

Annabelle Flores-Bonilla

Amherst, MA 01002

afloresbonil@umass.edu

Research Interests

I am interested in addiction and the intersection of stress and reward circuits modulating the transition from substance use to dependence. I'm specifically interested in the role of oligodendrocytes and myelin in strengthening stress circuits involved in the development of alcohol use disorder. I'm also interested in sex differences, neuro-glial cell interactions, and development of brain structures involved in decision-making processes and stress.

Keywords: Addiction, Alcohol, Sex differences, Oligodendrocytes, Stress, Reward, Behavior

Education

University of Massachusetts, Amherst, MA

Neuroscience and Behavior (NSB) Graduate Program.....(2020 – Present)

NIH-Postbaccalaureate Research Education Program (PREP).....(2019 – 2020)

Pontifical Catholic University of Puerto Rico, Ponce, PR.....(2014 – 2019)

B.S. in Biology; Magna Cum Laude

Sacred Heart of Jesus Catholic School, Ponce, PR.....(2001 – 2014)

Graduated with the third highest GPA in the 2014 graduating class.

Awards for Research Funding and Professional Development

Trainee Professional Development Award (TDPA) Society for Neuroscience.....(2024)

Awarded for the abstract titled *A history of adolescent drinking increases myelination of axons within the corticotropin releasing factor-enriched subregion of the central amygdala in adult mice*. Award for travel to the 2024 Society for Neuroscience Conference in Chicago, Illinois. Attended events for professional development training.

National Science Foundation (NSF) Graduate Research Fellowship Program.....(2020 – 2025)

NSF Award #1938059. *Targeting the sex differences in microglial activity and oligodendrocyte population in development of the Prefrontal Cortex and in response to an inflammatory challenge*. Fellowship funds graduate student for three years with an additional two years on reserve with available opportunities for networking and internship experiences.

Spaulding-Smith Fellowship University of Massachusetts, Amherst, MA.....(2020 – 2025)

Fellowship offered to graduate students who are in an underrepresented minority group in STEM that provide funding for two years.

Undergraduate Student Travel Award (Fully funded).....(2018)

Awarded to attend the 2018 Biomedical Research Conference for Minority Students (ABRCMS) in Indianapolis, Indiana.

Publications

Flores-Bonilla A, De Oliveira B, Silva-Gotay A, Lucier KW, and Richardson HN. (2021). Shortening time for access to alcohol drives up front-loading behavior, bringing consumption in male rats to the level of females. *Biology of Sex Differences*. 12(51) <https://doi.org/10.1186/s13293-021-00395-y>

Flores-Bonilla A and Richardson HN. (2020). Sex differences in the Neurobiology of Alcohol Use Disorder. *Alcohol Research: Current Reviews*.40(2):04 <https://doi.org/10.35946/arcr.v40.2.04>

Published Abstracts

Flores-Bonilla A, Cruz ML, Appleyard CB, and Chompré G. (2019). Astrocyte Activation is Increased in a Rat Endometriosis Model. *Experimental Biology*, Orlando, FL, April 2019 *FASEB Journal* 33:1 lb619 April 2019. Poster (published abstract).

Professional Positions & Employment

Gene and Genome Analysis Teaching Assistantship (TA)

University of Massachusetts, Amherst, MA. Funded by the Department of Biology.

Worked under the mentorship of Tomas Maresca, Ph.D.(Sep – Dec 2024)

- Assisted in conducting laboratory class experiments using molecular methods (cloning, sequencing, immunocytochemistry, DNA transformation, PCR, CRISPR/Cas9) *in vitro* in cultures of *E. coli*, *Drosophila melanogaster* (S2), and HeLa cells.

Neuroscience & Behavior (NSB) Graduate Program PhD Research Assistantship (RA)

University of Massachusetts, Amherst, MA. Funded by NSF Award #1938059, Spaulding-Smith Fellowship, and NIH grant NIAAA R01AA024774

Laboratory of Heather Richardson, Ph.D.(Jun 2020 – Present)

- Conducting research on determining the effects of alcohol during adolescence on oligodendrocyte lineage in frontotemporal axons in male and female mice.
- Currently conducting research on characterizing myelination during adolescence and early adulthood and studying the role of neuropeptides (corticotropin-releasing factor, CRF) in adolescent binge drinking.
- Constructing a map of developmental myelin using CLARITY.
- Assessing the consequences of alcohol binge drinking and chronic intermittent ethanol vapors (CIE) on cognitive performance and oligodendrogenesis in middle-and old-aged male and female mice.
- Currently conducting research on the effects of alcohol binge drinking in adolescent mice on cognition using a variety of behavioral cognitive tests.

Postbaccalaureate Research Education Program (PREP)

University of Massachusetts, Amherst, MA. Funded by NIH R25 GM086264 grant.

Laboratory of Heather N. Richardson, Ph.D.....(Jun 2019 – May 2020)

- Studied the sex differences in alcohol drinking behaviors in adult rats.
- Researched the interactions between glial cells in an alcohol binge mice model in the prefrontal cortex of the developing brain.

Undergraduate Research Technician

Ponce Health Science University, Ponce, PR. Funded by NIH R15 15AT009915 grant.

Laboratory of Caroline Appleyard, Ph.D.....(Aug 2018 – May 2019)

- Researched the effects of exercise in the neuroprotective and neuroinflammatory factors in the hippocampus and hypothalamus in a rat model of endometriosis.
- Studied the role of astrocyte and microglia activation in the development of disease.

Summer Internship Program (SIP) in the Basic Science Institute (BSI) division

Johns Hopkins University School of Medicine, Baltimore, MD. Funded by NIH & by the Leadership Alliance Summer Research-Early Identification Program.

Laboratory of Patricia Janak, Ph.D.....(Jun 2018-Aug 2018)

- Researched the effects of the attribution of incentive salience on the reward representation.
- Studied the role of midbrain dopamine function on reward-associated learning using the behavioral Autoshaping and blocking-unblocking procedures in rats.

Puerto Rico Louis Stokes Alliance for Minority Participation (PR-LSAMP)

Ponce Health Sciences University, Ponce, PR. Funded by NSF.

Brain Core Laboratory. Mentor: Gladys Chompré, Ph.D.....(Jan 2018-May 2018)

- Researched the role of long-chain ceramides in the development of depressive-like behavior in Sprague Dawley rats that consumed a high-fat diet.
- Studied microglial activation, pro-inflammatory cytokines formation, and sphingomyelinase activation using real time polymerase chain reaction (qPCR) from cDNA samples from the ventral hippocampus and the infralimbic prefrontal cortex.

Laboratory of Devin Mueller, Ph.D.....(Jan 2017-Dec 2017)

- Researched the role of gonadal hormones in cocaine-seeking behavior in Sprague Dawley and Long Evans rats using the conditioned place preference reward-learning paradigm.
- Studied the effects of inhibition of estradiol synthesis in both female and male rats in acquisition, consolidation, and extinction of cocaine-associated memories.
- Studied the role of astrocyte communication using gap junction blockade in the prefrontal cortex of male rats in retrieval of cocaine-associated memories.

Summer Medical and Research Training (UM-SMART)

University of Michigan School of Medicine, Ann Arbor, MI. Funded by NIH.

Laboratory of Donna Martin, M.D., Ph.D.....(Jun 2016-Aug 2016)

- Researched the role of Chd7 protein in neuronal development of hearing, associated with hearing-loss in CHARGE syndrome.
- Studied the formation of neurons in the vestibulocochlear nerve in *Chd7* conditional knockout mice of embryonic days e12 and e17 using immunohistochemistry.

Volunteer Undergraduate Research Assistant

Pontifical Catholic University of PR, Ponce, PR

Laboratory of Zaira Mateo, Ph.D.....(Aug 2015-May 2016)

- Assisted in experiments that studies the effects of an acute exposure to sucralose to the epinephrine levels of the whole brain in the zebrafish.
- Organized and directed weekly journal clubs for undergraduate students interested in research.
- Provided science communication skills in English for Spanish-speaking students.

Summer Internship Program

Princeton Neuroscience Institute, Princeton, NJ

Laboratory of Carlos Brody, Ph.D.....(Jun 2015-Aug 2015)

- Researched the methodology to define the anterior-posterior borders of the posterior parietal cortex (PPC) in the Long Evans rat brain.
- Studied the distribution of afferent connections of different brain regions to establish the boundary between the primary somatosensory cortex and the secondary visual cortex from the PPC.

Puerto Rico Biobank Data Assistant

Ponce Health Sciences University & Moffitt Cancer Center, Ponce, PR..(Jun 2014-July 2014)

- Assisted in archiving medical history data from patients that donated samples for research.

CEIBA AG-BIO Summer Camp

Biotechnology & Agro-biotechnology Research Center, Ponce, PR

CEIBA Laboratory.....(Jun 2013)

- Participated in intensive hands-on learning of research concepts, biotechnology procedures, and laboratory safety for one week.

Awards for Scholastic Performance

Baccalaureate Science in Biology Award.....(2019)

Awarded to the student with the graduating class's highest grade point average (GPA) in the Pontifical Catholic University of PR.

President's Award.....(2016-2019)

Awarded to the top 100 students with the highest GPA the Pontifical Catholic University of PR.

College of Science Honor Assembly Certificate for Academic Excellence.....(2016-2019)

Awarded to the top students with the highest GPA in the College of Science at the Pontifical Catholic University of PR.

Development Scholarship Fund for Academic Excellence.....(2017)

Yearly award to a single student at the Pontifical Catholic University of PR for their academic achievements.

Mayor's Medal.....(2014)

One student per high school graduating class is awarded an educational student trip to Washington DC, Philadelphia, and New York for their educational, social, and community

achievements. Award is sponsored by Autonomous Municipality of Ponce & María E. Meléndez Altieri.

Outstanding Senior Graduate Award.....(2014)
Awarded from National Honor Society at the Sacred Heart of Jesus Catholic School, Ponce, PR

High Honor Award(2014)
Awarded in recognition of Outstanding Academic Achievement and Leadership at the Sacred Heart of Jesus Catholic School, Ponce, PR.

Third Highest GPA Award.....(2014)
Awarded to the student with the graduating class's third highest grade point average (GPA) in the 2014 graduating class at the Sacred Heart of Jesus Catholic School, Ponce, PR.

Oral Presentations

Flores-Bonilla A. "Examination of the escalation of alcohol drinking and myelination of stress circuits after adolescent alcohol consumption" *Neuroscience and Behavior Seminar Series*, Old Chapel, University of Massachusetts, Amherst, MA. March 6th, 2024.

Flores-Bonilla A. "The role of corticotropin-releasing factor in Alcohol Use Disorder." *Hormones for Breakfast*, Life Sciences Laboratories, University of Massachusetts, Amherst, MA. April 12th, 2023.

Flores-Bonilla A. "The Fast-track to Addiction." *Richardson-Peyton Winter 2023 Retreat*, Windham, VT. January 27th, 2023.

Flores-Bonilla A. "Sex Differences in Drinking Dynamics: Front-Loading is Key." Roundtable panel discussion: "Front-loading your way to an AUD: the relationship between drinking rate, intoxication, and motivation to experience the subjective effects of alcohol." *45th Annual Research Society in Alcohol Scientific Meeting 2022*, Hyatt Regency Orlando, Orlando, FL. June 26th, 2022.

Flores-Bonilla A, Cruz ML, Appleyard C, Chompré G. "Astrocyte Activation is Increased in a Rat Endometriosis Model." *2019 Ponce Research Institute 15th Annual Scientific Conference*, Ferial Complex Convention Center, Ponce, PR.

Flores-Bonilla A, Chompré G, Appleyard C. "Exercise increases the expression of estrogen receptor β in the hippocampus in an endometriosis rat model." *26th Puerto Rico Neurosciences Conference 2018*, Pontifical Catholic University of Puerto Rico, Ponce, PR.

Flores-Bonilla A, Sambolin L, Chompré G, Appleyard C, Porter J. "High Fat Diet increases neutral sphingomyelinases in the rat brain." *2018 Junior Technical Meeting and PR Interdisciplinary Scientific Meeting*, University of Turabo, Gurabo, PR. & *2018 XVI Scientific Investigations Symposium*, Pontifical Catholic University of PR, Ponce, PR.

Flores-Bonilla A, Fitzgerald M, Santos B, Mueller D. “Prefrontal Astrocytic communication and energy metabolism in retrieval of cocaine-associated memories.” *2017 XV Scientific Investigations Symposium*, Pontifical Catholic University of PR, Ponce, PR.

Flores-Bonilla A, Skidmore J, Martin D. 2016. “The role of Chd7 in embryonic development of the CNS and cochlear ganglion.” *Medical Scientist Training Program Retreat*, Higgins Lake, MI.

Poster Presentations

Flores-Bonilla A, Akli S, Senthikumar R, De Oliveira B, Rajvanshi A, Amira N, Richardson HN. “A history of adolescent drinking increases myelination of axons within the corticotropin releasing factor-enriched subregion of the central amygdala in adult mice.” *NSB Open House*, University of Massachusetts, Amherst, MA. March 2025; *Neurobiology/Neuroscience UMass Chan Medical School and UMass Amherst 2024 Fall Meetup*. University of Massachusetts, Amherst, MA. October 2024; *2024 Society for Neuroscience Conference*. Chicago, IL. October 2024; *IONs Distinguished Lecture and Poster Presentation*, Amherst, MA. May 2024.

Flores-Bonilla A, Akli S, Senthikumar R, De Oliveira B, Rajvanshi A, Amira N, Richardson HN. “Determining how adolescent alcohol drinking alters corticotropin releasing factor (CRF) and axonal myelination in the central amygdala in adulthood in male and female mice.” *2023 Society for Neuroscience Conference*. Washington, D.C. November 2023; *2023 Initiative for Neuroscience Conference*. University of Massachusetts, Amherst, MA. November 2023.

Flores-Bonilla A, Akli S, Senthikumar R, De Oliveira B, Rajvanshi A, Amira N, Richardson HN. “Phenotyping a Subpopulation of Cells in the Amygdala Affected by Alcohol Exposure.” *2023 Interdisciplinary Neuroscience Conference*. University of Massachusetts, Amherst, MA. May 2023; *Neurosciences 2022 Poster Conference*. University of Massachusetts, Amherst, MA. November 9th, 2022.

Flores-Bonilla A, Lu YL, Silva-Gotay A, and Richardson HN. “Which population of CRF-expressing cells in the central amygdala are impacted by adolescent binge drinking?” *Initiative on Neuroscience 2021 Multidisciplinary Poster Conference*, University of Massachusetts, Amherst, MA.

Flores-Bonilla A, De Oliveira B, Silva-Gotay A, Lucier K, and Richardson HN. “Shortening Access Time to Alcohol Drives Up Front-Loading Behavior, Bringing Consumption in Male Rats to the Level of Females”. *44th Annual Research Society in Alcohol Scientific Meeting 2021*, Online.

Flores-Bonilla A, Silva-Gotay A, Akli S, and Richardson HN. “Manipulating Operant Parameters to Gain Insight into Sex Differences in Alcohol Drinking.” *43rd Annual Research Society in Alcohol Scientific Meeting 2020*, cancelled due to COVID-19 Pandemic.

Flores-Bonilla A, Silva-Gotay A, Akli S, and Richardson HN. “Determining the Role of Microglia in Clearing Oligodendrocyte Debris during Adolescence.” 2019 *Postbaccalaureate Research Education Program Poster Session*, University of Massachusetts, Amherst, MA.

Flores-Bonilla A, Cruz ML, Appleyard C, and Chompré G. “Astrocyte Activation is Increased in a Rat Endometriosis Model.” 2019 *Experimental Biology*, Orange County Convention Center, Orlando, FL.

Flores-Bonilla A, Fraser KM, Keiflin R, Janak PH. “Do Individual Differences in Incentive Salience Attribution Reflect Differences in Reward Representation?” 26th *Puerto Rico Neurosciences Conference 2018*, Pontifical Catholic University of Puerto Rico, Ponce, PR; 2018 *Annual Biomedical Research Conference for Minority Students (ABRCMS)*, Indiana Convention Center, Indianapolis, IN; 2018 *National Science Foundation Hispanic Speaking Institutions Innovation Conference*, Mayagüez Resort and Casino, Mayagüez, PR; 2018 *PR-LSAMP Advisory Board Meeting*, University of Puerto Rico, Río Piedras, PR; 2018 *Leadership Alliance National Symposium (LANS)*, Hartford, CT; & 2018 *Career, Academic, and Research Experiences for Students (CARES) Symposium*, Johns Hopkins University School of Medicine, Baltimore, MD.

Outreach Publications

Flores-Bonilla A. March 7th, 2022. “What is a post-bac? My experience in PREP”. *That’s Life Science*, University of Massachusetts, Amherst.
https://thatlifescience.github.io/github_dev/2022-03-07-What-is-a-post-bac-my-experience-in-PREP/

Flores-Bonilla A. September 13th, 2021. “Quarantine Blues? The Effects of Social Isolation in the Brain”. *That’s Life Science*, University of Massachusetts, Amherst.
https://thatlifescience.github.io/github_dev/2021-09-13-quarantine-blues-afloresbonilla/

Flores-Bonilla A, Rodríguez-Rivera J. September 5th, 2018. “Conditioned addiction? Pioneer participates in scientific research at Johns Hopkins University, in Maryland”. *Prints of the Future*, PUCPR. Spanish Language. <http://huellas.pucpr.edu/?p=32390>

Outreach Presentations

Flores-Bonilla A. February 16th, 2022. “My Scientific Journey” *Invited speaker for PREP Speaker Series: Scientists Tell Their Stories*. University of Massachusetts, Amherst, MA. (Presentation via Zoom).

Flores-Bonilla A. February 25th, 2021. “My experience at the University of Massachusetts, Amherst.” *Invited speaker for PR-LSAMP undergraduate students*, Pontifical Catholic University of Puerto Rico, Ponce, PR. (Presentation via Zoom).

Flores-Bonilla A, Edwards M, Otter K. January 27th, 2020. “Train your Friends” *Neuroscience and Behavior Educational Outreach Committee*, Holyoke High North Campus, Holyoke, MA.

Flores-Bonilla A, Edwards M, De la Rosa N. March 10th, 2020. “Train your Friends” *Neuroscience and Behavior Educational Outreach Committee*, Four Rivers Charter School at the University of Massachusetts, Amherst, MA.

Flores-Bonilla A. February 19th, 2019. “Experiences in Undergraduate Research” *General Biology Course for Undergraduates*, Pontifical Catholic University of Puerto Rico, Ponce, PR.

Flores-Bonilla A. November 9th, 2018. “Anatomy of the Brain” *Physiology (PhUN) week*, Pontifical Catholic University of Puerto Rico, Ponce, PR.

Science Communication

The Paaaper People™

Bengaluru, India (via Zoom)

(Jan 2021-Present)

An international Journal Club funded by K.S. Menon dedicated to make science and scientific literature accessible to everyone.

- *Sex Differences in Drinking Dynamics Journal Club*; oral presentation on June 15th, 2021
- *Stress and Social Isolation Journal Club*; oral presentation on February 27th, 2021

That’s Life Science Blog – now Science Stories

University of Massachusetts, Amherst, MA

A peer-reviewed open access journal founded by graduate students at the University of Massachusetts Amherst.

President

(Aug 2022-May 2023)

- Expanded the recruitment of graduate student writers from more diverse pool of life-sciences fields at UMass including kinesiology, animal biotechnology, public health, environmental conservation, biomedical engineering, and epidemiology to submit short-form science articles and expand opportunities for science communication.
- Collaborated our efforts with Science Café and merged in 2023 to create *Science Stories*.

Managing Editors Committee

(Aug 2020-May 2023)

- Promoted to Chair in January 2022: managed the science article submissions and coordinated the email communication between the authors, the peer editors, and the managing editors.
- Edited articles before publication on the website.
- Attended, took notes, and contributed to discussion in the committee meetings.

Mentorship Experience

Spaulding-Smith Peer Mentor

(2024-present)

University of Massachusetts, Amherst, MA

- Currently serving as a peer mentor for a first-year Spaulding-Smith graduate student.

McNair Scholars visit

(2024)

University of Massachusetts, Amherst, MA

- Participated in the graduate student panel organized by the Office of Inclusion and Engagement for the undergraduate students in the McNair program to discuss our experiences as graduate students in a PhD program.

SPACE (Supporting Peer Academic Commitment and Excellence) Program (2024)
University of Massachusetts, Amherst, MA

- Participated in the department-led graduate student panel for the undergraduate students in the SPACE program to discuss our experiences as graduate students in a PhD program.

NSB Community and Social Coordinator (Jan–Dec 2024)
University of Massachusetts, Amherst, MA

- Organized student-only social activities to create space for community and networking in a relaxed environment.

NSB Chair of the Mentorship Committee (Jan–Dec 2024)
University of Massachusetts, Amherst, MA

- Developed strategies with the NSB Vice-President to coordinate mentor-mentee connections among NSB graduate students.

PREP Near Peer Mentor (Aug 2021-May 2024)
University of Massachusetts, Amherst, MA

- Helped current PREP students on a 1-on-1 consultations for their interest in applying for graduate schools, gave feedback on their writing in their application materials and provided resources to apply for fellowships.
- Participated in a panel discussion about choosing graduate programs and selecting the laboratory (or Principal Investigator) of interest.

NSF Graduate Research Fellowship Program (GRFP) Mentor (Aug 2021-Oct 2021)
Graduate School Office of Professional Development (OPD)
University of Massachusetts, Amherst, MA

- Selected to be an NSF GRFP Mentor after passing through a competitive application process.
- Received training focused on understanding the NSF GRFP Review Criteria.
- Evaluated student's writing and provided constructive feedback on their application materials in 1-on-1 consultations.
- Co-facilitated an NSF GRFP OPD workshop for undergraduates and graduate students titled "NSF GRFP Graduate Research Plan Statement Workshop"

Mentorship for Underrepresented STEM Enthusiasts (MUSE) (Jan 2020-Dec 2020)
Member of the MUSE Board of Directors and Clerk for MUSE non-profit Inc.

- Developed, engaged, and promoted ideas for MUSE services to minorities and people of color in a collaborative environment.
- Attend, take notes, and contribute to discussion in the Board meetings.

Co-leader of the Impact Committee

- Developed quantitative and qualitative evaluation metrics to both acknowledge the efficacy of the approaches in MUSE and develop alternative/innovative approaches to best support underrepresented populations of STEM trainees.

Mentored students in 1-on-1 sessions

- Provided feedback, resources, and engage in conversations with mentees about their goals to get admitted and stay in STEM programs in the United States.

Attended the MUSE Mentorship Slack Workspace

- Provided resources and answer specific questions about STEM graduate school and fostering a community for mentees of different backgrounds to help cope with similar struggles as a cultural/identity minority in STEM.

Student Mentors Project**Pontifical Catholic University of Puerto Rico**, Ponce, PR

College of Science, Department of Biology

(Jan 2017-Aug 2017)

- Aided incoming students about their transition and adaptation to life in university.
- Provided guidance on the student's enrollment in the department of biology, biotechnology, chemistry, and mathematics on their first day at the Ponce campus.

Professional Associations

Society for Neuroscience.....(2023-Present)
 Research Society on Alcohol.....(2020-Present)
 Society for Advancement of Chicanos/Hispanics & Native Americans in Science.....(2019)
 American Physiology Association.....(2019)
 The Leadership Alliance.....(2018-2019)
 Puerto Rico Louis Stokes Alliance for Minority Participation (PR-LSAMP).....(2017-2018)
 Phi Kappa Phi Honor Society.....(2017-2018)

Student Associations

NSB Community and Social Coordinator.....(2024)
 NSB Chair of the Mentorship Committee.....(2024)
 Life Science Café.....(2023)
 That's Life Science.....(2019-2023)
 Neuroscience and Behavior Outreach.....(2019-Present)
 American Medical Student Association.....(2016-2018)
 Student Society of Environmental Sciences.....(2015-2016)
 Literary Circle of Expressive Revolution.....(2014-2016)
 National Honor Society.....(2012-2014)

Research Skills**Laboratory Rodent Animal Model**

- Handling rats and mice
- Tag mice
- Set up breeding for mice
- Weigh rats and mice
- Vaginal smears in rats
- Transgenic colony management

Laboratory Rodent Animal Surgery

- Ovariectomy
- Administration of drugs through intraperitoneal (isopentane, saline, cocaine, alcohol, pyrazole, tamoxifen), subcutaneous (saline), and inhalation

- (isoflurane and alcohol vapors) in mice and rats.
- Cannula implant, stereotaxic surgery (craniotomy and duratomy) under a microscope
- Microinjection and nanoinjection infusions to specific areas of the brain (retrograde tracers)

Rodent Behavioral Assays

- Zero maze
- Open-field test
- Sucrose grooming test
- Conditioned place preference (CPP)
- Morris water maze
- Pavlovian Autoshaping
- Blocking-unblocking procedure
- Two-bottle choice test
- Operant Self-Administration
- Drinking in the dark (DID)
- Chronic Intermittent Ethanol vapor exposure (CIE)
- Lick-Instance Quantifier Home Cage Device (LIQ-HD)
- Object Location and Novel Object Recognition (OL-NOR) task
- Spontaneous alteration y-maze task
- Attentional set-shifting task (ASST)

Histology

- Perfusion of mice and rats
- Embryonic dissections of mice at different embryonic stages
- Euthanasia via pentobarbital intraperitoneal injection in rats and mice
- Extraction of whole brain
- Dissection of the left and right mPFC, forceps minor, hypothalamus, and hippocampus
- Tissue collection of liver
- Paraffin embedding of tissues in blocks

- Processing brains for sectioning (flash-freezing using dry ice)
- Sagittal, coronal, and transverse sectioning on cryostat, microtome, and vibratome

Molecular Biology

- DNA, RNA and Protein extraction of frozen tissues
- Polymerase chain reaction (PCR)
- Gel electrophoresis
- Reverse transcription PCR
- Real-time PCR (q-RT PCR)
- Immunohistochemistry, Immunocytochemistry, and Immunofluorescence
- Hematoxylin and Eosin staining

Imaging

- Confocal microscope imaging in a fluorescent microscope (Olympus and CREST-V2 Nikon Instruments)
- Analyzing images using ImageJ and NIS Elements
- Designing a General Analysis 3 recipe for image processing and analysis

Data Analysis

- Standardized record keeping
- Data entry, analysis, and graphs in Excel, SPSS, GraphPad Prism, and R

Scientific discussion

- Scientific article review, discussion, and writing
- Scientific grant writing
- Organizing and leading scientific journal clubs
- Writing science for non-scientists
- Presenting research to scientists and non-scientists of all levels of education

Languages

- Spanish (native speaking, reading, and writing)
- English (native or bilingual speaking, reading, and writing)

Certificates

University of Massachusetts Amherst, Amherst, MA

Aseptic Surgery.....(2019-2028)
 Biomedical Responsible Conduct of Research.....(2020-present)
 Post-Procedure Care of Mice and Rats in Research.....(2019-2028)
 Working with the IACUC for Investigators, Staff and Students.....(2019-2028)
 PHS Financial Conflict of Interest Course.....(2019-2029)
 Working with Rats in Research Settings.....(2019-2028)
 Working with Mice in Research Settings.....(2019-2028)
 Fire Safety and Hazard Communication.....(2019-2028)
 Laboratory Safety Training course.....(2019-2024)
 Biolaboratory Safety Training course.....(2019-2024)
 Animal Training course.....(2019)

Ponce Health Sciences University, Ponce, PR

Animal Care and Use (ACU) Student working with Animals course.....(2019)
 Working with Rats in Research Settings course.....(2019)
 II Neuroscience of Learning Symposium.....(2017)
 Zoonoses and Small Laboratory Animal Safety and Wet Lab.....(2016)

Johns Hopkins University, Baltimore, MD

Animal Care and Use course.....(2018)
 Chemical Waste Management course.....(2018)
 Conflict of Interest and Commitment course.....(2018)
 Electric Information Security and Data Management course.....(2018)
 Fire Safety and Hazard Communication course.....(2018)
 Preparing for an Active Shooter in the Clinical and Non-Clinical Environment.....(2018)
 Laboratory Safety Preparatory Course.....(2018)
 Patient Privacy for Workforce Members course.....(2018)

iBiology Courses Online Course.....(2017)

Obtained the Honor Certificate of Completion in Planning Your Scientific Journey course.

Pontifical Catholic University of PR, Ponce, PR

Participated in the Individual Development Plan Workshop.....(2017)
 Participated in the Building a Presentation Poster Workshop.....(2017)
 Participated in the Research Ethics Workshop.....(2017)
 Participated in the Immunohistochemistry Workshop.....(2017)
 Participated in the Laboratory Safety Workshop.....(2016-2017)
 Participated in the Bridge to Neuroscience Workshop.....(2015)

University of Michigan, Ann Arbor, MI

Fulfilled the mandatory HIPAA requirement.....(2016)

Princeton Neuroscience Institute, Princeton University, Princeton, NJ

Completed the Aseptic Technique for Rodent Survival Surgery course.....(2015)
 Completed the Pain Management in Laboratory Animals course.....(2015)
 Completed the Working with the Laboratory Rat course.....(2015)

Clinical Shadowing

- C.S. Mott Children's Hospital (2016)
- Donna Martin, M.D., Ph.D. (Genetics and Pediatrics clinic)
- Cardiovascular Center, University of Michigan Health System (2016)
- John Nicklas, M.D. (Cardiology clinic)
- East Ann Arbor Health Center (2016)
- Jason Kahn, M.D. (Internal Medicine and Pediatrics clinic)

Community Service and Volunteering

- Little Sisters of the Poor**, Somerville, MA (2023)
- Newman Catholic Center, University of Massachusetts, Amherst
- Organized the Spring Dance for the elderly, decorated the dance room, and provided company to the elderly living there.
- Not Bread Alone**, Amherst, MA (2022)
- Newman Catholic Center, University of Massachusetts, Amherst
- Provided meals to those facing food insecurities in Amherst.
- Newman Graduate Student Group**, Amherst, MA (2020-2022)
- Newman Catholic Center, University of Massachusetts, Amherst
- Organized and led social and Catholic activities to develop a community of graduate students in the Newman Catholic Center.
- Ponce Benefit Association Nursing Home**, Ponce, PR (2018)
- Gave the elderly patients food, medicine, and social support.
- Ponce Health Sciences University**, Ponce, PR (2017)
- Made care packages of first necessities including medicine, food, water, and hygienic products for the people in need after suffering the disaster caused by Hurricane María in the Ponce Health Sciences University.
- Center of the Daughters of Charity Convent**, Yauco, PR (2017)
- Gave the homeless a home cooked meal and social support.
- Ponce Animal Rescue and Protection Services**, Ponce, PR (2016)
- Provided food and water for the animals, cleaned the cages, and bathed the animals.
- Ponce Homeless shelter "Amor Que Sana"**, Ponce, PR (2012)
- Provided the homeless women a home cooked meal and social support.

Additional Activities - Violinist

Newman Catholic Center, University of Massachusetts, Amherst.....(2021-Present)
Violinist in the mass Choir

Juan Morel Campos Music Institute, Ponce, PR.....(2005-2014)
Trained as a violinist student in classical and contemporary music.

National Society Talent Show in the University of Puerto Rico Theatre.....(2013)

- Won third place in the soloist category

Juvenile Symphonic Orchestra

- Won an award for outstanding music trajectory.....(2014)
- Participated every year in the Christmas and Awards Concerts.....(2010-2014)
- Trained young violinists in the 2013 Violin Summer Camp.....(2013)
- Volunteered to play in the Summer Concert at the Tibes Indigenous Ceremonial Center, in Ponce, PR.....(2011)

Bowed String Ensemble

- Participated every year in the Christmas and Awards Concerts.....(2012-2014)

Plucked String and Guitar Quartet, Ponce, PR

- Volunteered to play in the Christmas Special in the Perla del Sur Nursing Home....(2013)
- Played professionally in wedding ceremony in the Castillo Serrallés and reception in the Japanese Garden.....(2013)
- Played professionally in the Christmas Special of the Pontifical Catholic University of Puerto Rico.....(2013)
- Played professionally in the XVII Latino American Conference AZFA in the Ponce Art Museum.....(2013)
- Played professionally in the Ponce Art Museum Open House.....(2013)