BUILD ⊕ PODER
Promoting Opportunities for Diversity in Education & Research

2021 COMMUNITY COLLEGE PIPELINE PARTNER MASTER MENTOR LIST

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Bryant Horowitz, Professor of Psychology

Mentor Bio — As a Behavioral Neuroscience PhD, my research has focused on both human and animal research on multiple behavioral disorders. In the past, my research has focused on cognitive testing of Alzheimer's and Dementia patients, giving them cognitive tasks to assess their cognitive abilities, but the research also centered around the caregivers that take care of them. I have also looked at treatments for preventing the progression of Alzheimer's and related dementia using natural supplements, such as DHA in fish oil, and curcumin, the yellowish ingredient in turmeric, used in curry, as well as the benefits of aerobic exercise. My research has also extended to Schizophrenia, where my experience dealt mostly with some of the symptoms of Schizophrenia, concentrating specifically on the cognitive deficits using animal models (mice). I also have experience testing patients with head trauma and assessments with patients with Multiple Sclerosis.

Background & Purpose — In this area, the main focus of the research is to help to identify, prevent, or find treatment for behavioral disorders of a psychological nature.

Research Question(s) or Hypothesis — Are there factors or things that can be done to prevent disorders from progressing? The working hypothesis is that exercise, physical and mental, as well as supplements can potentially serve a neuroprotective purpose and prevent onset or progression of dementia.

Method — In this context, we can offer exercise programs and do assessments for people at risk.

Student Roles — Within psychology, my areas of interest in research have expanded recently, and I can tailor opportunities to fit the needs of potential students. I have taken a big interest in the psychology of political affiliation and psychology, looking at differences socially and cognitively when voting a certain way or different belief systems involved. I am very interested in the stigma society gives to people based on issues such as immigration, gun control, helping or withdrawing help for certain groups, and whether the information is processed automatically, and if this would change at all if we somehow made people more aware of these biases and automatic processes. In this area, we can answer questions that address whether there is a difference in how people vote and their stance on certain issues, especially with regards to minorities and ethical issues, and if the process is an automatic, unconscious issue. The main hypothesis in this area is that people that identify as conservative choose to vote more out of fear-based decision making and cognitive processing, whereas liberals vote more out of information-based decision making. Previous research falls in line with this hypothesis, and imaging studies show more amygdala activation with "conservatives" and more prefrontal cortex activation in "liberals".

Expectations — Potential students would get in with me on the ground floor and come up with their own interpretations of the research questions in order to tailor their focus. They would help define the variables we will study and manipulate how we study them. The student will get a taste for the scientific method, including collecting and interpreting their own data, and an inside look at the statistical analyses used in research and how to interpret what the results mean and how they can explain them.

Conferences typically attended — The typical conference for this area is the Western Psychological Association conference (WPA), but I would also like to strive to go to the American Psychological Association conference (APA), and any others that would suit the needs of the students.

Publications — Doctoral Dissertation: Horowitz, B (2012). "Investigating the Role for Dysbindin in Hippocampal-Dependent Learning and Memory: Glutamatergic Mechanisms"

Glen, W. Bailey, Horowitz, B, et al. "Dysbindin-1 Loss Compromises NMDAR-Dependent Synaptic Plasticity and Contextual Fear Conditioning". Hippocampus 24.2 (2014). 204-213.

"No Health Without Mental Health". National Publication distributed by The Chicago School of Professional Psychology in Spring of 2016.

Updated March 2021

Eileen Ie, Professor of Sociology

Mentor Bio — As a first-generation college student and child of immigrants I immediately connected with BUILD PODER's mission. I attended CSUN as an undergraduate and as a master's student for several reasons, one of which was staying close to family. While at CSUN, I was fortunate to have been mentored by Drs. David Boyns and James Elias who are largely responsible for my development as a sociologist, scholar activist, and instilling the values of kindness, generosity, and hard work. As an undergraduate I minored in Human Sexuality and as a graduate student, I specialized in the Social Psychology of Gender. At USC, my research focused on the experiences of first-generation Asian American and Pacific Islander student interactions with faculty. I have been a researcher since 2005 and began my tenure at ELAC in 2009. Currently, I am studying the sexual attitudes and behaviors of ELAC students through a mixed-methods approach. As a BUILD mentor my focus is to demystify and expose students to the research process. While my work has been in the areas of gender, sexuality, and education I am curious and open to exploring other areas. It is my hope to work, learn, and grow together!

Purpose — To explore the sexual knowledge and behaviors of community college students. Most American college student health behavior research focuses on university students (Pokhrel, Little, Herzog, 2014) and 2-year or community college students have been less studied. According to the Center for Disease Control (2013), American youth bear a disproportionate share of sexually transmitted infections. While 15 to 24 year olds make up 27% of the sexually active population, they account for half of new STIs in the U.S. each year.

Research question — What is the sexual knowledge and behaviors of ELAC students?

Method — Survey questionnaires, in-depth interviews, and content analysis of student journals. Qualitative analysis and basic quantitative analysis.

Student roles — Student will assist with sampling, data collection, coding, and analysis.

Expectations — Students can expect me to be responsive and genuinely care about their academic and personal growth. What I expect from students is also what students can expect from me: to be open to learning content and process and to be respectful of timelines, to be communicative, and to be kind. My goal is to demystify the research process and to expose students to the messiness of research in real life. Students will gain knowledge through experiential learning. You have a lot to bring to this relationship and I will be learning from you just as you will be learning from me.

Conferences — California Sociological Association annual conference, ELAC Mujeres Xingona's Conference, ELAC Global Awareness Conference.

Publications — "Mass Media 'Fast' for a Fast Media." 2005. Teaching about the Mass Media in the Classroom. Heather Laube and Sara Sobieraj (eds.). New York: American Sociological Association. (with David Boyns).

Pasadena City College

Jared Ashcroft, Chemistry

Mentor Bio — Jared Ashcroft received a doctorate from Rice University in chemistry designing drug platforms using immuno-conjugates of carbon-based nanostructure. Currently he teaches chemistry at Pasadena City College. His research group aims to engage and promote student centered learning within his classroom and research projects. Students are encouraged to formulate and design their own research experience and encouraged to present and publish their work. Research projects within Dr. Ashcroft's group have entailed using remotely accessible instruments to teach nanotechnology, design and analysis of effective active learning teaching strategies with a focus on increasing underrepresented

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student success in chemistry, as well as several interdisciplinary published science activities. Current projects center on determining optimal peer-to-peer mentoring strategies within community college STEM education and analyzing amounts of metal ions in California seawater samples and their possible effect on climate change.

Title of Research Project — Education Equity: Using Research and Mentoring to Increase Success and Completion in Community College STEM Pathways.

Background & Purpose — Undergraduate research and peer-to-peer mentoring are two effective practices that increase success within the STEM academic pathway and has especially shown high success among underrepresented students. We want to increase access and analyze effective strategies to further optimize using research and mentoring within STEM to promote science success within communities that are underrepresented in STEM.

Research Question(s) or Hypothesis — Do research experiences and mentoring increase success and completion among community college STEM programs? Is there an increase in underrepresented student success by embedding research principals within Chemistry classwork?

Method — We have developed summative and formative assessments that are aimed at determining how much science content students have retained from their research lab experience. We aim to utilize the research space at Pasadena City College along with heat cameras and eelctroencephalogram's (EEG's) to monitor student stress and brain activity during research/mentoring activities to determine physiological changes within students during these experiences.

Student Roles — Students design the labs and assessments, attend and run research sessions with K-12 and community college students as well as perform data analysis from our surveys and assessments. Lastly, students are responsible for writing initial drafts for publications and preparing poster and oral presentations.

Expectations — I expect our students to have a strong work ethic and to be an active contributor to the experience. Students must voice their thoughts and concerns for any experiment we perform. They must be vocal and contribute thoughtful discussion about the research. They must always be on time and be respectful for all that work with them on the project. My goal is to teach students to think and communicate effectively. I (Jared) especially expect my students to perform well in their classes and most importantly, have fun.

Conferences Typically Attended — High Technology Impact Conference, Micro-Nanotechnology Conference, American Chemical Society Conference, HTTC Honors Conference, Southern California Council For Undergraduate Research Conference, ATE PI Conference

Publications

1. Jared M. Ashcroft, Atilla Ozgur Cakmak, **Esteban Bautista**, **Vanessa Wolf**, Jillian Blatti, Dwaine Davis, M. Josefina-Jimenez, Raymond Tsui, Richard Hill, James S. Smith, Kristine J. Schroeder, Robert K. Ehrmann; "It's RAINing: Remotely Accessible Instruments in Nanotechnology to Promote Student Success." *Current Issues in Emerging eLearning*, Vol. 4, Issue 1, Article 4, 2018.

2. Brandon Rodriguez, **Vanessa Wolf**, **Esteban Bautista**, **Svetlana Timberlake**, James Shiffley, James Smith, M. Josefina Arellano-Jimenez, Jared Ashcroft; "Bridging the Gap Between 'Rocks for Jocks' and the Mars Sample Return Program: Using NASA Resources and Remote Access to Promote Geology." *Science Scope,* 41, 8, 48-57, 2018.

3. Brandon Rodriguez, Veronica Jaramillo, **Vanessa Wolf**, **Esteban Bautista**, **Jennifer Portillo**, Alexandra Brouke, Ashley Min, Andrea Melendez, Joseph Amann, Abdon Pena-Francesch, Jared M. Ashcroft; "Contextualizing Technology in the Classroom Via Remote Access: Using Space Exploration Themes and Scanning Electron

Microscopy as Tools to Promote Engagement in Multidisciplinary Geology/Chemistry Experiments." *Journal of Technology and Science Education.* 8, 1, 86-95, 2018.

4. Jared M. Ashcroft, Ashley Min, **Isabel Bojanini**, **Melanie Hacopian**, Kristine Schroeder, Attilla O. Cakmak, Brandon Rodriguez; "Cultivating Mars: A Problem-Based Learning Lab Designing an Oxygen-Rich Environment on the Red Planet." *Journal of Laboratory Chemical Education.* 6, 1, 4-11, 2018.

5. **Vanessa Wolf**, Brandon Rodriguez, Valerie Hsiao, Ashley Min, Jill Mayorga, Jared Ashcroft; "Education Equity: Using Problem-Based Learning in Tandem with a Remotely Accessible Scanning Electron Microscope to Close the Achievement Gap in the Science Classroom." Research In Science Education. *Manuscript in Review.*

6. Ashley Min, Jared Ashcroft, Joel Monroy, **Vanessa Wolf**, **Christina Lee**, Josée Horton, Robert Ehrmann, Brandon Rodriguez; "Making it RAIN: Using Remotely Accessible Instruments in Nanotechnology to Enhance High School Science Courses." *Frontiers in Education Technology.* 2, 2, 74-87, 2019.

7. **Christina Lee**, **Nay Chi P. Naing**, **Daisy Herrera**, Gerardo Aguirre, Brandon Rodriguez, Jared Ashcroft; "Light up My Life: An Active Learning Lan to Elucidate Conductive Properties of Electrolytes." *Journal of Laboratory Chemical Education.* 7, 1, 1-7, 2019.

8. Christian Burke, Richard Luu, Valerie Hsiao, Andy Lai, **Elwin Cheung**, Dustin Tamashiro, Jared Ashcroft; "Making STEM Equitable: An Active Learning Approach to Closing the Achievement Gap." *Journal of Research in Science Teaching, Manuscript in Review.*

9. Jared Ashcroft, **Melanie T. Hacopian**, Danyal Cave, Jillian L. Blatti, Pablo Zavattieri, Marcial Gonzalez, Veronica Jaramillo, Esteban Bautista, **Isabel Bojanini**, Janelle Wharry; "Early Career and Remote Undergraduate Research Experiences as Catalysts for More Impactful Community College STEM Opportunities." *American Society for Engineering Education, Manuscript Accepted.*

Jorge Iniguez, Professor of Biology

Mentor Bio – My goal as a mentor is to ignite a passion for biology so my mentees want to become immersed in this field and pursue careers in biomedical research. I have mentored two undergraduates that later moved on to honors thesis independent research projects. The basis of project is to use genetic tools to determine how voltage gated calcium channels regulate olfactory information in adult Drosophila central nervous system (CNS). These results will contribute to our understanding of how the rapid and specific communication between neurons and their peripheral targets is important in generating the appropriate behavioral response to a wide variety of external and internal stimuli.

Title of Research Project – Voltage gated calcium channels mediate calcium influx that influences a wide variety of cellular processes including excitability and chemical synaptic transmission in the nervous system and behavior.

Background & Purpose – Voltage gated calcium channels mediate calcium influx that influences a wide variety of cellular processes including excitability and chemical synaptic transmission in the nervous system. In vertebrates there are three major families of alpha1-subunit genes (Cav1, 2 and 3), some of which are functionally redundant. Drosophila has three genes, Dmca1D (1D), Dmca1A (cac), and Dmca1T (1T) encoding Cav1, Cav2 and Cav3 type channels respectively (Smith et al. 1996; Zheng et al. 1995; Littleton and Ganetzky 2000; King 2007). Null alleles in each of these genes result in embryonic lethality, demonstrating that they are not functionally redundant, but rather each plays a unique role in the organism (Eberl et al., 1998). However, there is no information regarding the role of the different calcium channel subtypes in regulating olfactory discrimination.

Research Questions or Hypothesis –All three calcium channel subtypes modulate Drosophila behavior

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Materials and Methodology

Animals- The fly stocks will be purchased from The Vienna Drosophila Resource Center (VDRC). The transgenic Drosophila melanogaster stocks will be maintained in a room illuminated with a 12-hour light/dark cycle and in a temperature of 23-25°C

Transgenic flies- The Gal4/UAS system will be used to study gene expression and function in Drosophila. The GAL4 gene is placed under the control of a native gene promoter, or driver gene, while the UAS controls expression of a target gene. GAL4 is then only expressed in cells where the driver gene is usually active. The system has two parts: the GAL4 gene, encoding the yeast transcription activator protein Gal4, and the UAS (Upstream Activation Sequence), a short section of the promoter region, to which Gal4 specifically binds to activate gene transcription.

Olfactory discrimination evaluation- An equal mix of female and male flies will serve as subjects. Flies put into a maze through upper chamber. One arm has an odor and the other arm contains control air. Air will continuously be drawn through the system by a pump at 1liter/min. Air entering on arm passes through chemical odors and air entering the other arm goes through diluents example water. After a period of 1 minute, the # of flies will be counted.

Expectations – Students will be responsible for animal feeding, animal breeding, transgenic crosses, maintenance and general assistance with all experiments

Conferences Typically Attended – Upon completion of these experiments results will be presented at meetings of the Society for Neuroscience, Genetics Society of America or Experimental Biology.

Publications

J. Iniguez, L. Sun and D.K.O'Dowd (2013) Cav3-type α1T calcium channels mediate transient calcium currents that regulate repetitive firing in Drosophila antennal lobe PNs. Journal of Neurophysiology. 110: 1490-1496.

Gu*, H., S.A. Jiang*, J.M. Campusano*, J. Iniguez*, H. Su, A.A. Hoang, M. Lavian, X. Sun, and D.K.O'Dowd (2009) Cav2-type calcium channels encoded by cac regulate AP-independent neurotransmitter release at cholinergic synapses in adult Drosophila brain. Journal of Neurophysiology. 101: 42-53. * authors contributed equally.

Veronica Jaramillo, Professor of Chemistry

Mentor Bio — Ph.D. (Chemistry), University of Arizona

Background & Purpose — Water quality is a big concern for a healthy life. It is proposed that we study tap water quality related to where students reside. Although this information is posted by water companies, most students are not aware of these reports. Most of our students either live at home with their parents or are renters, so they generally are exposed directly to the water quality reports.

Research Question(s) or Hypothesis — It is proposed that students will be more engaged in the issue by hands on testing of their own tap water.

Method — After characterizing different tap water samples, we will map out the quality of the different tap waters versus location and have a greater discussion of the causes and implications. Water quality testing will include testing for nitrates, nitrites as well heavy metals. Normal water characteristics will also be explored such as pH, conductivity, hardness and dissolved oxygen. After water has been analyzed, water purifications techniques will be explored through the collaborative research project described eCure proposal.

Student Roles — Students will explore different water purification techniques, but focus on nanoparticle purification. This experience will enlighten students to cost and effectiveness of water purification. Pasadena City College students will be involved in water collection as well as water analysis. They will be trained in making standard solutions, performing spectroscopic studies and volumetric analysis.

Expectations — Students will begin their research during their General Chemistry course and be expected to continue with the research project for at least one year and submit applications to the national Conference for Undergraduate Research (NCUR) and the national American Chemical Society (ACS) meetings.

Conferences Typically Attended — Conference for Undergraduate Research (NCUR) and the national American Chemical Society (ACS) meetings.

Juan Leon, Professor of Mathematics & Computer Science

Mentor Bio — My main interests lie in physics based simulations, scientific computing, and computer graphics and animation.

Background & Purpose — My research opportunity involves the Oculus Rift Virtual Reality system to model molecular models and reactions. The purpose of this opportunity is to develop educational tools to help understand molecular reactions in 3D space. Many chemical and biological systems studied are complex and having technology that allows for observation of these systems in 3D space would help students visualize chemistry and biology in a way they have never been able to. For example, complex biomolecules, such as proteins, which fold in a highly organized way, could be seen whole in a 3d space as opposed to on screen or in a book.

Research Question(s) or Hypothesis — We will be trying to answer some questions such as what sort of physics based models can be used to model and display chemical reactions in a 3D space. We will look at both a molecular mechanics model as well as a quantum chemical model. We would like to look at mathematically describing the collisions and subsequent reactions. One of our main research questions is "How can existing molecular databases be incorporated in the VR environment to create a physics based molecular graphics model?"

Method — A group consisting of students and faculty from Pasadena City College and CSUN within the Chemistry and Computer Science Department will work together in building a framework for using VR simulations in a Science classroom. Initially, two CSUN and two PCC students will work on the molecular rift computer program with the aim of having the first molecule in a virtual reality by July 1, 2018. They will then work over the summer to have to molecules collide by November 1, 2017 and finally by July 1, 2018 have a successful reaction taking place.

Student Roles — At the sophomore level students will be working to place virtual models into the virtual world. At the junior level, students will program the molecules to collide with each other to simulate a possible reaction. At the senior level, virtual molecules will be designed to properly orient themselves in order to show successful chemical reactions. Senior students might also try to incorporate a simple quantum chemical model. In the case of all level of students, they will have the opportunity and expectation to program in the Unity environment, which uses the C# programming language.

Expectations — Students should have some experience with at least any one of the C++, Java, or Python programming languages.

Conferences Typically Attended — I typically attend the SIGGRAPH computer graphics conference.

Miriam Hartman, Professor of Natural Sciences ** *NOT ACCEPTING NEW MENTEES FOR 2021-2022**

Background & Purpose — A pressing health concern in urban environments is the level of air pollution to which city-dwellers are exposed. Los Angeles has long been the poster child for air pollution; while the worst days of smog seem to be in the past, levels of pollution are far from ideal and appear again to be rising. In addition, there is evidence that poor air quality has the greatest impact on sensitive populations, such as children and the elderly, yet many locations where these individuals spend time (schools, apartments for seniors) are built in areas with major pollution problems. In addition, correlations between air pollution and low socio-economic status have been determined in several urban environments (citation1, citation 2). Recently, Google Street View cars were equipped with pollution-detecting equipment, and surveyed areas in both Oakland and Los Angeles, CA. This data is at higher resolution than any previous dataset of its size, and allows for study of correlations between pollution levels and geographic or demographic attributes, such as residential housing density, income level, and the ethnic makeup of a particular area.

Research Question(s) or Hypothesis — As noted above, studies have already shown that there is a correlation between pollution levels and poor neighborhoods. This dataset would allow such a study within the urban area of Los Angeles. Research questions would include: are there correlations between pollution and the location of schools where a large percentage of children receive a free or subsidized lunch? Of housing developments currently being built or planned, what fraction are in high-pollution zones? How far from major thoroughfares do high levels of pollution travel, and do these disproportionately affect low-income neighborhoods?

Method — The method would vary slightly depending on the research question being addressed, but all would utilize the Google data. In addition, demographic data, locations of schools, etc. will be determined using either datasets from data.gov or google.com. Students will extract data and place in a tabular/matrix format for ease of analysis. Initial analysis will be done graphically, plotting variables that are expected to show some correlation. Final statistical analysis will be determined using open-source software such as Python (NumPy).

Student Roles — Students would learn to manipulate the plethora of open-source data that are currently available, using software and tools that are applicable to a wide variety of topics and disciplines. Students will have hands-on experience at every step in the process, from distilling and formatting data to performing the mathematical and statistical analysis. Students will be encouraged to present their findings at conferences. Southern California Conferences for Undergraduate Research (SCCUR), local presentations at PCC.

Michael Vendrasco, Professor of Geology ** NOT ACCEPTING NEW MENTEES FOR 2021-2022**

Mentor Bio — Michael Vendrasco received a B.A. in Biology from UC Santa Barbara and a Ph.D. in Geology from UCLA. Since that time he has held adjunct teaching positions at UCLA and Cal. State Fullerton, and post-doctoral research positions at UC Santa Barbara and the University of Granada in Spain. He has also served as a Senior Environmental Specialist at the Orange County Sanitation District, and a Research Associate of the Los Angeles Museum of Natural History in the Department of Invertebrate Paleontology. He currently has a full-time position at Pasadena City College and teaches Soil Science, Physical Geology, Historical Geology, Oceanography, Oceanography Lab, and Field Geology courses.

Research Project Title — Monitoring plastic and toxic pollutants in southern California beaches and soils.

Background & Purpose — Pollutants accumulate in soils and beach sands. Beach pollutants pose health risks to beachgoers, who are especially plentiful in Los Angeles and Orange counties. Soil contamination exposes children in particular to risks, but the impact is even broader as soil pollutants can often be carried into groundwater where they can pollute drinking water supplies. It is important to determine the geographic and temporal patterns of pollutant concentrations in these regions, in order to: better estimate the range of probabilities of health impacts in different areas; better predict when certain beaches will contain higher concentrations of pollutants; and ultimately determine the causes of high accumulations of pollutants at specific places.

Research Question(s) or Hypothesis
(1) How and why do densities of **microplastics** vary in the sands of beaches in Los Angeles and Orange Counties? How do densities vary through time at specific beaches? Which environmental toxins become attached to these microplastics?
(2) How do concentrations of **heavy metals** and other pollutants vary in **soil samples** in different regions of Los Angeles County? What are the concentrations of these metals and other contaminants around known Superfund sites? How do these concentrations change through time? What factors contribute to these patterns?

Methods

(1) Beach microplastics

Sediments will be collected at beaches in Los Angeles and Orange Counties. A sediment corer will be used for an analysis of changing concentrations of microplastics over time. Microplastics will be extracted from beach sand using density-based methods, and the microplastics will be examined and characterized via binocular and scanning electron microscopes available at PCC. The density of microplastics and other anthropogenic debris will be measured and recorded for each sediment layer at each locality.

(2) Metals and other contaminants in local soils

Soils around superfund sites will be collected using a soil corer. The sediments will be digested using Aqua Regia in a High Pressure Microwave System. Concentrations of the metals Cadmium, Chromium, Copper, Manganese, Nickel, Lead, and Zinc will be measured using Inductively Coupled Plasma Mass Spectrometry. An XRF spectrometer at PCC can also be used to assess soil composition.

Student Roles — Students may participate in the entire research process, including: working to design a specific project within the research framework; doing background literature research; collecting and analyzing data; and contributing text and/or diagrams to a manuscript for publication.

Expectations —Students may develop their own research projects within the research framework presented here. The aim is for students to experience all steps of the research process. For their part, students must be willing to meet weekly and have the time and enthusiasm to consistently work on the project. Students must be willing to invest in the project and genuinely care about its quality.

Conferences Typically Attended — Geological Society of America (GSA) Annual and Regional Meetings.

Publications — For publications, please visit my Research Gate profile.

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