FIU | FLORIDA INTERNATIONAL UNIVERSITY

June 26, 2023

Freeman Chris Lewis, MPH
PhD Student, Robert Stempel College of Public Health & Social Work
Florida International University
Miami, Florida

Dear Dr. Xuexia (Helen) Wang:

My name is Freeman Lewis, and I am reaching out to introduce myself and formally ask if you have availability to participate as a member on my dissertation committee. Please find my CV with relevant experiences attached along with this cover letter.

As demonstrated in greater detail on my CV, my previous experiences include: (1) ten years of drug development (preclinical and clinical) applied research experience of which I acquired from various opportunities within the San Francisco Bay Area biotechnology community; and (2) a Master's in Public Health with an area of emphasis in Social, Behavioral, and Population Sciences from Tulane University School of Public Health and Tropical Medicine.

Currently, I am pursuing my doctoral degree here at Florida International University (FIU) in the Environmental Health Sciences (EHS) department - Brain Behavior and Environment (BBE) program. In addition to my coursework, I am a graduate research student in the lab of Dr. Haiwei Gu focusing on Metabolomic/Lipidomic research applications.

Although not officially defined, my dissertation topic will include multi-omics (Genomic, Transcriptomic, Proteomic, and Metabolomic) characterization of Translocator Protein 18 kDa (TSPO) deficiency in a transgenic mouse model of Alzheimer’s Disease. Due to your experience in the development of novel statistical methods and computational tools in genetic discovery and risk prediction for complex diseases, I believe you would be an invaluable resource in the pursuit of my dissertation goals. If your schedule permits, I would greatly appreciate an opportunity to speak with you more about your current availability and discuss training opportunities under your supervision.

Thank you again for your time and for allowing me to introduce myself.

I look forward to speaking with you and please do not hesitate to contact me if you need more information.

Thank you again,

Freeman Lewis

Statement of Intent

To begin my research career, I held assistant research positions in the labs of Dr. Karen Bales at the University of California (UC) Davis and Dr. Jacqueline Crawley at the UC Davis Medical Center M.I.N.D Institute. These positions provided me with introductory training in behavioral neuroscience, which I successfully applied to researching animal models of neurodegeneration. Following my tenure at UC Davis, I interned in the neuroscience department at Genentech, under the supervision of Dr. Kimberly Scearce-Levie. There I had the opportunity to take the lead in developing and advancing two important projects. The first project focused on validating a cutting-edge touchscreen technology to assess dentate gyrus function and pattern separating abilities in the APP/PS1 Alzheimer's mouse model. This involved conducting a Location Discrimination task and implementing in vivo pharmaceutical intervention. In the second project, I utilized immunohistochemistry techniques to establish correlations between previously studied behavioral phenotypes and the distribution and localization of differentially expressed protein biomarkers. As a result of these experiences, I gained a comprehensive understanding of behavioral neuroscience and the application of research techniques in practical settings. These early experiences with neuroscience, notably research in Alzheimer's disease, evolved into my career pursuit, and is the motivator for me reaching out to you today.

Alzheimer's disease is a complex multifactorial condition that progresses through various stages, including asymptomatic, mild cognitive impairment (MCI), and ultimately dementia (specifically Alzheimer's disease dementia). Unfortunately, attempts to develop therapies that can modify the course of the disease have proven unsuccessful. These failures can be attributed to two main factors: (1) intervening too late in the disease process; and (2) a lack of precise targets for intervention. However, a new research paradigm has emerged in parallel with the development and advancement of high-throughput technologies. To this end, researchers studying the etiology and progression of Alzheimer's disease are transitioning from 'top-down' clinical labels towards 'bottom up' pathological signatures created by unsupervised machine learning algorithms and high-throughput 'omic' measurements (genomics, transcriptomics, proteomics, and metabolomics). Notably, these data-driven methods have furthered biomarker discovery; revealing valuable insights into neuroinflammation and risk factors associated with Alzheimer's disease.

Consequently, I intend to focus my dissertation research on discovering multi-omic biomarkers that can further early detection of Alzheimer's disease and elucidate novel targets for therapeutic intervention strategies. To do so, I will leverage the Translocator Protein kDa 18 (TSPO) knockout transgenic mouse as an experimental model system. My overall dissertation goal is to enhance our understanding of the biological mechanisms observed in the TSPO knockout Alzheimer's disease mouse model and translate these findings into effective diagnostic tools for asymptomatic detection and personalized therapeutic strategies. By integrating "omics" data, a comprehensive in-depth biological understanding of Alzheimer's disease and its complexity may promote broader efficacy in intervention trials and lead to the commercialization of a novel diagnostic multi-omic biomarker platform with the ability to tailor intervention strategies for all Alzheimer's disease patient populations.

Freeman Chris Lewis Jr.

707-398-1511

flewi017@fiu.edu

EDUCATION

University of California Davis Bachelor of Science (BS) in Physiological Psychology with an area of emphasis in Neurology, Physiology & Behavior (2008-2013)

Tulane University School of Public Health & Tropical Medicine Master of Public Health (MPH) in Social, Behavioral, and Population Sciences (2020-2022)

Florida International University Robert Stemple College of Public Health and Social Work Doctor of Philosophy (PhD) student in Environmental Health Sciences with an area of emphasis in Brain, Behavior, and the Environment. (2022-present) [Expected graduation data: Aug 2026]

NOTABLE COURSEWORK AND LAB EXPERIENCE

Organic Chemistry (Lab)	Molecular Biology (Lab)	General Biology and Chemistry (Lab)
Physiological Psychology (Lab)	Biochemistry (Lab)	Neurobiology, Physiology, and Behavior (Lab)
Hormones and Behavior (Lab)	Cognitive Neuroscience	Biological Psychology
Developmental Disorders	Human Development	Comparative Neurobiology (Lab)

NOTABLE WORKSHOPS AND SELF-PACED LEARNING

Stanford's Institute for Computation and Mathematical Engineering (ICME)

- Linear Algebra
- Introduction to Mathematical Optimization
- Introduction to Machine Learning
- Introduction to Deep Learning
- Deep Learning for Natural Language Processing
- Data Visualization in Tableau

SUMMARY OF QUALIFICATION AND SKILLS

- Advance proficiency with research techniques including those involved in behavioral neuroscience, physiology, microscopy, genomics, and cell biology.
- Expertise in designing and executing aseptic techniques and stereotaxic administration of neuroanatomical tracers into localized brain regions.
- Excellent ability to conduct research experiments while accurately maintaining and meticulously recording procedures and results.
- Capable of recreating animal models of disease to test proprietary compounds.
- Above average communication skills with the aptitude to effectively relay information to an audience.
- PC Skills: Microsoft Office (Word, Excel, PowerPoint, OneNote, Outlook, Publisher, Access), Statistica, Sigmaplot. and Ethovision (automated tracking software), Tableau.
- Programming Languages – Familiarity with R Programming.

PROFESSIONAL EXPERIENCE

Principle Research Associate In Vivo Physiology/Pre-Clinical Translational Pharmacology, Calico Life Science (Alphabet Company)
(Dr. Ganesh Kolumam & Dr. Nick Van Bruggen, 2015-2022)

- Independently created experimental designs, prepared samples, constructed libraries and generated data of gene expression patterns in animal models of disease using next generation Illumina sequencing.
- Familiarity with droplet-based and plate-based single cell assays and platforms (10x Genomics), spatial transcriptomics, laboratory robotics, large-scale experiments, and process development.
- Experience with cell culture and tissue processing including isolation of Mouse Embryonic Fibroblasts.
- Independently performed animal dosing (routes: Intravenous, Intraperitoneal, Subcutaneous, Intramuscular, & Oral) and animal blood collections (Retro Orbital, Cardiac Puncture, Tail Nick, Submandibular) in mice and rats to perform Pharmacodynamic and Pharmacokinetic studies.
- Harvested tissues during necropsy for further downstream analysis.
- Autonomously Performed Intracerebroventricular (ICV) Stereotaxic injections and subsequent tissue processing (brain sectioning, immunohistochemical staining, H&E staining)
- Performed Microsurgeries/Micro Dissections of tissues/organs of the nervous, digestive, cardiovascular, and musculoskeletal systems.
- Purified DNA/RNA for -omic's analysis (both single cell and bulk -omic's sequencing).
- Developed in vivo assays to test drug target engagement to be subsequently used for human clinical studies.
- Independently completed in vitro assays to test for target engagement through secondary biomarker measurements.
- Familiarity with Promethion Metabolic Cages and Vium Video Monitoring Systems for large scale metabolic and computer vision phenotype identification.

Research Scientist Intern, Genentech (Roche Group)
(Dr. Kimberly Scearce-Levie, 2015)

- Autonomously constructed equipment, refined training protocols, trained subjects, analyzed data, and communicated results of cognitive behavior to project leads in a rodent model of Alzheimer's disease using novel touchscreen operant conditioning technology.
- Developed skills in molecular biology – specifically immunohistochemistry techniques (perfusion, dissection, and sectioning).
- Mastered pharmaceutical compound administration through various dosing routes (intraperitoneal, subcutaneous, and oral gavage).

Junior Specialist, University of California, Davis Department of Psychiatry and Behavioral Neuroscience (MIND Institute)
(Dr. Jacqueline Crawley, 2012 – 2015

- Independently conducted assessments of animal health and diagnosed health concerns when applicable.
- Conducted a multitude of behavioral assays including but not limited to the measurement of ultrasonic vocalizations in transgenic models of Autism.
- Followed proper IACUC protocol involving the testing and handling of animal subjects.
- Catalogued and classified experimental data using various software packages.
- Prepared cohesive analyses of tabulated experimental data for article publication.

Undergraduate Lab Research Assistant, University of California Davis Psychology Department of Comparative Neurobiology
(Dr. Karen Bales, 2012-2013)

- Handled Prairie Vole subjects while administering Oxytocin intranasal injections.
- Collected blood samples from Prairie Vole subjects and performed immunohistochemistry on the samples.
- Conducted behavioral assays and scored behavioral traits of Prairie Vole subjects.
- Quantified neuro staining within Prairie Vole brains using neuroimaging techniques.
- Surgically removed Prairie Vole brain for experimentation.

Emergency Room Intern, University of California Davis Medical Center
(Dr Mary L. Bing, 2012)

- Developed professional relationships with and conveyed feelings of sensitivity towards patients and their comfortability by performing basic duties (maintained the cleanliness of patients' rooms, motivated rehabilitation and recovery through conversation, and perceived non-verbal social cues for assistance).
- Initiated new ideas as well as coordinated tasks to provide support to medical staff by respectfully delegating specific duties andspatial locations to fellow undergraduate peers within the Emergency Room.
- Provided alternative solutions to patients in the waiting area by facilitating discussion and listening attentively to the feelings and issues they described.

VOLUNTEER EXPERIENCE
Monitoring and Evaluation Team Volunteer, Tulane School of Public Health and Tropical Medicine (The Skin You're In)
(Dr. Thomas A. LaVeist, 2020)

- Social marketing campaign to dispel myths and raise awareness in the community about staying safe and healthy throughout the COVID-19 pandemic. Utilizing a multi-layered education campaign, TSYI delivers timely, accurate, and relevant information about COVID-19's effect on Black Americans in the Greater New Orleans area.
- Monitored and evaluated program activities, quantified goal attainment, and reported to team leads.

PUBLICATIONS

Yang M, Mahrt, E J, **Lewis, FC**, Foley, G, Portmann, T, Dolmetsch, RE, Portfors, CV, Crawley, JN (2015). 16p11.2 Deletion Syndrome Mice Display Sensory Deficits and Reduced Ultrasonic Vocalizations during Social Interactions. ***Autism Research***.

Yang M, **Lewis F**, Foley G, Crawley JN (2015). In Tribute to Bob Blanchard: Divergent Behavioral Phenotypes of 16p11.2 Deletion Mice Reared in Same-Genotype Versus Mixed-Genotype Cages. ***Physiology and Behavior***.

Yang M, **Lewis F**, Sarvi M, Foley G, Crawley J (2015). 16p11.2 Deletion Mice Display Cognitive Deficits in Touchscreen Learning and Novelty Recognition Tasks. ***Learning and Memory***.

CONFERENCE PRESENTATIONS

Yang M, Mahrt J, **Lewis F**, Foley G, Portmann T, Dolmetsch R, Portfors C, Crawley J. 16p11.2 deletion syndrome mice display ultrasonic vocalization deficits during social interactions. **Society for Neuroscience (SfN) Annual Meeting**. Washington,D.C. 2015

Yang M, **Lewis F**, Foley G, Portmann T, Dolmetsch R, Crawley J. 16p11.2 Deletion Mice Display Cognitive Deficits in Novelty DiscriminationTasks. **The International Meeting for Autism Research (IMFAR)**. Salt Lake City, Utah. 2015

Yang M, **Lewis F**, Foley G, Crawley J. 16p11.2 Deletion Mice Display Cognitive Deficits in Novelty Discrimination Tasks. **International Behavioral Neuroscience Society (IBNS) Annual Meeting**. British Columbia, Canada, 2015

ABSTRACT SUBMISSIONS

Ambade A, **Lewis F**, Kolumam G, Morrison J, Cornicelli J. Defining the Onset of Fibrosis in a CDAA Diet Induced Mouse Model of Non-Alcoholic Steatohepatitis using RNA-seq / pathway profiling. **American Association for the Study of Liver Diseases (AALSD).** Digital Experience, 2020.

References available upon request