomenon of music endlessly fascinating. From how the brain hears and interprets music to the biological processes that occur with musical performance; it is the ultimate mixture of science and art. I play piano and, being a musician, I would love to study the brain's perception of music down to the molecular level.

ENDURE Trainee Career Goals and Plan:

During my bachelor's degree I want to learn and experience as much as I can. I want to make the most out of my time studying and wish to maintain good grades. Also, I plan on acquiring as much research experience as possible as an undergraduate student. During the summer I participated in a research internship on the U.S. mainland. After I graduate and obtain my B.S. degree in cellular and molecular biology, I will apply to graduate school and continue studying, eventually obtaining a PhD. Afterwards, I plan on dedicating myself fully to research.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **Northwestern University, Chicago, IL**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. John F. Disterhoft**

ENDURE Research Project Title: **Optimizing odor-signaled eye blink conditioning paradigm in mice**

Investigating associative learning is an important part of neuroscience research. One of the obstacles faced is designing an experiment that can record needed information while being representative of learning. A commonly used task is eye blink conditioning; however, current paradigms can only apply a limited amount of physiological recordings and ignore the context

where learning occurs. Optimizing the experiment by restraining the animal's head and adding odor cues would increase the variety of physiological information that can be obtained and serve to better characterize learning. To optimize the paradigm, we applied it to mice which were head fixed on top of a wheel. The criteria used for determining if the experiment works is whether mice are able to differentiate between odors and learn to respond to a conditioned stimulus in anticipation of another unconditioned stimulus. This is called a conditioned response. The preliminary data show that mice are able to learn odor discrimination while restrained. With additional options for physiological recordings and a task that better represents the acquisition of sensory information; the eye blink paradigm becomes more useful for investigating associative learning. This improvement would benefit the field by helping elucidate the brain regions associated with learning and memory.

ENDURE TRAINEE ABSTRACT

JEAN CARLOS RODRIGUEZ DIAZ

Home Institution and State: **University of Puerto Rico-Rio Piedras Campus, Puerto Rico**
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Undergraduate Academic Level: **Senior**
Undergraduate Major and Expected Graduation Date: **Biology, 2016**
Mentors/Advisors at Home Institution: **Dr. Jose Colon-Saez, Dr. Jose Lasalde-Dominicci**

ENDURE Trainee Scientific Interest:

Neuroscience and biomedical engineering are the main fields that have caught my attention. Increasing our understanding how the nervous system coordinates its functions and different everyday activities is one of my goals. I want to be involved in the development of novel technologies that can be used to repair or substitute certain areas of the body. Particularly, the development of neural prosthesis and brain computer interfaces. I would also like to work studying neuronal circuits. My interest is in other fields like Physics and Chemistry makes the interdisciplinary nature of the field of neuroscience very appealing to me, especially neural engineering.

ENDURE Trainee Career Goals and Plan:

My goal is to become a professor and researcher. I desire to pursue a PhD or a MD-PhD in neuroscience or biomedical engineering in a laboratory related to neural engineering. My goal is to discover new techniques and knowledge that may lead to a better understanding of the nervous system. I wish to take part in the development of novel technology that may improve the quality of life for those suffering from some impediment due to diseases or injuries of the nervous system. I also want to take part in the training of future scientists.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **Johns Hopkins University**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Jose Colon-Saez, Dr. Jose Lasalde-Dominicci**

ENDURE Research Project Title: **Direct reprogramming of Fibroblast to chemical induced Schwann cells**

The project consisted on directly reprogramming human derived fibroblast into chemical induced Schwann cells. The main objective was to find a way to obtain Schwann cells derived from fibroblast that could be used to model diseases from patient derived fibroblasts. To directly reprogram the fibroblast, chemical compounds were used to promote endogenous gene

expression. We identified several surface markers that could be used to purify the cells. In order to identify these potential markers we initially worked with human derived Schwann cells with the Green Fluorescence Protein reporting system. They were purified by Fluorescence-activated cell sorting. They were then used to obtain their global gene expression profile. With the gene expression profiling, the possible surface markers were identified. The Fluorescence-activated cell sorting was used to determine if the markers would yield the desired purified cells. We also worked on determining the mechanism by which these chemical compounds are acting. We started to use promoter trapping to identify possible transcription factors affected by the compounds and the drug affinity responsive target stability test to identify possible proteins that interact with the chemical compounds.

ENDURE TRAINEE ABSTRACT

CAROLINA SANTIAGO-ROBLES

Home Institution and State: **University of Puerto Rico, Río Piedras Campus, Puerto Rico**
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Undergraduate Academic Level: **Senior**
Undergraduate Major and Expected Graduation Date: **Biology, 2016**
Mentors/Advisors at Home Institution: **Mark W. Miller, Ph.D.; Eduardo Rosa-Molinar, Ph.D.**

ENDURE Trainee Scientific Interest:

The experience gained by doing research has been one of the most meaningful as an undergraduate student. Once I started in the NIH-ENDURE program known as NeuroID, I was accepted in Dr. Rosa-Molinar's laboratory in the University of Puerto Rico, Río Piedras Campus. My research project is about studying the motor connectomics of the vertebrate spinal cord in the Western Mosquitofish. Ever since I started doing research it made it easier for me to understand the courses and applying the techniques learned was all about it. Entering the world of publications, poster presentations, speeches, community outreach, scientific interactions, traveling to attend conferences, among other activities is truly amazing.

ENDURE Trainee Career Goals and Plan:

Establishing short and long term-career goals are extremely important for an individual's success and especially in the field of Natural Sciences, where competition is one big of a deal. In the present, I have a priority and in mind completing my Biology Bachelor's degree and graduating next year with a good GPA. For my long term goals, I want to complete an M.D./Ph.D. in Neuroscience, later on going to medical school and specialize in neuroradiology, since a little girl I loved to work with photographs, computers and technology along with science and a great combination will come to reading x-rays, MRI's, sonograms and identify what's wrong for able to give a diagnosis, in other words, practice medicine along with doing some research.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **Nanoprobes Inc., Long Island, NY**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Vishwas Joshi, Ph.D.; Eduardo Rosa-Molinar, Ph.D.; Mark W. Miller, Ph.D.**

ENDURE Research Project Title: **Silver-graphene dots as nanoscale imaging probes for correlative optical and electron microscopy**

Major advances in cell biology and neuroscience have been made possible by new imaging

instrumentation and the concomitant development of appropriate probes. Optical and electron based imaging instruments extend detection capabilities to the nanoscale level, but new nanoscale probes are needed to take advantage of the increased resolution. Graphene dots (GDs), 0D nanostructures of sp2 C in the 2-20 nm size range, show intrinsic fluorescence due to quantum confinement, surface defects, and edge structures and have attracted tremendous attention for their potential in cellular sensing and imaging. However, that potential has not been realized. A strategy to enhance the fluorescence quantum yield of GDs is by plasmonic interaction with metallic nanoparticles, most typically silver or gold. The proximity of a metallic nanoparticle to a fluorophore increases the local electromagnetic radiation intensity and the probability of spontaneously emitted photons. Therefore, the fluorescence of GDs can be enhanced by direct contact with metallic nanoparticles, in this case, silver nanoparticles. In our study, we show the utility of the silver-graphene dots (Ag-GDs) as a nanoscale imaging probe. Three dimensional correlative imaging shows internally localized clusters of Ag-GDs within the somas and axons of spinal motor neurons following retrograde neural tract-tracing. New nanoscale imaging probes such as the one described here are needed to overcome the challenges of new optical and electron based imaging technologies and take advantage of the increased resolution they provide.

ENDURE TRAINEE ABSTRACT

SEBASTIAN VELAZQUEZ

Home Institution and State: **University of Puerto Rico Rio Piedras Campus, Puerto Rico**
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Undergraduate Academic Level: **Senior**
Undergraduate Major and Expected Graduation Date: **Biology and Chemistry, 2017**
Mentors/Advisors at Home Institution: **Dr. José E. García Arrarás**

ENDURE Trainee Scientific Interest:

My research interest focuses on cellular and molecular neurobiology; particularly on protein structure, function and overall configuration. I am interested in working on the characterization of protein interactions and their relationship with malformations or aggregations that are associated to neurological diseases. Studies in this area of research have the potential of identifying specific sites of interaction. I believe that protein analyses techniques could be improved not only in neurological systems but in other systems to identify analog proteins and their functions.

ENDURE Trainee Career Goals and Plan:

My immediate career goal plan includes finishing my undergraduate education and obtaining outstanding research experiences in the field of Neuroscience. At the same time I will explore the path to continue graduate studies leading to a Ph.D at a top mainland institution. I would like to focus my doctoral studies on protein interaction and methodologies that could give an insight in identifying a protein unknown ligand sites. I believe that by improving technological tools will advance the elucidation of these binding mechanisms and serve for the development of new potential therapies. My long-term plans are aimed at working in a leading academic research institution developing novel methods to identify key components of specific neurological diseases.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **University of Cincinnati**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Rafeeq Habeebahmed**

ENDURE Research Project Title: **Reactive Oxygen Species in Adult Cardiomyocyte Cell Cycle Regulation**

During the summer I had the opportunity of being part of the Univ. of Cincinnati Cardiovascular Disease Center. This program gave me a new insight into scientific research and its possibilities. I worked with cardiomyocytes which share several similarities with neurons. The laboratory where I worked focused on regenerating the ischemic myocardium using miRNa's. It focuses not only on

symptomatic treatment but also in the development of novel therapeutic intervention for the repair and regeneration of ischemic myocardium. The research made me think of possible nervous factors that are influencing neurons but are not being studied, and of the potential of combining disciplines for the development of new methodologies. This encouraged me to do research and to implement different methodologies and more extensively to finish my undergraduate studies combining degrees in Biology and Chemistry. Participation in this program exposed me to techniques such as cell cultures, Immunofluorescence, Flow Cytometry, PCR and Confocal Microscopy. This experience leads me to the search and experience in various fields through my undergraduate studies, with the vision to combine disciplines for the efficiency in scientific research.

TENNESSEE STATE UNIVERSITY-NEUROSCIENCE EDUCATION AND RESEARCH VANDERBILT EXPERIENCE (TSU-NERVE)

TENNESSEE STATE UNIVERSITY
Principal Investigator: *Dr. Kiesa Kelly*
Partner Institutions: Vanderbilt University

PROGRAM DESCRIPTION: The TSU-NERVE program in partnership with Vanderbilt University will prepare underrepresented students majoring in STEM disciplines at Tennessee State University, a Historically Black College and University, for graduate study and careers in Neuroscience.

The TSU NERVE program will provide quality research, didactic, and professional development opportunities to support programmatic initiatives and goals: free Neuroscience courses, seminars, and retreats at Vanderbilt University; a 6-part Workshop series on graduate school admissions that will involve directors of Neuroscience doctoral programs from around the country; a 3-semester Neuroscience research seminar course; research experiences in Vanderbilt Neuroscience labs during the academic year; and summer research experiences at Vanderbilt or one of three T32-funded Neuroscience institutions (U. of Michigan, U. of Minnesota, and Oregon Health and Science University) with which a partnership has been formed.

Carefully crafted retention plans will maximize TSU-NERVE trainee completion and success. These include: 1) a Vanderbilt Teaching Assistant to tutor students in rigorous Vanderbilt Neuroscience coursework, 2) Vanderbilt graduate student mentors who will work with each TSU-NERVE student in his/her academic year lab placements, and 3) individual mentoring and advising from program directors that include evaluation of participant progress. Among enrolled TSU students, TSU-NERVE draws from the University Honors Program and TSU's NSF-funded HBCU-Undergraduate Programs for STEM majors.

TSU-NERVE will: 1) recruit talented (primarily African American) STEM majors from TSU interested in Neuroscience, 2) provide appropriate support and scaffolding for these students as they receive quality research and didactic experiences at major research institutions, and 3) advance students from underrepresented backgrounds into doctoral programs in Neuroscience with well-crafted professional development activities. Well-conceived admissions and retention plans will increase completion rates. Additionally, comprehensive formative and summative assessments will be conducted in both program evaluation and the career development of trainees to ensure the success of the TSU-NERVE program.

ADDITIONAL PROGRAM TEAM MEMBERS:

Dr. Terry L. Page – Co- Program Investigator, Vanderbilt University
Dr. Lisa A. de la Mothe – Co-Program Director, Tennessee State University
Dr. Quincy Quick – Co-Program Director, Tennessee State University

ENDURE TRAINEE ABSTRACT

ERIN CHATMAN

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Undergraduate Academic Level: **Junior**
Undergraduate Major and Expected Graduation Date: **Psychology, 2017**
Mentors/Advisors at Home Institution: **Dr. Lisa A. de la Mothe, Dr. Quincy Quick**

ENDURE Trainee Scientific Interest:

I am particularly interested in researching the long term effects of adolescent drug use on the brain, especially marijuana. With the legal status of marijuana changing in many states, it is important that people understand how the drug will affect them.

ENDURE Trainee Career Goals and Plan:

First I would like to receive my bachelor's degree in psychology, and then go on to a neuroscience PhD program. In addition to the research training I will obtain through my graduate program I would also like to seek out opportunities to teach while I am working on my PhD. Ultimately, I would like to work in a laboratory setting at a hospital or university researching the effects of various substances on the brain.

ENDURE Trainee Summer Research Experience:

ENDURE Research Project Title: **TSU-NERVE**

I have not yet been able to experience a summer research project. However, I will be beginning my research training in the spring with faculty at Vanderbilt University. In addition this coming summer I will be able to gain additional research experience through the TSU-NERVE program where I have the opportunity to complete research experiences with University of Minnesota, University of Michigan, or Oregon Health and Science University. I am hoping to conduct research in the area of neuropsychopharmacology.

ENDURE TRAINEE ABSTRACT

ROMIN E. GEIGER

Home Institution and State: **Tennessee State University, Tennessee**
Email: **rgeiger@my.tnstate.edu**
Undergraduate Academic Level: **Junior**
Undergraduate Major and Expected Graduation Date: **Psychology, 2017**
Mentors/Advisors at Home Institution: **Dr. Quincy Quick, Dr. Lisa de la Mothe**

ENDURE Trainee Scientific Interest:

Cognitive neuroscience has been something that I have always been interested in. I have always wondered what makes humans think and behave, and the reasons for those thoughts and behaviors. What is more important to me is figuring out what parts of the brain are active when humans partake in certain behaviors. I also am very interested in this study of cognitive neuroscience in young children. Children must learn a lot of information when they are very young and as a human gets older that person learns at a slower pace. I would like to study this process and figure out if there are any ways to stop the rapid regression of learning at an older age.

ENDURE Trainee Career Goals and Plan:

In 100 words or less describe the career goals and plans of the trainee supported by the ENDURE program If given the opportunity I would love to study humans from both ends of the spectrum from young children to more seasoned individuals. I would like to work for a company or non-profit organization that is geared toward the betterment of helping children psychologically. Whether be finding cures/remedies for disorders that occur mostly in children at a young age like ADHD or anxiety disorders. My plan is to obtain my Ph.D. in Cognitive Neuroscience with a specialty in neuroscience behavioral disorders. If I do not go straight into a doctoral program I plan to pursue a master's degree in clinical psychology and then a Ph.D. in Cognitive Neuroscience.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **Tennessee State University**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Anne Hart PhD**

ENDURE Research Project Title: **TSU-NERVE**

This is the first cohort of students of the TSU-NERVE program at Tennessee State University. However we have collaborative agreements from at least (3) Neuroscience REU programs (University of Minnesota, University of Michigan, and Oregon Health and Science University that will provide summer research experiences for our students.

ENDURE TRAINEE ABSTRACT

GERMYSHA LITTLE

Home Institution and State: **Tennessee State University, Tennessee**
Email: **glittle@my.tnstate.edu**
Undergraduate Academic Level: **Junior**
Undergraduate Major and Expected Graduation Date: **Biology, 2017**
Mentors/Advisors at Home Institution: **Dr. Quincy Quick, Dr. Lisa De la Mothe**

ENDURE Trainee Scientific Interest:

I am interested in researching neurological childhood disorders; particularly I would like to conduct translational research related to neurological disorders in children as previously mentioned. This will most importantly provide me an avenue to give back as relates to my passion for children.

ENDURE Trainee Career Goals and Plan:

My plan is to enter a neuroscience graduate program or MD/PhD program where I can bridge both basic and clinical science, as well enhance neuroscience awareness in underrepresented communities.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **Vanderbilt University**

I have not begun research yet. I will begin researching spring 2016 at Vanderbilt University. There I will choose my research path. Like stated before, I am very much interested in childhood diseases/disorders, for example autism.

ENDURE TRAINEE ABSTRACT

JORDYNE JACKSON

Home Institution and State: **Tennessee State University, Tennessee**
Email: **jordyne_13@yahoo.com**
Undergraduate Academic Level: **Junior**
Undergraduate Major and Expected Graduation Date: **Psychology, 2017**
Mentors/Advisors at Home Institution: **Dr. Lisa A. de la Mothe, Dr. Quincy Quick**

ENDURE Trainee Scientific Interest:

The brain and how it relates to behavior has always been very interesting to me. Due to both personal experiences with diseases such as Alzheimer's, with which my grandmother suffers, as well as my overall interest in understanding more about mental illness, I am drawn to research that relates to these areas. Hands on experience with Alzheimer's has taught me so much about how to work with individuals with mental disorders and I would like to expand that knowledge to include understanding brain mechanisms related to mental disorders including depression.

ENDURE Trainee Career Goals and Plan:

I am very interested in clinical psychology and clinical neuroscience. I would love to be able to counsel someone through their issues and potentially be able to help them not just as a practitioner, but also through research. I have not decided on a specific disorder or population that I am most interested in working with, but am excited about the ENDURE program and believe it will help me to be able to make the right choices in my career path.

ENDURE Trainee Summer Research Experience:

ENDURE Research Project Title: **TSU-NERVE**

I have not yet been able to conduct summer research but will do this coming year through the TSU-NERVE program where we are partnered with one of several institutions (University of Minnesota, University of Michigan, Oregon Health and Science University). I am interested in conducting research in a clinical neuroscience laboratory so I can gain more experience in that field, and better prepare to pursue a doctoral degree.

ENDURE TRAINEE ABSTRACT

RENITA JONES

Home Institution and State: **Tennessee State University, Tennessee**
Email: **renitadjones@yahoo.com**
Undergraduate Academic Level: **Junior**
Undergraduate Major and Expected Graduation Date: **Neuroscience, 2017**
Mentors/Advisors at Home Institution: **Dr. Lisa A. de la Mothe, Dr. Quincy Quick**

ENDURE Trainee Scientific Interest:

I have a variety of interests related to understanding the brain and behavior such as the effect of substances on brain functioning, evolutionary and comparative anatomy and potential for future neural adaptations, as well as cognitive neuroscience. The topic of mental disease and disorders interest me, in particular their thought processes and how they compare to those of a non-clinical population.

ENDURE Trainee Career Goals and Plan:

My overall desire is to understand the human mind and how it functions and I plan to pursue this by completing a PhD in Neuroscience. I have not narrowed down and selected a specific career path. My interest in a career in neuroscience and psychology is still broad and I am looking forward to the opportunity to learn more about specific fields within neuroscience. Currently I am drawn to the clinical fields such as clinical neuroscience because while I am excited about conducting research, I would like to practice and apply what I learn in a clinical setting. I also believe this will give me unique insight into developing research questions.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **Tennessee State University**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Ashleigh Maxcey**

ENDURE Research Project Title: **TSU-NERVE**

Beginning this semester I will have the opportunity to conduct research with Dr. Ashleigh Maxcey at Tennessee State University in her cognitive neuroscience laboratory. In addition as a member of the TSU-NERVE program I will begin conducting research in the spring for the remaining two years of my degree with a faculty member and research lab at Vanderbilt University. The summer will also provide an additional opportunity for research through summer partnerships with the TSU-NERVE program at University of Minnesota, University of Michigan, or Oregon Health and Science University. I am excited about the broad number of research opportunities available to me through this program and look forward to experiencing various fields within neuroscience.

BP-ENDURE ST. LOUIS: A NEUROSCIENCE PIPELINE

WASHINGTON UNIVERSITY IN ST. LOUIS
Principal Investigator: *Dr. Erik Herzog*
Partner Institutions: University of Missouri – St. Louis and Harris-Stowe State University

PROGRAM DESCRIPTION: The objective of the program is to provide rigorous and critical training in neuroscience to a diverse cohort of students from three partner institutions (Washington University, the University of Missouri-St. Louis and Harris-Stowe State University). By providing support for 10 funded positions for summer research, this proposal will establish a Pipeline to graduate school. The Pipeline emphasizes sustained training in oral and written science communication, discovery science and outreach experience. Specifically, this proposal will support 10 early-stage trainees annually for up to three years each. Our Pipeline has long-standing commitments to cutting-edge research, to interdisciplinary education, and to providing modern career development.

We seek to be a Program that responds to changes in the research environment by helping our students to pursue important and innovative problems and concepts, to adopt new techniques and to communicate effectively with their peers and the general public. The proposal will allow for the addition of three interactive and immersive courses that will appeal to teens and create a community of young scientists who can begin as early as the summer after their freshman year. The curriculum and research environments will remain broad and deep, combining expertise in molecular, cellular and systems-level approaches to the study of neural function and dysfunction.

Major new initiatives aimed at accomplishing these goals include: 1) the establishment of a new network of research opportunities for undergraduates interested in the neurosciences, 2) the introduction of three interactive courses (The Teen Brain, Neuroscience Futures, and Skills for a Neuroscientist) to bolster neuroscience fundamentals and a sense of community among the students, 3) enhanced involvement of the undergraduates in the Society for Neuroscience Brain Bee as part of their training in science communication, and 4) refinement of a near peer-mentoring program that has graduate students working with undergraduates and undergraduates working with high school students. These initiatives will ensure our students remain at the forefront of developments in neuroscience research, teaching and outreach.

ADDITIONAL PROGRAM TEAM MEMBERS:

Dr. Sonya Bahar – University of Missouri-St .Louis
Dr. Robert Paul – University of Missouri-St. Louis
Dr. Jana Dorfman Marcette – Harris-Stowe State University
Ms. Rochelle Smith – Program Manager, Washington University
Ms. Diana José-Edwards – Program Assistant, Washington University

ENDURE TRAINEE ABSTRACT

GARRETT W. AROSEMENA OTT

Home Institution and State: **Washington University**
Email: **g_ott@outlook.com**
Undergraduate Academic Level: **Junior**
Undergraduate Major and Expected Graduation Date: **Physics and Music Cognition, 2017**
Mentors/Advisors at Home Institution: **Ralph Wessel PhD, Benjamin Duane PhD**

ENDURE Trainee Scientific Interest:

Biological Imaging of the Brain (i.e. neuroimaging), Computational Neuroscience, Music/Acoustics Perception.

ENDURE Trainee Career Goals and Plan:

MD/PhD (MD in neuroradiology and PhD in physics/biomedical engineering or computational neuroscience).

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **Washington University**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Marcus E. Raichle, MD**

ENDURE Research Project Title: **"Nuclear Magnetic Resonance in the Brain: Identification and Analysis of varying field-strength parameters in Task and Resting-State functional Magnetic Resonance Imaging"**

Magnetic Resonance Imaging employs gradient fields and electromagnetic perturbations in a high-strength static magnetic field to induce Nuclear Magnetic Resonance, the absorption and re-emission of radio-frequency energy at a specific frequency via resonating magnetic nuclei. MRI utilizes the abundance of water molecules in the body through specific tuning to resonate 1H. MRI has become the face of modern biomedical imaging, capable of non-invasive generation of biomarkers for prognosis of disease as well as identification, localization, and labelling of critical motor, language, and memory structures without exposure to ionizing radiation as entailed in Positron Emission Tomography, X-Rays, Computed Tomography, and other alternatives. Traditional MRI programs, or pulse sequences, remain more than adequate for measurements of shape, size, and integrity of gray and white matter structures (structural), due to their temporal consistency; however, functional MRI, the examination of neural activity via blood-oxygenation-level-dependency, continues to suffer from the inherent temporal discrepancy between neuronal and

haemodynamic responses, and image acquisition time (2-3s). Newly developed ultra-fast pulse sequences (Feinberg 2013), capable of imaging the brain in 100-350 milliseconds, will allow us to better characterize the neural basis for cognitive processes, as well as understand the ways in which these processes malfunction during disorder and disease.

ENDURE TRAINEE ABSTRACT

DAVINELLE DANIELS

Home Institution and State: **Washington University**
Email: **davinelly@gmail.com**
Undergraduate Academic Level: **Student Researcher**
Undergraduate Major and Expected Graduation Date: **Post-Baccalaureate Research Program, 2015**
Mentors/Advisors at Home Institution: **Dr. Eric Herzog**

ENDURE Trainee Scientific Interest:

As a third year research scholar my interests have migrated from developmental cognition to translational neurological questions. Obscure characterization of neurological dysfunction inhibits the development of pharmaceutical treatment. I am interested in the broad field of neurological disorder elucidation and prospective treatment. Currently, I am investigating the phenotypic correlation of genetic expression and metabolic regulation at the period of metastatic transformation of plexiform benign tumor to Malignant Peripheral Nerve Sheath Tumor (MPNST).

ENDURE Trainee Career Goals and Plan:

Upon completion of my current post-baccalaureate research program, I plan to begin as a first year graduate student in a neuroscience intensive doctoral program. During the prospective Ph.D. program I plan to improve my problem solving skills, scientific communication, and develop a strong scientific network. My long-term goals are to make a significant contribution to my chosen field of research, to gain sufficient proficiency that I may mentor others, and to expand my outreach so that I may prove to underprivileged students, such as I was, that obtaining a PhD is possible.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **Washington University**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Brian Van Tine**

ENDURE Research Project Title: **SPTBN2 Drives Glutamine Anapleurosis and Sensitizes to Glutaminase Inhibition in Malignant Peripheral Nerve Sheath Tumor Cells**

Neurofibromatosis (NF1) is a genetic condition characterized by benign tumors of the peripheral nervous system. 10% of all NF1 cases develop tumors classified as Malignant Peripheral Nerve Sheath Tumors (MPNST) that either develop from an pre-existing MPNST or a benign plexiform neurofibroma. MPNSTs are classified as soft tissue sarcomas, and they cause increased morbidity in the afflicted. Recently, whole exome sequencing of MPNSTs and plexiforms has identified Beta III Spectrin (SPTBN2) as up regulated in tumors but not their benign counterparts. SPTBN2 has been

implicated in the regulation of glutamine transporters in neurodegeneration. This led us to explore glutamine biology in MPNSTs using established cells lines and cell lines derived from mice with spontaneously emerged MPNSTs and to correlate dependencies with SPTBN2 expression.

ENDURE TRAINEE ABSTRACT

NICHOLAS HOURGUETTES

Home Institution and State: **Washington University in St. Louis, Missouri**
Email: **nhourguettes@wustl.edu**
Undergraduate Academic Level: **Senior**
Undergraduate Major and Expected Graduation Date: **Biology, 2016**
Mentors/Advisors at Home Institution:

ENDURE Trainee Scientific Interest:

The trainee is interested in neuroscience research, particularly behavioral research concerning disorders of the nervous system.

ENDURE Trainee Career Goals and Plan:

The trainee plans to pursue an MD/PhD degree.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **Michigan State University**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Erik Herzog**

ENDURE Research Project Title: **Activation of the kappa-opioid receptor system is both necessary and sufficient for reinstatement of nicotine place preference.**

The Kappa-opioid receptor (KOR) system plays a conserved role in stress-induced behavioral responses including reinstatement of drug seeking behavior. Due to nicotine's high propensity for stress-induced relapse, we hypothesized that stress would also induce reinstatement of nicotine seeking behaviors in a KOR-dependent manner. We used a conditioned place preference (CPP)/reinstatement protocol in mice to investigate the role of KORs in mediating stress-induced behavioral responses to nicotine. We found that the pharmacological stressor Yohimbine (Yoh) (2mg/kg, i.p.) given prior to reinstatement post-testing causes reinstatement of nicotine CPP. This reinstatement of nicotine CPP is NorBNI sensitive, indicating that KOR activity is necessary for Yoh-induced nicotine CPP reinstatement. To determine if KOR activation alone is sufficient for reinstatement of nicotine CPP, we injected the KOR agonist U50,488 prior to reinstatement, and found that KOR activation was sufficient to reinstate nicotine place preference. Following the reinstatement test, mice were perfused to examine the effects of Yoh on neuronal activation (c-fos) in the presence and absence of KOR signaling. c-fos expression in the Basolateral Amygdala (BLA) following Yoh treatment was significantly reduced in mice pre-treated with norBNI. Future studies will attempt to further dissect this BLA circuitry to identify cell type-specificity of these KOR circuits.

ENDURE TRAINEE ABSTRACT

JESSICA JIMENEZ

Home Institution and State: **Oberlin College, Ohio**
Email: **Jessica.Jimenez@oberlin.edu**
Undergraduate Academic Level: **Junior**
Undergraduate Major and Expected Graduation Date: **Neuroscience and Biology, 2017**
Mentors/Advisors at Home Institution: **Gunnar Kwakye**

ENDURE Trainee Scientific Interest:

My scientific and research interests include studying the molecular mechanisms underlying neurodegeneration in disease pathology, in addition to how different genetic variants can affect susceptibility to diseases. Lastly, I am interested in studying the gene environment interaction caused by toxins that can enhance genetic risk for neurodegenerative diseases.

ENDURE Trainee Career Goals and Plan:

I plan on attending a graduate degree program to earn a Ph.D. in neuroscience, or possibly pursuing an M.D./Ph.D. to undertake research that can be influenced by my patient interactions.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **Washington University in St. Louis**
Mentors/Advisors at ENDURE Summer Research Experience Institution: **Carlos Cruchaga, Maria-Victoria Fernandez, Erik Herzog**

ENDURE Research Project Title: **Role of ABCA7 & TM2D3 Variants in Alzheimer's Disease**

Identification of genetic risk factors for Alzheimer's disease (AD) is an ongoing effort that will provide important diagnostic and therapeutic insight. AD has a strong genetic component that cannot all be explained by the pathogenic and risk variants already identified. This suggests that additional unidentified genes contribute to AD risk. Next generation sequencing can identify new rare variants with larger effects on AD risk. While a single rare variant cannot be used to predict AD risk for the population, it may have relevance for personal risk prediction and highlight new pathways in disease pathology. Recent studies found a significant increase of variants in the genes ABCA7 and TM2D3 in AD cases compared to controls. We tried to replicate this association in a large European American dataset. I replicated the direction of the associations for ABCA7 variants, with lower effect sizes compared to the original report. However, the results were only significant for the ABCA7 gene-based analysis (p-value=0.038; OR=1.549). Our study supports the role of ABCA7 variants in AD risk and highlights the variability in minor allele frequencies among populations. Ultimately, ABCA7 may contribute to AD pathology and aid in understanding molecular pathways involved in the disease.

ENDURE TRAINEE ABSTRACT

NECO JOHNSON

Home Institution and State: **San Diego State University, California**
Email: **necoxjohnson@gmail.com**
Undergraduate Academic Level: **Junior**
Undergraduate Major and Expected Graduation Date: **Psychology, 2017**
Mentors/Advisors at Home Institution: **Terry Cronan**

ENDURE Trainee Scientific Interest:

I am most interested in neurodegenerative diseases, especially Alzheimer's, and their effects on cognition. However, I am also intrigued by cognitive control in relationship with substance abuse, the mesolimbic dopaminergic reward pathway, and memory consolidation across the lifespan. This summer I explored the cognitive mechanisms underlying memory benefits of wakeful rest by examining active rehearsal and memory consolidation as explanations for wakeful rest effects. This experienced provide the opportunity to fine tune my interests and solidify my resolution to work with older adults.

ENDURE Trainee Career Goals and Plan:

I plan to pursue a Ph.D in Neuroscience or Neuropsychology directly following the completion of my Bachelor's degree. Although I would like to partake in research and teaching both of these functions are eclipsed by my desire to work with underrepresented college students to help reconcile the racial inequities in research. My summer at Washington University allowed me to further develop my research skills, become a more critical thinker, and experience the amount of effort one must maintain to be a successful graduate student and researcher.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **Washington University in St. Louis**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Peter Millar**

ENDURE Research Project Title: **Exploring the Cognitive Mechanisms Underlying Memory Benefits of Wakeful Rest**

Previous research indicates that stimuli are recalled better when encoding is followed by periods of wakeful rest than high sensory stimulation. Although the existing interpretation of the effect suggests that active rehearsal of stimuli during periods of wakeful rest is not necessary, the use of explicit encoding and immediate recall tests make it unclear whether rehearsal is truly unnecessary. The current study aims to investigate whether the effect persists under conditions

less conducive to rehearsal. In Experiment 1, participants encoded verbally presented lists of unrelated nouns in a pleasantness-rating task. Following the presentation of each word list, participants experienced periods of low sensory stimulation (wakeful rest) and high sensory stimulation (spot-the-difference task). Following a delay period, participants completed surprise recall and recognition tasks to assess differences in memory strength between conditions. A second experiment followed the same procedures but with visual words. In both experiments, participants recalled wordlists presented before the wakeful rest condition better than wordlists presented before the high sensory stimulation condition. There were no differences in recognition scores. These results indicate that, even without the presence of an immediate memory tests and explicit encoding, periods of wakeful rest following the presentation of stimuli allow for superior recall.

ENDURE TRAINEE ABSTRACT

DEMIA JONES

Home Institution and State: **Harris-Stowe State University, Missouri**
Email: **missmia_jones@hotmail.com**
Undergraduate Academic Level: **Junior**
Undergraduate Major and Expected Graduation Date: **Biology, 2017**

ENDURE Trainee Scientific Interest:

The purpose of my research was to determine if there are circadian rhythms in gene expression in tumors. I am interested in learning more about circadian rhythms and how any disruption in those rhythms can affect the body. I would like to continue my research in this field and ultimately pursue a career in it.

ENDURE Trainee Career Goals and Plan:

I would like to obtain a PhD with a specialty in Neuroscience Research, specifically the effects of circadian rhythms on the brain and in brain tumors. I will continue to do my research on additional genes to determine if they are rhythmic. The genes that I have done research on is Per 2 and GAPDH. There are several other genes that I intend to try as I continue with my research.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **Washington University**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Erik Herzog, Emily Slat, and Tatiana Simon**

ENDURE Research Project Title: **Daily Gene Expression in Brain Tumors**

The question that I am researching is whether or not there are circadian rhythms in gene expression in tumors. More specifically, if there are circadian rhythms in gene expression in Bmal1 knockout tumors. To test if these Bmal1 knockout tumors have daily rhythm in vivo, I measured mRNA levels taken from tumors at 4 different times of day (6am, 12pm, 6pm, and 12am). I began by isolating and purifying mRNA from brain tissue and tumors. After extracting mRNA, I measured the 260/280nm and the 260/230nm optical density ratios to ensure that the mRNA is not contaminated. Then I performed cDNA synthesis, which synthesizes DNA from the RNA template, via reverse transcription using a Polymerase Chain Reaction (PCR). The combination of reverse transcription with PCR will amplify the amount of sample available for analysis. I had to determine the best annealing temperatures for my Per2 primers using the cDNA that was generated from the

brains of the mice, so I tested the primers on a standard curve as well as a melting curve to determine the efficiency of them. I then used qPCR to quantify the amount of Period2 (Per2) mRNA from each sample at the four times of day when the tumors were extracted. Potential Outcomes: We hypothesized that in vivo, Bmal1 knockout tumors, express daily rhythms in Per2 mRNA levels compared to the housekeeping gene, GAPDH. We found that Per2 is in fact circadian in vivo, and we concluded that daily rhythms in the host (e.g. hormone levels or body temperature) drive daily rhythms in the Bmal1-null tumor cells. We noticed that the expression in Per2 nearly doubled during the day. This suggests that we can treat these tumors according to the time of day of the host.

ENDURE TRAINEE ABSTRACT

MARIAH LAWLER

Home Institution and State: **Washington University, St. Louis, Missouri**
Email: **mariahlawler@wustl.edu**
Undergraduate Academic Level: **Sophomore**
Undergraduate Major and Expected Graduation Date: **Neuroscience, 2017**

ENDURE Trainee Scientific Interest:

As a neuroscience major, I am interested in neurodegenerative diseases and researching treatments for them, in which I worked on Multiple Sclerosis and learned more about ALS through the ENDURE program. Additionally, I have shown interest in developmental neuroscience, more specifically, the teen brain and improving the lifestyles of teens to support a better brain development.

ENDURE Trainee Career Goals and Plan:

Career goals include obtaining a MD/PhD through a MSTP program and working in the academia in the neurology department doing research and seeing patients.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **Washington University, St. Louis**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Erick Herzog, Dr. Timothy Miller, Dr. Greg Wu Mariah Lawler**

ENDURE Research Project Title: **Dendritic Cell miRNA Expression in the CNS**

Multiple Sclerosis is an antigen driven, predominantly T cell-mediated autoimmune disease. White blood cells, including B and T lymphocytes, monocytes, and dendritic cells (DCs), enter the CNS resulting in destruction of myelin. One cause of this neurodegeneration is the provocation of an inflammatory response of the CNS. An important step for the CNS immune response to occur is the migration of immune cells across the brain blood barrier (BBB). The immune response in MS is dependent on the ability of immune cells, such as DCs, to reach the CNS through the BBB. DCs are immune cells, which regulate T-cell responses, including ones of the CNS. However, there is little known about what role DCs play when they migrate into the CNS and what influences this migration. MiRNA are highly preserved, non-coding, 20-22 nucleotide RNAs that usually repress mRNA translation. Therefore, studying differential miRNA expression of DCs in the CNS versus periphery may reveal mechanisms of DC migration into the CNS. We sought to examine miRNA expression in DCs of the CNS versus those of the periphery. I hypothesize that there is a miRNA signature specific to DCs that allow them to migrate to the CNS, which aids in the destruction of myelin, causing MS.

ENDURE TRAINEE ABSTRACT

UJUNWA NWOSU

Home Institution and State: **Harvard University, Massachusetts**
Email: **ujunwanwosu@college.harvard.edu**
Undergraduate Academic Level: **Junior**
Undergraduate Major and Expected Graduation Date: **Neurobiology, 2017**

ENDURE Trainee Scientific Interest:

I was interested in studying cognitive neuroscience and psychology and the ENDURE program helped support my interests with my placement in the Dynamic Cognition Lab.

ENDURE Trainee Career Goals and Plan:

My career goals and plans are to enter in a MSTP or MD/PhD program after graduation from undergrad. I hope to become a psychiatrist and conduct research on psychopathology.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **Washington University in St. Louis**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Jeffrey Zacks, Dr. Lauren Richmond**

ENDURE Research Project Title: **Role of the Reference Electrode in Transcranial Direct Current Stimulation**

The research that I was doing this summer involved transcranial direct current stimulation (tDCS). We were measuring the effects of applying the stimulation to the primary motor cortex (M1). Two studies were conducted to investigate the role of both stimulation and electrode placement on RTs. In both studies, the anodal pole was placed over left motor cortex (M1). The first study employed a between subjects design in which participants completed one session of tDCS; the placement of the negative pole was varied across participants (right homologue, right cheek, right shoulder, or sham stimulation). The speed of participants' responses was recorded while stimulation was on (or when it was believed to be on in the case of our sham group). Findings from this study indicated that there were no significant differences in RTs as a function of cathode placement or between active vs. sham stimulation. To follow up on this surprising finding, the second study employed a within-subjects design, which is more commonly seen in the tDCS literature, as well as more powerful, than a between-subjects design. In study 2, participants undergo two sessions of stimulation (active vs. sham, order of stimulation counterbalanced) with the cathode over the right homologue for both sessions. Throughout the summer, I worked on the second study.

ENDURE TRAINEE ABSTRACT

TAYLOR WYNNE

Home Institution and State: **George Mason University, Virginia**
Email: **twynne@gmu.edu**
Undergraduate Academic Level: **Sophomore**
Undergraduate Major and Expected Graduation Date: **Neuroscience, 2017**
Mentors/Advisors at Home Institution: **Kevin Story, Patrice Granfield**

ENDURE Trainee Scientific Interest:

My scientific research interests are neurodegenerative diseases such as ALS or Multiple Sclerosis as well as developmental neuroscience. I hope to better understand the cause of neurodegeneration and create treatments to prevent or cure the. Also, I aim to identify ways to better the lifestyle of teens to enhance their brain development.

ENDURE Trainee Career Goals and Plan:

My career goals are to become an MD/PhD and do both clinical work and research doing neurology work and specializing in development or neurodegeneration. Through the BP EDNURE program, I am exposed to working in the lab on neurodegeneration, as well as participating in many seminars and writing workshops to help me complete graduate school applications and write grants.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **Washington University in St. Louis**
Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Erik Herzog, Dr. Timothy Miller, Dr. Gregory Wu Mariah Lawler**

ENDURE Research Project Title: **Dendritic Cell miRNA Expression in the CNS**

In Multiple Sclerosis (MS), white blood cells, including B and T lymphocytes, monocytes, and dendritic cells (DCs), enter the central nervous system (CNS) resulting in destruction of myelin. One cause of this is the provocation of an inflammatory response of the CNS. An important step for the CNS immune response to occur is the migration of immune cells across the brain blood barrier (BBB). DCs are immune cells, which regulate T-cell responses, including ones of the CNS. However, there is little known about what role DCs play when they migrate into the CNS and what influences this migration. Studying differential miRNA expression of DCs in the CNS versus periphery may reveal mechanisms of DC migration into the CNS. It is hypothesized that there is a miRNA signature specific to DCs that allow them to migrate to the CNS, which aids in the destruction of myelin, causing MS. Mice model, EAE, is used to examine miRNA expression and an in vitro BBB assay is used to examine the miRNA expression of DCs in the CNS. The work presented here has profound implications for future studies of dendritic cells and may help develop more therapeutics for the treatment of MS.

BRIDGE TO THE PHD IN NEUROSCIENCE

MICHIGAN STATE UNIVERSITY
Principal Investigator: *Dr. William Atchison*
Partner Institutions: St. Mary's University, Northern New Mexico College, University of Puerto Rico –Arecibo, and University of Puerto Rico - Cayey

PROGRAM DESCRIPTION: The goal of "Bridge to the PhD in Neuroscience" is to increase the number of underrepresented minority (URM) Ph.D.s trained in neurosciences: specifically to facilitate their entry into high quality and highly competitive mainland Ph.D. or dual degree) programs with a Neuroscience emphasis and enhance their likeliness of their success in the program. Central to this is the need to 1) identify talented students with potential for Ph.D studies in Neuroscience; 2) introduce them to career opportunities in neuroscience; 3) provide research training and individual mentoring; 4) increase their competitiveness for graduate study; 5) and provide additional professional development activities. It entails established partnerships between MSU and 4 minority serving institutions (MSIs): two campuses in Puerto Rico in the University of Puerto Rico (UPR) system (UPR-Cayey and UPR-Arecibo), as well as two MSIs in the Southwest (Northern New Mexico College and St. Mary's University).

To introduce students to neuroscience, a day-long workshop entitled, "What is Neuroscience?" will be held annually on each of the partnering campuses. To sustain student interest in neuroscience, a two semester videoconference journal club will be held at MSU and broadcast live to the 4 MSIs. Six URM students annually from the four MSIs will spend the Fall semester between their 3rd and 5th yrs at MSU taking 9 credits of classwork and continuing on an original, hypothesis-based research project. Included will be a seminar-type course stressing translational and interdisciplinary approaches to understanding the etiology of human disease. This course will entail significant practice in writing, as well as an integral journal club. Improvement of communication skills will involve both informal and more formalized settings (research presentations, participation in class, journal club participation and paper writing).

This program will increase the number of URM students entering Ph.D programs in Neuro-/Behavioral Science, by 1) increasing the student's awareness for research career opportunities in neuroscience, 2) improving their English language skills, 3) providing high quality mentored research experience during the undergraduate studies to 'springboard" the student into the Ph.D program, and 4) providing further didactic training in neuroscience principles, scientific writing and career enrichment activities. Through these combined activities, the student will become more confident in the application process, present a more competitive application and make valuable contacts (network) with researchers at MSU and elsewhere.

ADDITIONAL PROGRAM TEAM MEMBERS:

Dr. Brian Mavis – Co-Investigator, Michigan State University
Ms. Shari Stockmeyer – Program Coordinator, Michigan State University
Dr. Robert Ross – University of Puerto Rico - Cayey
Dr. Hirohito Torres – University of Puerto Rico – Arecibo
Dr. Ulises M. Ricoy – Northern New Mexico College
Dr. Timothy D. Raabe – St. Mary's University

ENDURE TRAINEE ABSTRACT

GARRETT BAZANY

Home Institution and State: **Calvin College, Michigan**
Email: **gdb5@students.calvin.edu**
Undergraduate Academic Level: **Junior**
Undergraduate Major and Expected Graduation Date: **Biochemistry, 2017**

ENDURE Trainee Scientific Interest:

I am interested in the study of Neuroscience specifically looking at spinal cord injuries while also looking into neurodegenerative disorders and their treatment methods.

ENDURE Trainee Career Goals and Plan:

I am interested in the field of medicine looking at both the role of a doctor and a researcher. I am specifically interested in the study of Neuroscience and spinal cord injuries. I would like to be in a position where I can help patients as a doctor through their recovery process using my own experience with a spinal cord injury while also researching innovative treatment methods for spinal cord injury recovery. I want to be able to be a doctor that can have a full understanding of the field of medicine and an appreciation for time and work that goes into the discovery of current treatment methods and pharmaceuticals.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **Michigan State University**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Atchison, Duanghathai Wiwatratana**

ENDURE Research Project Title: **Investigating the role of dimethyl fumarate in activating Nrf2 pathway associated genes and in the survival of motor neurons following MeHg-toxicity**

The pathogenic mechanisms by which MeHg-induced toxicity occurs include perturbation of membrane receptor functions, intracellular calcium homeostasis, mitochondrial functions, and neurotransmitter release. This multi-cascade toxicity, in turn, generates excessive reactive oxygen species; subsequently, oxidative stress occurs. A cytoprotective agent dimethyl fumarate (DMF) has been used successfully to treat relapsing multiple sclerosis. DMF exerts neuroprotection by activating the Nrf2 pathway. We tested if DMF treatment will induce up regulation of antioxidant genes in NSC34 cells. We also tested if DMF treatment is able to protect primary spinal cord cell cultures from MeHg-induced toxicity. Quantitative PCR was applied to assess Nqo1 and Txnrd1 expression in cells treated with different DMF concentration and vehicle alone (DMSO). While,

NSC34 cells treated with 0, 7, 21 and 42 µM DMF for 24 h demonstrated equivalent changes in Nqo1 and Txnrd1 levels relative to control (Gapdh), upregulation of Txnrd1 is significantly higher than Nqo1 in all DMF concentrations. However, DMF treatment prior to MeHg exposure did not protect cell death. Several factors such as the half-life of DMF and its concentration, and the overly high toxicity of this MeHg concentration which caused 75% cell death could contribute to this non-protective result.

ENDURE TRAINEE ABSTRACT

DARLYN CARABALLO-PÉREZ

Home Institution and State: **University of Puerto Rico-Arecibo, Puerto Rico**
Email: **darlyn.caraballo@upr.edu**
Undergraduate Academic Level: **Senior**
Undergraduate Major and Expected Graduation Date: **Medical Microbiology, 2017**
Mentors/Advisors at Home Institution: **Mari Luz Acevedo, PhD**

ENDURE Trainee Scientific Interest:

The scientific interest of the trainee supported by the ENDURE program is Neuroscience.

ENDURE Trainee Career Goals and Plan:

My career goals and planes after graduate are to pursue a PhD in the Neuroscience field.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **Michigan State University**
Mentors/Advisors at ENDURE Summer Research Experience Institution: **Michelle Mazei-Robison, PhD Bill Atchison, PhD Megan Kechner**

ENDURE Research Project Title: **Induction of ΔFosB following Physical and Emotional Stress**

Depression is a devastating disease and the underlying cellular mechanisms are not well understood. To study this, we have employed physical (PS) and emotional (ES) chronic social defeat stress as mouse models of depression. In ES, mice do not receive any physical stress, but witness physical subordination of another mouse. ES has been shown to produce many of the same depressive-like behaviors as PS. Exposure to PS has been shown to promote differences in ΔFosB induction in multiple brain regions including the nucleus accumbens (NAc); a region known to play a significant role in motivation, pleasure and reward. With this in mind, we sought to investigate if the induction of ΔFosB was similar between PS and ES. Eight-week-old C57BL/6J male mice were exposed to either PS or ES for 5 minutes per day for 10 days. PS mice were placed into the home cage of a CD-1 aggressor mouse, and ES mice were placed into the same cage, but were physically separated from the CD-1 and PS mouse by a perforated Plexiglas partition. One-hour following social interaction testing on day 11, mice were perfused and brains were post-fixed and cryoprotected. Brains were then sectioned and immunohistochemistry was performed for ΔFosB. FosB-positive cells were counted in multiple brain regions including NAc, dorsal and ventral hippocampus, prefrontal cortex and ventral tegmental area to assess whether PS and ES induce a similar pattern of induction. This work could identify brain regions important for depressive behaviors to focus on in future studies.

ENDURE TRAINEE ABSTRACT

CRYSTAL KORALIS COLÓN ORTIZ

Home Institution and State: **University of Puerto Rico at Cayey, Puerto Rico**
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Undergraduate Academic Level: **Senior**
Undergraduate Major and Expected Graduation Date: **Biology, 2016**

ENDURE Trainee Scientific Interest:

The main scientific interests of the trainee are Developmental Neuroscience and Ophthalmic Research.

ENDURE Trainee Career Goals and Plan:

After completing her Bachelor's Degree in Biology at the University of Puerto Rico at Cayey, she would like to pursue a dual degree (MD/PhD, Neuroscience). In a future she would like to have her own laboratory and to be part of the academia.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **Tufts University School of Medicine**

ENDURE Research Project Title: **Developmental Expression of TRPV1 in the Embryonic Chicken Cornea**

The cornea is the outermost part of the eye and is the most innervated structure of the body. This means that it is richly supplied by sensory neurons or corneal nerves. These neurons are important in maintaining a healthy ocular surface. Therefore, the loss of corneal nerves can lead to serious corneal damage. The main goal of our project was to determine the spatial and temporal expression of the Transient Receptor Vanilloid Type 1 (TRPV1) in the embryonic chicken cornea. The approach we used to determine the expression of TRPV1 was by western blot and immunohistochemistry of the chicken embryonic cornea for the developmental stages where previous research has demonstrated that the cornea is being developed (E8-E16). We hypothesized that TRPV1 would be expressed in the chicken corneal nerves. Western blots results showed the expected TRPV1 molecular size (93 kDa) and analysis suggested an increase in the receptor expression among the studied developmental stages, precisely when the corneal nerves enter the epithelium (E12-E13). Immunohistochemistry performed for E9 and E13 embryonic chicken cornea with TRPV1 and TUJ-1 antibodies, revealed a nonspecific expression of the receptor.

ENDURE TRAINEE ABSTRACT

PERLA ELOSEGUI

Home Institution and State: **University of Puerto Rico at Cayey, Puerto Rico**
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Undergraduate Academic Level: **Junior**
Undergraduate Major and Expected Graduation Date: **Biology, 2017**
Mentors/Advisors at Home Institution: **RISE Program, Dr. Michael Rubin**

ENDURE Trainee Scientific Interest:

My research interest will be all who involves working with genes and all that it carries. Since genetics is the study of mutations, heredity and genomics it is a field of biology with countless information. I have always questioned myself: what is the basis that causes disease? Despite of all the research that the scientists have been doing, there is always a new disease or mutation that has a very complex formation. Science has always captured my attention when it comes to finding new ways to understand the information system and combining Genetics with Neuroscience will be a major achievement in my career path. Having a research related to Neuroscience really cleared my thoughts because I felt really captivated by how our body and mind works. The combination of these two fields will provide ingenious research which will help to understand more about how the body works, reacts and goes through constant processes.

ENDURE Trainee Career Goals and Plan:

My career goals were clarified with the previous experience in research I did this summer. Working in the laboratory environment really convinced me I would like to do a PhD in the science field. It motivates me having to thoroughly analyze the data or results obtained from research and reach conclusions which will then be evaluated and will become useful to help other research Since I am currently in my junior year I began to search for a way to combine a research and medicine career. It will provide me with extensive knowledge to work on research and at the same time interact with people who are in need of answers. As the main objective of research is to have a better understanding of the processes or diseases and be able to alter or oppose them for the benefit of society.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **Michigan State University**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Atchison**

ENDURE Research Project Title: **Comparative susceptibility of NSC34 motor neuron cell line and spinal cord cell culture to methylmercury- induced toxicity**

Methylmercury's (MeHg) lipophilicity allows it to cross both blood brain barrier (BBB) and blood spinal cord brain barrier (BSCB) inducing neurotoxicity in both brain and spinal cord. MeHg- induce toxicity primarily targets upper motor neurons located in the primary motor cortex, while the lower motor neurons located in the ventral spinal cord are secondarily targeted. The differential susceptibility of these motor neurons doesn't depend upon the differential selective property between BBB and BSCB. In fact, BSCB is greater permeable than BBB which allows spinal cord cells exposure to toxicants greater than the brain cells. Due to the neuroprotective role of astrocytes by providing neurotrophic factors for neuronal differentiation and proliferation, astrocytes could contribute to this differential susceptibility. We compared the susceptibility of NSC34 cells, a motor neuron-like-cell and spinal cord cell cultures (SCCs) to MeHg- induced toxicity. Both cell types had reduced viability after 24h exposure to MeHg. The SCCs were more sensitive to MeHg than NSC34 cells; 1µM MeHg significantly reduced SCC viability whereas 5µM MeHg was needed to reduce NSC34 cell viability.

ENDURE TRAINEE ABSTRACT

WILMARIE MORALES

Home Institution and State: **UPR Cayey, Puerto Rico**
Email: **morale74@msu.edu**
Undergraduate Academic Level: **Senior**
Undergraduate Major and Expected Graduation Date: **Biology, 2016**

ENDURE Trainee Scientific Interest:

Ever since my first research experience with the BPNP summer program at Michigan State University I've developed a passion for neuroscience. As I've earned more experience through more research experiences and coursework I've found my interest center around neuro-degenerative diseases and neuro-immunology.

ENDURE Trainee Career Goals and Plan:

After obtaining my bachelor's degree I wish to pursue a PhD in neuroscience and eventually join the world of academia.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **UNC Chapel Hill**

Mentors/Advisors at ENDURE Summer Research Experience Institution:

ENDURE Research Project Title: **ACTIVIN A EXPRESSION IN MACROPHAGES AND MICROGLIA**

Multiple Sclerosis (MS) is a neurological disorder characterized by demyelination that is commonly followed with a remission period where there is partial or complete recovery of myelin. Studies have established a correlation between increased activin A cytokine expression and oligodendrocyte differentiation. The mechanism by which this cytokine assists in oligodendrocyte differentiation is still unknown. We hypothesized that activin A expression may be regulated by the presence of apoptotic cells. To analyze activin A expression, we collected peritoneal macrophages and microglia from C57BL/6. These cells were then treated with apoptotic cells, Gas6, Interleukin-10, and GMCSF. Activin A expression was assessed by immunocytochemistry over four days. We observed that activin A was at its highest expression in macrophages that were treated with apoptotic cells and that expression was at its peak at 24h. Supernatants from stimulated macrophages induced complex differentiation of an oligodendrocyte cell line, Oli-neu cells. This pattern of activin A expression, however, was not observed in microglia. Most significantly, microglia BV-2 cells induced complex differentiation of Oli-neu cells. Therefore, microglia and macrophages aid in oligodendrocyte differentiation partly through activin A expression, however, it may not be the sole molecule that plays a role in this process.

ENDURE TRAINEE ABSTRACT

CHARLENE RIVERA

Home Institution and State: **University of Puerto Rico at Cayey, Puerto Rico**
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Undergraduate Academic Level: **Senior**
Undergraduate Major and Expected Graduation Date: **Biology, 2016**

ENDURE Trainee Scientific Interest:

Charlene Rivera's main interest is Neuroscience. Within Neuroscience, the trainee is interested in the areas of Neurotoxicology, Neurobiology of Disease, and Cognitive Neuroscience. She would like to gain more experience in these areas in order to get immersed in them, learning new concepts and laboratory techniques.

ENDURE Trainee Career Goals and Plan:

Charlene's current goal is to finish her undergraduate studies and enter Graduate School to a Neuroscience Program. She aims to obtain a PhD in Neuroscience and afterwards, continue to complete a post-doctoral degree. The trainee's ultimate goal is to work in the academia, having her own laboratory, and creating more programs to aid students to have research experiences.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **Tufts University**

ENDURE Research Project Title: **The loss of Alpha2delta-1 (α2δ-1) disrupts excitatory synaptogenesis and cortical structure: A link to epilepsy and hyperexcitability?**

Alpha2delta-1 (α2δ-1) is a calcium channel subunit that plays a role in excitatory synaptogenesis within the cortex during development. The synaptogenic actions of α2δ-1 rely on its ability to bind astrocyte secreted thrombospondins (TSP). Altered TSP/α2δ-1 activity has been implicated in several disease states, such as epilepsy. Previous work has shown that α2δ-1 knock-out (KO) mice exhibit hyperexcitability as assessed by evoked cortical field potential recording. We hypothesized that absence of α2δ-1 during development leads to hyperexcitability by altering synaptogenesis and cortical structure. To approach this, immunohistochemistry was performed in α2δ-1 KO and wild-type littermates to examine cortical structure development, synapse number alteration, and astrocyte regulation. Synapse number was determined by counting pre and post synaptic terminal markers PSD95 and vGlut1. Cortical development was evaluated using cortical layer markers CTIP2 and CUX1. Excitatory/inhibitory balance was analyzed using neuronal marker NeuN and interneuron marker Parvalbumin. Astrocyte regulation was also determined using astrocyte marker

GFAP. Results showed a decreased number of excitatory synapses, ectopic CTIP2 positive cells in the outer layer of the cortex, increased amount of neurons and astrocyte upregulation. Understanding the mechanism of hyperexcitability in the absence of α2δ-1 will shed light on the normal role of α2δ-1 during development.

ENDURE TRAINEE ABSTRACT

GRETCHEN RIVERA

Home Institution and State: **University of Puerto Rico, Puerto Rico**
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Undergraduate Academic Level: **Senior**
Undergraduate Major and Expected Graduation Date: **Biology, 2016**

ENDURE Trainee Scientific Interest:

Neuroscience is a branch that I am really interested in and I am looking forward to get involved in it. Besides my passion and enthusiasm for science, I consider myself as someone who excels in research. When it comes to work, I execute it with compromise and devotion. Indeed, I enjoy doing research very much because I am a person who likes to work hard, be honest with my work, and never gives up. In addition, I have acknowledged that the laboratory is an environment of constant learning that allows you to fill current gaps in research. Therefore, doing science in a laboratory is an exciting experience for me.

ENDURE Trainee Career Goals and Plan:

I am currently completing my bachelor's degree in biology. After completing my bachelor's degree in biology I plan to apply to graduate school because I desire to expand my knowledge in science. My intentions are to start working on my PhD and develop a research of my own. I am strongly considering doing the PhD in Neuroscience because I find it fascinating.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **Michigan State University**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Brian Gulbransen Ninotchska Delvalle Dr. William Atchison**

ENDURE Research Project Title: **Localization of Tachykinin Receptors in Mouse Colon and Human Jejunum**

The Enteric Nervous System (ENS) is comprised of neurons that are surrounded by glial cells. Recent evidence has illustrated the functional role of glial cells in a myriad of aspects of gastrointestinal physiology and pathophysiology. Irritable Bowel Syndrome (IBS) is a multifactorial gastrointestinal disease caused by alterations in the ENS. However, the role of enteric glial cells (EGC) in this disease state is still unknown. As such, we wanted to see if tachykinins (TKs) are involved in glial changes during IBS. TKs act as neurotransmitters in the central and peripheral nervous system to provide a

link for bi-directional interactions between EGC and neurons. The binding of neurokinin receptors (NKR) is responsible for the regulation of motility in the ENS. The purpose of this study was to localize NKR to EGC a to better understand the role of NKR activation on glial cells. NKR are responsible for various effects such as smooth muscle contraction, inflammatory processes, hypotensive effects, and stimulation of gland secretion. To localize expression on EGC, we used fixed mouse colon preparations and performed immunohistochemistry to identify different NKR subtypes. Our preliminary data suggests that NK2R, a specific NKR subtype, is expressed on EGC, suggesting a role of TKs in neuron-glial communication. Furthermore, the data suggest that NK1R and NK3R subtypes are not expressed in EGC.

ENDURE TRAINEE ABSTRACT

JESICA VICENTE-REYES

Home Institution and State: **University of Puerto Rico at Cayey, Puerto Rico**
Email: **jesica.vicente@upr.edu**
Undergraduate Academic Level: **Senior**
Undergraduate Major and Expected Graduation Date: **Biology, 2016**
Mentors/Advisors at Home Institution: **Dr. Ricardo Chiesa**

ENDURE Trainee Scientific Interest:

My research interest is to continue investigating the neural system and their function. I think that if we control some of the problems of this system we can control other problems from the entire body. Also I want to expand my knowledge to other areas like who the nervous system and the circulatory system work in common for better benefits. During this summer I find that those two systems are much correlated. This experience has me the forward to look this area like one for a good profession for my future.

ENDURE Trainee Career Goals and Plan:

Before I finish my bachelor degree I want to continue doing research to contribute as a piece of new science to Puerto Rico and to the scientific community. Then I want to get a PhD and continue to do research. At this point I do not know what branch of science I would like to specialize in but I want to work on something that helps people obtain a better quality of life and also something that is new and innovative in science. My life as an undergraduate has given me all the skills necessary to face in the best way possible the challenges I may encounter during my graduate studies and career.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **Michigan State University**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. Anne Dorrance, Nusrat Matin**

ENDURE Research Project Title: **The effects of unilateral carotid artery occlusion on microvessel density in stroke prone spontaneously hypertensive rats**

Unilateral carotid artery occlusion (UCAO) induces hypoperfusion of the brain and this causes cognitive impairment. Stroke prone spontaneously hypertensive rats (SHRSPs) with UCAO are a novel model of cognitive impairment with pre-existing hypertension. Studies suggest that carnosine (CAR), an antioxidant, may have neuroprotective effects. We hypothesized that UCAO in SHRSPs will cause cognitive impairment, and that CAR treatment will alleviate cognitive

dysfunction by increasing microvascular perfusion. 40-50 week old SHRSP were divided into three groups: SHAM, UCAO, UCAO+CAR. Data are shown as mean ± SEM. Short-term memory was assessed using the novel object recognition test. Short-term memory was impaired in UCAO rats (Sham vs UCAO: 0.72 ± 0.05 vs 0.43 ±0.4) and this was improved by CAR administration (UCAO vs UCAO+CAR: 0.43 ± 0.04 vs 0.64 ±0.07). To assess microvascular perfusion rats were injected with FITC-dextran to label the vessels. Then we did the Iba-1 staining to assess microglia activation. The memory tests tell us that CAR could be a treatment to improve spatial abilities. CAR treatment will not alleviate cognitive dysfunction by increasing the cerebral artery number and did not reduce microglia activation. These results suggest that CAR will have therapeutic benefits for vascular dementia.

ENDURE TRAINEE ABSTRACT

NECO WILSON

Home Institution and State: **Michigan State University, Michigan**
Email: **wilsonne@msu.edu**
Undergraduate Academic Level: **Senior**
Undergraduate Major and Expected Graduation Date: **Biomedical Laboratory Diagnostics, 2016**
Mentors/Advisors at Home Institution: **Dr. William D. Atchison, Alexandra Colon**

ENDURE Trainee Scientific Interest:

I am interested in neurotoxicology specifically focusing on neurodegenerative diseases as well as how toxicants affect the human population upon exposure.

ENDURE Trainee Career Goals and Plan:

After completing my undergraduate education I plan to attend graduate school to pursue graduate study in one of the following area of interest: Neuroscience, Pharmacology and Toxicology, or Comparative Medicine and Integrative Biology programs. I aspire to become an expert toxicologist in my field as well as to obtain a leadership position in a professional organization to foster opportunities to those like me.

ENDURE Trainee Summer Research Experience:

ENDURE Summer Research Experience Institution: **Michigan State University**

Mentors/Advisors at ENDURE Summer Research Experience Institution: **Dr. William D. Atchison, Alexandra Colon**

ENDURE Research Project Title: **ACUTE METHYLMERCURY EXPOSURE EFFECTS ON MRNA EXPRESSION OF GLUTAMATE RECEPTORS IN NSC34 CELLS**

Methylmercury (MeHg) is an environmental toxicant that targets the central nervous system. MeHg neurotoxicity has cell specificity and motor neurons are an identified target. Acute exposure to MeHg can lead to disturbances in sensation, hearing, speech, balance and movement. MeHg toxicity in motor neurons leads to dysregulation of Ca2+concentrations that contribute to cell death. The observed Ca2+ alterations are mediated in part by alpha-amino-3-hydroxy-5-methyl-4-isoxazole propionic acid (AMPAR) receptor. The objective of our study was to evaluate the effects of acute MeHg exposure on mRNA levels of glutamate receptor AMPAR in a motor neuron cell line (NSC34). Identifying effects of MeHg on expression of this receptor could contribute to the understanding of its toxicity on this cell line. NSC34 cells were cultured in 1:1 DDMEM/F12+1%FBS+1%Anti Anti media for 48hours then exposed to 0, 1, 2, or 5 µM MeHg for 24

hours. Then RNA was isolated from 500µL NSC34 cells and reverse transcribed. Real time qPCR was used to determine the mRNA expression levels of the AMPAR subunits GluR1, 2, 3, and 4. Based on the literature our expected results are that mRNA levels of all AMPAR subunits studied will be increased.

COMPLETE ENDURE STUDENT ACTIVITIES AT SFN: October 17-20, 2015

SATURDAY Oct 17	7:00 – 11:00 am 5TH ANNUAL NIH BLUEPRINT ENDURE MEETING **Hyatt Regency Chicago Downtown, Crystal Ballroom B & C** (151 East Wicker Drive Chicago, IL 60601) *7:00 – 7:30 am Registration 7:30 – 9:30 am Featured Speakers 9:30 – 11:00 am T32 Recruitment Fair and Networking 1:00 - 2:00 pm GETTING THE MOST OUT OF SFN: THE ANNUAL MEETING AND BEYOND **Location: McCormick Place S101** Students, postdocs, and others new to the SfN annual meeting are invited to this session where experienced participants will share tips on how to get the most out of your annual meeting experience, both during and after Neuroscience 2014. Whether you are looking for networking strategies or simply ways to make your experience productive and enjoyable, this session will be beneficial. Representatives from the SfN Program Committee, SfN Committee on Neuroscience Departments and Programs, the Faculty for Undergraduate Neuroscience, and an institutional postdoctoral association will provide strategies for navigating the annual meeting, discuss professional development tools available during and after the meeting, suggest ways to find and use a mentor, and answer questions from session participants. 1:00 – 3:00pm GRADUATE SCHOOL FAIR **Location: McCormick Place – Hall A** Meet face-to-face with student advisors, program faculty, and graduate school representatives at the third annual Graduate School Fair. 6:30 – 8:30pm DIVERSITY FELLOWS POSTER SESSION **Location: McCormick Place – Hall A** 7:30 – 9:30pm CAREER DEVELOPMENT TOPICS: A NETWORKING EVENT **Location: McCormick Place – Hall A** Experienced neuroscientists will be on hand to offer advice on a wide range of topics in an informal, roundtable format. Topics include work-life balance, securing grants, career transitions, careers away from the bench, choosing graduate schools and postdoctoral fellow positions, and many others. Participants from diverse backgrounds, fields, and work sectors are encouraged to attend.
SUNDAY Oct 18	MORNING AND AFTERNOON Attend Scientific Program •Featured lectures •Symposia •Special lectures •Minisymposia Plan Your Itinerary for Neuroscience 2015 12:00 – 2:00pm GRADUATE SCHOOL FAIR **Location: McCormick Place – Hall A** Meet face-to-face with student advisors, program faculty, and graduate school representatives at the third annual Graduate School Fair.

COMPLETE ENDURE STUDENT ACTIVITIES AT SFN: October 17-20, 2015

MONDAY Oct 19	MORNING AND AFTERNOON Attend Scientific Program •Featured lectures •Symposia •Special lectures •Minisymposia Plan Your Itinerary for Neuroscience 2015 12:00 – 2:00pm GRADUATE SCHOOL FAIR **Location: McCormick Place – Hall A** Meet face-to-face with student advisors, program faculty, and graduate school representatives at the third annual Graduate School Fair. 7:00 – 8:00pm DIVERSITY IN NEUROSCIENCE RECEPTION **Location: Hyatt Regency Chicago Downtown – Crystal C**
TUESDAY Oct 20	MORNING AND AFTERNOON Attend Scientific Program •Featured lectures •Symposia •Special lectures •Minisymposia Plan Your Itinerary for Neuroscience 2015 12:00 – 2:00pm GRADUATE SCHOOL FAIR **Location: McCormick Place – Hall A** Meet face-to-face with student advisors, program faculty, and graduate school representatives at the third annual Graduate School Fair.

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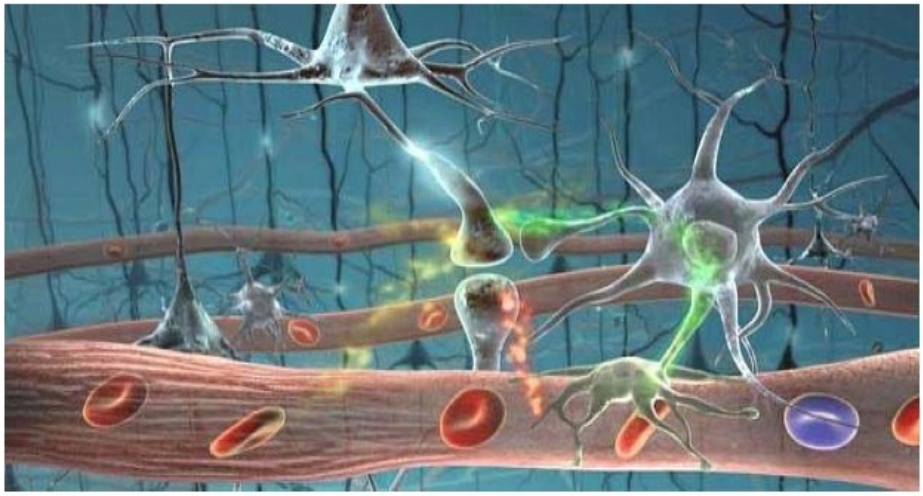

THANK YOU FOR YOUR PARTICIPATION