BUILD PODER

Promoting Opportunities for Diversity in Education and Research

2018 CSUN MASTER MENTOR LIST

Table of Contents

1. **College of Health & Human Development.....Pg. 1**
    a. Department of Child & Adolescent Development.....Pg. 1
    b. Department of Communication Disorders and Sciences.....Pg. 5
    c. Department of Environmental & Occupational Health.....Pg. 5
    d. Department of Family & Consumer Sciences.....Pg. 6
    e. Department of Health Sciences.....Pg. 9
    f. Department of Kinesiology.....Pg. 14
2. **College of Social & Behavioral Sciences.....Pg. 16**
    a. Department of Anthropology.....Pg. 16
    b. Department of Geography.....Pg. 17
    c. Department of Political Science.....Pg. 19
    d. Department of Psychology.....Pg. 20
    e. Department of Urban Studies and Planning.....Pg. 37
3. **College of Science & Mathematics.....Pg. 39**
    a. Department of Biology.....Pg. 39
    b. Department of Chemistry & Biochemistry.....Pg. 60
    c. Department of Physics & Astronomy.....Pg. 69
4. **College of Humanities.....Pg. 69**
    a. Department of Asian American Studies.....Pg. 69
    b. Department of Chicano/a Studies.....Pg. 70
5. **College of Engineering & Computer Science.....Pg. 71**
    a. Department of Computer Science.....Pg. 71
    b. Department of Electrical & Computer Engineering.....Pg. 71
    c. Department of Manufacturing Systems Engineering and Management.....Pg. 73
    d. Department of Mechanical Engineering.....Pg. 74

College of Health & Human Development

Department of Child & Adolescent Development

Kandice Grote

Mentor Bio — The opportunity to mentor students through the research process, at the undergraduate level, is a part of my career that has proved to be an invaluable opportunity. At my previous institution (UC Merced), I mentored 8 students who have gone onto successful graduate careers.

Purpose & Background — The current research examines cognitive benefits of bilingualism and possible mechanisms related to advanced cognition by which such benefits operate. Although older balanced bilinguals (proficient in two languages) display several cognitive advantages (Bialystok, 2001; Hakuta & Gould, 1987) when compared to monolinguals, less is known about when such benefits begin during early development. In an effort to examine potential advantages of early bilinguals, this research utilizes a series of visual-spatial memory (spatial cues to remember where missing objects are located), executive functioning tasks testing inhibitory control (the ability to suppress information to successfully complete a task) and attentional control (the ability to pay more attention to complete a task, while ignoring irrelevant information). In addition, this research investigates the influence of several methodological factors on cognitive performance including socioeconomic status (SES), age, and language group

Research Questions or Hypothesis — *Research Questions #1*: What possible visual-spatial memory and executive functioning advantages exist among early bilingual children vs. monolingual children? *Research Questions #2*: Is there a relationship between executive functioning and advanced visual-spatial memory?

Method — Each experiment includes an independent sample consisting of one age group (four year olds), three language groups (monolingual English, monolingual Spanish, and bilingual Spanish-English), and low-SES populations. Experiment 1 investigates whether bilinguals show an advantage on visual-spatial memory tasks. To address this question, participants are tested on two visual-spatial memory tasks. Experiment 2 utilizes visual-spatial memory to explore proposed executive functioning mechanisms for why we see a bilingual advantage, inhibitory control. Children participate in both an inhibitory control and visual-spatial memory video animation tasks that draw directly on inhibitory control. Experiment 3 utilizes visual-spatial memory to explore another proposed mechanism of executive functioning, attentional control. Like experiment 2, attentional control is tested in isolation and then with visual-spatial memory with another video animation task. All language group performances are coded for success on each task within each experiment. Means of these performances (dependent variables) are also analyzed through series of SPSS software ANOVAs and T-tests.

Student Roles — All students (regardless of school year) will have an opportunity to participate in all aspects of the research process, including literature review (e.g. how to identify relevant articles and summarize findings), experimental design and stimuli creation (e.g. collaborative discussion of experimentation methodology), working with participants (e.g. how to recruit participants, obtaining consent, executing research protocols), and coding/analysis (e.g. how to transcribe, code, and analyze data).

Conferences Typically Attended — Association for Psychological Sciences (APS) Society of Research in Child Development (SRCD) Cognitive Development Society (CDS) Western Psychological Association (WPA)

Shu-Sha Angie Guan

Mentor Bio — Dr. Guan earned her BA in Psychology at UC Berkeley and her Ph.D. in Developmental Psychology at UCLA. She studies the psychology & physiology of social bonding across contexts (e.g., cultural contexts, technology/digital media contexts), particularly among ethnic minority and immigrant adolescents and young adults. Please check out my lab website for more info on projects & people: http://angiesguan.wixsite.com/guancultrelab.

Title of Research Project — Social Experiences and Relationships on Cross-Cultural Health (SEARCH)

Purpose and background — Social relationships have a powerful effect on well-being, such that supportive experiences can get "under the skin" to affect physical health outcomes (Guan, Bower, Almeida, Cole, Dahl, Irwin, Seeman, & Fuligni, 2016). Positive social relationships may affect health by buffering against the negative effect of stress on physiological, stress-response systems (e.g., neuroendocrine, cardiovascular, immune). However, individuals from different cultural backgrounds may have different support needs and norms (Guan & Fuligni, 2015).

Research Questions or Hypothesis — The study examines how receiving and providing social support affects stress reduction among young adults from diverse backgrounds within an experimental paradigm.

Method — We use primary quantitative methods. Within the experimental design, we collect survey, behavioral, and physiological data.

Student Roles — Students have opportunities to be involved in many various steps of the scientific method -- from reviewing literature, designing a study, analyzing data, writing up the results in an APA-formatted presentation or manuscript.

Expectations — My research assistants meet with me regularly. They learn to collect, analyze, and interpret empirical data. They practice the craft of research methods in developmental psychology.

Conferences Typically Attended — Western Psychological Association (WPA), American Psychological Association (APA)

Publications — Please check out my faculty page for more publications: https://www.csun.edu/health-human-development/child-adolescent-development/shu-sha-angie-guan-0.

April Taylor

Mentor Bio — Ph.D. 2001, University of California Los Angeles. B.A. 1993, Pomona College

Purpose & Background — Motivational researchers have consistently documented that as students move into middle school many experience a decline in academic achievement and orientation towards school. This is particularly the case for ethnic-minorities who experience disproportionate declines in academic indicators compared to their non-ethnic minority counterparts.

Research Question(s) or Hypothesis — Guided by the expectancy-value framework this work examines 1) perceptions of barriers and achievement values as mediators for the relationship between experiences with discrimination and academic outcomes, and 2) how this mediational model may be moderated by ethnicity.

Method — Analyses will include sociometric and nonparametric analyses, multilevel regressions, and multivariate analyses of variance.

Student Roles — Undergraduates will participate in recruitment, data collection, analysis, reporting, and presentation

Roxanne Moschetti

Mentor Bio — Dr. Moschetti received her Ph.D. and Master's degree at the Gevirtz Graduate School of Education at the University of California, Santa Barbara. She earned her Bachelor's degree in Psychology from California State University, Chico. She began teaching at Cal State Northridge as a lecturer in 2008. In 2011, she joined the tenure-line faculty after completing a developmental psychology postdoctoral fellowship at Johannes Gutenberg-Universität in Mainz, Germany.

Research Projects — Dr. Moschetti's research focuses on the development and well-being of underserved adolescents and emerging adults with a specific focus on the transition from high school to college. She is particularly interested in investigating the attitudes, experiences, social support systems, and knowledge among students who are first in their family to attend college, using the lens of social capital theory.

Purpose & Background — Existing research suggests that peer mentoring (a form of social capital) results in more feelings of connection, integration, and perceived support at the university (Yomtov et al., 2015); ultimately increasing retention and graduation rates in college (Ward, Thomas, & Disch, 2010). Her current research is focused on evaluating whether first-generation Latino student participation in a peer-mentoring program increased connection, integration, and perceived support at the university.

Research Question(s) or Hypothesis — The main research questions guiding the study are: (1) How does the peer mentoring program impact students' academic and social transition into college? (2) Do mentored students' perceptions of integration and support in college significantly increase from the beginning to the end of the semester (pretest/posttest)?

Method — A mixed methods study of students who participated in a peer mentoring program completed pretests and posttests and a separate open-ended survey which contained questions asking about perceptions of their peer mentors, the transition into college, and challenges and progress in school. A random sample of 30 participants were also selected to participate in focus groups of 3-5 students. Students in focus groups responded to open ended questions such as "Provide a specific example(s) of how your peer mentor has influenced your experience this semester?" Data analysis includes open-ended coding, followed by focus coding, was used to analyze the open-ended survey and focus group data.

Student Roles — BUILD PODER Mentees roles include, but are not limited to, conducting literature searches and data entry, assisting in the development and pilot testing of experiments, recruiting and running study participants, coding and entering data, as well as preparing materials for presentations at conferences and submitting manuscripts to peer-reviewed journals.

Expectations — Students will gain a deep understanding of the research process and be involved in important design and implementation decisions. The extent and nature of students' contributions will be determined in part by their interests, qualifications, and availability.

Conferences Typically Attended — Society for Research on Adolescence, Western Psychology Association, Society for Research in Child Development, and American Educational Research Association.

Mentors Not Accepting New Mentees (Sabbatical)

Emily Russell

In the language development lab, our research seeks to understand better the ways bilingual children build their vocabularies. We are currently comparing monolingual and bilingual children's word-learning behavior and vocabulary content using experimental and survey-based studies. Students at every level are involved all aspects of the research process, including: study planning, participant recruitment, data collection and analysis (using Excel and SPSS), and sharing of findings with the wider scientific community at local and national conferences (e.g., Cognitive Development Society, Society for Research in Child Development). I encourage students to gain independence and increase their responsibilities as they advance in the lab. Students who join our team have the opportunity to increase their knowledge of the research process, form instructor-to-peer and peer-to-peer mentorship relationships, and gain experience working with 15- to 30-month-old children and their families. Lab members will learn more about the development of children from a diverse array of language backgrounds; they may also gain insight into their own development. We are particularly interested in English-Spanish bilingual students applying to join our lab—though all applicants will be considered

Nancy Miodrag

Mentor Bio — Autism Spectrum Disorders and Intellectual Disabilities; Maternal Health and Wellbeing; Psychological Stress; Positive Psychology. **Ph.D.** 2010, McGill University **M.A.** 2004, Concordia University **B.A.** 1999, Brock University

Purpose & Background — To: (1) enhance the health and psychological well-being of individuals with Autism Spectrum Disorder (ASD) and their caregivers; and (2) evaluate the effectiveness of a 10-week mindfulness intervention for mothers of children with ASD using psychosocial measures and activity tracking devices (i.e., Fitbit).

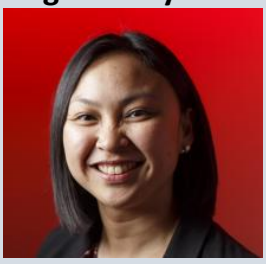
Research Question(s) or Hypothesis — This is an applied research project working with families and children.

Method — We will explore both quantitative and qualitative data on psychological stress, coping, and various health outcomes in female caregivers of individuals with ASD.

Student Roles — BUILD PODER students will participate in all aspects of the research including weekly meetings with Dr. Miodrag and an interdisciplinary team of CSUN researchers, research design, assessments, data collection, data entry, analysis, and dissemination of findings.

Expectations — Students will gain valuable research skills including analytical thinking by analyzing data; critical thinking by reviewing and synthesizing literature; effective communication through public speaking in meetings, at conferences (i.e., local and national conferences in the social sciences), and with families; and team work by collaborating with other students and faculty on the project. Participation on this project can also help facilitate lifelong learning skills such as scholarly writing, work ethics, time management, and organization.

Virginia Huynh



Dr. V. Huynh's research focuses on understanding social and cultural factors that influence the adjustment of ethnic minority and immigrant youth. Her current line of research focuses on the effects of ethnic discrimination on the health outcomes (e.g., biological stress, blood pressure, heart rate) and behaviors (e.g., food choices) of minority youth. The goal of this work is to provide evidence that discrimination may be one contributor to health disparities, and this effect emerges as early as adolescence. Students will have access to participant survey and experimental data of cultural and social factors and mental and physical health. Students' responsibilities may include recruiting schools and participants, running experiments, analyzing quantitative data, and presenting research at conferences (e.g., WPA, APA, SRCD, SRA). Most sophomore and junior students will create a research project from collected data and present research as a poster. Senior students may collect their own data and present research as a talk.

Department of Communication Disorders and Sciences

Vickie Yu *New Mentor*

Purpose & Background — The way in which speech sounds are perceived and produced depends on the nature of individual's language experience. My study aims to investigate the acoustic aspect of the speech features in second language (L2) learners of English to better understand how the different phonetic components between their native language and English affect their speech production in English. The findings would provide useful reference for improving efficacy on pronunciation enhancement in the clinic and ESL settings.

Research Question(s) or Hypothesis — 1) What phonetic components affect speech intelligibility in speakers who learn English as a second language? 2) What is the relation between the English speech production and perception patterns in L2 learners of English?

Method — This study will involve both auditory perception and speech production tasks. L2 adult learners will complete both tasks. Native English speakers will be also recruited as control. Participants' language background information will also be collected. The analysis of this study will involve acoustic analysis on vowels and consonants and speech intelligibility measures.

Student Roles — Students involved in this study will engage in different types of research activities in line with the progress of the project. The students will learn how to: Conduct literature review (i.e., what to look for in a research article to help them understand and think beyond the article and summarize findings), Understand the process of designing experimental tasks, Conduct data collection (e.g., how to recruit participants, obtaining consent, executing research protocols), Perform data analysis (e.g., transfer/backup data, code, and analyze data), Present/Report the results (e.g., learn how to make interpretations based on the results and to relate the current findings to evidence in the literature, how to write a summary of the findings and how to make a scientific research presentation).

Expectations — Prior knowledge of phonetics is recommended, though all applicants will be considered. The students in this study will receive an intensive training on acoustic analysis for speech sounds (consonants and vowels) using an acoustic tool. Students will be encouraged to create a research project, collect data and present their studies as a poster at the conference.

Conferences Typically Attended — American Speech-Language, and Hearing Association (ASHA), The Acoustical Society of America (ASA).

Department of Environmental & Occupational Health

Nola Kennedy

Mentor Bio — Dr. Kennedy is a graduate of UC Berkeley and UCLA. She is currently the EOH Internship Coordinator. She is interested in occupational health and most of her research has focused on the quantification of exposures. She has worked on grants from NIOSH and NIH and currently has a grant from NIEHS to train undergraduates seeking a career in research. She is a board member of the Southern California section of the American Industrial Hygiene Association and of the California Industrial Hygiene Council. **Ph.D.** 2000, University of California Los Angeles **M.S.** 1997, University of California Los Angeles **B.A.** 1984, University of California Berkeley.

Purpose & Background — The objective of this project is to evaluate environmental exposure to noise experienced by dance students. Current understanding of non-occupational exposures to noise is limited because these exposures are often accepted as part of the recreational experience.

Research Question(s) or Hypothesis — The investigation seeks to measure (1) noise exposure levels and (2) exposure durations. The research will investigate control technologies for reducing noise exposures in the dance studio environment.

Method — Health outcomes, related to noise exposure, will be evaluated using a questionnaire. Students will work with the collection and analysis of noise exposure data, including dosimetry and octave band source characterization. These data will be analyzed using statistical analyses for correlation, variance and significance.

Student Roles — Students will be responsible for survey scheduling, data collection, interaction with test subjects, data analysis and presentation.

Expectations — Students will gain a broad set of research-related skills, including survey management, environmental mentoring, equipment calibration, data analysis and public communication of findings.

Department of Family & Consumer Sciences

Annette Besnilian, Executive Director of the Marilyn Magaram Center

Mentor Bio — Annette Besnilian's dedicated academic leadership focuses on serving and educating the next generation of dietitians, public health nutritionists, and food scientists. Today, she serves as the Executive Director of the Marilyn Magaram Center for Food Science, Nutrition, and Dietetics (MMC) and works tirelessly to provide robust educational and professional opportunities for students, who like her, have the passion to advance the understanding of nutrition, dietetics, and food in diverse communities. In addition, at CSUN she is the Dietetic Internship Program Director; and faculty teaching Nutrition and Dietetic Classes to graduate students in the Department of Family and Consumer Sciences. She is a Fellow of the Academy of Nutrition and Dietetics, a Registered Dietitian Nutritionist (RDN), and a Certified Lactation Educator (CLE). She also serves as a NIH BUILD PODER Mentor for CSUN. For more than seventeen years she has obtained research and program development grants that have resulted in more than $3,000,000 in funds. She has been a DI Director for over 16 years and has trained and graduated approximately 160 dietetic interns and Registered Dietitians/Registered Dietitian Nutritionists (RDs/RDNs) in both Community and Nutrition Therapy Concentrations.

Purpose & Background — The research project goals are to implement, evaluate and conduct follow up to determine the effectiveness of school-based and community childhood obesity and diabetes (chronic disease) prevention programs (e.g., parent/family nutrition and activity workshops, cooking demonstrations, gardening programs, educational theater) designed to affect healthful behavior in parent participants and their families in schools with a high percentage of Latino families in LAUSD and the low income families in LA County. The programs focus on increasing awareness and providing guidelines on healthy nutrition choices, food-label reading, recipe modification, smart shopping, and related nutritional and healthy lifestyle information. Other research projects include body composition testing and education for athletes, and testing of antioxidant levels, sensory analysis, microbial content and growth in hydroponics, aquaponics, and conventionally grown plants. Additionally, a peer mentorship program has been developed to ensure student success and increase diversity in the field of dietetics.

Method — Baseline, Six-month and one-year follow-ups will determine long-term effects of school-based and community obesity and diabetes (chronic disease) prevention programs. Research variables are: participants' knowledge regarding nutrition, cooking, physical activity, gardening, sodium (pretest, posttest, follow up); cooking, eating, gardening, physical activity behaviors at pretest, posttest and follow up; changes in body mass index (BMI) and percent body fat, three-six months and one-year follow-ups. Focus groups and one on one interviews with participants to determine changes they have made to their eating, cooking, gardening and physical activity.

Student Roles — Students will assist with data collection, taking field notes, taking height, weight and calculating BMI. Students will learn to administer surveys, analysis and interpretation; organization skills, professional development, curriculum development, use SPSS, Compusense, Genesis and Esha Computer software. They will also learn to conduct body composition testing using the BodPod in the Health assessment lab. They will learn to conduct antioxidant level testing in the food chemistry labs and biology microbial testing in the microbiology labs. They will learn to conduct focus groups and interviews, coding and determining themes.

Dena Herman-Mendes

Mentor Bio — Dr. Herman's research has focused on improving dietary quality and food security among low-income, ethnically diverse populations. Her earlier projects focused on the assessment of dietary quality of mothers and families participating in the WIC program. Her site-randomized trial of an economic intervention to increase fruit and vegetable intake, demonstrated the efficacy of adding fruits and vegetables to the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) food package became national policy and was initiated in California in October 2009. Her current research endeavors focus on childhood obesity prevention and its relationship to the microbiome. As a registered dietitian, she has worked with children with special needs, women getting ready to get pregnant (preconception care), and is now working with patients and their families in UCLA's FIT for Healthy Weight Program. **Ph.D.** 2002, University of California Los Angeles **M.P.H** 1997, University of California Los Angeles **B.S.c.** 1993, Fredrich-Wilhelms University

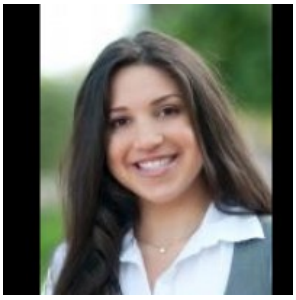
Purpose & Background — The goals of the LA ROCCS evaluation project are to: 1) Reduce the prevalence of childhood obesity among children 3-5 years of age participating in an intervention to inform parents of children's weight status using a parent BMI letter; and 2) To evaluate if a provider training on healthy lifestyle habits results in lower BMI values for children ages 3-5 years attending child care services in Los Angeles County.

Methods — The primary variables are: Body mass index (BMI) (kg/m2); knowledge, attitudes, and beliefs of child care providers regarding their personal healthy lifestyle habits including: healthy eating, exercise, and screen time; and demographic variables (e.g., age, race, education, and income).

Student Roles — Students will work with survey data including the variables listed above, and they will be responsible for measuring and weighing children, data entry, recruitment of childcare sites.

Expectations — Students will gain skills in anthropometry, experience in community-based participatory research, data management.

Elizabeth Sussman, Graduate Coordinator, Department of Family and Consumer Sciences



Mentor Bio — My research focuses on nutritional deficiencies in kidney failure patients. As a member of the medical advisory board for the National Kidney Foundation of AZ, I've partnered with them to evaluate the effectiveness of their nutrition assistance program in malnourished dialysis patients. As a Registered Dietitian and a CardioRenal Society of America Board of Directors member, I work to improve the health of people with Chronic Kidney Disease. **Ph.D.** 2013, Arizona State University **M.A.** 2010, Teachers College Columbia University **B.A.** 2006, California State University Long Beach.

Research Project Title — Effectiveness of the Patient Assistance Nutritional Supplementation Program in Dialysis Patients in Arizona

Background & Purpose — Poor adherence to the renal diet within end stage renal disease (ESRD) patients leads to further complications, and can result in mortality. Additionally, an inverse association has been established between nutritional status and mortality among this patient population, as measured by albumin and equilibrated normalized protein

catabolic rate (nPCR). The above normal energy requirement and decrease in appetite ESRD patients experience is associated with poorer clinical outcomes, quality of life and mortality, making it difficult for them to obtain the necessary energy requirement. For over fifteen years, the National Kidney Foundation of Arizona (NKF AZ) has implemented the Patient Assistance Program for Nutritional Supplementation to help patients achieve their protein and caloric needs. When malnourished patients were deemed eligible for the program, they received a 2-month supply of calorie-protein supplements at a maximum of $100 per fiscal year. The purpose of this study isto investigate the effectiveness of the NKF AZ's nutritional supplementation program.

Hypothesis — We hypothesize the use of the nutritional supplements will improve nutritional status in Arizona dialysis patients.

Methods — Quantitative. Evaluation of the NKF AZ's Patient Assistance Nutritional Supplementation Program is being conducted using variables already collected by the NKF AZ. These variables are cleaned, coded and analyzed for change.

Student Roles — Students will help with literature reviews (to understand why we are doing this study), data coding and analyzing, and publication preparation and submission.

Expectations — Students will learn the importance of research, how it's conducted, analysis of variables, and how research stimulates future projects.

Conferences Typically Attended — Dr. Sussman attends the International Society of Renal Nutrition and Metabolism's Congress on Renal Nutrition every two years.

Yoko Mimura

Researcher Bio — I grew up in Japan and received Ph.D. from the University of Georgia. Starting with master's thesis preparation, I have been involved in social science research for over 20 years. I joined CSUN in 2012. My research primarily focuses on intergenerational transmission of financial values and advantages.

Title of Research Project — Intergenerational Transmission of Values and Advantages

Background & Purpose — The aim of our work is to better understand the conditions that promote bias, so that we can ultimately create interventions that might attenuate stereotyping and prejudice.

Research Question(s) or Hypotheses — What do people learn about certain values, such as money and health, from their parents when growing up?

Methods — Quantitative and Qualitative. Data collection - survey & interview. Data analysis - multivariate statistics, grounded theory

Student Roles — literature review, working with the data, among others

Expectations — I expect my students bring in new perspectives. Students can expect personal attention from me. The skills the students may gain will depend on what we both see as beneficial and interests to the students.

Conferences Typically Attended — American Council on Consumer Interests

Publications: SELECTED PUBLICATIONS ON HOUSEHOLD FINANCE

Mimura, Y., Koonce, J., Plunkett, S. W., & Pleskus, L. (2015). Financial information source, knowledge, and practices of college students from diverse backgrounds. Journal of Financial Counseling and Planning, 26(1), 63-78. Available from: https://files.eric.ed.gov/fulltext/EJ1074650.pdf

Mimura, Y. (2014). The relationship between life satisfaction among wives and financial preparedness of households in Japan. Journal of Family and Economic Issues, 35(4), 532-541. DOI: 10.1007/s10834-014-9390-7 Available from: https://link.springer.com/article/10.1007/s10834-014-9390-7

Mimura, Y. (2014). Family characteristics and educational expenditures in Japan and the United States. The Japanese Political Economy, 40(1), 1-23.DOI: 10.2753/JES2329-194X400101 Available from: https://www.tandfonline.com/doi/abs/10.2753/JES2329-194X400101?needAccess=true&journalCode=mjes20

Mimura, Y. (2013). Variations in retirement account holdings among women: Native and immigrants in the U.S. International Journal of Business and Finance Research, 7(5), 11-22. Available from: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2261980

Department of Health Sciences

Bobbie Emetu

Mentor Bio — Dr. Bobbie Emetu's research focus is in sexual transmitted infections (STIs) and HIV/AIDS risk behaviors. Her research interests include condom use errors, innovative methods for STI testing, HIV-related stigma, and the association between sexual abuse and sexual risk behaviors. She continues to conduct applied research within the areas of health education, disease prevention, and sexual health. **Ph.D.** 2014, Indiana University **M.P.H** 2014, Indiana University **M.L.S** 2009, University of Wisconsin **B.S.** 2007, Middle Tennessee State University.

Background & Purpose — Research conducted on male sexual minorities are limited to disease or sexual behavior, even though the definition of sexual health incorporates other dimensions. The aim of this study was to examine the physical, emotional, and mental sexual health components of young men who have sex with men (YMSM) with a previous history of childhood sexual abuse (CSA). The data was collected in the Midwest. Participants had to be a male, ages of 18-29, with a history of CSA, and currently engaging in same-sex behaviors.
Research Question(s) or Hypothesis — **1.** What is the meaning of other sexual health components such as physical, emotional, and mental sexual health to YMSM who have experienced CSA? **2.** What are the perceived risk factors related to the physical, emotional, and mental components of sexual health among YMSM with CSA histories?

Method — Phenomenology is both a conceptual framework and a methodology (Marton, 1986; Moustakas, 1994). Semi-structured interviews are the primary method of data collection for phenomenological studies (Creswell, 2012; Merriam, 2002). The interview guide consisted of questions that covered the comprehensive components of sexual health. During the interview, notes were taken and an audio recorder was utilized to assure accuracy of interview responses. The face-to-face interviews lasted approximately an hour. Sixteen (N=16) interviews were conducted. The data collection and transcription are completed for this study. The data will be analyzed and prepared for two journal submissions through the context of the physical, emotional, and mental components of sexual health. A semiotic phenomenological procedure will be used for analyzing the data. The semiotic procedure is the methodological schema of description-reduction-interpretation (Merriam, 2002). As part of thematic and content analysis to develop independent themes, preliminarily themes will be further analyzed by the utilization of NVivo (qualitative data analysis software). The first manuscript will focus on the physical components of sexual health, and the second manuscript will highlight the emotional and mental components of sexual health among the participants of this study.

Student Roles — The assistance of one student is needed for this project. Regardless of college level, the selected student will be trained by the researcher on qualitative methods and analysis, including NVivo (qualitative data analysis

software). Then, the selected student along with the researcher will analyze the data separately, and afterwards will compare results. The researcher and student will reanalysis the data using NVivo. After the thematic analysis, the student will assist with the manuscript development.

Expectations — This project will provide an opportunity for a student to become familiar with qualitative methods and manuscript development. Also, the student could potentially be included in a publication and an opportunity to attend and present at a conference

Conferences Typically Attended —American Public Health Association; American Association of Behavioral and Social Sciences; Ethnographic and Qualitative Research; Society for the Scientific Study of Sexuality; Society of Public Health Education

Grishma Bhavsar

Mentor Bio — I have expertise and motivation to successfully conduct quantitative and qualitative research studies, while training and working with undergraduate students. I am specifically interested in several different areas of research within healthcare. First, I am interested in the intersection of health information technology and quality of care, while maintaining safety. I have conducted several studies that look at the early adoption of electronic health records among private physicians. In addition, my dissertation focused on how adoption of health information exchange, specifically electronic prescribing, is correlated with hospitalization rates for adverse drug events among elderly patients. Second, I am interested in the public health system and how it adapts to policy changes in healthcare. I am currently working on a research study that looks for geographic disparities in the public health workforce training and adaptability to policy changes. Lastly, I'm interested in healthcare access disparities that are experienced by vulnerable populations. The current application to conduct research with undergraduate assistants will explore my second research interest on public health systems. **Ph.D.** Health Services Policy & Management 2015, University of South Carolina **M.P.H** Health Services Policy & Management 2010, University of South Carolina **B.S.** Biochemistry 2008, University of Maryland

Background & Purpose — Few, if any, studies have examined the difference in job satisfaction, educational attainment, workplace environment, and core competencies between rural and urban public health providers. Data from PH WINS dataset will be used to conduct this exploratory study to inform future studies.

Research Question(s) or Hypothesis — Understanding differences between urban and rural public health practitioners can help target programs that better address the complexity of rural serving institutes.

Method — Quantitative. Descriptive statistics will be used to provide demographic characteristics of survey respondents. Multiple logistic regression models will be used to examine urban/rural differences in job satisfaction (using Job in General Scores), educational attainment, workplace environment, and core competencies after adjusting for potential confounding variables. Sample weights will be used throughout the analysis to account for the study design of PH WINS.

Student Roles — Students will help in the literature review process, interpretation of analysis tables, and the writing process.

Conferences Typically Attended — The main conference typically attended is the American Public Health Association, especially for this presentation.

Stephanie Benjamin

Mentor Bio — Stephanie Benjamin, Ph.D., M.P.H. is an Associate Professor in the Health Sciences Department at California State University, Northridge. She earned her Ph.D. and M.P.H. in epidemiology from Tulane University and her B.A. in biological basis of behavior from the University of Pennsylvania. Prior to this position, Dr. Benjamin worked as an epidemiologist in the Division of Diabetes Translation at the Centers for Disease Control and Prevention. Dr. Benjamin's research interests include diabetes, obesity and college health.

Title of Research Project — Behaviors that Influence the Health of College Students

Purpose & Background — College is a critical period of transition when students must balance the demands of obtaining a college degree while adapting to their increasing autonomy and responsibility. Research suggests that college students are an especially vulnerable subset of the population for risky behaviors, such as substance use and misuse. These types of behaviors can threaten students' ability to successfully navigate challenges faced in college and can have lasting implications for future employment and health.

Research Question — Do CSUN students have a high prevalence of risky behaviors (such as substance abuse)?

Method — Data from the American College Health Association - National College Health Assessment (a nationally recognized research survey that is conducted at CSUN periodically and provides precise data about students' health habits, behaviors, and perceptions) will be analyzed.

Student Roles — Literature review and analysis of data using SPSS software

Expectations — Students will gain experience in conducting a literature review and analyzing data. Prior experience with SPSS software is necessary.

Conferences Typically Attended — American Public Health Association Conference

Publications — Forster, Myriam & Grigsby, Timothy & Rogers, Christopher & M. Benjamin, Stephanie. (2017). The relationship between family-based adverse childhood experiences and substance use behaviors among a diverse sample of college students. Addictive Behaviors. 76. 10.1016/j.addbeh.2017.08.037.

Stephan (Kyusuk) Chung

Mentor Bio — Dr. Chung's research focuses on issues related to health disparities, such as end-of-life care in medically underserved communities. He has produced a video featuring a Mexican-American patient at the end stage of Alzheimer's, along with her primary caregiver, husband, and hospice interdisciplinary team. Appointed as a 2018 CSUN Research Fellow, he has been able to devote his time to disseminating the video to clinics and hospitals in predominantly Latino communities in Southern California to support timely referrals to hospice (the video can be found here: http://csunshinetoday.csun.edu/media-releases/csun-spanish-language-video-explores-end-of-life-care-options/). He was selected as a health disparities scholar at NIH in 2013. He served as a consultant for the Illinois Department of Public Health from 2002 to 2009, helping to amend Certificate of Need program regulating new healthcare services and facility construction, generating $1 million in research grants. He has published more than 30 peer-reviewed journal articles and given more than 60 presentations. One of his recent papers was cited in a Washington Post article ("Terminal neglect? How some hospices decline to treat the dying" May 3, 2014). He is working on three projects: 1) looking at state policies on hospice providers; 2) analyzing the cancer (SEER)-Medicare joint dataset to investigate the reasons underlying live hospice discharge; and 3) promoting the awareness of hospice care among the Hispanic

population. **Ph.D.** 1999, University of Illinois at Chicago **M.S.** 1991, Wayne State University **B.S.** 1986, Chonnam National University

Background & Purpose — Racial difference in healthcare use pattern is well documented: Minorities are less likely than their white counterparts to use preventive and primary care and more likely to use aggressive inpatient care at the end of life. My recent research has been focused on barriers for Latinos to the use of end of life care options including hospice care. In particular, I look for explanations for low hospice use among beneficiaries of In-Home Support Service (IHSS) program. IHSS is the largest long-term care program with nearly 50,000 low-income individuals with disabilities and another 50,000 caregivers. Half of the caregivers are beneficiaries' own family members who are paid for their care services.

Research Question(s) or Hypothesis — Latino IHSS beneficiaries who died without hospice did so 1) because they were mistaken that they would lose IHSS benefit if they enrolled in hospice; 2) because they were not aware of hospice availability; 3) because they were concerned about hospice cost.

Method — Focus group meetings and telephone/in-person interview targeting (1) IHSS caregivers; (2) hospice workers; (3) hospital discharge planners. Data will be analyzed through qualitative analysis of interviews using Nvivo

Student Roles — Conduct Literature review. Develop a survey questionnaire, Conduct a focus group meeting/phone/in-person interview. Analyze qualitative data collected and identify themes. Write a method/result section for a journal manuscript. Write an abstract to submit for a conference.

Expectations — Students will gain:
(1) Opportunities to present/publish research findings at national level conference/journals.
(2) A promising career in long-term care research and policy as the old population rapidly increases over the next two decades.
(3) An experience with various research methods—for example, students from the CTVA and Journalism departments recently collaborated with me to produce a video featuring a Mexican-American patient at the end stage of Alzheimer's, along with her primary caregiver, husband, and hospice interdisciplinary team.

Conferences Typically Attended — American Public Health Association and Academy Health

Publications — I have published more than 30 peer-reviewed journal articles and given more than 60 presentations at professional health services research conferences.

Vicki Ebin

Mentor Bio — Vicki J. Ebin, PHD, MSPH is Professor and Graduate Coordinator of the Master of Public Health Program in Community Health Education at California State University, Northridge (CSUN). All three of Dr. Ebin's academic degrees were in the field of Public Health awarded from the University of California, Los Angeles. Her expertise is in the area of research, program planning, adolescent and college health issues, as well as mental health concerns within the public health realm. Community collaboration and innovative health outreach projects with student participation are of special interest. Dr. Ebin has served on national professional organizational committees. **Ph.D.** 1995, University of California Los Angeles **M.S.** 1976, University of California Los Angeles **B.S.** 1974, University of California Los Angeles

Background & Purpose — The research goal is to investigate the relationship between discrimination and the impact on health promotion within college populations, specifically the relationship of race/ethnicity, obesity, and discrimination. My goal is to explore these relationships on campuses and then create a video or short Public Service Announcements designed by students for students. An additional goal of this health equity research is to explore the relationship of

social support and social networks across gender and cultural groups. Inclusion of this component will enhance knowledge of obesity and discrimination of college-aged students.

Research Question(s) or Hypothesis — The primary variables are: discrimination, BMI, ethnicity, gender, depressive affect, self-esteem and self-efficacy, social support, health-promoting and health risk behaviors.

Method — Qualitative and quantitative.

Student Roles — Students will work with both qualitative and quantitative data. Students will be responsible for recruitment of participants in the qualitative research component, data collection, data processing, production of videos. Students will learn statistical software for both qualitative and quantitative analyses, steps in the research recruitment process, how to conduct a focus group, and data analysis processes. Students will also present their work at a national conference.

Expectations — Additional responsibilities of the student include: assistance in conducting a literature review, preparation of an abstract for presentation at a conference as well as a manuscript for publication.

Conferences Typically Attended — I typically attend the American Public Health Association annual conference. Additional conferences of interest are: Society of Public Health Education, Community-Campus Partnerships for Health. Key words: college health, discrimination, obesity.

NOT ACCEPTING NEW MENTEES (SABBATICAL)

Kathleen Young

The main goals of this research are to provide comprehensive breast health services (prevention education and health screening programs) for low income and uninsured women (marginalized populations) throughout the LA-Region and to also advocate for marginalized populations at the local, state, and federal level(s). I take students to Sacramento and Washington D.C. yearly to receive training in order to advocate for the key public health bills that effect the nation as a whole (e.g. Patient Protection and Affordable Care Act: P.L. 111-148; REACH U.S. Racial & Ethnic Approaches to Community Health (provide funding for line item via CDC's National Center for Chronic Disease Prevention & Health Promotion). Our goal in this is two-fold (1) provide public health education students with formal health advocacy training and (2) advocate for health equity policies, programs and best practices that address the nation's health across all populations. Students will work closely with me and other members of various research teams utilizing the Community Based Participatory Research Model (Minkler & Wallerstein, 2012). This may include (but not be limited to) community needs assessment(s), program implementation, evaluation, data analyses, and dissemination of findings. Students will gain exposure and hands-on work in research and program development, implementation, and outcome assessment(s). Students are also required to create dissemination materials, assist in publication and conference abstracts.

Danielle Jarvis *New Mentor*

Mentor Bio — Dr. Jarvis teaches courses in biomechanics, dance, and athletic training. Her research interests are in movement coordination during skilled athletic activities. Specifically, she studies joint demands during jumping movements and her current research focuses on lower extremity biomechanics during dance jumps. She also regularly choreographs and performs with the Los Angeles-based dance company LA Unbound.

Background & Purpose — My current research focuses on examining movement coordination during skilled athletic activities. My work investigates the strategies underlying complex movement patterns and compensations in movement patterns that may contribute to or result from injuries. Most of my work focuses on trained athletes performing jumping movements. Specifically, my current projects investigate the mechanical demands that dance movements place on the human body. Dancers are unique athletes who emphasize the aesthetic appeal of human movement. Skilled dancers develop unique movement patterns that may provide insight for understanding the effects of dance training on the body, for training future dancers, or for preventing injury.

Research Question(s) or Hypothesis — Some projects I am currently working on include: (1) Determining the effects of a dance-specific fatigue protocol on jumping performance in dancers, as measured by lower extremity joint motion (kinematics) and joint forces (kinetics); (2) Examining the differences in movement and coordination patterns during gross motor skills performed by college students with and without autism spectrum disorder; (3) Comparing the differences in lower extremity dynamics during walking, running, and jumping when using different methods of marking and tracking the foot.

Method — My research uses a computer aided video motion analysis system and force plates to collect data regarding kinematics and kinetics. Markers are placed on subjects and video data is collected as movements are performed. Software is then used to process the data and draw conclusions about motion and forces, particularly at lower extremity joints such as the hip, knee, ankle, and toes.

Student Roles — Students will learn how to collect biomechanical data, process the data using specialized software programs, and analyze and interpret the results. Software programs used include Cortex (Motion Analysis), Visual3D (C-Motion), MATLAB (Mathworks), and SPSS.

Expectations — Students will be exposed to the entire research process, including the presentation of the results in the forms of posters, presentations, and publications. Seniors will also have the opportunity to develop and investigate their own biomechanical research question.

Conferences Typically Attended — Conferences I typically attend include American College of Sports Medicine (ACSM), International Association for Dance Medicine & Science (IADMS), American Society of Biomechanics (ASB), and National Athletic Trainers' Association (NATA).

Taeyou Jung

Mentor Bio — Dr. Taeyou Jung is the Executive Director of the Center of Achievement, which provides internationally recognized clinical exercise programs. He is a professor in the Department of Kinesiology and an adjunct professor in Assistive Technology Engineering Program. He earned his doctoral degree in Kinesiology with emphases on Sports Medicine and Adapted Physical Activity at the University of Virginia. Prior to joining CSUN in 2003, he had worked at the Gait and Motor Performance Laboratory in the Kluge Children's Rehabilitation Center and the McCue Sports Medicine Center in Virginia.

Dr. Jung enjoys mentoring aspiring future researchers in Kinesiology, Neuroscience, Rehabilitation Science, and Biomedical Science & Engineering. An active group of graduate researchers and interns participate in various projects at the Adapted Motor Performance Laboratory. Many of his former mentees have successfully advanced to and completed a doctoral training. They are currently working as academic faculty or a research scientist in various institutions, such as NIH, NYU, University of Delaware, University of Alabama Birmingham, and CSUF. His research interests focus on investigating movements of people with disabilities and clinical outcomes following therapeutic interventions. Some of recently published works include a) 3D gait analysis of children with cerebral palsy on treadmill, b) underwater 3D gait analysis in people with traumatic brain injury, c) cardiorespitory responses to aquatic walking in people post-stroke and d) post-exercise hypotensive response following aquatic exercise in people post-stroke.

Background & Purpose — Current research projects include:

1) Study of brain activity corresponding to exercise via functional neuro-imaging tool (fNIRs):

a) To analysis cortical hemodynamics during forced cycling in people with Parkinson's disease (PD)
b) To compare prefrontal lobe activity of people post-stroke when using chopsticks vs. fork
c) To examine motor cortex activity during backward walking in people-post stroke

2) Clinical investigation of using Virtual Reality (VR) applications in rehabilitation:

a) To study the effect of VR on pain and fatigue during exercise in people with spinal cord injury
b) To examine the use of VR game for improving reaction time of people with PD

3) Evaluation of gait and balance outcomes following various locomotive training modes:

a) To investigate the effect of backward walking on gait and balance in people post-stroke
b) To compare energy expenditure among various locomotive training modes in people with PD
c) To examine gait and balance outcomes following elliptical training in people with PD

Research Question(s) or Hypothesis — Each research group is to address: 1) How does the brain response to various modes of exercise?; b) Can the use of VR be effective for rehabilitation?; and c) Which locomotive training would be most effective for improving motor and fitness outcomes?

Method — Various biomedical research instrumentations are used, including neuroimaging device for brain study, 3D motion analysis system for gait study, posturographic system for balance evaluation, and telemetric metabolic system for energy expenditure study, and VR equipped workstation.

Student Roles — Students will learn to use research instruments and participate in projects of their interest while assisting literature review, data collection & analysis, and manuscript preparation.

Expectations — Students will develop clinical research skills from data collection to data analysis. They will learn how to utilize biomedical research instruments for clinical trials. They are expected to deliver professional presentations in collaboration with graduate researchers and faculty mentors.

NOT ACCEPTING NEW MENTEES

Rosa Angulo-Barroso (SABBATICAL)

Our research examines the impact of early iron deficiency in children's development. My focus is in motor-perceptual development, but these data get also integrated with emotional and cognitive processes. Infants that participate in our research are classified as iron deficient with or without anemia, prenatally or postnatal on the basis of the newborn umbilical cord blood, and their blood analysis at 9 months of age, respectively. Students who may get involved in our research process will be working with data processing of (1) motor-perceptual tasks, (2) levels of motor activity, and (3) motor-cognitive tasks. Students will be in charge of basic data analysis, literature search, local presentation of the data results to local small groups. Students will gain knowledge about the entire research process, but will focus more on literature search, data processing and dissemination of results in the form of a poster.

Teri Todd

The main goal of my research is to increase physical activity levels of children and adults living with a developmental disability, in particular, autism spectrum disorder (ASD). I am interested in identifying barriers to being physically active. Presently we are studying balance and physical activity levels in individuals with ASD, and physical activity habits of college students on the autism spectrum. Students assisting in the balance study work with data generated by force plates and accelerometers as well as physical activity diaries. Data from the study with college students consists of weekly diaries, anxiety scale readings and anxiety assessments. Students have a variety of responsibilities including data collection and analysis. Students working on these projects will gain knowledge of ASD and implications to motor performance, use of specialized equipment, data analysis, and presentation skills.

College of Social & Behavioral Sciences

Department of Anthropology

Chin-Hsin Liu

Mentor Bio — I am a biological anthropologist specialized in bioarchaeology- the study of human skeletal remains from archaeological context. Paleodietary reconstruction using stable isotope analysis and paleopathology are my main methods. Key geographic foci are Southeast Asia (Thailand, Philippines) , East Asia (Taiwan), and West Mexico (project in development). **Ph.D.** 2012, University of Florida **M.A.** 2005, University of Florida **B.A.** 2002, National Taiwan University

Background & Purpose — Bioarchaeology is the study of human skeletal remains in archaeological context. By observing skeletal and dental pathologies and reconstructing dietary patterns, human skeleton can inform us about past life history, community organization, movement, identity, social structure, and environmental change, just to name a few. These topics are relevant to our current societal discourse as we face impacts of globalization, migration, and climate change. Keywords: Archaeology, human skeleton, bone chemistry, paleopathology, health, prehistory

Research Question(s) or Hypothesis — This project aims to explore issues of skeletal health disparity, recourse procurement, migration pattern, and regional interaction of the people once lived during the Post-classic period in modern day West Mexico. This area was a key corridor of interaction in terms of material trade, ideology, and biological admixture both before and after the abandonment of major Maya cities (Post-classic Maya). Despite being at the crossroads of cultural and biological exchange between North and Central America, this area has received relatively less scholarly attention, especially in bioarchaeology, than other Maya and peripheral sites.

Method — These research interests will be addressed by analyzing the human skeletal remains excavated from five archaeological sites in West Mexico. The collection is currently curated in the Fowler Museum (UCLA). The analytic process has three phases, with heavy involvement of scientific methods and medical concepts. An inventory of the remains will first be conducted by identifying and recording the skeletal elements available and their state of preservation. Macroscopic observation of paleopathology and health markers (e.g., trauma, congenital abnormalities, development/nutritional stress markers, infectious diseases, etc.) will follow. Microscopic and histological studies will be conducted to enhance differential diagnosis when warranted. The third phase will involve sample selection and laboratory work to extract collagen and purify hydroxyapatite for stable isotope analysis in the mass spectrometry. Statistical analyses will be performed after viable data are collected.

Student Roles — Students have the opportunity to assist in conducting literature research to understand geographic and temporal context of the sites. I will provide training on handling human skeletal remains and laboratory safety before helping with inventory, paleopathological observation, and bone chemistry lab work. Students will learn how to estimate sex and age of a skeletal individual, identify pathology and health markers, and perform basic statistical analyses. Students will also participate in the preparation of manuscripts for publication and have opportunities to present in conferences

Expectations — I welcome students who are motivated, disciplined, and responsible. Students must be able to follow directions well and are expected to behave professionally when conducting research on human skeletal remains. Students with backgrounds in anthropology, biology, museum studies, or Central American history and culture are preferred but not required. Students who are interested in pursuing higher degrees or careers in anthropology, museum curation and management, forensic sciences, criminal justice, biochemistry, and medical professions are highly encouraged to participate in this project.

Conferences Typically Attended — Western Bioarchaeology Group Meeting, Annual Meeting of Paleopathology Association, Society for American Archaeology, and American Association of Physical Anthropologists (particularly in the Undergraduate Research Symposium).

Department of Geography

Luke Drake *New Mentor*

Mentor Bio — To date, I have conducted research at neighborhood, urban, and national scales through studies in Florida, New Jersey, California, and through a U.S. and Canada national survey. Current projects are located in Southern California and the South Pacific country of Vanuatu. **Ph.D.** 2015, The State University of New Jersey, **M.A.** 2010, University of Miami, **B.S.** 2002, University of North Carolina

Title of Research Project — My research contributes to CSUN BUILD PODER objectives through theoretically-informed and empirically-grounded investigation of urban food systems. Food access and nutrition are two issues that are underscored by geographical disparities. Interventions often include gardens and farmers' markets, whose health benefits have been noted through inter-disciplinary research. However, relatively little knowledge about the geographies in which these interventions are proposed and carried out.

Background & Purpose — My research aims to create knowledge on 1) which places should be targeted for interventions such as gardens and markets; 2) how and why these interventions serve the neighborhoods they are intended to serve, and 3) the processes through which garden and markets succeed or fail to deliver health outcomes.

Research Question(s) or Hypothesis — What are the spatial patterns of food access and distribution that may lead to uneven health outcomes? Where are farmers' markets, gardens, and food retail located, and are they associated with demographic trends? Is the food distributed at the locations consumed by residents of those neighborhoods or

elsewhere? Do urban residents acquire food from markets or gardens, and if so, where? Why and how do these spatial patterns form? Why do farmers choose certain farmers' markets over others? How do urban residents become involved in and sustain garden efforts? What processes lead to urban residents taking up or rejecting participation in food security interventions?

Method — These research questions require the use of mixed methods. My research has employed qualitative and quantitative methods, including interviews, participant observation, focus groups, archival research, surveys, spatial statistics, and geographic information systems (GIS). Primary data collection through fieldwork, as well as secondary data collection from federal, state, and local sources is used. I have also developed and used web-based mobile mapping and GIS applications. Analytical methods include the identification of themes from coded qualitative data through NVivo software, discourse analysis of archival materials, spatial statistics in GIS and SPSS software. Since my research draws on multiple epistemologies and not just mixed methods, analysis with rely in some cases on statistical significance through large sample size and in others on analytical generalization through the small sample size and context provided by case studies.

Student Roles — Data collection opportunities for students include the selection and pre-processing of secondary datasets using Microsoft Excel and ArcGIS; fieldwork to collect location and attribute data on urban food systems; advanced students can also assist in the collection of qualitative data through interviews and observations. Data analysis opportunities include the processing and management of data; tabulation of descriptive and inferential statistics using Excel, SPSS, and ArcGIS; transcription and coding of qualitative data using NVivo. Advanced students can assist in many-to-many database design and management, web programming, advanced GIS analysis and modeling, cartography in Adobe Illustrator, and the design and maintenance of web-based data tools such as ArcGIS Online and ArcGIS Collector.

Expectations — This research should be of interest to students interested in the intersection of health and related topics such as urbanization, sustainability, environmental justice, and economy.

Conferences Typically Attended — California Geographical Society; Association of Pacific Coast Geographers; American Association of Geographers.

Edward Jackiewicz

Mentor Bio — Research interests include Urban, Tourism, and Migration/Transnationalism. **Ph.D.** 1998, Indiana University, **M.A.** 1993, Temple University, **B.S.** 1983, Arizona State University

Background & Purpose — My research examines the spatiality of health disparities in California, looking not only at racial and ethnic divides, but also socioeconomic and geographical (rural, suburban and urban). I am interested in the inequities in both how health services are accessed and delivered.

Research Question(s) or Hypothesis — Are certain diseases and health issues more prominent in certain locations? What are the barriers to a more equitable health system? Which groups are more prone to inferior health treatment? How has the Affordable Care Act altered previously existent health disparities? How can the healthcare experience for undocumented individuals be improved?

Method — Research will be conducted using both existing (secondary) data and by gathering primary data through surveys as well as more in-depth interviews with various stakeholders as well as community members.

Student Roles — Students can participate in this research through various activities from the very early stages of a project such as reading relevant literature, writing literature reviews, designing surveys, manipulating and analyzing data, collecting data, mapping geographic phenomenon, and writing publishable articles.

Conferences Typically Attended — There are several conferences that I frequently attend, including: The Association of American Geographers (Spring), Association of Pacific Coast Geographers (Fall), California Geographical Society (Spring), and the National Health Disparities Conference.

Regan Maas

Mentor Bio — **Ph.D.** 2010, University of California Los Angeles **M.A.** 2005, California State University Northridge **B.S.** 2001, Iowa State University **B.S.** 1998, University of Iowa

Background & Purpose — My specific research area is focused within Minority Health Disparities (specifically Hispanic populations), emphasizing Spatial Demography, Urban Neighborhood Dynamics, and GIS applications. This research focuses on both compositional and contextual variables, including socioeconomic measures, health outcomes measures, as well as neighborhood contextual measures such as social networks, residential choice and mobility, and spatio-temporal activity space.

Research Question(s) or Hypothesis — My research projects test the idea of spatially segmented cultural adaptation as a framework for unraveling the spatial and cultural differences in health outcomes across Hispanic/Latino neighborhood contexts and its relationship to the 'Hispanic health paradox'.

Method — Datasets include cutting-edge geospatial data. Spatial and non-spatial statistical techniques as well as geographic information systems (GIS).

Student Roles — Students would be exposed to working with large datasets including work with cutting-edge geospatial data. Students would be responsible for collecting and analyzing data using both spatial and non-spatial statistical techniques as well as geographic information systems (GIS). Students would gain skills in data collection/manipulation, hypothesis building, and data analysis for minority health disparities research through the lens of the geospatial sciences.

Department of Political Science

Boris Ricks

Mentor Bio — Dr. Ricks is an Associate Professor at California State University, Northridge and specializes in Urban, State and Local Politics; Racial Politics; Environmental Justice; Public Policy; Political Leadership; and Health Disparities. Ricks' employs a mixed methodological approach to better grasp and question the intersection of race, class, and gender upon political incorporation. Ricks is also interested in diversity, inclusiveness, and the Scholarship of Teaching and Learning. **Ph.D.** 2003, University of Southern California. **M.A.** 1996, University of Southern California **M.P.A** 1991, University of Mississippi **B.S.** 1989, Mississippi Valley State College

Background & Purpose — The retention rate for African American male undergraduate students at public universities in California has been on a steady decline. Though the disparity between racial groups (i.e., Blacks and Whites) regarding graduation rates has narrowed since the 1980s, notable gaps remain. CSUN joins universities across the country trying to find ways to bridge the gap between higher education and Black male students. A recent report documents the "crisis" facing Black men in higher education found the relative number of Black men entering college hasn't improved since 1976, with only 33% of Black male college students graduating within six years. For Spring 2013, Black males comprised 5.3% of undergraduate male enrollment at CSUN compared to 34.3% for Latino males and 27.8% for White males (CSUN Office of Institutional Research). Similarly, the six-year graduation rate for first-time Black males who entered in fall 2006 was only 23%, compared to 47% for Asian American, 36% for Latino, and 53% for White male students.

Research Question(s) or Hypothesis — To evaluate a mentoring program for Black male students at CSUN, with an emphasis on academic achievement, health and wellness, as well as college graduation.

Department of Psychology

Alyssa Arentoft

Mentor Bio — Dr. Arentoft received her BA in Psychology from NYU and her PhD in Clinical Psychology, specializing in Neuropsychology, at Fordham University. She completed her postdoctoral fellowship in Clinical Neuropsychology at UCLA. She has been a full-time faculty member at CSUN since 2014. For more information, please visit her laboratory website here: http://www.aarentoft.com. As a Clinical Neuropsychologist, her research focuses on exploring brain-behavior relationships, primarily through the use of neuropsychological assessment. This involves the systematic administration of neuropsychological tests, which measure how an individual performs in areas such as learning, memory, attention, working memory, executive functioning, language, visuospatial, and motor functioning. Her research program applies a biopsychosociocultural framework while examining neuropsychological functioning among healthy individuals and those with neurological illness. Currently, much of her work is focused on an ongoing NIH-funded research study which examines healthcare quality, medication characteristics, and neurological outcomes in HIV+ individuals.

Title of Research Project — Ongoing projects investigate neuropsychological functioning, healthcare disparities, and health risk behavior in HIV+ adults; executive functioning, psychosocial factors, and health risk behavior in young adults

Background & Purpose — Please see my CSUN faculty bio for more information: https://www.csun.edu/social-behavioral-sciences/psychology/alyssa-arentoft

Research Question(s) or Hypothesis — This study seeks to evaluate the relationships between specific HIV medications, longitudinal neurological outcomes (i.e., neuropsychological and neuroimaging), race/ethnicity, and quality of healthcare.

Method — Quantitative. Study participants are tested at CSUN. They are interviewed regarding their medical and psychiatric history, complete several questionnaires, and receive a comprehensive neuropsychological assessment. Data is analyzed quantitatively using SPSS.

Student Roles — Students are integrated into the lab using a developmental approach, where they are given increasingly complex responsibilities as they gain research skills and experience in the lab. For example, undergraduate students typically begin by learning about data collection, coding, and entry. Graduate students (and some advanced undergraduates) receive intensive training to administer neuropsychological tests, psychiatric screening, and psychosocial / sociocultural interviews to research study participants. They are also trained in the proper scoring of these instruments.

Expectations — Students will be trained and integrated into the research team using a developmental approach. Therefore, students will be given greater levels of responsibility as their research skills and experience develop, and students with prior research experience may begin at a more advanced level. Students will begin with relevant research education, gain familiarity with the study protocol and the research literature, shadow more senior lab members, perform data entry, screen and schedule participants, and assist more senior lab members with study visits. As students progress, they will receive training to administer the study protocol, score data and maintain participant files, become more involved in data analysis, and make contributions to research posters and papers. Students will have opportunities to observe the MRI protocol if they complete the proper MRI safety training. All students will have the opportunity to attend weekly lab meetings at CSUN and will be directly supervised by Dr. Arentoft. They will also have opportunities to attend center-wide research meetings, if interested.

Conferences Typically Attended — International Neuropsychological Society (INS); American Academy of Clinical Neuropsychology (AACN)

Publications — Please see my CSUN faculty bio for a list of my publications: https://www.csun.edu/social-behavioral-sciences/psychology/alyssa-arentoft

Meeta Banerjee

Mentor Bio — Dr. Meeta Banerjee received her Ph.D. in Ecological-Community Psychology with a specialization in Applied Developmental Science from Michigan State University in 2012. Her research employs both integrative and ecological frameworks to understand the influence of contextual factors on early and late adolescent developmental trajectories in ethnic minority families. Research Interests include Racial/ethnic discrimination; Racial-ethnic socialization; academic achievement; academic engagement; mental health. She is especially interested in exploring the interaction between ecological contexts and race-related parenting practices. **Ph.D.** 2012, Michigan State University **M.S.W** 2003, University of Michigan **B.A.** 2001, University of Michigan.

Background & Purpose — The purpose of this research is to examine how different contextual factors such as racial/ethnic discrimination during high school or even in college can influence ethnic minority youth's academic achievement or other academic related outcomes. In addition, I am interested in understanding how neighborhood factors may influence these academic and mental health outcomes.

Research Question(s) or Hypothesis — The aims of the current study include 1) To examine how racial discrimination in high school or currently in college influences school motivation or academic engagement. 2) To explore how racial/ethnic discrimination is associated with psychosocial outcomes such as depression or anger. 3) To investigate the relation between racial/ethnic discrimination, academic outcomes and mental health. I predict that youth who experience higher amounts of racial discrimination by teachers or peers will be less engaged in academic courses and have lower achievement. Similarly, I hypothesize that neighborhoods with less resources and negative characteristics may be related to lower engagement and achievement.

Method — Currently, we have a data collected from over 200 African American youth from the Midwestern United States. I am planning to collect data from a sample of ethnic minority youth (e.g., Asians, African Americans and Latinos) in the next year. Analysis with this study can be as preliminary as helping to conduct descriptives and correlations on the study variables. However, there will be opportunities to conduct more advanced analyses such as regression, ANOVAs and hierarchical regressions.

Student Roles — Students will have opportunities to work on helping to build a research project from the ground up. They will get experience helping with literature reviews, learning about online data collection, actively collecting, coding and cleaning data, learning how to run statistical analyses and possibly even putting together a proposal for research conferences. In addition, they will have the opportunity to conduct secondary data analysis on previously collected data. Students of all three levels (e.g., sophomores, juniors and seniors) will have the opportunity to get involved in different ways depending on their research skills and knowledge.

Expectations — Students applying can have any level of experience, but should have at least a B average in their classes. If you are interested in applying to graduate school and receiving research experience, I strongly urge you to apply.

Conferences Typically Attended — Usually I attend Society for Research on Child Development (SRCD); Society for Research on Adolescence (SRA); International Society for Social and Behavioural Development (ISSBD); Association for Psychological Science (APS) and American Psychological Association (APA).

Gabriela Chavira, Co-PI of BUILD PODER

Mentor Bio — Dr. Chavira is one of the Principal Investigators of BUILD PODER, focusing on the student core. All of her research projects focus on successful transitions to adulthood for immigrant and ethnic minority youth. **Ph.D.** 2003, University of California Santa Cruz **B.A.** 1994, California State University Northridge. View her faculty profile.

Current Research Projects:

"Developing College Awareness and a College-Going Identity in Latina/o Youth"
(Current Status: recruiting a 2nd cohort of participants; follow-up with 1st cohort).
For this project, we developed a series of workshops for Latina/o parents and their adolescent youth (early adolescence through late adolescence) with the aim to a) increase their college knowledge, b) provide instrumental support and guidance navigating the college application process, and c) increase the number of Latina/o youth who apply for and enroll in four-year colleges and universities. Workshops will be conducted in Spanish and English for parents and in English for Latina/o youth. We will be examining psychosocial factors that may contribute to their retention in the workshop series and persistence towards college enrollment.

"Adolescent Academic Achievement: Psychological Functioning and Cultural Discontinuity Project"
(current status: coding, analyses, and report-writing).
This research project, funded by the National Center on Minority Health and Health Disparities (NCMHD), a branch of the National Institutes of Health's Research Infrastructure in Minority Institutions (RIMI), focuses on the *cultural discontinuity* or "mismatch" between the home and school environments and how these may contribute to the underachievement and psychological dysfunction of Latino youth. This dataset includes three waves of data collection. We are currently entering interview data in preparation for coding and analyses.

"Mentoring Matters Research Study"
(Current status: analyses and report-writing)
This research project has partial support by the National Institutes of Health (NIH) Enhancing the Diversity of the NIH-Funded Workforce Initiative. The goal of this study is to understand the mentor-mentee relationship in biomedical and behavioral sciences at CSU Northridge. I posit that if the NIH wants to increase the number of students who pursue graduate studies in the sciences, we needed to understand the current climate of mentoring at our university. This project is now complete, but we are currently analyzing the results in preparation for report-writing.

Method — Qualitative and Quantitative

Student Roles — For all of research projects, students will learn how to: (a) conduct a literature review and annotate bibliographies, (b) code and analyze data (quantitative and qualitative), and (c) prepare presentations for regional and national professional conferences. In specific projects students will learn to: (a) translate and transcribe interviews of families, (b) recruit participants, (c) participate in data collection and data entry, (d) develop codebooks for analyses, (e) use software (NVivo, SPSS, Qualtrics).

Publications — View publications at her CSUN faculty profile.

Stefanie Drew

Mentor Bio — **Ph.D.** 2009, University of California Irvine **M.A.** 2007, University of California Irvine **B.A.** 2004, Claremont McKenna College

Background & Purpose — The goal of the proposed research is to investigate the prevalence of asthenopia, also known as visual discomfort, a common condition that can result in somatic symptoms when performing near work tasks such as reading.

Research Question(s) or Hypothesis — Specifically, we aim to utilize both self-report and objective measures to assess the prevalence of visual discomfort symptoms, and examine their potential relationship to academic performance.

Method — Data for this project includes survey response sets and measurements of accommodation, the physical changes of the thickness of the lens of the eye to maintain focus on a target.

Student Roles — Student involved in this project will be responsible for assisting in developing experimental design and collecting and analyzing data. Related experiences gained will include the development of skills related to conducting literature reviews, experimental design, data collection and analysis.

Expectations — Furthermore, students will be trained to operate an open field autorefractor to collect measurements accommodation and refractive errors.

Tara Fahmie

Mentor Bio — Dr. Fahmie is a behavior analyst with over 10 years of experience providing assessment and intervention services to children, adolescents, and adults with a variety of abilities. Her current passion is to study the development and prevention of behaviors like aggression and disruption in young children. Please check out her website.

Title of Research Project — Strategies to prevent the development of severe problem behavior in children

Background & Purpose — The purpose of this research is to design effective tools for the screening of emerging problem behavior and the prevention of severe problem behavior in young children with and without intellectual and developmental disabilities.

Research Question(s) or Hypothesis — We hypothesize that paying close attention to the immediate consequences of problem behavior in young children will enhance early detection and prevention strategies. These tools ultimately will enhance the quality of life for children and families of many abilities and backgrounds.

Method — Mixed method (primarily quantitative). Targeted skills will be assessed using direct observation and behavioral measurement systems. Specifically, students will observe children during arranged activities and will collect data on functional skills (e.g., communication, play) and problem behavior (e.g., aggression, disruption) using iTouches running ABC DataPro software. In addition, students will record measures of experimenter integrity to identify whether the intervention is being implemented as planned. Data will be analyzed using graphic display of behavior change over time and will be discussed during weekly lab meetings.

Student Roles — All research occurs off site, at established community partnerships. Students will be responsible for traveling to the site of the research, fostering collaborations with the community partner, collecting and analyzing data, graphing results, and discussing data during weekly meetings. Students will gain experience in direct observation, behavioral measurement, single-subject experimental design, and visual analysis of data.

Expectations — Students can expect to participate in all levels of my community-based action research. This includes assisting with the: design of the study, implementation of sessions with children, in-vivo and video data collection, data review and analysis, and dissemination (via posters and presentations at local, national, and perhaps international conferences). Students can expect me to be a hands-on mentor who is closely monitoring their progress and tailoring their experience to best meet their personal goals. Students can also expect a lot of open, honest feedback in both directions (me to them, and them to me).

Conferences Typically Attended — California Association for Behavior Analysis, Applied Behavior Analysis International, CSUNPosium

Publications — All of my publications can be found and full texts can be requested at ResearchGate. Also, please see my website for my CV and link to full texts of my publications.

Elise Fenn

Mentor Bio — I am a cognitive psychologist, and am interested in understanding cognitive mechanisms such as memory and decision-making, broadly. Specifically, I am interested in two main lines of research: (1) how the understanding of cognitive mechanisms can be applied towards improving the legal system (specifically investigative interviewing and detecting deception), and (2) investigating factors that bias judgments of truth when making truth judgments rapidly, such as in a social media environment. I received my PhD in 2015 from Claremont Graduate University. I have been working as a faculty member at California State University Northridge since 2015 teaching Cognitive Psychology of Memory at the graduate and undergraduate level, and Research Methods for Psychology. Here is a link to my research gate profile page: https://www.researchgate.net/profile/Elise_Fenn.

Project Title — Cognitive and Social Factors that Impact Truth Biases in a Social Media Environment
Background & Purpose — Human make rapid judgments of truth daily, such as when scrolling through social media feeds. While these rapid judgments of truth may seem meaningless in the moment, the potential long-term consequences may impact meaningful areas of life, from health choices, to political decisions, to understanding news headlines. During these rapid judgments, the availability of "non-probative" information can increase bias to believe the information is true. For example, a series of studies found that presenting a related, but uninformative photo (e.g., a photo of a turtle) alongside a trivia statement ("turtles are deaf") increased bias to believe that information was true. In this research project, we investigate whether the effect of non probative information persists within a social media environment, and what cognitive mechanisms underlie this effect. Further, we examine methods for reducing the unintended influence of nonprobative information on truth biases.

Research Question(s) or Hypothesis — In this research project, I am interested in answering the question, "What cognitive mechanisms underlie the effects of non probative information on truth biases in a social media environment?" and "What methods can be used to reduce the influence of non probative information on truth biases in a social media environment?" A particular emphasis will be places on understanding the influence of non probative information in several applied areas, including: health behaviors, political beliefs, memory for news headlines, and jury decision-making.

Method — This research is Quantitative. The method of data collection will most likely be designing an experiment via in-person and online methods. You may develop surveys and also design materials to be administered on a computer screen via programs such as Inquisit or EPrime software. You may also analyze data using SPSS, Excel, or R software.

Student Roles — Students will be responsible for conducting hypothesis-driven literature reviews, collecting data in-person or online, designing and creating materials using computer software programs such as Qualtrics, Inquisit, or EPrime, analyzing data using SPSS, R, Excel software, presenting and disseminating data at regional or national conferences, and the opportunity to publish in peer-reviewed journals pending student contributions to the project.

Expectations — I expect students to have an interest in understanding cognitive psychology, and experimental psychology. Student in lab will gain knowledge on all aspects of the research project, from project creation to project dissemination. I hope to provide students with a supportive lab environment and help them accomplish their goals of becoming psychological scientists.

Conferences Typically Attended — American Psychology-Law Society, Association for Psychological Science, Society for Applied Research in Memory and Cognition, Psychonomic Society, Western Psychological Association

Publications — Please see my research page.

Stephanie Hood *New Mentor*

Mentor Bio — Dr. Hood is a behavior analyst with over 10 years of clinical and research experience. She has worked with children, adolescents, adults, and older adults. Her current research in practice interests have been related to determining the extent to which efficacious teaching procedures produce socially important behavior change and promote maintenance and generalization, and expand the reach of behavior-analytic services. **Ph.D.** 2015, University of Nebraska Medical Center **M.S.** 2011, Southern Illinois University Carbondale **B.S.** 2008, University of Minnesota Duluth. Please check out her website.

Research Project Title — Evaluating the Effects of Behavioral Skills Training on Identifying and Conversing about Common Interests Between Conversation Partners

Background & Purpose — The purpose of this research is to design effective interventions to teach complex social skills to adolescents and young adults with disabilities or social skill deficits. In addition, it is important to evaluate the extent to which interventions produce robust changes such that individuals engage in these newly acquired skills in other contexts. Effective interventions to teach complex social skills is essential for adolescents and young adults with disabilities to become fully functioning members of the community (e.g., independent living, success in higher education, and employment).

Research Question(s) or Hypothesis — We will be evaluating interventions for specific conversation deficits such as discriminating and responding to sarcasm, identifying common interests, and discussing past experiences with individuals to whom the activity was shared and individuals whom did not share the same experience.

Methods — Mixed Method (primarily quantitative). We will directly observe the participants social skills and measure their performance. Specifically, students will observe participants target social skills (e.g., following non-preferred conversation, changing the topic of conversation following indicies of uninterest, ending the conversation, and talking about common and uncommon topics). Students will also record the researchers integrity of implementing the research procedures as designed. Data will be analyzed through visual inspection of graphical data to show change over time.

Student Roles — Students in my research lab will have the opportunity to get involved in all aspects of applied research. Students will collect data on social behaviors and researchers' integrity, interact with research participants, conduct research sessions, graph and analyze data, and discuss data during weekly meetings. Students will learn how to visually inspect data and use single-subject experimental designs. Students will have the opportunity to work directly with participants and foster relationships with their caregivers. Students will have the opportunity to co-author a poster or symposium presentations at local, regional, and international conferences for behavior analysis such as California Association for Behavior Analysis and Association for Behavior Analysis International.

Student Expectations — My research lab is a collaborative environment. Students can expect to work with other undergraduate and graduate students, and myself. Students will assist in research design, implementation of sessions

with participants, data collection, data analyses, graphing the data, and discussion of each project in our weekly lab meeting. I also encourage students to be active in disseminating our research through presentations at local, regional, and international conferences. I expect students to come with motivation and willingness to learn. In developing professionalism, I expect students to be dependable, ask questions, and communicate effectively with the team. Also, I hope students are excited about the important work we are doing as a team. It is my commitment to try and tailor these experiences to aid students in meeting their individual career goals.

Conferences Typically Attended — California Association for Behavior Analysis and Association for Behavior Analysis International, CSUNPosium.

Publications — All of my publications and CV can be found and full texts can be requested at my lab website.

Sun-Mee Kang (No longer available, lab is full)

Mentor Bio — I am a social and personality psychology with expertise on statistical data analyses and research methods. I have been mentoring students at UC Davis, University of Notre Dame, and CSUN for over 20 years. All of my research projects focus on the psychological factors that contribute to social adaptation, including emotion, personality, social working memory, and acculturation strategy.

Research Projects — Two projects are currently undergoing in my research lab, (1) Alexithymia, emotion information, and EEG, (2) Racial discrimination and emotion recognition accuracy.

Project 1: "Alexithymia, emotion information, and EEG"

Background & Purpose — The current study is designed to understand how individuals with alexithymia would process emotion information using the Electroencephalogram (EEG). Alexithymia is a term coined by Sifneos (1973) that describes a personality trait in which individuals have difficulty identifying feelings, difficulty describing feelings, and an externally oriented cognitive style. Although a number of studies have been conducted to explore a possible neural basis for alexithymia, very few attempts have been made to understand how individuals with alexithymia would process emotional information using the EEG. The current project is designed to address this issue.

Research Question(s) or Hypothesis —Past research has demonstrated that individuals with high degrees of alexithymia (HDA) show an early processing deficit compared to individuals with low degrees of alexithymia (LDA) by focusing on P100 and P300 peaks in the Event-Related brain Potential patterns. However, their study did not explore differences in the amplitude of N170. Literature has shown that N170 marks the point in processing when a visual stimulus is consciously interpreted as a face and its occurrence depends on our past experience of what is a 'face' (Rossion 2014). The main purpose of the current study is to further explore differences in N170 amplitudes between individuals with HDA and LDA, when they process facial expressions.

Method — Quantitative method. We are using an experimental design. We present study stimuli on a computer monitor using E-prime (by Psychology Software Tools. This is a comprehensive software available for behavioral research) and record brain waves using Brainvision recorder while participants take computerized tests.

Project 2: "Racial discrimination and emotion recognition accuracy"

Background & Purpose — While overt racial discrimination has decreased, subtle forms of discrimination continue to persist in US. Modern day discrimination, also known as racial microaggression, is defined as daily verbal and noverbal behaviors that convey negative racial slights and insults (Sue & et al., 2007). Due to its subtlety, when minority members are treated unfairly, they have difficulties to label the situation as racial discrimination (Noh & et al., 2007). Given the

complexity of racial discrimination in current society, how individuals process such ambiguous experiences and what impacts it would have on psychological and physical health are not well documented.

Research Question(s) or Hypothesis —Our lab is exploring whether people have subconsciously learned to focus on nonverbal cues, such as facial expressions, when anticipating that they may be discriminated against. To address this question, we are currently evaluate the effects of priming minority status on emotion recognition accuracy tests among people of color, using the implicit and explicit priming methods.

Method — Quantitative method. We are using an experimental design. We present an emotion recognition test and other computerized tests using Inquisit Lab (a powerful tool for designing and administering psychological tests and experiments on computers).

Student Roles — Students who are involved in these projects will receive comprehensive training to be a qualified research assistant including how to run an EEG study and analyze EEG data. They will also learn how to design a study using Inquisit Lab or E-prime for the racial discrimination and emotion recognition project. Students will learn how to do a literature review and comprehend empirical papers by weekly lab meetings. They will learn how to write an abstract for presentation and how to present their studies at various conferences. They will be also invited to write a manuscript together for publication.

Expectations — Our lab is looking for students with strong motivation, persistence, passion, and dependability, and maturity.

Conferences Typically Attended — Society for Neuroscience, Association for Psychological Science, American Psychological Association, Society for Personality and Social Psychology, International Association for Cross-Cultural Psychology, Western Psychological Association, UCLA Psychology Undergraduate Research Conference

Justin Kantner (No longer available, lab is full)

Mentor Bio — Most of the decisions we make are based on some form of supporting evidence from memory, yet memory is notoriously faulty. My research examines the biases that help us come to decisions (often erroneously) when evidence from memory is incomplete. My focus is on recognition memory judgments, which entail a decision as to whether a presented stimulus was also encountered earlier in the experimental session (an "old" item) or was not encountered earlier (a "new" item). In a recognition memory task, participants may exhibit a bias to err on the side of "old" responses (a liberal bias), "new" responses (a conservative bias), or neither (a neutral bias). My research (Kantner & Lindsay, 2012, 2014) demonstrated that recognition bias is relatively stable within an individual and behaves like a cognitive trait, one with potentially broad significance for cognition and behavior. **Ph.D.** 2011, University of Victoria **M.A.** 2005, Indiana University **B.A.** 2000, Purdue University.

Background & Purpose — A number of studies have examined the relationship of response bias to neural and behavioral pathologies, with strikingly consistent results: compared to appropriate controls, recognition criteria are more lax in elderly individuals, patients with Alzheimer's disease, patients with dementia, patients with schizophrenia, individuals with mental retardation, and individuals with panic disorder. These findings strongly suggest that interventions aimed at improving decision making in these populations should focus on this lax tendency, which may indicate a degraded ability to engage top-down control mechanisms that normally keep individuals from making memory decisions based on weak evidence. Such individuals may adopt false beliefs (e.g., accepting false claims as true or false memories as accurate) that might be averted with the use of a stricter criterion when evaluating the evidence for those beliefs. Training in the use appropriate decision criteria does not require improvements in memory acuity per se (which may be difficult or impossible in some individuals) and could substantially improve decision making in individuals with these conditions. Such training may also be applied in the domains of eyewitness memory, medical diagnosis, security, and law enforcement, settings in which errors due to inappropriate decision criteria can carry disastrous consequences.

Method — Two experiments will test the relationship between decision bias and false memories and false beliefs. Another will use a technique called "content analysis" to understand the rationale behind the decisions of lax versus strict recognizers. A fourth will test novel procedures for training decision bias when recognition decisions are extremely difficult.

Student Roles — Students have the opportunity to assist in multiple experiments related to understanding decision bias and training it in memory impaired individuals. Students at any level can assist in all phases of the research, from experimental design and gathering of stimuli to running participants in experiments, conducting descriptive and inferential data analyses using common statistical software packages, and, potentially, preparation of manuscripts and presentations at conferences such as the Psychonomic Society and Association for Psychological Science annual meetings.

Ellie Kazemi

Mentor Bio: I have had the privilege of mentoring students during my Ph.D. program at UCLA and as a member of the faculty at CSUN for the past 10 years. I have a very active research lab. You can see our current members and our work by going to my lab website.

Title of Research Project: Leveraging Technology for Simulation-based Learning

Purpose & Background: We have several projects in my lab, all focused on effective, efficient training that provides hands-on experience to participants. We use technology to develop simulations and to gain efficiency in training. For example, we use a humanoid robot to simulate a child with problem behaviors during teaching sessions so that we can study how teachers, parents, and other caregivers respond under such circumstances and how we can provide more effective trainings to such individuals so that they feel better equipped before working with real children.

Research Question(s) or Hypotheses: Can a humanoid robot serve as a child simulator for simulation-based learning as well as research? Can we use Artificial Intelligence to provide hands-on, safe training to practitioners?

Methods: We use group and single-subjects designs with direct observational data.

Student Roles: Students are involved in all aspects of various research projects depending on their interests. They may develop creative behavior patterns for the robot, add emotions or lifelike characters our existing behaviors, develop computer-based training material, edit videos, develop animations, observe and record data, conduct experiments, conduct literary searches, develop posters or symposia material, and much more.

Expectations: Mentorship is a two-way relationship. I expect open communication and honesty from my mentees. I expect them to help me guide them and to work with me in reaching their goals. I expect them to find learning reinforcing and to solicit feedback from and their peers, and myself, in lab to help them improve and grow.

Conferences Typically Attended: California Association for Behavior Analysts (CalABA), Association of Behavior Analysts International (ABAI), Human-Robot Interaction (HRI)

Publications: Almost all of my publications are with student co-authors and can be found at our lab website www.csun.edu/~klab.

Debbie Ma

Mentor Bio — My research focuses on stereotyping and prejudice. In my lab, we utilize implicit measures of stereotyping and prejudice to reveal unconscious biases that people may have. More recently, we have also been collaborating with Dr. Just Kantner's lab to explore research surrounding racial categorization of racially ambiguous individuals, such as those who might be low in racial prototypicality or those who are biracial/multiracial.

Title of Research Project — Stereotyping & Prejudice and Biracial Face Perception

Background & Purpose — The aim of our work is to better understand the conditions that promote bias, so that we can ultimately create interventions that might attenuate stereotyping and prejudice.

Research Question(s) or Hypothesis — What facial features correspond with accurate racial categorization? Why is it difficult for people to correctly categorize biracials as biracial? What are some individual differences that might moderate how a person racially categorizes others?

Method — Quantitative. In-lab experiments, online experiments.

Student Roles — students can take on a host of responsibilities from data collection, analysis, writing up research, presenting posters, and in some cases coming up with novel research questions and co-authoring papers.

Expectations — I expect lab members to be involved, reliable, and willing to learn. Students should be able to dedicate 5-10 hours a week to data collection, lab meetings, and other lab-related projects.

Conferences Typically Attended — Society of Personality and Social Psychology

Publications

Scott, K., Ma, D. S., Sadler, M. S., & Correll., J. (in press). A social scientific approach toward understanding racial disparities in police shooting: Data from the Department of Justice (1980-2000). Journal of Social Issues.

Ma, D. S., Webster, C., Tachibe, N., & Gressis, R. (2017). 21% versus 79%: Explaining Philosophy's Gender Disparities with Stereotyping and Identification. Philosophical Psychology. Link

Ma, D. S., Correll, J., & Wittenbrink, B. (2016). Context Dependency at Recall: Decoupling Context and Targets at Encoding. Social Cognition, 34, 119-132. PDF download

Correll, J., Hudson, S. M., Guillermo, S. & Ma, D. S. (2014), The Police Officer's Dilemma: A Decade of Research on Racial Bias in the Decision to Shoot. Social and Personality Psychology Compass, 8, 201-213. PDF download

Ma, D. S. & Devos, T. (2013). Every Heart Beats True, for the Red, White, and Blue: National Identity Predicts Voter Support. Analyses of Social Issues and Public Policy. doi: 10.1111/asap.12025. PDF download

Jonathan Martinez (No longer available, lab is full)

Mentor Bio — **Ph.D**., 2013, UCLA (Clinical Psychology) **M.A.,** 2009, UCLA (Clinical Psychology) **M.A.,** 2007, SDSU (Psychology) **B.A.,** 2002, UCI (Psychology)

Purpose & Background — In child psychotherapy, parents' active participation in their child's mental health (MH) treatment is imperative, with children faring better when parents are actively engaged in treatment relative to individual child treatment (Dowell and Ogles 2010). Yet, when families - particularly those from ethnic minority and socially disadvantaged backgrounds - initiate services, they often experience significant barriers to therapy engagement (Kazdin, 1996). Knowledge and beliefs about MH problems and treatments, referred to as *MH literacy*, appear to be among the most common and explanatory barriers (Jorm, 2000). Thus, developing engagement strategies

to target MH literacy gaps are needed. *Psychoeducation*, an evidenced- based practice used to present factual information about MH problems and treatments (Lukens & McFarlane, 2004), may be a successful strategy for targeting MH literacy barriers and engaging families in care. The proposed research plan has an overall aim of developing and pilot testing a psychoeducation-based **enhanced-intake procedure (PEP)** for engaging families entering child MH services, with the following specific aims and questions.

Research Question(s) or Hypotheses — (Aim #1) Develop and refine the PEP in collaboration with community partners. Using a collaborative, iterative approach, feedback from community partners is expected to increase the validity, feasibility, and acceptability of the PEP in usual care (UC) settings, and will answer the following: *What difficulties do providers encounter in attempting to engage families in care, and what strategies are used? What are potential benefits/challenges to using PEP?* **(Aim #2)** Examine the feasibility and acceptability of the PEP in a small-scale pilot study. The PEP will be evaluated for feasibility, fit, relevance, utility, and will be refined as needed for UC settings. This will answer the following: *Do families and providers find the PEP beneficial in promoting family engagement? How can the PEP be modified to increase feasibility, helpfulness, and utility for engaging families, particularly ethnic minority families?* **(Aim #3)** Implement the PEP in a pilot randomized trial. The feasibility, acceptability, and fidelity of the PEP will be evaluated, as well as the comparative effectiveness of the PEP vs. UC. This randomized trial will answer the following: *Does the PEP promote family engagement in care compared to UC? Are there specific subgroups of families (ethnic minority status, SES, acculturation) that benefit more/less from the PEP?*

Student Roles — 1) Observational coding of therapy session recordings. Students will be trained on a coding system to document therapist behaviors/strategies used to engage families, as well as parent/family behaviors that are indicative of engagement. **2)** Semi-structured interviews with participants. Students will be trained on providing semi-structured interviews to participants to document participant perspectives on the PEP. **3)** Focus groups with participants. Students will assist the focus group facilitator, and when effectively trained, lead their own focus group with participants.

Expectations — Students will have the opportunity to participate in several facets of research, and will be integral to the success of this research program.

Conferences Typically Attended — This research will give students the opportunity to present study findings at conferences, such as: American Psychological Association, Western Psychological Association, Association for Behavioral and Cognitive Therapies, and UCLA Psychology Undergraduate Research Conference.

Scott Plunkett

Mentor Bio — Ph.D. 1997 in Family Relations and Child Development, Oklahoma State University. M.Ed. 1992 and B.A. in Psychology and Speech/Theater 1986, Northwestern Oklahoma State University

Title of Lab — Adolescent & Adult Adjustment (A Lab). https://www.csun.edu/plunk/

Background & Purpose — The goals of my research are:
(1) to examine family, school, peer, and community influences on emerging adults' mental health from diverse backgrounds (e.g., SES, ethnicity, deaf, LGB);
(2) to examine ecological validity of mental health measures in emerging adults from diverse backgrounds; and
(3) to evaluate campus programs (e.g., programs to increase retention/graduation of students) and community programs (nutrition classes, gardening classes, free tax help for low-income community).

Methods — Qualitative and quantitative data. Self-report surveys, focus groups, interviews, pretest/posttest designs, cross-section and experimental designs

Student Roles — Students work by task in the lab so that they get experience with many different types of research and projects. They will also get experience with Qualtrics, SPSS, R, running various statistical analyses, coding qualitative data, editing research reports, presenting at conferences, etc.

Expectations — Since my office and lab are the same space, I am in the lab 3 days a week with the students, so I spend lots of time with students. My students have been very successful.

Conferences Typically Attended — American Psychological Association, Association for Psychological Sciences, National Council on Family Relations, National Council on Measurement in Education, Society for Research on Child Development, Society for Research on Adolescents, Association for Behavioral and Cognitive Therapies

Publications & Presentations — http://www.csun.edu/plunk/documents/scholarship_plunkett.pdf

Jill Quilici

Mentor Bio — Jill Quilici has 18+ years of experience mentoring high school, undergraduate, and graduate students in research and has previously been Co-Director of a program (with Dr. Saetermoe) designed to prepare under-represented students to pursue doctoral level studies in mental-health related research. **Ph.D.** 1997, University of California Santa Barbara **M.A.** 1994, University of California Santa Barbara **B.A.** 1992, California State University Chico.

Background & Purpose — Jill Quilici studies the relationship between self-regulation and decision-making, focusing on developing and testing interventions to improve self-regulation capabilities. Difficulties with self-regulation have been implicated in many health issues, particularly obesity. This topic is of great significance because of the current obesity epidemic in the United States, which is associated with serious health conditions, including heart disease, stroke, and type II diabetes.

Research Question(s) or Hypothesis — Some questions her lab is exploring include: Is self-regulation a limited resource which can be depleted or are self-regulation failures due to changes in motivation and/or attention? How do we improve self-regulation capabilities? How do we manage decision-making when faced with conflicting goals (e.g., choosing what to eat when we want to eat healthy, but we also want to eat something very tasty)?

Method — Most research studies in the lab use an experimental approach. A typical study might involve asking participants to carry out a task which involves self-regulation (e.g., controlling emotional expression while watching an intense video or holding one's arm in icy water as long as possible). Then, some participants participate in an intervention designed to improve self-regulation, while other students (control group) do not. Finally, participants are asked to complete another self-regulation task (e.g., choosing between a healthy vs. unhealthy snack). If the intervention group outperforms the control group on the second self-regulation task, this would be evidence that the intervention is effective. Data analysis would be primarily quantitative—usually involving analysis of variance or multiple regression.

Student Roles — Students assisting in Dr. Quilici's lab get experience conducting literature review, experimental design, development of stimulus materials, quantitative data collection, data scoring, data entry, data analysis, and writing up and presenting research findings. Students at the sophomore, junior, and senior levels can participate in all of these activities.

Expectations — It is expected that students will become more independent as they progress in the lab and will take on more of a leadership role, eventually mentoring more junior students.

Conferences Typically Attended — Dr. Quilici's lab presents at a variety of conferences, such as Western Psychological Association, Association for Psychological Science, Society for Behavioral Medicine, and Society for Personality and Social Psychology.

Jill Razani

Mentor Bio — Dr. Razani has worked with a number of NIH Fellowship students, such as those in MARC, RISE, and COR programs and will be happy to mentor students and/or faculty in the BUILD program. She is currently the chair of the psychology department. http://www.csun.edu/~ljr77544/

Research Projects — Dr. Jill Razani has two major research projects in the area of health disparities.
The first study is to assess the relationship between neuropsychological test performance and everyday functional abilities of patients with early-stage dementia. The purpose of this study is to better characterize and find predictors of functional abilities of patients with dementia and those with mild cognitive impairment. Additionally, this study aims to better understand the relationship between patient functioning and caregiver burden.
The second study in Dr. Razani's lab is designed to examine cultural and acculturation factors that impact neuropsychological test performance of individuals from immigrant backgrounds. Factors such as bilingualism and level of acculturation are examined as they relate to neuropsychological performance in first, second and third generation immigrants.

Method — We will assess these factors over a one-year period to understand the rate of decline in neuropsychological and daily functioning, as well as caregiver burden.

Student Roles — Dr. Razani's lab has research assistants at all levels from freshmen to master's students. All students will learn the test battery for each project (i.e., the neuropsychological test battery) and those who master test administration, will be given the opportunity to administer the tests to research participants. All interested students will co-author a presentation to a regional scientific conference within their first year in the lab, and those students who continue in the lab past one year, will most likely present at national and/or international scientific conference.

Expectations — As students gain mastery in the lab, they will work more independently with scoring, data entry, data analysis, and dissemination of the findings (e.g., conference presentations or possibly journal publications).

Abraham Rutchick

Mentor Bio — Hello! I grew up in Massachusetts, got my PhD at UC Santa Barbara, taught at Syracuse University, and have now been at CSUN for 10 years. In addition to the work on psychology and technology, students in my lab work on health psychology, political psychology, moral psychology, priming, and social perception. Visit my website for more information.

Title of Research Project — Social Psychology and Emerging Technology

Background & Purpose — The technology that shapes our daily lives is changing more quickly than ever. My lab works on understanding how new technologies change the way we think, feel, and act, and also on how fundamental psychological theories can inform the way we interact with new technologies.

Methods — Mostly quantitative. We use a variety of methods, including lab experiments, surveys, archival analyses, and more.

Student Roles — My BUILD students work on all aspects of projects, including literature reviews, data collection, and study design. Typically they start by working with me on a project that I initiate (by designing stimuli and conducting the study) and progress to developing an independent research project.

Expectations — I expect my students to engage passionately with their research questions. The most important qualities - that I can't teach or help with - are curiosity and work ethic. If a student is excited and curious and passionate and works hard, they'll probably do very well. We'll work on writing, critical reading, statistical techniques, scientific communication, scientific thinking, and so on.

Conferences — SPSP (social psychology), APS (Association for Psychological Science), JDM (Judgment and Decision Making), the other APS (American Psychosomatic Society), SAA (Society for Ambulatory Assessment), SBM (Society for Behavioral Medicine).

Publications — Visit http://rutchick.com/research/ to view my publications.

Omar Ruvalcaba

Mentor Bio — I grew up in Inglewood, and I'm a proud first-generation student. My parents came to the United States from Zacatecas, Mexico and decided to stay in Mexico to provide their children with educational opportunities. I completed my Bachelor's degree in Psychology at UCLA with minors in education and Chicana/o studies. I was interested in research that could change the lives of other first-generation students. I then went on to completed my developmental psychology Ph.D. with an emphasis in cultural psychology at UC Santa Cruz.
In my research, I take a cultural strengths approach to understand the relationships between culture, institutional barriers, and access to higher education opportunities. My current research focuses on the experiences of first-generation students in pursuing higher degrees and their experiences in the workplace. For example, in one study I focus on studying how Latinx students participate and seek help university contexts. My research takes an approach that is aware of gender, culture, and race. A second line of my research focuses on understanding access to technology careers in underrepresented communities (with a focus on Latinx and women). This research includes research that focuses on the experiences of underrepresented students in computer science (Latinx and women) and the experience of these individuals once they join the tech workforce. Another project focuses on women's experiences during online gaming.

Research Website http://www.tecc-lab.com. Personal Website www.omarruvalcaba.com.

Title of Research Project — 1st Generation Immigrant Women and Men's Experiences & Women's Experiences While Gaming Online (or spending time online)

Background & Purpose — The purpose of the research is to help address issues of equity regarding access to higher education and careers. Research in this lab draws on Psychology, Learning Sciences, and Educational research.

Research Question(s) or Hypothesis — How do first-generation immigrant women and men navigate institutional barriers and family responsibility to succeed in the university? What cultural strengths do

different ethnic groups draw on to succeed at the college level? What are women's experiences in online and in-person gaming circles?

Method — Qualitative, Interview, some Quantitative Analysis

Student Roles — study design, data collection, interviews, submitting posters to conferences.

Expectations — I expect that students come to my lab with a willingness to learn and go beyond their comfort zone. In addition, I expect that students will always follow through, feel comfortable asking questions, are excited or interested research that gives back to underserved communities.

Conferences Typically Attended — American Educational Research Association, Society for Research in Child Development, Society for Research on Adolescence, American Association of Hispanics in Higher Education, International Conference in the Learning Sciences.

Publications — http://www.tecc-lab.com/references/

Carrie Saetermoe, Co-PI of BUILD PODER

Mentor Bio — I have dedicated my career to social equity in education, health, and disability. I am one of the Principal Investigators (PI) of BUILD PODER, focusing on the Faculty Core. I have conducted extensive research on variations in Latina/o familial reactions to the transition to adulthood of youth with and without disabilities in Los Angeles, Guatemala, and in Juarez, Mexico. Specialty Areas: Developmental Psychology, Health Psychology, International Disability Studies, Latin@s and Education. Ph.D. 1988, University of California Riverside M.A. 1983, California State University Long Beach B.S. 1981, Michigan State University. https://www.csun.edu/social-behavioral-sciences/psychology/carrie-saetermoe

Background & Purpose — Professor Carrie Saetermoe studies two central populations: (1) Chican@s and their families as they negotiate education in the U.S., and (2) youth with disabilities as they transition to adulthood.

Method — For project 1, interviews from a 3-year longitudinal study of middle and high school Chican@ students are analyzed qualitatively using Grounded Theory analysis. For project 2, data (quantitative, interview, focus groups) from the U.S. and Guatemala are analyzed with a cultural lens to detect strengths and barriers in the transition to adulthood for youth with physical disabilities.

Student Roles — Students meet with their faculty mentor weekly and conduct contextual analyses for presentation and publication.

Publications — Visit my CSUN faculty profile for a list of representative publications.

Holli Tonyan

Mentor Bio — Dr. Tonyan has been a member of the Department of Psychology since 2007. This appointment follows three years as a Lecturer in Early Childhood Education at Monash University in Australia and two years as a Postdoctoral Fellow in Psychology at the University of California, Santa Cruz. Dr. Tonyan has also served as a consultant, conducting program evaluations for higher education and non-profit agencies. **Ph.D.** 2001, UCLA. Psychological Studies in Education. **M.A.** 2000, UCLA. Psychological Studies in Education **B.A.** 1996, Carleton College (MN). Psychology. http://www.csun.edu/~htonyan/

Background & Purpose — My research examines the opportunities children have to develop particular capacities and skills based on the activities that adults organize for them. My main goal is to document how ecological (e.g., physical and material conditions) and cultural (e.g., beliefs, priorities) features of local contexts impact the opportunities adults create for children to practice capacities and skills (e.g., close relationships, physical activity, self-regulation) that promote well-being throughout development. The sustainability of daily routines (i.e., fit with resources, stability/predictability, personal meaning, congruence across stakeholders' interests) is a key determinant of children's opportunities to develop school readiness, close relationships and healthy habits of physical activity. My current research focuses on family child care (FCC) – licensed, regulated child care offered in the provider's home – and the individuals who operate FCC.

Research Question(s) or Hypothesis — We address the overarching question: under what conditions do FCC providers (FCCP) engage in quality improvement initiatives in two counties participating in California's Quality Rating and Improvement System (QRIS)? Specifically, we ask: What are the similarities and differences among providers who are "in" "not in" QRIS in working conditions, beliefs, opportunities for children's learning and development and sustainability of daily routines?

Method — A very brief quantitative Regional Survey distributed to all licensed FCCP in selected service areas examines providers' needs and interests in the regions studied. In-depth Case Studies of 54 FCCP in Los Angeles County and 30 FCCP in Sacramento County include (a) a field visit to the FCC; (b) a survey that includes information about the providers and the children they serve and standardized measures of stress, motivation, etc; (c) an in-depth interview about daily life in FCC, including questions about photos that the providers take of their activities with children. Using a mixed-method approach, we create descriptive, quantitative profiles of characteristics and needs of providers in selected regions (i.e., many participants, with little information about each participant) which we compare to larger, more representative surveys to understand how our samples fit into the broader landscape of child care providers in the state and nation. We can then relate qualitative, emergent codes with standardized measures and quantitative indicators (e.g., income, stress, professionalism).

Student Roles — All students start with data entry and transcribing and will have opportunities for more advanced analysis (quantitative and qualitative) including establishing their own coding system for a topic of interest identified in consultation with the PI. With time, there will be more opportunities for mixed-method analyses that examine associations between qualitative codes and standardized measures.

Expectations — There are many opportunities in this rich research project for identifying related topics for student research: provider well-being and burnout, resourcefulness and strategies for coping with stress, cultural variations in what providers consider to be important for children to experience in their care, relationships between providers and children's parents, and much more.

Conferences Typically Attended — Society for Research in Child Development, American Educational Research Association, Child Care Policy Research Consortium, International Conference of Infant Studies, Research Conference on Early Childhood.

Erica Wohldmann

Mentor Bio — My research is aimed at understanding how people learn, remember, and attend to information, as well as how they use that information to make decisions, especially about consumption of food and material goods. I teach classes related to cognition, the psychology of food choice, ecopsychology, positive psychology, and sustainability. As a cofounder of the Institute for Sustainability, and an environmental activist, I strive to create a better world--one that is environmentally and socially just. **Joint Ph.D.** (2006) in Psychology and Cognitive Science, University of Colorado, Boulder **M.A.** (2004) Psychology, University of Colorado, Boulder

Background & Purpose — My research examines factors that influence food choices, and can be applied to teaching and learning about ways to encourage healthy eating.

Method — I conduct experiments and occasionally examine correlational relationships to test my research questions. The variables I collect and examine most often include caloric and nutritional value estimates, memory for learned information, simulated and actual food choices, as well as amount and type of food consumed. In addition, I collect a number of responses through the use of questionnaires, which are used to assess the relationship between health outcomes (e.g., exercise patterns and Body Mass Index) and behavioral, cultural, and socio-economic variables (e.g., parental education levels, family dynamics, frequency of dining out, etc).

Student Roles — Students who work in my lab gain valuable experience conducting psychological research, making them highly competitive applicants for graduate programs. They are trained to collect human subject data, do library research, analyze data, and I strongly encourage them to present results and regional and national conferences such as the Western Psychological Association and the Association of Psychological Science.

Conferences Typically Attended — Western Psychological Association and the Association of Psychological Science.

Publications — Visit https://www.csun.edu/social-behavioral-sciences/psychology/erica-wohldmann to view my list of select publications and presentations.

NOT ACCEPTING NEW MENTEES

Luciana Lagana

I am an experimental and a clinical psychologist with nine degrees, post-docs, and specializations, and about 40 peer-reviewed publications. Students (at sophomore, junior, senior, and graduate levels) who join my research team often acquire one or two research presentations, and at times a publication (or more if they are highly motivated): this contributes to making their applications to doctoral programs stronger. Some of my former students are completing their doctoral degrees at prestigious Universities or have become faculty at highly-regarded Universities. My research goals include contributing to the understanding of 1) average physical pain levels across major ethnic/racial groups, 2) risk and protective factors for pain in older age, and 3) psychopathology associated with relational and sexual health problems. I also conduct studies in the developing field of narrative medicine research, testing whether original social impact films created in collaboration with some of my students (on topics including LGBTQ discrimination and physical pain under-treatment of ethnic/racial minorities) are successful at a) reducing stereotypes and b) increasing empathy towards discriminated minorities of different kinds. At present, a graduate student and a CSUN Presidential Scholar undergraduate student are involved in exciting narrative medicine research efforts. Students who are interested in 1) giving a voice to neglected minorities via video/film and 2) testing whether this film can have a positive impact on people's attitudes typically find participating in this type of research fulfilling via creatively combining social impact filmmaking with research work. These projects compete in many film festivals in the U.S. and worldwide, and have won several festival awards. Furthermore, a social impact show created in collaboration with one of my

students has been featured in April 2015 by the *American Psychological Association* next to the work of renowned psychologist Albert Bandura. My research in the field of ethnogeriatrics has been funded by NIH since 2002. My current grant funds innovative research on older women living with diverse levels of pain regarding their medical collaboration with their physicians and their engagement in advised health behaviors that could contribute to lower pain levels. I will also test my new model of physical pain in older age. Moreover, to fill gaps in the psychometric literature, I create and validate measures to assess psychopathology and aspects of the relationship between patients and their health care providers. I have a variety of cross-sectional and short-term longitudinal, self-report survey data. In my "Adult Behavioral Medicine Laboratory," using SPSS and other programs, students collect, enter, verify, code qualitative data, and analyze data on the physical/medical, psychosocial, and sexual needs of cognitively high-functioning, community-dwelling women and men of all ages and from diverse ethnic/racial backgrounds. Also, they co-write quantitative and qualitative research posters and manuscripts on the findings of our research. Moreover, they attend a variety of research conferences at locations such as Honolulu and Palm Springs, where they present our research findings and make connections that could lead to identifying potential future mentors in strong doctoral programs.

Department of Urban Studies and Planning

Zeynep Toker

Mentor Bio — As a proponent of community design, I have been working with communities in different cultural settings helping them shape their built environments. My experience of working with communities includes projects such as Designing Dynamic Environments for the Performing Arts in Cambridge, UK; Sandhills Community Center in Spring Lake, NC; Laguna Child and Family Education Center in Laguna, NM; Programming of County Office Buildings in Pamlico County, NC; and Urban Revitalization of Downtown Mebane, NC. I have also designed and participated in research projects utilizing different methodologies with quantitative and qualitative methods of data collection. My research agenda aims to understand spatial representations of cultural, social and gender identities in everyday lives of individuals and communities, both placeless and place-bound. My research interests focus on the ways to accommodate user needs and preferences generally in built environment, especially in housing. **Ph.D.** 2004, North Carolina State University, **M.A.** 2000, Middle East Technical University Turkey, **B.A.** 1998, Middle East Technical University Turkey

Research Question(s) or Hypothesis — The goal of the proposed research to investigate how physical environment characteristics and physical activity patterns interact in neighborhoods with different socioeconomic status (SES).

Method — The variables include perceived pedestrian environment characteristics and objective pedestrian environment characteristics to measure physical environment, destination and time spent for recreational walking to measure physical activity, and income and education to measure SES. Students will work with mixed methods data. Perceived pedestrian environment characteristics and destination of recreational walking are qualitative data. Objective pedestrian environment characteristics, time spent for recreational walking, income, and education are quantitative data.

Student Roles — Students will utilize different tools to measure these variables in different SES neighborhoods, and will conduct questionnaires and audits to collect data and analyze qualitative and quantitative research.

Expectations — Students will become familiar with the most popular tools utilized in public health research for physical activity in relation to the built environment. They will also learn how to conduct qualitative data analysis and quantitative data analysis with corresponding software.

Publications in peer-reviewed journals

Toker, Z. (2015) "Walking beyond the Socioeconomic Status in an Objectively and Perceptually Walkable Pedestrian Environment" Urban Studies Research, vol. 2015, Article ID 919874, 15 pages.
Toker, Z., Minassians, H. (2012) "Good cities and healthy communities in the United States" Urban Design and Planning Journal, Special Issue on Quality of Life. 165:3, 137-145.

Toker, Z., Pontikis, K. (2011) "An Inclusive and Generative Design Process for Sustainable Urbanism: The Case of Pacoima" Journal of Urbanism: International Research on Placemaking and Urban Sustainability 4:1, 57-80.
Toker, Z. (2010) "New Housing for New Households: Comparing Cohousing and New Urbanist Developments with Women in Mind"Journal of Architectural and Planning Research 27:4, 325-339.
Toker Z. (2007) "Recent Trends in Community Design: The Eminence of Participation" in Design Studies. 28.3, 309-323.
Toker, Z., Toker, U. (2006) "Community Design in its Pragmatist Age: Increasing Popularity and Changing Outcomes." METU Journal of the Faculty of Architecture 23:2, 155-166.
Toker, Z. (2001) "Influences of Cultural Differences on the Formation of 'Home' Constructs," in International Association for People-Environment Studies (IAPS) Autumn 2001 Issue of the Bulletin of People-Environment Studies: Special Issue on Housing.

For more publications and conference presentations, visit CSUN faculty page.

Mintesnot Woldeamanuel

Mentor Bio — Dr. Mintesnot Woldeamanuel enjoys all aspects of urban planning but he is most interested in the functional relationship between urban land use and transportation. He has conducted extensive research and written on the relationship among travel behavior, the environment and urban form focusing on transportation mode choice and spatial analysis. His research interest includes public transportation policies and its impact on the environment, spatial and network analysis, mode choice, urban transportation service quality assessment and application of Geographic Information systems (GIS) for transportation. He is also interested in comprehensive urban transportation planning, urban land use planning, travel behavior analysis, community development and sustainability. Prior to joining California State University, Northridge, he worked as an Assistant Professor in the Planning and Community Development Program of Saint Cloud State University, and as a Research Fellow in Transportation Research Institute of German Aerospace Center (DLR). **Ph.D.,** 2007, Hokkaido University, Urban and Environmental Engineering/planning **M. Eng**., 2004, Hokkaido University, Urban and Environmental Engineering/planning **B.Sc**., 2001, Ethiopian Civil Service University, Urban Planning **Adv. Diploma**, 1996, Ethiopian Civil Service University, Urban Engineering.

Background & Purpose — Our cities face increases in obesity, and deceases in walking, bicycling and physical activity. The built environment that encourages automobile use and sedentary living is one of the factors responsible for the poor health outcome of urban residents.

Research Question(s) or Hypothesis — The goal of this research is to create correlational and causal relationship between walkable/bikable communities and health outcomes. The primary dependent variable is Obesity (measured in BMI) and the independent variables include built environment variables that encourage physical exercise (such as sidewalk quality, availability of biking infrastructure, neighborhood density, distance between activity places, availability of parks etc.).

Method — The data include a survey, filed observation on the physical characteristics of the built environment and secondary data on health outcomes.

Student Roles — Students are responsible for designing surveys, gathering primary and secondary data and making statistical and spatial analysis.

Expectations — Students will develop research and critical thinking skills that will help them succeed in their academic and professional endeavors.

Publications

Mintesnot Woldeamanuel (2016). "Concepts in Urban Transportation Planning: The Quest for Mobility, Sustainability and Quality of Life", McFarland Publishers. https://mcfarlandbooks.com/book-2.php?id=978-0-7864-9966-3

Mintesnot G. Woldeamanuel. (2011). "Planning and Decision Models for an Integrated Public Transportation: Tools for a Developing City", VDM publishing

For a full list of publications in peer-reviewed journals and conference presentations, please visit his CSUN faculty page.

College of Science & Mathematics

Department of Biology

Lisa Banner

Mentor Bio — Ph.D. 1992, University of Southern California **B.S.** 1984, San Diego State University

Research Interests / Background & Purpose — The nervous and immune systems consist of complex networks of cells that monitor signals and respond in a specific manner. It has become apparent that these systems are intimately connected and more importantly that functional bidirectional communication exists between them. This concept implies that signals are involved in this process. Cytokines are a group of polypeptides that mediate information between cells of the peripheral immune system and the CNS. This occurs in part, because they are actively transported through the blood-brain barrier, but they are also released from many cell types within the CNS.

Hypothesis — The main question I am interested in is how do cytokines coordinate interactions between the nervous system and the immune system.

Method — One approach to address this question of coordination is to analyze the regulation of cytokines when the system is perturbed, for example, in response to stress. Stress can be achieved in a variety of ways. For my studies, adult mice are placed in a novel environment; this is a well-known model for psychological stress. Subsequently, the mice are analyzed for changes in cytokine levels. Additional lines of research include examining the pathways that link stress to the onset of pathogenesis, the roles other factors play in stimulating cytokine release in both the nervous and immune systems and the regulation of cytokines and their receptors throughout development and after injury.

Recent and Seminal Publications

Petrossian, Karineh, Lisa R. Banner, and Steven B. Oppenheimer. 2007. "Lectin Binding and Effects in Culture on Human Cancer and Non-Cancer Cell Lines: Examination of Issues of Interest in Drug Design Strategies." Acta Histochemica 109: 491-500.

Banner, L.R., Patterson, P.H., Allchorne, A., Poole, S. and Woolf, C.J. (1998). Leukemia inhibitory factor is an anti-inflammatory and analgesic cytokine. Journal of Neuroscience18: 5456-5462.

Banner, L.R., Moayeri, N.N., and Patterson, P.H. 1997. Leukemia inhibitory factor is expressed in astrocytes following cortical injury. Experimental Neurology 147: 1-9.

Banner, L.R. and Patterson, P.H. 1994. Major changes in the expression of the mRNAs for CDF/LIF and its receptor following injury to adult peripheral nerves and ganglia. Proc. Natl. Acad. Sci. USA 91:7109-7113.

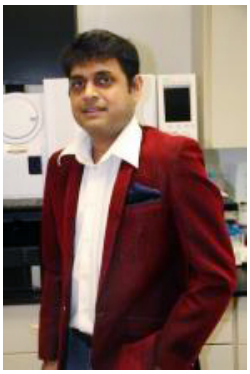
Yokomori, K., Banner, L.R., and Lai, M.M.C 1992. Coronavirus mRNA Transcription: UV light transcriptional mapping studies suggest an early requirement for a genomic-length template. J. of Virology 66: 4671-4678.

Banner, L.R. and Lai, M.M.C. 1991 Random nature of coronavirus RNA recombination in the absence of selection pressure. Virology185: 441-445.

Yokomori, K., Banner, L.R., and Lai, M.M.C. 1991. Heterogeneity of gene expression of the hemagglutinin-esterase (HE) protein of murine coronavirus. Virology 183: 647-657.

LaMonica, N., Banner, L.R., Morris, V., and Lai, M.M.C. 1991. Localization of extensive deletions in the structural genes of two neurotropic vairants of murine coronavirus JHM.Virology 182: 883-888.
Herrera, A.A., Banner, L.R., Werle, M.J. Regnier, M, Nagaya-Stevens, N. 1991 Postmetamorphic development of neuromuscular junctions and muscle fibers in the frog cutaneous pectoris. J. of Neurobiology 22: 15-28.
Banner, L.R., Keck, J.G., and Lai, M.M.C. 1990. A clustering of RNA recombination sites adjacent to a hypervariable region of the peplomer gene of murine coronavirus. *Virology*175: 548-555.

Chhandak Basu



Mentor Bio — My doctoral work involved investigation of foreign gene expression in various plant tissues. In my postdoctoral work, I studied the incorporation and expression of the reporter gene (jelly fish green fluorescent protein or GFP) in herbicide tolerant weed species. Currently I am working in the field of biotechnology based biofuel development. My lab focuses on genetic transformation of plants and bacteria to produce biofuel like compounds. **Ph.D.** 2003, University of Rhode Island **M.A.** 1998, Montana State University **B.S.** 1996, B.C.K.V

Background & Purpose — The overall goal in the lab is production of genetically engineered plants for trait enhancement and modification. In particular, we are interested in producing biofuel/biodiesel-like compounds in plants and bacteria. We are also interested in differential gene expression plants in various abiotic stressful conditions. Our final goal is cloning abiotic stress induced genes and transforming plants with these genes to produce environmental stress resistant genetically engineered plants

Research Question(s) or Hypothesis — 1) Overproduction of terpenes lead to production of biodiesel-like compounds in bacteria and plants; 2) Overexpression of abiotic stress induced genes will produce environmental stress tolerant plants.

Method — We use *Agrobacterium tumefaciens*, a soil borne bacteria to transform plants. We sequence the transcriptome of plants using the RNAseq technique and we analyze the transcriptome using bioinformatics software. Production of biofuel/biodiesel-like compounds will be analyzed by gas chromatograph-mass spectrometer. Global energy crisis (Problem) → Overproduction of terpenes lead to production of biodiesel-like compounds in bacteria and plants (Hypothesis) → Production of transgenic plants and bacteria (Experiment) → Analyze transgenic plants and bacteria for potentials for biofuel production (Data analysis) → Optimize best experimental approach to produce transgenic plants and bacteria for production of biofuel (Strategy development to address the problem)

Student Roles — Students will be involved in experiments as described. It is expected that students will present their data in scientific conferences and involved in writing manuscripts. All students will be expected to learn fundamentals of gene cloning and plant genetic engineering.

Expectations — Students are encouraged to enroll in BIOL 470 (Biotechnology) and Recombinant DNA (BIOL 572)

Conferences Typically Attended — America Society for Plant Biologists, Society for In Vitro Biology, International Plant and Animal Genome Conference

Maria Elena de Bellard

Mentor Bio — My passion for science started early, my father was one of the last explorers of Venezuela and our home was more a freeloading zoo than a regular house for 6 children. I went on to do my undergraduate school at a small, Caltech-like University in Caracas (Universidad Simon Bolivar) then worked for 4 years in a lab studying the Venezuelan Equine Encephalitis (which by the way you do not want to get infected with as I was due to a lab accident! But that is another story). I then decided to risk it all and got on plane and came to New York to start a Ph.D. program in biology. I was lucky that because my father's

friendships with the Herpetologists at the American Museum of Natural History, I was able to volunteer for one year there helping a renowned herpetologist, Janis Roze classify snakes from the tropics. After this fun experience I entered a Ph.D. in Molecular, Cellular & Developmental Biology at the City University of NY and worked under the leadership of an extraordinary Irish woman, Marie T. Filbin. Her mentorship solidified my interest in neural research and from there I moved to Caltech to do a Post-doctoral Fellowship with another extraordinary woman: Marianne Bronner. Finally I began as a Biology Faculty at the Biology department at CSUN on 2005.

Research Projects — "Look at neural crest markers through evolution in sharks, snakes and lampreys" & "Identify molecules that determine the specific migratory pathways decisions by neural crest cells." Visit https://mariadebellard.wixsite.com/debellardlab for all projects.

Background & Purpose — My lab focuses on understanding the molecular and cellular mechanism underlying the earliest events in neural crest cell migration.

Research Question(s) or Hypothesis —
1) Identify molecules that determine the specific migratory pathways decisions by neural crest cells.
The neural crest is a migratory population of cells but we know very little about the migratory clues that guide the neural crest for the rest of their path. It is the goal of this study to find which other molecules are capable of guiding the neural crest along their migratory routes. For this purpose I had set out to screen a group of neurotrophic factors that are expressed at the same time that the crest is migrating through the embryo and which have been shown to be important in neural crest migration by analyzing the corresponding knockout mice (5).
2) Look at neural crest markers through evolution in sharks, snakes and lampreys.
The neural crest appearance in evolution is critical for cranial formation and the development of the peripheral nervous system. The question my lab addresses is: How similar are the migratory routes of neural crest across evolution? We hypothesize that there are more similarities than differences.

Method — My lab is interested in studying neural crest cell migration under many angles. With the help of highly driven undergraduates my lab has been able to develop new methods for studying neural crest cell migration in vitro and has set a reputation as a place to learn cell and neural crest biology/development among colleagues. We carry out classic cell biology experiments (cell migration, cancer analysis, molecular signals for migration), embryology studies (neural crest migration in live embryos, genetic manipulations) and the evo-devo of the neural crest across early vertebrates (snakes, turtles, geckos, sharks, rays). In chemoattraction project students live image and track cells migrating; then they gather parameters (i.e. velocity and direction) and compare with control or other chemicals. In the evo-devo project, students analyze their data is by comparing their observations (morphological location of their stem cells in embryos) with what is known for other, more common organisms.

Student Roles — Sophomore and junior students are part of the in-training cohort on their first year. Senior students are generally working on their individual project and helping more junior undergraduates.
Conferences Typically Attended — Society for Neuroscience, CSUPERB and Society for Developmental Biology.
Publications — Please visit https://mariadebellard.wixsite.com/debellardlab/publications for all of deBellard's publications.

Robert Espinoza

Mentor Bio — Robert Espinoza earned his BS in Biology at San Diego State University and Ph.D. in Ecology, Evolution, and Conservation Biology at the University of Nevada, Reno. He spent a year as a post-doctoral fellow at the Carnegie Museum of Natural History and began his academic career at CSUN in 2001. He is currently a Professor of Biology and an Associate Dean of the College of Science and Mathematics. His research interests are in the physiology, ecology, and evolution of amphibians and reptiles. **Ph.D.** 2002, University of Nevada Reno **B.S.** 1990, San Diego State University

Background & Purpose — Research in our lab is broadly concerned with understanding the physiological mechanisms that underlie animal diversity. In short, we seek to answer the "how" questions that pertain to animal function. Although most studies are at the whole-organism level, recent research has drawn on inferences from biochemical properties of cell membranes, to tissue-level processes, to populations and communities. Our research is also integrative and comparative, which means for we draw from several fields of inquiry (physiology, ecology, behavior, evolution) and include multiple species or populations in each investigation. Most of our research focuses on amphibians and reptiles, because these two groups of vertebrates are very diverse (>7800 and >10,600 species, respectively) and possess many adaptations and specializations that capture the fascination of scientists and the general public alike. The evolutionary relationships are also well resolved for most groups of amphibians and reptiles, allowing us to test broad hypotheses concerning organismal diversity in an evolutionary framework.

Research Question(s) or Hypothesis — Current research themes in our lab include: (1) thermal adaptation, (2) diet evolution, (3) the mechanisms underlying successful colonization by invasive species, and (4) the evolution of sociality. As ectotherms ("cold-blooded"), amphibians and reptiles are good models for studies of thermal adaptation because most aspects of their biology are closely linked to their abiotic environments. Reptiles are well suited to studies of diet evolution because closely related species often have different diets. This can help us identify the potential forces selecting for diet evolution, while testing the mechanisms underlying those shifts in diet, and the consequences of those shifts on morphology, physiology, behavior, and interactions with other species. Invasive species are ideally suited for testing rapid evolution in behavior, physiology, and ecology, as successful invasives can become establish in climates that are radically different from their native ranges.

Method — We use a diverse array of methods and analytical tools to address the broad range of studies conducted in our lab, often in collaboration with other labs at CSUN, across the US, and internationally. These include: genetics (currently: multilocus phylogenetic analyses, microsatellites, metagenomics, and genomics), physiology (metabolism, thermal tolerances, temperature-dependent performance, supercooling and freeze tolerance, evaporative water loss, digestive efficiency, passage rate, etc.), morphology (gross dissections, histology, SEM/TEM), microbiology (genetically characterizing the microbiomes of host guts), and niche modeling and biogeography. Nearly every new study brings with it new analytical tools, and we embrace new projects that offer new opportunities for collaboration with other labs and add new tools to our toolbox.

Student Roles — In weekly lab meetings we practice giving presentations, write and review manuscripts and grant proposals, and discuss research papers. Participation is mandatory, although the lead responsibility rotates weekly. I also meet with students individually to identify research and career goals and create a plan to help them achieve these goals.

Expectations — Students from sophomores to grads to postdocs have worked in our lab. New undergraduates are mentored by me or a senior undergrad or grad until responsibility and proficiency are established, then given the opportunity to develop their own project. Our lab has also hosted several postdocs and visiting scientists from Argentina and Brazil from three months to a year.

Conferences Typically Attended — Members of our lab usually attend the Joint Meetings of Ichthyologists and Herpetologists each summer. If I am not in the field, I attend the Society for Integrative and Comparative Biology meetings in January. We attend regional meetings from time to time as well.

Publications — Most of our lab publications can be viewed on our lab website (http://www.csun.edu/~ree77914/) or at ResearchGate (https://www.researchgate.net/profile/Robert_Espinoza2).

Gilberto Flores

Mentor Bio — I am an interdisciplinary scientist who specializes in microbial ecology, exploring the diversity and function of microbial communities in a wide range of environments. I use a combination of cutting-edge molecular biology/bioinformatics tools (such as high-throughput sequencing and genomics) and more traditional microbiological techniques (e.g. cultivation, fluorescent microscopy) to address fundamental questions about the ecology and evolution of microorganisms. I have worked in a wide array of environments including deep-sea hydrothermal vents, terrestrial hot-springs, public restrooms and the human body. **Ph.D.** 2011, Portland State University **M.S.** 2006, University of Idaho **B.S.** 2001, Humboldt State University. https://gilbertoflores.weebly.com/

Research Projects — "Integrated Studies Into the Genomic, Metabolic, and Cultivable Diversity of the Human Gut SymbiontAkkermansia muciniphila" & Dietary Drivers of the Human Gut Microbiome.

Background & Purpose — The human gut is home to trillions of microorganisms that collectively are known as the gut microbiome. These microorganisms perform functions that are essential for normal human physiology but changes in the types of microorganisms in the gut have been associated with several diseases including obesity. Although numerous other factors play a role in the development of obesity, the composition of the gut microbiome is now considered an important environmental factor and a potential therapeutic target for treatment of obesity. Much of what we know about the association between the gut microbiome and obesity has been gleaned through observational studies of adult humans and from manipulative experiments using model organisms like mice. Given that childhood obesity has more than doubled over the past 30 years particularly in ethnic minorities in the USA, identifying if an association also exists in children would strengthen our understanding of the pathophysiology of obesity.

Research Question(s) or Hypothesis — Research in my lab seeks to identify the factors that influence the composition of the gut microbiome in both healthy and overweight/obese children. Factors of interest include both long-term and short-term dietary habits, and antibiotic use.

Method — To address these questions, we utilize cutting-edge genomic techniques coupled with more traditional microbiological methods to characterize the microorganisms at the community and species levels.

Student Roles — Students working in my lab will gain valuable hands-on experience in both wet-lab (e.g. DNA extraction, PCR, DNA sequencing, bacterial cultivation, etc.) and bioinformatics based methods.

Expectations — Students working in my lab are expected to develop independent projects with my guidance but can also expect to work collaboratively with other graduate and undergraduate students. I also expect students to immerse themselves in the primary literature outside of their designated laboratory times so long as it does not interfere with their coursework.

Conferences Typically Attended — Conferences typically attended by students and myself include the American Society of Microbiology General Meeting (every May/June), the International Society of Microbial Ecology Meeting (even years in August), and the ASM Conference on Beneficial Microbes (even years, September).
Publications — To see a full list of Dr. Flores' publications, writings and press coverage, please visit: https://gilbertoflores.weebly.com/publications.html

Yoshie Hanzawa *New Mentor*

Mentor Bio — A primary goal of my research is to understand the genetic bases of reproductive transition of plants (flowering) in response to environmental signals, and to clarify how these mechanisms have evolved. My research currently focuses on the evolution of the flowering gene network in Arabidopsis and soybean, taking an interdisciplinary approach encompassing molecular genetics, genomics, biochemistry, population genetics and systems biology, with an ultimate goal of plant improvement for higher adaptation to diverse and changing environments.

Background & Purpose — Phosphatidylethanolamine-binding proteins (PEBP), also known as Raf-kinase inhibitor proteins, play critical roles in the regulation of diverse signaling pathways controlling cell growth and differentiation in bacteria, plants and animals and affect a range of diseases including cancer metastasis, pancreatitis as well as Alzheimer's disease, which makes PEBP a particularly suitable target for precision medicine and individualized therapy. In plants, FT and TFL1 in the PEBP family govern a unique and simple molecular switch that modulates the activity of the transcription factor FD and determines the fate of meristematic cells in reproductive transition (flowering), offering the novel molecular mechanisms to engineer PEBP signaling cascades for disease-specific therapeutic intervention.

Research Question(s) or Hypothesis — Both FT and TFL1 bind FD and modulate expression of the floral meristem identity genes that control development of the reproductive organs. However, FT and TFL1 act in an opposite manner; the FT-FD complex induces this process, while TFL1-FD represses. Our preliminary work identified that FD phosphorylation at Threonine 282 in the C-terminus is responsible for the transcription activator action of FD, and that multiple Calcium-Dependent Protein Kinases (CPKs) phosphorylate FD at T282. We hypothesize that FD phosphorylation may be regulated by FT and TFL1. Alternatively, FT and TFL1 may control subsequent cellular actions of FD depending on FD's phosphorylation status.

Method — Epitope-tagged FD and mutant FD (T282A and T282S) will be coexpressed in protoplast cells of *Arabidopsis* with FT, TFL1 or control and the biochemical and cellular actions of FD and mutant FD will be examined, including phosphorylation by CPKs, interaction with FT and TFL1, organelle localization, stability and transcription activity. The function of FD, mutant FD and CPKs in flowering transition will be tested by creating transgenic *Arabidopsis* plants overexpressing these proteins or carrying mutations using the latest CRISPR/Cas9 systems available for plants. Data analysis: Protein abundance, phosphorylation and immunoprecipitation will be observed using Western Blotting and quantification by biotin or 32P labeling, and localization and interaction using fluorescent or confocal microscope. Transcription of downstream genes will be examined using quantitative RT-PCR. Flowering phenotypes will be assessed by the numbers of days and leaves produced before flowering and statistical analyses will be conducted using Excel or SAS.

Student Roles — All levels of students will participate in cloning, Western, plant transformation and screening, expression studies and phenotypic analyses. In addition, junior and senior students will contribute to experimental design and interpretation of results, and senior students to training of sophomore and junior students and presentation of results at conferences and in peer-reviewed journals.

Expectations — Students in this project will learn in-depth knowledge in signaling mechanisms controlling diverse diseases and techniques in emerging molecular genetic, biochemical and genome editing approaches that are extensively applied to biomedical research including precision medicine solutions.

Conferences Typically Attended — American Society for Plant Biologists, International Conference on Arabidopsis Research, Society for Molecular Biology and Evolution, Genetic Society of America

Publications —

Wu, F. and Hanzawa, Y. (2017) A Simple Method for Isolation of Soybean Protoplasts and Application to Transient Gene Expression Analyses. Journal of Visualized Experiments. In Press.
Wu, F., Sedivy, E.J., Price, W.B., Haider, W. and Hanzawa, Y. (2017) Evolutionary trajectories of duplicated FT homologs and their roles in soybean domestication. The Plant Journal. 90(5):941-953.
Sedivy, E.J., Wu, F. and Hanzawa, Y. (2017) Soybean domestication: the origin, genetic architecture and molecular bases. New Phytologist. doi: 10.1111/nph.14418
Serrano-Mislata, A., Fernández-Nohales, P., Doménech, M.J., Hanzawa, Y., Bradley, D. and Madueño, F. (2016) Separate elements of the TERMINAL FLOWER 1 cis-regulatory region integrate pathways to control flowering time and shoot meristem identity. Development. 143(18):3315-3327.
Baumann K., Venail, J., Berbel, A., Domenech, A.J., Money, T., Conti, L., Hanzawa, Y., Madueno, F. and Bradley, D. (2015) Changing the spatial pattern of TFL1 expression reveals its key role in the shoot meristem in controlling Arabidopsis flowering architecture. Journal of Experimental Botany. 66(15):4769-4780.
Wu, F. and Hanzawa, Y. (2014). Photoperiodic control of flowering in plants. Handbook of Plant and Crop Physiology. the 3rd edition, ch.4, CRC Press, Taylor & Francis Group, LLC.
Wu, F., Price, W.B., Haider, W., Seufferheld, G., Nelson, R. and Hanzawa, Y. (2014). Functional and Evolutionary characterization of the CONSTANS gene family in short-day photoperiodic flowering in soybean. PLOS ONE. 9: e85754.
Rosas, U., Mei, Y., Xie, Q., Banta, J., Seufferheld, G., Gerald-Martinez, S., Chou, L., Bhambra, N., Parks, J.D., Flowers, J., McClung, C.R., Hanzawa, Y. and Purugganan, M.D. (2014). Variation in Arabidopsis flowering time associated with cis-regulatory variation in CONSTANS. Nature Communication. 5:3651-3658.

Ray Hong

Mentor Bio — Joined CSUN Biology Department 2008. He is a post-doc fellow at the Max-Planck Institute for Developmental Biology (Tuebingen, Germany). **Ph.D.** Biology UC San Diego 2002 **B.A.** Biology Pomona College 1996.

Research Projects — Our research primarily involves the use of the nematode model Pristionchus pacificus, which has been used to study the evolution and developmental programs required for host finding behavior at the molecular and genetic level. https://rayhonglab.wordpress.com/research

Background & Purpose — To understand the chemosensory genes involved in the interaction between invertebrates.

Research Question(s) or Hypothesis — The beetle-associated nematode (a round worm) *Pristionchus pacificus* represents a model system to study nematodes that associate with insects. In particular, our research sought to identify host factor that affect nematode behavior and development, with the long-term goal of translating basic research knowledge into improving treatments against parasitic nematodes.

Method — Molecular biology and genetics involving PCR, recombinant DNA technology, genetically modified organisms, bioinformatics. Data analysis is reductive and quantitative. We try to isolate factors to characterize genetic function. Data collection and processing is quantitatively intensive.

Student Roles — **Sophomores**: genetic screens, DNA extraction, PCR. **Juniors**: genetic crosses, advanced PCR, recombinant DNA "cloning" **Seniors**: independent project involving the above techniques

Expectations — **Sophomores**: strong performance in BIOL106; will be paired with a more senior student (undergraduate or masters) on specific projects. **Juniors**: strong performance in BIOL107; BIOL360 Genetics; ready to be part of a team. **Seniors**: strong performance in BIOL380 Cell Biology and other advanced courses in biology. Ready to work on an independent project.

Conferences Typically Attended — CSUPERB conference (CSU Program for Education and Research in Biotechnology)(January), CSUNposium (April), CSUN Sigma-Xi Research Symposium (April), International C. elegans Conference (June), Society for Developmental Biology (July)

Publications — For a full list of publications, visit his Wordpress website.

Jonathan Kelber

Mentor Bio — I teach undergraduate and graduate courses on cell/molecular biology and cancer. My research focuses on understanding the mechanisms by which cancers begin and then later acquire the ability to metastasize. We also study these same mechanisms during tissue regeneration to better understand their normal contexts. By understanding what drives cancer and what prevents complete tissue regeneration, we aim to develop novels therapeutic strategies. **Ph.D.** 2009, University of California San Diego **M.S.** 2003, California State Polytechnic University Pomona **B.S.** 1999, California State Polytechnic University Pomona. Visit my lab website.

Background & Purpose — Broadly, we seek to characterize the molecular mechanisms and functions of genes that play critical roles in cancer and tissue regeneration. Our work integrates molecular/cellular biology, signaling biochemistry, animal models of normal development and disease, and microscopy imaging to answer questions in these fields. **Ongoing Projects: 1)** Switching of TGFbeta signaling outcomes in normal and disease states; **2)** Innate and acquired therapy resistance in breast cancer; **3)** Tissue regeneration and wound healing; **4)** Biomarker identification in pancreatic cancer; **5)** Influence of the microenvironment on homeostasis and cancer progression.

Research Question(s) or Hypothesis — How do changes in gene expression and subcellular protein localization coordinately regulate stem cell behavior during tissue regeneration? How do intracellular scaffolding proteins mediate TGFbeta-mitogenic signaling crosstalk and tumor progression in response to extracellular cues? Questions such as these are at the center of our lab's research efforts. In many cases, genes that are known to perform critical roles during development also have integral functions during cancer initiation and progression. In this regard, cancer may be considered a recapitulation of developmental (or regenerative) processes in an inappropriate temporal and spatial manner. Gene families such as TGF-beta and EGF along with their receptors, co-receptors and intracellular mediators are central regulators of essential stages during vertebrate development. Notably, however, many of these genes are deregulated in multiple tissue types to induce oncogenesis and are classified as developmental oncogenes. Fluctuations in the genetic and/or epigenetic states of developmental oncogenes are most abundant during embryogenesis in utero and regenerative/healing or cancer initiation/progression processes in the adult. Cripto (TDGF1, tumor-derived growth factor one) and PEAK1 (SGK269) are two developmental oncogenes that our research group is studying with regard to how they control cell proliferation/migration of tumor cells and govern critical steps during stem cell recruitment/differentiation in tissue development/regeneration. We are also interested in identifying new genetic/molecular regulators of tumor phenotypes in breast and pancreatic cancers, and further identifying any novel developmental functions that these genes may have.

Method — Immunostaining, qPCR/RT-PCR, Site-Directed Mutagenesis, Cell Biology, Intravital Cancer Imaging, RNAi Techniques, Viral Gene Delivery, Confocal/TIRF/Epi Microscopy, Chick-CAM and Orthotopic Xenograft Tumor Models, Cell Proliferation/Migration/Cycle/Transformation Assays, Radio-Immunoassays of Ligand-Receptor Interactions, Luciferase-Response Assays, Phosphoprotein Analysis, Kinase Assays, iPSC/ESC Culturing and Characterization, Adipocyte/Neuronal Cell Differentiation, Bioinfomatics, TGF-beta Superfamily Signaling, Analysis of Stem Cell Properties in Cancer Cells, Primary Cell Isolation and Characterization from Normal and Tumor Tissue, Zebrafish Husbandry and Developmental Studies, and FACS.

Student Roles — Trainees in our group will gain experience with the techniques listed above.

Expectations — All undergraduates are paired with graduate students in the lab from whom they learn techniques/skills relating to a particular project. Undergraduates are assigned a portion of the larger project as their "own" project, but

continue to work closely with Dr. Kelber and the graduate student to ensure that the project progresses and that their work is relevant to the larger research efforts. Ultimately, this model ensures that undergraduates have the opportunity to publish their research as all graduate students must publish their findings.

Conferences Typically Attended — All lab members are encouraged to attend international scientific conferences on cancer, stem cells and developmental biology (e.g., ASCB, AACR, SDB, and ISSCR)."

Publications — For more visit http://developmentaloncogenelab.gutensite.net/

2015 Agajanian M*, A Campeau*, M Hoover*, A Hou*, D Brambilla*, SL Kim*, Richard Klemke and Jonathan Kelber. PEAK1 acts as a molecular switch to regulate context-dependent TGFbeta responses in breast cancer. PLoS ONE https://doi.org/10.1371/journal.pone.0135748

2015 M Agajanian*, F Runa*, J Kelber. Identification of a PEAK1/ZEB1 signaling axis during TGFβ/fibronectin-induced EMT in breast cancer. BBRC

2014. Fujimura K, T Wright, J Strnadel, S Kaushal, C Metildi, AM Lowy, M Bouvet, J Kelber, RL Klemke. A hypusine-eIF5A-PEAK1 switch regulates the pathogenesis of pancreatic cancer. Cancer Research

Mariano Loza-Coll (No longer available, lab is full)

Mentor Bio — I went to university in Buenos Aires, Argentina, where I majored in Biology and specialized in animal physiology. For my PhD, I moved to Canada, and received my degree from the Department of Medical Biophysics at the University of Toronto, where I studied cancer cell biology. Then I came to the United States (first to San Diego, and then Los Angeles), where I trained as a postdoc investigating the genetics basis of asymmetric cell decisions using the fruit fly Drosophila melanogaster as an experimental model system. In the Fall 2015 I joined the Department of Biology at CSUN, where my students and I are currently investigating the genetic control of stem cells in flies. You may visit our lab's website at: https://lozacollcsunbio.wordpress.com

Title of Research Project — Genetic regulation of adult stem cells in Drosophila melanogaster

Background & Purpose — In order to remain functional, many of our organs can replace cells that are lost to injury or wear, thanks to the activity of adult stem cells. Like their embryonic counterparts, adult stem cells undergo “asymmetric self-renewing divisions”, generating a new copy of themselves (to maintain a healthy stem cell pool) and a cell that differentiates into a specific cell type that replaces missing cells in the organ. A long-term objective of my laboratory is to characterize the genetic regulatory mechanisms and networks that control adult stem cells across tissues.

Research Question(s) or Hypothesis — One of the general hypotheses that we are actively investigating at this time is that systemic stress can affect the genetic regulation of stem cells, impairing the capacity of their host tissues to maintain homeostasis and/or properly recover from injury.

Method — We normally combine classical Drosophila genetics, tissue dissections and high resolution microscopy to determine how stressful stimuli may affect major genetic pathways controlling the number, activity and responsiveness of diverse adult stem cell populations in flies. We also try to identify new genetic modules and pathways through the bioinformatics, integrating public datasets from genome-wide screens related to stem cells. In a typical experiment, we would subject flies that carry cell-type specific markers and genetic activity reporters to any of a number of forms of systemic stressors (e.g. heat shocks, intoxication, reproductive isolation). After several days, we dissect relevant organs/tissues out of the fly, and analyze the expression of the cell type and activity markers through microscopy, which allows us to not only quantify adult stem cells in a tissue, but also the identity and function of their progeny.

Student Roles — None of the techniques used in our lab (setting up and caring for Drosophila crosses, dissecting tissues and preparing samples for microscopy) demand any special skills or prior training, nor do they involve hazardous reagents or equipment. Therefore, students at all levels (sophomore, junior and senior) can and will be involved in each

and all steps of our experiments. While I encourage teamwork within our group, I also expect that my students can work independently and develop a sense of ownership and pride in their projects.

Expectations — I expect my students to take the project and themselves very seriously, because I also take them both very seriously. For us to maintain a productive and meaningful mentorship relationship, I mostly need to see that our lab is a top priority for the student. From me, students can expect respect, patience, dedication and a profound passion for doing science. In my lab, students will learn how to set up genetic crosses, predict their outcomes, dissect tissues and carry out fairly sophisticated fluorescence microscopy. But much more importantly, they will learn to think independently as scientists, evaluate evidence critically, and formulate testable hypotheses. In addition, I strongly advocate the communication of scientific progress, challenges and approaches to society at large. I have spearheaded several science communication and outreach projects, including the development of a website for the dissemination of science news to a broad readership (www.science4everybody.com). Regardless of their future career choices, science majors will be our science ambassadors, interpreters and advocates in society. Therefore, besides providing my students with the best experimental genetics training that I can offer, I will passionately mentor them to develop sound communication skills.

Conferences Typically Attended — CSUNposium, CSUPERB, GSA Drosophila Research Conference. We may also sporadically attend the Society for Developmental Biology Meeting, and the American Society for Cell Biology Conference.

Publications

Loza-Coll MA, Jones DL. Simultaneous control of stemness and differentiation by the transcription factor Escargot in adult stem cells: How can we tease them apart? Fly (Austin). 2016 Apr 2;10(2):53-9.
Loza-Coll MA, Southall TD, Sandall SL, Brand AH, Jones DL. Regulation of Drosophila intestinal stem cell maintenance and differentiation by the transcription factor Escargot. EMBO J. 2014 Dec 17;33(24):2983-96.
Voog J, Sandall SL, Hime GR, Resende LP, Loza-Coll M, Aslanian A, Yates JR 3rd, Hunter T, Fuller MT, Jones DL. Escargot restricts niche cell to stem cell conversion in the Drosophila testis. Cell Rep. 2014 May 8;7(3):722-34.
Solek CM, Oliveri P, Loza-Coll M, Schrankel CS, Ho EC, Wang G, Rast JP. An ancient role for Gata-1/2/3 and Scl transcription factor homologs in the development of immunocytes. Dev Biol. 2013 Oct 1;382(1):280-92.
Rast JP, Smith LC, Loza-Coll M, Hibino T, Litman GW. Genomic insights into the immune system of the sea urchin. Science. 2006 Nov 10;314(5801):952-6. Review.

Rachel Mackelprang (No longer available, lab is full)

Mentor Bio — **Ph.D.** 2006, University of Washington **B.S.** 2001, University of Utah. Keywords: Permafrost, climate change, genomics, genetics, metagenomics, bioinformatics, microbiology.

Background & Purpose — Our lab is broadly interested in understanding microbial populations by integrating next-generation tools such as high-throughput DNA sequencing with traditional microbiology approaches. Our overarching goals are two-fold. Microbial life exists in many extreme environments including permafrost, soil in the arctic that has been frozen for thousands of years. Understanding how permafrost microorganisms survive and grow can give us insights into exobiology, global warming, and antibiotic resistance.

Research Question(s) or Hypothesis — (1) Exobiology— A fundamental goal of exobiology is to investigate the boundaries at which life can exist to inform the search for habitable environments and life outside Earth. Since six of the eight other planets in our solar system, as well as their moons, asteroids, and comets are permanently frozen, life—if it exists—on these other celestial bodies is most likely to be found in a sub-zero environment. On Earth, permafrost acts as analogue to Mars and other cryogenic bodies. If we can understand how microbial life survives in permafrost on Earth, it will help us understand how life may survive on other planets in our solar system and beyond.
(2) Climate change— One quarter of the earth's terrestrial surface is underlain by permafrost, or perennially frozen soils. Permafrost soils contain approximately 25% to 50% of the total global soil carbon pool. Permafrost carbon is protected from microbial degradation by freezing temperatures. However, rising global temperatures are causing the

permafrost to thaw. As the permafrost thaws, it is predicted that microorganisms will become more active and that organic matter will become increasingly accessible for microbial degradation, releasing large amounts of greenhouse gasses into the atmosphere. We study how permafrost microbes degrade carbon in order to predict its contribution to climate change.
(3) Antibiotic resistance—Antibiotics were discovered more than 70 years ago and revolutionized medicine. Growing antibiotic resistance due to misuse is threatening the effectiveness of these medications. We study the history of antibiotic resistance by studying antibiotic resistance genes in microbial communities that have not been exposed to antibiotics—those that have been trapped in permafrost for thousands of years.

Method — Our lab uses a large number of techniques including standard laboratory procedures (ex: DNA extraction & manipulation, PCR, culturing of bacteria) and computational analysis of large-scale genomic data sets. Students may select lab or computer based studies.

Conferences Typically Attended — Members of the lab have attended the following conferences: American Society of Microbiology, International Society for Microbial Ecology, and the International Conference on Permafrost.

Publications — For a full list of publications, visit: http://www.csun.edu/~rmackelpr/LabWebsite/Publications.html

Cindy Malone (No longer available, lab is full)

Mentor Bio — Dr. Malone earned her B.S in Biology at Illinois State University and her PhD in Microbiology and Immunology at UCLA. She continued her Post-doctoral work at UCLA in Molecular Genetics. Dr. Malone is the Director of the $6.1M CSUN-UCLA Bridges to Stem Cell Research Program funded by the California Institute for Regenerative Medicine. Dr. Malone's own research in her CSUN lab is aimed at understanding how genes are regulated through genetic mechanisms that alter gene expression. https://www.csun.edu/science-mathematics/biology/cindy-malone
Elite Gene Team App: https://itunes.apple.com/us/app/elite-gene-team/id1046974841
E-Portfolio: https://contentbuilder.merlot.org/toolkit/html/snapshot.php?id=65226554931352
Youtube Channel: https://www.youtube.com/channel/UC3K2TdToNgAJcTK_V94d7qw

Background & Purpose — Appropriately controlling when and where genes are turned on and off is essential for cells to function normally and avoid becoming cancerous or dying prematurely. The expression of a gene is usually controlled by adjacent DNA sequences, called the gene promoter that functions essentially as an "on/off switch". In a previous study, we linked a set of genes to both an aggressive cancer and non-aggressive/indolent cancer by an analysis of genes expressed (turned on) in an aggressive mantle cell lymphoma (MCL) compared the genes to the expressed non-aggressive small lymphocytic lymphoma (SLL). We study the promoter regions of these genes to determine why and how they are expressed or not in our lymphoma tumor samples. Our study will provide new insight for how these lymphoma associated genes are controlled and may increase the knowledge of how gene expression is controlled in general. Enhanced understanding from our studies should provide information for why certain cancers are very aggressive and others are less aggressive and therefore have a higher long-term survival rate.

Research Question(s) or Hypothesis — We hypothesize that these identified lymphoma-associated genes are dysregulated in these cancers and therefore play a role in their aggressive or non-aggressive natures, respectively.

Method — Promoter analysis of these genes, first in an epithelial cell line and subsequently in MCL and SLL cell lines, will identify how these genes are regulated and will lead to in vivo promoter regulation studies. We use bioinformatics (computer analysis) first, to identify the promoter regions of the lymphoma associated genes we found, then we isolate the promoter DNA region and determine how they are turned on and off. Molecular genetics techniques such as PCR, subcloning, restriction digest analysis, gel electrophoresis, cycle sequencing, site-directed mutagenesis, transient transfection, and dual luciferase analysis are used.

Student Roles — Students of all levels can run their own project from start to finish. Students choose a gene from the list of lymphoma-associated genes, identify and design PCR primers to the promoter region, PCR and subclone. After they verify their promoter by sequencing, they will perform transient transfections dual luciferase analysis. Site-directed mutagenesis and subsequent transient transfections and analysis will be performed to identify how the promoter is turned on and off.

Expectations — Students present their work at conferences and are integral in the manuscript and publication submission process. Students performing research in my laboratory often go on to CSUN UCLA Bridges to Stem Cell Research Program, PhD programs, industry jobs, and professional schools.

Conferences Typically Attended — CSUPERB, CSUN symposia, Sigma Xi Symposia, UCLA Stem Cell symposia, CIRM Bridges Trainee meeting, Gordon conferences, ISSCR.

Publications — For a full list of publications, please visit: https://www.csun.edu/science-mathematics/biology/cindy-malone

Sean Murray

Mentor Bio —**B.S**., 1997 Biology and Psychology, Summa Cum Laude, Montclair State University, NJ **M.S**., 1999 Biology,Yale University, New Haven, CT, **M.Phil.,** 2000 Biology, Yale University, New Haven, CT **Ph.D. 2003** Yale University **2003-2007** Postdoctoral Fellow in Dr. Lucy Shapiro's laboratory at Developmental Biology Department, Stanford University, Stanford, CA **2004 J. Spangler Nicholas Prize** for best Ph.D. thesis in Molecular, Cellular and Developmental Biology at Yale University.

Research Interests — The dimorphic bacterium Caulobacter crescentus is a model organism for studying the bacterial cell cycle. Its asymmetric cell division results in one swarmer and one stalked cell progeny. Motile swarmer cells can not undergo DNA replication until they differentiate into stationary stalked cells. If sufficient nutrients are available, swarmer cells eject their polar flagellum and build a stalk (with adhesive at its end; for attaching to a surface near nutrients) at the same pole formerly occupied by the flagellum. Stalked cells are competent for DNA replication and cell division. During cell division, a flagellum is placed at the pole opposite that of the stalk. Caulobacter's obligate cell cycle is controlled by oscillating master regulators that control different genetic modules in space and time. As a result of this carefully orchestrated process, a flagellum is synthesized only when needed (just prior to cell division) and is placed at the pole opposite that of the stalk. Likewise, a new stalk is synthesized only at the pole previously occupied by a flagellum. Our lab studies the roles of lipid biosynthesis in this process, using pharmacological, genetic, and molecular approaches. Only by further elucidating the control mechanisms of bacterial cell division can we advance the development of new antimicrobial compounds. Lipid biosynthesis is essential for cell viability and bacterial fatty acid synthetic enzymes have been suggested as antibiotic targets. In fact, compounds specific to bacterial fatty acid biosynthetic compounds have been generated. Most previous studies on bacterial lipid metabolism have focused on E. coli, a gamma-proteobacteria. Caulobacter in contrast, as an alpha-proteobacteria, is closely related to human pathogenic bacteria, such as Brucella and Rickettsia.

Background & Purpose — The purpose of my research is to study how cells enter and exit the bacterial cell cycle in response to stresses such as starvation or antibiotic treatment.

Research Question(s) or Hypothesis — My research questions include:

1) What genes are differentially regulated during starvation?
Methods: RNA will be extracted from starved bacterial cells. cDNA libraries will be created and deep-sequencing will identify changes in transcript abundance in bacterial cultures grown under various conditions. CSUN

students will analyze the data using bioinformatic computational tools. Murray Lab members will confirm the changes in gene expression using real-time qPCR or transcriptional reporters.

2) Which of the starvation-upregulated genes contribute to persistence during starvation?
Methods: A subset of differentially regulated genes identified through deep-sequencing will be selected for gene knock-outs. The gene knockout strains will be tested for survival during starvation. Gene knock-outs will be confirmed using molecular genetic techniques. The strains will be tested for survival during starvation using direct counts, colony formation, and live/dead stains.

3) Do the starvation-upregulated genes contribute to persistence during antibiotic treatment?
Methods: A subset of differentially regulated genes identified through deep-sequencing will be selected for gene knock-outs. The gene knockout strains will be tested for survival during starvation. Gene knock-outs will be confirmed using molecular genetic techniques. The strains will be tested for survival during antibiotic treatment using direct counts, colony formation, and live/dead stains.

Student Roles — Sophomores will make bacterial growth media and solutions, culture bacteria using the aseptic techqnique, and clone PCR products into vectors to create transcriptional reporters. Juniors will confirm gene transcription using transcriptional reporters and create geneknockouts. Seniors will use real-time qPCR to validate differentially-regulated genes during starvation and will test gene knock-out strains for persistence in starved- or antibiotictreated cells.

Expectations — The Murray laboratory offers excellent training for students who are interested in becoming clinical laboratory scientists or public health microbiologists

Conferences Typically Attended — Murray lab members have recently attended the CSUPERB Annual Meeting, the CSUN research symposium, an EMBO meeting on alpha-proteobacteria in Germany, and plan to attend the American Society for Microbiology Conference on Prokaryotic Development in Washington DC in June 2015.

Publications — For a full list of publications, please visit: https://www.csun.edu/science-mathematics/biology/sean-murray

Rheem Medh (No longer available, lab is full)

Mentor Bio — **Ph.D**. 1990, University of Texas **M.S.** 1984, University of Bombay **B.S.** 1982, University of Bombay

Background & Purpose — My primary interest is in understanding how cells die. There are multiple forms of cell death; the one I am most interested in is called 'apoptosis' or 'programmed cell death'. It is a form of cellular suicide, where the dying cell activates within itself a series of well-orchestrated events including activation and repression of precise sets of genes, which modulate the execution. Excessive apoptosis, or a defect in the process has been implicated in diseases such as neurodegenerative disorders like Alzheimer's, autoimmune disorders, and cancer. My long-term goal is to understand the biochemical and molecular basis of apoptosis and to utilize this information to design therapeutic strategies to alleviate or overcome human diseases, particularly cancer.

Research Question(s) or Hypothesis — Using both conventional methods and microarray technology, we have identified a set of genes that may modulate leukemic cell apoptosis. We are testing the hypothesis that these genes play a crucial role in early steps of chemotherapy-induced apoptosis of leukemic cells. The molecular pathway for apoptosis involving each of these genes is being systematically studied, along with potential cross-talk among them.

Method — We are studying the molecular events associated with apoptosis of leukemic cells in response to therapeutic agents such as glucocorticoid hormones, immunosuppressants and anti-proliferative agents, in parallel models of

glucocorticoid-sensitive and -resistant human lymphoblastic cells. This work involves the use of modern cell and molecular biology techniques such as mammalian cell culture, morphological and biochemical characterization of cells; DNA and RNA isolation and characterization by restriction digestion, Southern and Northern blotting and polymerase chain reaction; protein expression and analysis by Western Blotting; protein-protein interaction and DNA-protein interaction studies etc. Various anti-cancer drugs are being tested in cell culture models of cancer for their ability to alter gene expression, and induce apoptosis. Key gene regulatory events that trigger apoptosis are being identified. Students will perform experiments to generate data on drug-induced cell death, apoptosis and gene regulation. Data will be analyzed through standardized methods.

Student Roles — There are a number of potential projects for undergraduate and graduate students interested in this field of research. Student projects vary depending on the qualifications, background and goals of the student. Students obtain training in research methodology, scientific thinking, critical analyses as well as learn diverse techniques including cell culture, SDS-PAGE and Western blotting, DNA/RNA extraction and purification, Restriction enzyme digestions, PCR, DNA cloning, Northern hybridization, reverse transcription, get mobility shift assays, reporter gene assays, cell proliferation assays, apoptosis assays and flow cytometry.

Expectations — Under my mentorship, students are expected to perform experiments, interpret data, and discuss their research outcomes among peers in laboratory meetings, write reports summarizing their data, and present their research findings at local, regional, and national conferences.

Conferences Typically Attended — Early stages: department/college/campus-wide research symposia. Intermediate: CSU-wide biotechnology symposium, CSUPERB. Advanced: Annual meetings of the Endocrine Society and The American Association for Cancer Research.

Publications — For a full list of publications, please visit: http://www.csun.edu/~rm77305/

Jeanne Robertson *New Mentor*

Mentor Bio — My research is focussed on the microevolutionary processes that mediate population and lineage diversification, mostly in amphibians and reptiles. Specific areas of interests include: natural selection, behavior and sexual selection, spatial patterns of diversity, the evolution and functional significance of color pattern, population genomics and phylogeography, the California Channel Islands, speciation, and biogeography of Central America. I teach the Introductory Biology course (106) for Biology majors - this course is part of the myCSUN tablet initiative - we use the iPad in class to engage with course material during lecture - thus creating a student-centered learning environment! I also teach Molecular Markers in Evolutionary Studies (BIOL452) – a course which introduces students to the lab techniques and concepts used in Molecular Ecology. Ph.D. 2008, Cornell University M.S. 2001, Southern Illinois University Carbondale B.S. 1993, University of California Davis. https://jrobertsonlab.wordpress.com/

Research Project Title — Genomic and behavioral basis of speciation in field crickets

Background & Purpose — Research in the Robertson Lab focusses on the evolutionary processes that mediate lineage diversification speciation, including the relative roles of gene flow and selection A Build PODER student will examine the evolution of reproductive isolation in two divergent lineages of crickets that co-occur in narrow contact zone, and will determine the extent of hybridization in these two lineages using an integrated field and molecular genetic research approach. The two cricket species are nearly indistinguishable except for color and habitat preference. While G. saxatilis is uniformly black in coloration and prefers rocky outcrops, G. navajo exhibits color polymorphism, ranging from black to red, and occurs on red, sandy

substrate.

Research Question(s) or Hypothesis — **Aim 1:** We predict that the black color form of G. navajo morphs represent a hybrid cross with G. saxatilis in the contact zone. **Aim 2:** We expect that natural selection acts on color morph in the contact zone of Goblin Valley, Arizona.

Method — Mixed method. Molecular Ecology & Ecological Field-based research. **Aim 1**: A high-throughput sequencing approach (RADseq) will be used to genotype individuals of both G. navajo and G. saxatilis, with a focus on contact zone populations. RADseq data will be filtered through abioinformatics pipeline. We will conduct a suite of analyses including genetic diversity estimates, genetic clustering analyses (e.g., STRUCTURE, PCA) to determine genetic groupings. The program NewHybrids will be used to examine the extent of hybridization; this metric will allow us to estimate the extent of hybridization in the wild and distinguish among multiple hybrid generations. **Aim 2:** Students will perform field-based measure of natural selection in the contact zone. Enclosures will test for survival of crickets that are both cryptic and conspicuous. We will uncover a signal of strong selection if survival is higher in cryptic color forms.

Student Roles — This research includes both field and molecular laboratory research. At all levels, students will conduct fieldwork in the summers of 2018-2019 in Utah, Arizona and California (natural selection studies, field sampling). Advanced students (Juniors/Seniors) will have the opportunity to work alongside a graduate student and PI to perform bioinformatics. Students will be mentored in all aspects of manuscript preparation and submission.

Expectations — The student can expect to gain experience in both field, experimental laboratory, and molecular genetics. In the lab, the student will learn: DNA extraction, DNA quantification and all aspects of library construction for next-generation sequencing. Both the heritability and molecular components of this research will help students develop skills that can be broadly applicable to all biotechnology and medicine fields.

Conferences Typically Attended — A BUILD PODER student will present findings at the CSUN student research symposium, held annually and will be expected to attend one of the scientific conferences: Society for Integrative and Comparative Biology (SICB); Evolution; and/or the Ecological Society of America (ESA).

Publications — For a list of publications, please visit: https://jrobertsonlab.wordpress.com/publications/

Crystal Rogers (No longer available, lab is full)

Mentor Bio — Originally from the wine country in Northern California, I moved to Southern California in 1997 to attend UCLA. I received my B.S. in biology from UCLA in December of 2001. After I graduated I worked with J. Patrick Johnson at Cedars Sinai for a year and a half and then took a big leap and moved across the U.S. to attend graduate school at Georgetown University. I began graduate school in August of 2003 and quickly joined the lab of Elena Casey in the Department of Biology. I was in the Casey lab for five and a half years studying early neural development in the African claw-toed frog, Xenopus laevis. I received by PhD from Georgetown in 2009 and moved to the California Institute of Technology in January of 2010 where I was a postdoctoral fellow in the lab of Marianne Bronner in the Division of Biology and Biological Engineering. Currently, I am an assistant professor in the Department of Biology at CSUN. www.crystalrogersphd.com.

Research Projects — My lab studies the molecular mechanisms that drive neural crest cell development in chicken (Gallus gallus) and axolotl (Ambystoma mexicanum) embryos. More specifically, I am interested in identifying and characterizing genes and proteins involved in the specification of these tissues as well as those controlling the epithelial to mesenchymal transition (EMT), a process that occurs naturally during development and also during cancer transformation.

Background & Purpose — Neural crest (NC) cells are a unique vertebrate stem-cell population that originates in the developing dorsal neural tube and eventually detaches and migrates throughout the developing embryo forming multiple derivatives such as the craniofacial skeleton, pigment cells and the peripheral nervous system. Not only does aberrant neural crest development cause one of the most common birth defects (cleft palate), these cells provide an excellent model system for studying molecular mechanisms that are involved in the epithelial to mesenchymal transition (EMT) in a nonmalignant developmental environment. The process of EMT occurs normally in developing embryos, but also occurs during cancer metastasis. Despite the similarities in morphology and gene expression between embryonic and cancer cells undergoing EMT, little is known about the functional conservation of the molecular pathways that regulate changes in adhesion during EMT. Recent studies from our lab suggest that the process of EMT may include two steps, detachment and mesenchymalization. We have shown that NC cells can lose apicobasal polarity and exhibit breakdown of the basement membrane, but fail to complete the process of EMT if cadherin proteins are dysregulated (Rogers, 2013). Few in vivo studies have focused on the function of cadherin proteins that may be important in this process.

Research Question(s) or Hypothesis — Our current projects will explore the transitioning roles of Ncad, Ecad, Cad11 and Cad7, their transcriptional inputs such as Sip1, and possible interacting factors during cranial NC EMT. Here, we propose to test the hypothesis that Ecad, Cad11 and Cad7 play important roles in NC EMT and migration. In addition, we will also identify the role that cadherins play in NC cell proliferation and survival. We have previously shown that Ncad and Ecad function together heterophilically in the neural tube prior to neural crest EMT, and this project directly follows up to determine if Ecad functions coordinately with Cad11 or Cad7 in the migratory crest to complete EMT.

Method — Our aim with this project is to accumulate preliminary data about the roles of the cadherin proteins during EMT and neural crest migration. To this aim, we will perform gain and loss of function experiments in avian embryos by electroporating either full-length or truncated cytoplasmic versions of the cadherin protein constructs, or translation blocking morpholino oligomers, into the presumptive NC prior to EMT. Subsequently, we can use quantitative RT-PCR, in situ hybridization, biochemistry and immunohistochemistry to elucidate the effects on early development. We will also perform co-immunoprecipitation experiments and proximity ligation assays to identify functional binding partners. Overall, these experiments will detect which genes require specific cadherin expression, and how these proteins function to regulate neural crest EMT.

Student Roles — Students at all levels are welcome to apply for our lab as our research is highly amenable to undergraduate participation. Students will learn molecular and developmental biology techniques that will assist them in medical school, graduate school and beyond. They will also be encouraged to attend national conferences.
Conferences Typically Attended — Society for Developmental Biology and American Society of Cell Biology national meetings.

Publications — For a list of publications, please visit: https://www.crystalrogersphd.com/publications.html

Cristian Ruiz Rueda (No longer available, lab is full)

Mentor Bio — Adjunct Assistant Professor (2015–). Dept. Microbiol. & Immunol., Weill Cornell Medical College, New York, NY. Research Associate (2013–2015) with Dr. Francis Barany, Dept. Microbiol. & Immunol., Weill Cornell Medical College, New York, NY. Research Associate (2009–2012) / Postdoctoral fellow (2006–2012) with Dr. Stuart Levy, Dept. Molecular Biol. & Microbiology, Tufts University School of Medicine, Boston, MA. Ph.D. cum laude in Microbiology (2005) with Dr. Pilar Diaz, Dept. Microbiol., University of Barcelona, Barcelona, Spain. M.Phil. Microbiology (2001). Dept. Microbiol., University of Barcelona, Barcelona, Spain. B.S. Biology (1999). University of Barcelona, Barcelona, Spain.

https://ruizruedalab.wordpress.com/

Background & Purpose — The ultimate goal of my research is to develop novel ways of preventing and treating infectious diseases caused by bacteria resistant to multiple antibiotics. These bacteria have become a major problem in the U.S. and abroad, from failed treatment of previously curable diseases to increased hospital costs. There are approximately 2 million hospital-acquired infections in the U.S. each year, with more than 99,000 deaths occurring mostly due to antibiotic resistant pathogens. World health leaders have described antibiotic resistant pathogens as "nightmare bacteria that pose a catastrophic threat to people in every country in the world".

Research Question(s) or Hypothesis — I am especially interested in the physiological role of multidrug efflux pumps such as AcrABTolC, the main multidrug efflux pump in Escherichia coli and many other pathogenic enterobacteria.

Method — My laboratory uses a multidisciplinary approach that includes bacterial genetics and biochemistry, molecular biology, gene expression experiments, and "omics" to study resistance to multiple antibiotics in bacteria, to ultimately identify new antimicrobials and targets; as well as to develop novel detection methods.

Student Roles — By combining global transposon mutagenesis and untargeted metabolomics, students will identify regulatory and metabolic pathways that reduce the expression or activity of multidrug efflux pumps. Students will then use genetics, gene expression and biochemical methods to further characterize these pathways and pinpoint the cellular metabolites that affect these pumps. They will also determine their mechanism of action, whether they are pump substrates, and their potential as therapeutics capable of preventing antibiotic efflux. Students will also use this knowledge to develop novel molecular detection methods capable of identifying pathogens and their resistance genes in raw samples or metagenomic DNA. I organize research so students participate in different projects and learn different techniques such as antibiotic susceptibility testing, mutagenesis, gene deletion, gene cloning, DNA and protein electrophoresis, PCR, LDR, qPCR, RT-qPCR, Next Generation Sequencing and bioinformatics. As students gain experience, they can then choose on which projects to focus.

Expectations — My final goal is that my students learn the techniques and develop the critical thinking and communication skills that will make them successful in pursuing their careers in the biomedical and health sciences.

Conferences Typically Attended — I encourage my students to use their results to prepare communications for conferences they will be attending, such as CSUPERB Annual Meeting, the American Society for Microbiology General Meeting, and the Interscience Conference on Antimicrobial Agents and Chemotherapy Meeting; as well as to write publications for peer-reviewed journals.

Publications — For a list of publications and patents, visit: https://ruizruedalab.wordpress.com/publications-and-patents-2/

Michael Summers (No longer available, lab is full)

Mentor Bio — **Ph.D.** 1995, University of California Davis **B.S.** 1976, Heidelberg College.
http://www.csun.edu/~mls42367/

Background & Purpose — The overall goal of research in the Summers lab is to understand the formation and function of cyanobacterial lipid droplets (LDs). These are small compartments within the cell that contain un-charged oil-like lipids.

Research Question(s) or Hypothesis — We have identified a number of proteins associated with LDs, and have a hypothesis that these play essential roles in LD formation or function. If this turns out to be true, these proteins will have great importance for use of cyanobacteria as production platforms for biofuel (biodiesel) or for holding or sequestering high-value pharmaceutical or industrially important compounds.

Method — To test our working hypothesis, student researchers are needed to learn molecular genetic skills such as primer design, PCR, cloning, sequence analysis, and bioinformatics prediction of protein function. Using these skills, students will use them to 1) mutate, 2) over-express, and 3) attach a fluorescent protein of the LD-associated proteins for expression in the cyanobacterium. Following this, students will observe the resulting phenotypes using staining and fluorescence microscopy. Altered LD phenotypes such as loss or over-expression of LDs, a change in size or location, or altered LD composition, will lead to other more detailed experiments that will aid in understanding the molecular role of the protein. Some students may wish to overexpress a His-tagged version of their protein and purify it from from *E. coli* for further characterization of its function.

Student Roles — I envision sophomore and junior level students creating the strains mentioned above, and analyzing the effects using epifluorescence microscopy. Interesting proteins can be purified for further study. Senior level students may be involved in more detailed biochemical experiments (*in vitro* and *in vivo*) and bioinformatic analysis unique to each protein. Such studies may involve purification of isolated LDs and use of thin layer chromatography and gas chromatography to study changes in LD composition. Once the basics have been mastered, advanced students may wish to take on projects to express industrially important compounds in LDs.

Expectations — My lab provides a supportive environment for students who wish to work hard and discover new things about this little known suborganelle in bacteria. I am currently funded by a NSF grant through June of 2017 for this project, so the lab is well stocked with materials to perform this work. You will be joining a group of dedicated student researchers, typically 10-12 students each semester, who will welcome you and help introduce you to the world of research. My lab also has the added benefit of a full-time research associate that will help train you and assist me in advancing your research skills.

Conferences Typically Attended — Students typically present their research at local, regional and national meetings such as CSUN's Creative Works Symposium, the CSUPERB Biotechnology conference each January, and the American Society for Microbiology General Meeting each spring.

Publications — For publications, visit: http://www.csun.edu/~mls42367/Summers_CV.html

Cheryl Van Buskirk (No longer available, lab is full)

Mentor Bio — **Ph.D.** 2000, Princeton University, **B.S** 1993, University of Calgary. I grew up in Calgary, Canada and received my Bachelor's degree in Biochemistry from the University of Calgary in 1993. I fell in love with genetics thanks to a great teacher, and I've been doing genetics ever since. I went to Princeton to study developmental genetics in Drosophila under Trudi Schupbach, then to Caltech to study behavioral genetics in C. elegans under Paul Sternberg. Here at CSUN I strive to pay forward the inspiration given to me by my professors and mentors along the way.

Name of Lab — FIRE (Full Immersion Research Experience)
https://sites.google.com/site/biol447/

Background & Purpose — The purpose of our lab's research is to understand the origin and function of sleep. We do this by studying one of the simpler organisms known to enter a sleep state: the nematode C. elegans. This animal is highly amenable to molecular-genetic analysis, and importantly, shares conserved sleep-regulating pathways with vertebrates. We expect that our work in C. elegans will shed light on the function of sleep in humans. Our lab has recently shown that, in response to stressful conditions such as heat, high salt, and toxin exposure, C. elegans will enter a sleep-like state. Importantly, we have shown that this sleep state enhances survival following extreme stress.

Research Question(s) or Hypothesis — We posit that perturbations of cellular homeostasis drive sleep behavior, which in turn allows allocation of resources toward restoration of homeostasis.

Method — We are testing our hypothesis using mutants that are known to be either defective in, or abnormally good at, restoration of protein folding. We are performing molecular-genetic analyses to characterize the signaling pathway that mediates stress-induced sleep behavior.

Student Roles — Students examining sleep behavior will collect data on the sleep responses animals at various times following various stressors, and analyze the data using appropriate statistical methods. Students examining the molecular mechanism of cellular stress-induced sleep will examine gene expression, perform molecular cloning, RNA-mediated interference (RNAi), PCR, and other standard molecular techniques. Each student has the opportunity to choose from among several projects based on their interests. We perform molecular cloning as well as organismal/behavioral assays, all contributing to our overall goal of understanding the function of sleep. Junior students can work as part of a team with more experienced students in the lab, learning techniques and gaining knowledge of the scientific method. More senior students develop independent research projects that often contribute to publications from the lab, which looks very good on their CVs!

Expectations — Undergraduate students involved in my research program have been very competitive for PhD programs, as well as for entrance to health professional schools.

Conferences Typically Attended — Students in the lab have presented their work at CSUPERB (each January in California), CSUN symposia, the Society for Neuroscience (SFN) meeting, the Gordon conference on Sleep Regulation, and the international C. elegans meeting (in June of every other year at UCLA).

Publications — You can find an easy-reading article and a podcast about my research at: http://www.scientia.global/dr-cheryl-van-buskirk-sandman-and-the-worm-cellular-insights-into-the-world-of-sleep/

Jeremy Yoder *New Mentor*

Mentor Bio — The fundamental hypothesis of evolutionary biology is that things that happen in a single growing season ultimately create the patterns of biological diversity that emerge over millions of years. As an evolutionary ecologist, I use field studies, mathematical models, and population genomic data to understand how the ecological effects of different habitats, climates, and biological communities create and maintain biodiversity. My doctoral dissertation research with Olle Pellmyr at the University of Idaho applied theoretical, phylogenetic, and population genetic approaches to examine the origins and evolutionary trajectories of species interactions, with particular focus on the obligate pollination mutualism between Joshua tree (Yucca brevifolia) and yucca moths (Tegeticula spp.). As a postdoctoral researcher with Peter Tiffin at the University of Minnesota I used genome-scale genetic data to examine patterns of local adaptation to climate and mutualistic rhizobial bacteria in the model legume Medicago truncatula, as part of the Medicago Hapmap Project. I am currently a postdoctoral fellow with Sally Aitken at the University of British Columbia, studying the genetic architecture of adaptation to climate by lodgepole pine (Pinus contorta) and interior spruce (Picea glauca, P. engelmannii, and their hybrids) with the AdapTree project. http://lab.jbyoder.org/

Background & Purpose — Most multicellular organisms host communities of microbes that provide supplementary nutrients, physiological services, even defense against natural enemies (1–3). Many host species manage their symbionts to prevent the evolution of “cheaters” that take the benefits of symbiosis without reciprocating, yet the sanctions hosts deploy against cheaters rarely eliminate symbionts that provide substandard services (4). Recent theory suggests variation in symbiont quality can persist when hosts select symbionts via signals separate from the benefit symbionts provide, as they do in many real-world cases (5). This simple model may not fully reflect real-world dynamics, however — it models host sanctions and symbiont effects on hosts as simple genetic effects rather than continuously varying quantitative traits, and limits the variation possible in the signals symbionts send to hosts. Demonstrating that host-symbiont signals maintain variation in symbiosis outcomes under more realistic circumstances can help understand how signaling shapes real-world outcomes in medical and agricultural systems.

Research Question(s) or Hypothesis — We will test the linked hypotheses that (1) host sanctions against poorly cooperative symbionts, modeled as a continuous quantitative trait, can select for more cooperative symbionts and that (2) host recognition of symbiont signals, modeled as infinitely varying rather than with a small number of alternate signal types, can maintain variation in host sanctioning ability and symbiont cooperation quality.

Method — We will develop a novel mathematical model of host-symbiont coevolution extending the model of ref (5), in which symbionts' effect on host fitness varies from negative (antagonistic) to beneficial (mutualistic), and hosts are able to respond by sanctioning or rewarding symbionts based on these effects. We analyze this model algebraically, and program individual-based computer simulations to test its dynamics without the simplifying assumptions necessary for mathematical tractability in the algebraic model.

Student Roles — Students will learn to develop and analyze algebraic models of dynamic systems to help model host-symbiont coevolution in Mathematica; write code for individual based simulations and run simulations to validate algebraic results; and contribute to analysis, visualization, and presentation of model and simulation results.

Expectations — Results from this project should be suitable for publication in internationally-recognized journals of ecology and evolution, such as the *Proceedings of the Royal Society B,* the *American Naturalist*, or *Evolution*.

Conferences Typically Attended — The annual Evolution meeting, Western Society of Naturalists meeting.

Publications

Godsoe W, JB Yoder, CI Smith, and O Pellmyr. 2008. Coevolution and divergence in the Joshua tree/yucca moth pollination mutualism. The American Naturalist 171(6): 816-23. doi: 10.1086/587757
Hembry DH, JB Yoder, and KR Goodman. 2014. Coevolution and the diversification of life. The American Naturalist. 184(4): 425-438. doi: 10.1086/677928
Smith CI, CS Drummond, WKW Godsoe, JB Yoder, and O Pellmyr. 2009. Host specificity and reproductive success of yucca moths (Tegeticula spp. Lepidoptera: Prodoxidae) mirror patterns of gene flow between host plant varieties of Joshua tree (Yucca brevifolia: Agavaceae). Molecular Ecology 18(24): 5218-29. doi: 10.1111/j.1365-294X.2009.04428.x
Yoder JB, CI Smith, DL Rowley, WKW Godsoe, and O Pellmyr. 2013. Effects of gene flow on phenotype matching in two varieties of Joshua tree (Yucca brevifolia; Agavaceae) and their pollinators. Journal of Evolutionary Biology 26(6): 1220-33. doi: 10.1111/jeb.12134

MENTORS NOT ACCEPTING NEW MENTEES

David Bermudes

The primary goals of my microbiome research is to understand the role of secreted bacterial protease inhibitors. It has long been understood that the human microbiome has numerous bacteria that secrete proteases, some of which play roles in inflammation, however, there has been little attention to protease inhibitors that may play a role in stasis and the maintenance of normal skin and gut ecologies. My lab is employing novel screening methods for isolation and analysis of bacteria producing secreted protease inhibitors to determine which bacteria produce them and what types of inhibitors they produce.

Students in my lab learn basic isolation of bacterial strains, analysis of protease inhibitor production, PCR, 16sRNA sequencing, SDS-PAGE, reverse zymography and preparation of protein samples for protein sequence analysis (MALDI-TOF). Students will gain skills in and are responsible for performing PCR, DMA sequencing and analysis, protein and protease inhibitor analysis. Sophomores are expected to be able to plate bacterial samples from human skin to obtain single colony isolates and to screen them by performing protease inhibitor assays. Juniors are expected to be able to identify bacteria by performing PCR and sending the DNA out for sequencing and analyze the DNA sequence. They are also expected to perform basic microscopy and bacteria biochemical tests used in identification. Seniors are expected to conduct SDS-

PAGE gels and reverse zymography, to prepare protein samples for protein sequencing (MALDI-TOF) and to analyze the protein sequence data.

The primary goals of my cancer research are to use bacteria as therapeutic vectors for the treatment of tumors. *Salmonella* have many of the desirable properties of a cancer therapeutic delivery vector, including targeting of multiple tumors from a distant inoculation site, selective replication within tumors, tumor retardation, and the ability to express effector genes with antitumor properties directly within the tumor. My lab engineers genetic modifications to *Salmonella* and selects for suppressor mutations that are designed to enhance their antitumor properties and/or the ability to kill cancer cells. **Students in my lab** learn basic DNA manipulation, gene expression techniques and microbial genetics in order to generate strains with the potential for enhance anticancer properties. Students will gain skills in and are responsible for designing PCR primers, performing PCR, cloning DNA, transforming *Salmonella* and assessing genotypic and phenotypic changes. Sophomores are expected to be able to screen cloning reactions (ligations and transformations) by performing plasmid minipreps, conducting restriction endonuclease reactions, separation by gel electrophoresis and analysis of the resulting gel. Juniors are expected to be able to design and conduct cloning experiments and work with sophomores. Seniors are expected to be able to design PCR primers, carry out PCR reactions, clone and prepare DNA for DNA sequencing, be able to analyze the DNA sequence, and work with sophomores and/or juniors.

Department of Chemistry & Biochemistry

Ravinder Abrol (No longer available, lab is full)

Mentor Bio — Dr. Ravi Abrol's research lab is focused on developing and using computational methods to probe how protein structure and biochemical (protein-ligand and protein-protein) interactions of G protein-coupled receptors (GPCRs) determine cellular signaling and physiology, as well as how this knowledge can be used for the rational design of drugs targeting GPCR signaling pathways. GPCRs are integral membrane proteins that form the largest superfamily in the human genome. The activation of these receptors by a variety of bioactive molecules regulates key physiological processes (e.g., neurotransmission, cellular metabolism, secretion, cell growth, immunity, differentiation), through a balance of G protein-coupled and beta-arrestin-coupled signaling pathways. This has made them targets for ~50% drugs in the clinic. A molecular and structural understanding of these GPCR signaling pathways will have a broad impact on our understanding of cellular signaling and on drug discovery efforts targeting GPCRs. Research in the Abrol Lab lies at the interface of Chemistry and Biology, where they are using computational biophysics and structural bioinformatics based methods to gain mechanistic insights into the biochemistry of GPCR signaling. **Ph.D.** (Chemistry), California Institute of Technology, Pasadena, CA. **M.Sc.** (Chemistry), Indian Institute of Technology, Kanpur, India. **B.Sc. Honours** (Chemistry), University of Delhi, India. View his CSUN Faculty profile.

Research Project Title — Structural Mechanisms of GPCR Signaling

Background & Purpose — GPCR Complexity: G protein-coupled receptors (GPCRs) comprise the largest superfamily of integral membrane proteins that interact with G proteins, GPCR Kinases (GRKs), and arrestins, to convert extracellular signals into multiple intracellular signaling cascades. This critical role of GPCRs makes them therapeutic targets for ~50% of all modern drugs. Pleiotropic signaling of GPCRs targeted by drugs can cause on-target side-effects, so a molecular understanding of this pleiotropy is essential for rational drug discovery to minimize those side-effects. Integrated Approach: The conformational flexibility of GPCRs plays a mechanistic role in their pleiotropic function. Our research is focused on the development and application of methods in computational biochemistry, biophysics and evolutionary/structural bioinformatics to provide this mechanistic link between receptor sequence and signaling.

Research Question(s) or Hypothesis — We are pursuing three focused complementary themes to answer the following questions centered on the sequence-structure-signaling nexus of GPCRs:

1. How do GPCRs exert their allosteric and pleiotropic effects in signal transduction?
2. What is the structural basis of receptor-G protein selectivity and G protein vs □arrestin selectivity?
3. How have GPCR paralogs (products of gene duplication events activated by same/similar chemical signals) evolved to increase the repertoire of GPCR function?
4. How do sequence variations map to downstream signaling cascades and pathophysiology?

Method — We are developing following methods to answer these questions:

1. Our previous conformational sampling algorithms are being combined with Markov State Models to identify physiological important conformations.
2. We are combining evolutionary relations of closely-related paralogs with their structures to understand functional divergence.
3. We are combining evolutionary approaches with conformational methods to understand the evolution of GPCR structural plasticity.

Methods are validated against available experimental data and then applied to interesting GPCR systems. The results generated in our lab are being combined with data from public datasets to create a GPCR Knowledgebase (http://www.gpcrkb.org), available to the worldwide research community.

Student Roles — In the beginning, the students are trained in the computational methods used in the lab and they are responsible for learning one programming language during this time. After this phase, each student is assigned a project that they take ownership of and that they are fully responsible for. They interact with me regularly and also with any experimental collaborator as an active participant. The students get to write the manuscripts for publication and they also get a chance to present their research at one of the conferences listed below.

Expectations — I have mentored many undergraduate STEM students (freshman to senior). The computational nature of our research enables both short and long term projects to be designed based on student interests. Our lab has a broad range of reading/study resources to get any undergraduate ready for research. The students learn about GPCR signaling, computational methods, programming, and using protein visualization/analysis tools. Students are not required to have any programming experience, however, they need to be open to learning some programming.

Conferences Typically Attended — GPCR-Keystone; Molecular Pharmacology Gordon; Biophysical Society; Intelligent Systems for Molecular Biology; Protein Society, CSUPERB

Publications — For a full list of publications, visit his faculty profile.

"Identifying multiple active conformations in the G protein-coupled receptor activation landscape using computational methods"; Dong S, Goddard WA 3rd, Abrol R (2017), G Protein Coupled Receptors Part A (Methods in Cell Biology Book Series), Ed. Arun K. Shukla (Elsevier), Vol.142, pp. 173-186. [PMID: 28964335]

Aziz Boulesbaa *New Mentor*

Mentor Bio — PhD (Physical-Chemistry), Emory University & Temple University, **MSc** (Physics), Université Sorbonne Paris Cité (Paris 13), **BSc** (Physics), Université des Sciences & de la Technologie Houari-Boumediane of Algiers

Background & Purpose — Photothermal therapy using nanomaterials, and specifically gold nanoparticles, is one promising technique to cancer therapy. Noble metals in general have a unique way of interacting with light. When light is shined on them, they strongly absorb it at wavelengths that are similar to those of the collective motion of their electrons. This phenomenon is called surface plasmons resonance (SPR). SPR can be engineered through designing metal nanoparticles with specific shapes and sizes, and the SPR becomes localized, and termed as LSPR, when the metal

particle size is on the nanoscale. In photothermal therapy, gold nanoparticles are injected around the tumor area, then a near-infrared (NIR) laser emitting at the LSPR wavelength is shined on the area. The nanoparticles are designed to have their LSPR in the NIR spectral region so the laser can penetrate the tissue and reach nanoparticles. Because of the resonance, the nanoparticles absorb the laser strongly, and consequently their temperature increases substantially, causing the neighboring cancer cells to burn.

Research Question(s) or Hypothesis — Our research program targets the understanding of fundamental aspects and steps of cancer cells destruction at the DNA molecular level using gold nanoparticles.

Method — We will incorporate femtosecond (1 fs = 10-15 second) spectroscopy and microscopy techniques. At the first stage of the program, gold nanoparticles of different shapes and sizes will be prepared and characterized using absorption and emission spectroscopy techniques to verify their LASR photonic modes. At the second stage of the program, these gold nanoparticles will be interfaced with DNA base-pair molecules, such as cytosine, and the photothermal aspect will be examined. A NIR laser pulse (pump) resonantly excites the nanocomposite, then a second laser pulse (probe) in the mid infrared (mid-IR) spectral region probes the vibrational modes of the cytosine adsorbate at different times with respect to the pump's arrival time. The ultrafast dynamics of energy transfer from excited nanoparticles to vibrational stretches of N-H and O-H bonds in the cytosine molecule will be captured. These studies will provide an understanding of the energy transfer process, which allows us to design nanoparticles with an optimal photothermal therapy efficiency.

Student Roles — Students working on research projects within this program will learn the fundamental aspects of the application of metal nanoparticles in photothermal therapy, synthesis of these materials, and finally the photothermal therapy at the molecular level using lasers and optics.

Karin Crowhurst

Mentor Bio — I grew up in western Canada (Calgary and Vancouver) but traveled east to pursue my university degrees. I received Bachelor's and Master's degrees in Chemistry before moving into the field of Biochemistry at the University of Toronto where I completed a PhD in Biochemistry and Biomolecular Structure in the Forman-Kay lab. In 2003 I moved to Los Angeles to join the Mayo lab at Caltech for my postdoc. I started as a tenure-track faculty member at CSUN in 2007. **Ph.D.** 2003, University of Toronto, **M.Sc.** 1997, University of Toronto, **B.Sc.** 1995, Queens University Kingston.

Crowhurst Lab — http://www.crowhurstlab.com/

Background & Purpose — The overarching goals of our research are to study the structure and function of proteins to better understand their mechanism of action and the specificity of their interactions with target proteins. This can lead to improved understanding of specific diseases, and may point toward more targeted therapies than are currently available.

Research Question(s) or Hypothesis — Of particular interest in the Crowhurst lab is HdeA, a protein that is largely responsible for the successful proliferation of dysentery, in that it aids in the survival of pathogenic bacteria as the organism travels through the stomach on its way to infect the intestines. Dysentery disproportionately impacts lower-income parts of the world; research in this area (that improves our understanding of the mechanism of HdeA activity and might lead to therapies or vaccines) would therefore provide a valuable contribution towards reducing health disparities between different cultural groups. One of the very unique characteristics of HdeA is that it is inactive in its folded form and becomes activated only when it unfolds at the low pH of the stomach. This is in direct conflict with our traditional understanding of how proteins function. Our primary aims with this project are to use high resolution techniques to investigate the changes in structure and flexibility of HdeA with decreasing pH. This will shed light on fundamental protein folding questions and provide us with a better understanding of the mechanism by which the protein becomes activated.

Method — The wetlab component of our work primarily involves preparing protein samples for study. This includes recombinant protein expression and purification, as well as some DNA work. Our primary analytical tool is NMR (nuclear magnetic resonance) spectroscopy, which permits study of these proteins with atomic resolution. We have numerous specialty techniques such as preparing selectively and uniformly isotopically labeled proteins for NMR analysis, and we may also do some in-cell NMR experiments.

Student Roles — Students will collect many different types of data with their protein samples using the NMR spectrometer. This can include data that provides information on structure, internal flexibility, binding with other proteins, and unfolding processes. Students will learn how to use specialized software for analyzing the data as well as spreadsheet programs for displaying the results. There may also be some computational component work involving molecular simulations to better visualize our results.

Expectations — Students in the Crowhurst lab will learn many marketable and translatable skills, including wetlab skills (relating to the techniques and equipment required to make and purify proteins in advance of NMR studies), computer and analytical skills (in processing and interpreting NMR data), and the "softer" skills of learning to work with others, recover from setbacks, troubleshoot problems and present scientific data in front of an audience.

Conferences Typically Attended — CSUPERB Symposium, the Protein Society meeting, ASBMB.

Publications — To view all publications, please visit: http://www.crowhurstlab.com/publications/

Paula Fischhaber

Mentor Bio — **B.A.** Biochemistry, University of Colorado, Boulder. **Ph.D.** University of Washington, Seattle

Background & Purpose — Dr. Fischhaber's group is investigating the protein biochemistry of DNA repair in S. cerevisiae (baker's yeast). In human beings, failure to repair covalent modifications to DNA (DNA damage) by the biologic repair pathways results in genetic mutations and cancer, particularly skin cancer. DNA damage is ubiquitous in living cells and much of it is unavoidable, so DNA repair pathways are crucial for survival.

Research Question(s) or Hypothesis — The spatial and temporal relationships of several important DSB Repair proteins from *S. cerevisiae* will be investigated *in vivo* using fluorescence microscopy. Fluorescence microscopy data from the PI's laboratory demonstrate that Rad10 is recruited to spatially localized I-*Sce*I-induced DSBs in a *RAD51*-, *RAD52*- and *SAW1*-dependent fashion and that *SAW1* is required for the Synthesis-Dependent Strand Annealing (SDSA) pathway. The proposed experiments will build on these findings by investigating the necessity of longer DNA flaps in the requirement of Saw1 for Rad10 recruitment to sites of Single-strand Annealing (SSA) and similarity between yeast and human Rad52 in downstream recruitment. These experiments will determine whether Saw1 and Rad10 recruitment to DSB sites is altered as a function of length of nonhomologous sequence flanking the DSB site.

Method — The PI will create a panel of yeast strains in which the DNA region surrounding an inducible DNA Double-strand Break site is varied so that the amount of DNA between the DNA cut site and the DNA repeats is altered. The strains will be investigated for the ability to observe Rad10-YFP protein being recruited to the DSB site. The experiments will also determine whether yeast and human Rad52 are sufficiently similar that human Rad52 can recruit yeast Saw1-Rad1-Rad10 complexes during yeast DSB repair.

Publications — To view publications, visit: https://www.csun.edu/science-mathematics/chemistry-biochemistry/paula-fischhaber

Eric Kelson

Mentor Bio — **Ph.D.** 1993, California Institute of Technology. **B.S.** 1988, University of Utah

Research Question(s) or Hypothesis — The main goal of my research is the refinement of a ketone transfer hydrogenation pre-catalyst developed in my laboratory for eventual customization for pharmaceutically important reactions. This catalyst is unique in being a polypyridine supported ruthenium dimer in which metal centers electronically cooperate to bind organic substrates and transfer hydride as part of the overall catalytic process. Future work will explore new ligand designs within the existing framework to improve the activity and stability of catalytic intermediates as well as establish convenient means to customize catalysts for specific substrates.

Student Roles — Students will prepare organic ligands and ruthenium complexes, characterize them spectroscopically, and assess the resulting catalytic activity and selectivity. In doing this, they will collect and interpret nuclear magnetic resonance and multidimensional mass spectra as well as gas chromatographic data.

Expectations — By participating in this work, students will gain marketable synthetic and analytical skills and experience in organic and inorganic chemistry.

Publications — To view publications, visit: https://www.csun.edu/science-mathematics/chemistry-biochemistry/eric-kelson

Jheem Medh

Mentor Bio — My overall research interest is in the area of lipoprotein metabolism and atherosclerosis. It is well known that abnormal plasma low density lipoprotein (LDL) and high density lipoprotein (HDL) cholesterol levels result in cardiovascular disease. We are interested in the molecular and cellular mechanisms that translate an anomalous lipoprotein profile into atherosclerotic lesions. We are studying various components of the atherogenesis pathway including apolipoproteins, lipases and lipoprotein receptors. The current emphasis is on understanding cellular events that are unique to the vessel wall and may initiate lesion formation. **Ph.D.** 1990, University of Texas **M.S.** 1984, University of Bombay **B.S.** 1982, University of Bombay.

Background & Purpose — The general purpose of our research activities is to understand tissue-specific metabolic activity in pathophysiological conditions such as diabetes and atherosclerosis.

Research Question(s) or Hypothesis — There are two main research projects in our laboratory.
LPL and insulin sensitivity: This project is aimed at understanding the mechanisms and signaling pathways by which down-regulation of lipoprotein lipase (LPL), an enzyme participating in fat metabolism, leads to improved insulin sensitivity in muscle cells.
LPL and Cholesterol Efflux: A cholesterol transporter, ABCA1, reverses atherosclerosis by allowing the removal of cholesterol from cells lining the blood vessels (macrophages). This project aims to investigate how LPL inhibits the cholesterol efflux process.

Method — Different cultured cells (muscle, adipose, macrophages, hepatocytes) will be treated with various chemicals and reagents at variable doses and times and various cellular responses, such as insulin sensitivity and cholesterol accumulation will be measured. Quantitative data will be collected to represent glucose uptake, glycogen synthesis, cholesterol removal from cells. The data will be analyzed to compare differences in metabolism between normal and abnormal cells. Excel spread sheets will be used to generate bar graphs and plots to represent our data.

Student Roles — Students at all levels will design wet experiments with cultured cells, perform the experiment, collect and process data and prepare images and figures for presentation/publication.

Expectations — Students will learn experimental techniques, analytical skills, and the ability to communicate their research project and data. Students will be co-authors on publications describing their work.

Conferences Typically Attended — All students usually attend the CSU-wide Biotechnology symposium held in January each year.

Publications — To view publications, please visit: https://www.csun.edu/science-mathematics/chemistry-biochemistry/jheem-medh

Thomas Minehan

Mentor Bio — **Ph.D.** 1998, Harvard University **B.A.** 1992, Columbia University. http://www.tminehan.com/Research/

Background & Purpose — The development of cell-permeable sequence selective DNA-binding molecules is a crucial goal in the context of current approaches to disease therapy. Since the vast majority of cellular regulatory proteins interact with DNA primarily or exclusively in the major groove, the preparation of major-groove binding ligands that can directly compete with these proteins for DNA binding sites is of paramount importance. However, no general paradigm currently exists for the design of sequence-specific major-groove binding small molecules.

Method — This research project involves the synthesis and DNA binding affinity/sequence selectivity evaluation of a series of aryl-C,O-glycosides, molecules hypothesized to interact with the major groove of DNA.

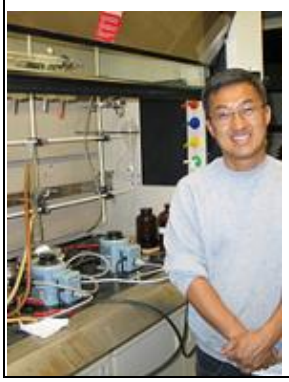
Student Roles — Students at the sophomore and junior levels will be introduced to the techniques of organic synthesis and then assigned specific chemical structure to prepare in the lab. Students at the senior level will also be involved in the analysis of the interaction of their synthetic compounds with DNA by spectroscopic (UV and fluorescence) techniques. Students may join this research project after having taking General Chemistry courses (Chem 101, 102 or equivalent).

Expectations — The synthetic and spectroscopic techniques used in this research can be learned in the lab in hands-on fashion.

Conferences Typically Attended — American Chemistry Society National Meetings, Southern California ACS Meetings, and National Sigma Xi Student Research Symposium.

Publications — To view publications, visit: https://www.csun.edu/science-mathematics/chemistry-biochemistry/thomas-minehan

Taeboem Oh



Mentor Bio — Dr. Oh's research is the development of new methods and strategies for organic synthesis. These methods will be applied to undertake efficient syntheses of complex naturally occurring molecules, particularly those with biological activity and potential use in medicine or medical research. One of Dr. Oh's goals is to develop and apply the hetero Diels-Alder reaction to natural product synthesis. The targets of his current interests are indole alkaloids, starting with ergot alkaloids, and histrionicotoxins. Another project involves the development of chiral Lewis acids that can catalyze and induce asymmetry in organic transformations. The emphasis in on transformations that have been shown to be effective in the synthesis of complex natural products. **Ph.D.** 1985, University of Virginia **B.S.** 1980, Juniata College.

Research Projects — Benzimidazole derived compounds are an important class of biologically active small molecules. Their inhibition of a variety of enzymes have made them the focus of anticancer, antibacterial, anti-parasite, anti-fungal, anti-histamine, anti-malarial, analgesic, anti-viral (HIV), and as treatment and radiological probe for brain imagining particularly Alzheimer's among many other applications. One of the major problems of such an active drug is its tendency to have strong side effects; new variations of benzimidazole are constantly needed to develop better specificity and decreased side effect profiles. The biological activity arises from interactions with proteins or nucleic acids. Since DNA and proteins recognize chiral "mirror image" compounds, this can be used to either enhance or lower the biological effects. One potential way to increase the specificity of the biological effect is to modify the benzimidazole to incorporate a chiral center. We will explore incorporation of chiral axes to enhance the specificity of biological activity of these compounds.
Our second project involves benzimidazolium compounds in chemistry of ionic liquids. Imidazolium ionic liquids have been found to possess unique properties that have the potential to solve many other chemical and pharmacological problems. Deeper investigations of Imidazolium ionic liquids are needed to improve drug discovery, (especially in asymmetric methods for synthesis of chiral drugs, catalysis, chiral additives for synthetic transformations), and to the field of biomolecule manipulation in ionic liquid systems. We will explore the synthesis of chiral atrope isomers based on imidazolium compounds capable of catalyzing various synthetic methods, investigate the mechanism that gives high stereoselectivites in ionic liquids at room temperature, and apply this method to asymmetric synthesis of biologically active compounds.

Method — The overall analytic process involves several areas. The first is isolation and purification of compounds that are synthesized. For purification, we use the methods of chromatography and recrystallization. For structural identification and dynamic investigations, we use spectroscopic techniques, especially nuclear magnetic resonance (NMR), infrared spectroscopy (IR), and polarimetry. For examining the interactions with substrate compounds, NMR and electron pair resonance (EPR) are important. The most important part of the analysis is the structure-activity studies, which utilizes computational modeling.

Student Roles — The students participate in research aspects relating to experimental design, scientific inquiry, synthesis, and data analysis. Students will analyze the experimental data by relating structural/electronic configurations to changes in catalytic activity.
Expectations — Students will develop a wide variety of skills in synthesis, methodology development, purification methods, use of sophisticated analytical instruments, designing-planning chemical research, laboratory safety, communication, and working in a team environment.

Conferences Typically Attended — We have a history of students attending national ACS, NOS, local ACS, SCCAP, and symposia on campus.

Publications — To view publications, please visit: https://www.csun.edu/science-mathematics/chemistry-biochemistry/taeboem-oh

Jessica Vey

Mentor Bio — **Ph.D.,** Massachusetts Institute of Technology, Cambridge, MA. **B.S.** (Chemistry), Temple University, Philadelphia, PA.

Title of Research Project — Enabling rational design of the biodesulfurization process: biochemical characterization of dibenzothiophene monooxygenase

Background & Purpose — The Vey laboratory focuses on studying catalysis by selected flavin monooxygenases with the longer-term goal of rationally designing those monooxygenases to modify their substrate-binding properties. Our efforts will center on an ongoing research project in the lab that seeks to help develop bacterial biodesulfurization (BDS) as an industrially useful process for the desulfurization of crude oil. The long-term goal of this work is to produce an engineered BDS pathway capable of desulfurizing the majority of the refractory organosulfur compounds (ROCs) present in crude oil. Sulfur

dioxide is an atmospheric pollutant generated by combustion of the sulfur that naturally occurs in coal and petroleum. Sulfur is currently removed from crude oil by hydrodesulfurization, a costly technique that requires harsh reaction conditions. Certain refractory organosulfur compounds (ROCs) cannot be effectively treated in this manner4. Researchers have identified several bacterial species that use a simple metabolic pathway to remove sulfur from specific ROCs5. This bacterial capability (biodesulfurization) could be exploited as an effective additional step to employ during the refinement process for generating low-sulfur fuels; however, several technical hurdles prevent industrial use of this environmentally friendly pathway. For example, the enzymes involved in biodesulfurization are too slow and too specific to effectively desulfurize the wide range of organosulfur compounds present in coal and oil. BDS will not be a viable industrial process until organisms are engineered to desulfurize a wide range of molecules6.

Research Question(s) or Hypothesis — To address this problem, we will examine the enzymes of the biodesulfurization pathway with the long-term goal of improving the enzymes' functional capabilities. We will first ensure that we have reliable methods to produce the four enzymes of the BDS pathway, and then we will establish methods to study the function of the enzymes using transient-state kinetics and surface plasmon resonance. With reliable methods in place, we will study how these enzymes work by strategically "breaking" them (using a process called site-directed mutagenesis) and observing whether or not our attempt to break the enzymes has impacted their function. Our results will help guide rational design of the BDS enzymes to improve their enzymatic rates and substrate specificities.

Method — Recombinant DNA methods (PCR, subcloning, mutagenesis), recombinant protein expression and purification (E. coli culture, chromatographic purification methods), and a variety of biochemical characterization methods such as HPLC- or UV-Vis-based steady state enzyme activity assays, spectrophotometric titration, stopped flow spectrophotometry, protein crystallization and protein X-ray crystallography.

Student Roles — The specific methods each student uses depend on the specific project undertaken and the amount of progress made.

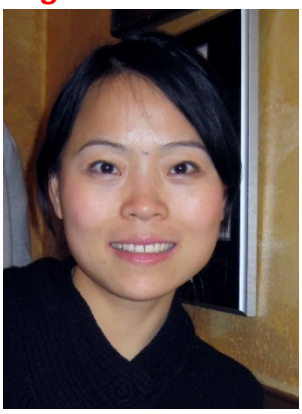
Expectations — Students must maintain a clean and safe lab, keep accurate notes of experiments, and analyze and present their results. They will learn essential biochemical techniques, and will develop critical thinking and communication skills.

Conferences Typically Attended — American Society for Biochemistry and Molecular Biology (ASBMB), California State University Program for Education and Research in Biotechnology (CSUPERB)

Publications — http://www.ncbi.nlm.nih.gov/sites/myncbi/1jenfa5D-3nkj/bibliograpahy/47898654/public/?sort=date&direction=descending

Department of Mathematics

Jing Li



Mentor Bio — I am broadly interested in mathmatical modeling of biological phenomena using such mathematical techniques as differential equations (ODEs, PDEs, and DDEs). Recently I have also been applying techniques from game theory to problems from mathematical epidemiology. **Ph.D.** 2008, University of Western Ontario. **M.A.** 2003, Huazhong University of Science and Technology. **B.A.** 2000, Huazhong Normal University. http://www.csun.edu/~jingli/

Background & Purpose — My research, in applied mathematics, is concerned with using mathematical techniques to describe, understand and predict the dynamics of biological systems in a variety of settings related to epidemiology, ecology and immunology, as well as in the study of economic and logistical issues involved in disease management. This research has both directly and indirectly evolved from my PhD work on modeling the dynamics of infectious

diseases with latency in spatially heterogeneous environments. This work taught me the value of both theoretical and applied aspects of mathematics. I am fascinated by applied mathematics and the way in which it can be used to describe and guide interdisciplinary research. My current and anticipated future research is focused primarily on both theoretical analysis and applications to epidemiology, ecology, immunology, etc.

Research Question(s) or Hypothesis — My research questions concern the game theory of epidemic control and management.

Method — The mathematical techniques used in this work include both techniques from the theory of differential equations such as ordinary differential equations (ODEs), delay differential equations (DDEs), partial differential equations (PDEs) and impulsive differential equations (IDEs), as well as techniques from game theory and network/graph theory. The analytic process includes understanding the biological problem, building the model, analyzing the model, validating the model, using the model, and the repetition of the above mentioned steps.

Student Roles — Sophomore will be learning basic mathematical skills needed for the project, (e.g., Ordinary Differential Equations). Juniors will be learning bases of mathematical modeling (the bridge of mathematics and other disciplinary). Seniors will understand the background of the research project, build the model, and analyze the model.

Conferences Typically Attended —SIAM (Society for Industrial and Applied Mathematics) Annual Meeting, SIAM (Society for Industrial and Applied Mathematics) conference on Life Sciences, and The Annual Meeting for Society of Mathematical Biology.

Publications — To view publications, please visit: http://www.csun.edu/~jingli/research.html

Bruce Shapiro

Mentor Bio — Ph. D. Biomath UCLA; MS Physics Cornell; **MS** Computer Science Johns Hopkins: **BS,** Univ. Maryland. 1999 - Present: CSUN Dept of Mathematics; Previous Affiliations: Caltech Division of Biology; JPL Machine Learning Group; Computer Sciences Corp at NASA; Ford Aerospace. http://biomathman.com/

Background & Purpose — Systems biology lies at the intersection of biology, mathematics, computation, and engineering. It has been broadly defined as the emergent behavior of the complex systems that arise in organisms when the individual components are considered as a functioning whole. Traditional experimental approaches are tantamount to chopping up a Boeing-777 into small pieces while attempting to determine the function of the large object by testing the various parts (gears, screws, circuit boards, coffee pots, etc) each on their on or in ones and twos. In the systems approach all interacting parts must be considered at once. To reduce the number of experiments, we resort to modeling. Unfortunately, it is difficult to share and reproduce these models. For example, over two hundred computational models of glucose metabolism and diabetes onset have been published, but they are not in a common format.

Research Project — The Systems Biology Modeling Language (SBML) is an open interchange format for computer models of biological processes that is useful for models of metabolism, cell signaling, and more, and has continued to evolve and expand through an international community. It is now the de-facto standard for model representation and Dr. Shapiro was a co-author on the original paper that introduced SBML in 2003. Mathematical and computational modeling are just like any other type of biological modeling, they just provide way to calculate and predict biologically or clinically relevant parameters that can be measured in an experiment or study. As models are being developed and published they are being curated in an international database at EBI so that they can be used by others. We have worked with the curators in the past.

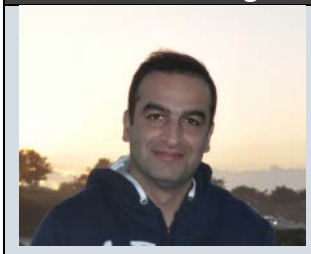
Student Roles — The project will focus on having students learn to develop computational models of disease metabolilsm, implement in the SBML, and submit them to the curated database. At the freshman level, students can begin to learn how to perform simulations using stand-alone software tools like COPASI. The only pre-requisite at this level would be pre-calculus and un understanding of basic chemical equations. Sophomores would begin to learn about basic techniques of modeling based on mass action kinetics and learn to implement models found in the literature. They can run simulations from these models and duplicate the results of the publication. The resulting SBML files can then be deposited at the BIOMODELS database at EBI for curation. Juniors will begin to develop their own disease model and can develop and implement a simulation which can be completed by the end of their senior year.

Expectations — An interest in computer programming will help but is not necessary. Some modelers prefer to write their models in a computer language but it is possible to do it entirely with simulation programs. Some calculus no later than the junior year would be useful.

Publications — To view publications, visit: http://biomathman.com/publications.html

Department of Physics & Astronomy

Sattar Taheri Araghi – NOT ACCEPTING NEW MENTEES



Antibiotic resistance is an ever-growing global health problem. Over the years, bacteria managed to develop strategies to resist antibiotics, urging us to search for alternative antibacterial options. Antimicrobial peptides (AMPs) are one of the candidates that hold promise for combatting the resistant bacteria. AMPs success in medicine, however, relies on new designs that are highly toxic for bacteria, yet, selective enough not to harm human cells. The difficulty is that we still lack a comprehensive understanding of their action mechanisms, which is needed to inspire new designs. **My laboratory is utilizing an state-of-the-art imaging platform,** named "mother machine", to study effects of AMPs on bacteria. We perform video microscopy on individual live bacteria that are treated with AMPs. We then use our custom-designed image-analysis software to extract quantitive information on the life patterns of thousands of bacteria under AMPs treatment. Our data reveal the dynamics of cell death and possible development of resistance in bacteria. Information of these types are only accessible in high-throughput single-cell experiments. **The long-term goal of our laboratory** is to leverage theoretical knowledge and modern experimental techniques to provide a framework to find ways to improve activity and selectivity of AMPs, such that they can be used to fight resistant bacteria. Previously, we developed theoretical models that provide experimentally-testable benchmarks on optimization of AMPs activity. For instance, AMPs activity is predicted to be a function of its electric charge, being maximum for charges around +4e. **In the lab, students learn** how to set up single-cell experiments. The trainings cover four technical areas: (1) standard bacterial culture techniques, (2) fabrication and assembly of the mother machine, (3) time-lapse microscopy on live cells, and (4) analysis of the microscopy images. **The interdisciplinary nature of my research program invites students from various departments.** This includes students from College of Science and Mathematics who are interested in quantitative approaches to fundamental questions in biology, and also students from College of Engineering who are interested in technologies used in cutting-edge scientific research. The technical aspects of the research projects cover tasks at various levels of difficulty. Students at different levels in their education (from freshman to graduate students) can have important contributions to our research projects. **We publish the results of our research** in physics, biology and interdisciplinary journals. Students' contribution will be major parts of our publications. Students' will also present posters and give talks in scientific meetings and conferences, including the meetings of the American Physical Society, Biophysical Society, and American Society for Microbiology. **For more information about our lab,** visit http://www.csun.edu/~taheri/

College of Humanities

Department of Asian American Studies

Edith Chen

Mentor Bio — Professor Chen joined the department in 2001. Her teaching and research interests include Chinese American experiences; Chinese in the Americas; Asian American issues; Asian American women; Food, Culture & Identity; and Applied Research. During her sabbatical leave in 2008-2009, she was busy editing (with Grace Yoo) The Greenwood Encyclopedia of Asian American Issues Today. She also extended her research interests in the Chinese in Latin America by visiting Barrio Chino in Buenos Aires. She spent the first half of 2009 by teaching in Shanghai, while gaining insights about U.S.'s influence on rapidly changing China. Previous to her appointment at CSUN, she taught at the University of Hawai'i, Manoa in Women's Studies. Professor Chen can be found teaching AAS 100 (Introduction to Asian American Studies), AAS 340 (Asian American Women), AAS 361 C (Chinese American Experiences), and AAS 390 (Asian American Communities: Field Practicum. **Ph.D.** Sociology 1998, University of California Los Angeles. **M.A.** Sociology 1992, University of California Los Angeles. **B.A.** Sociology & Zoology 1989, University of Texas Austin.

Background & Purpose — I am interested in understanding the specific social processes underlying the growing rates of Type 2 diabetes and obesity in the Asian American & Pacific Islander population. Generally, Asian Americans born in the U.S. have higher rates of these diseases than their immigrant counterparts. This however, varies by ethnicity, with Filipinos, Koreans, and South Asians having particularly higher risks for diabetes. With similar obesity rates to Latina/os, Filipinos have the highest rate among all Asian American groups, and also higher than Caucasians. It is unclear what are the unique underlying social processes that may contribute to the risk profiles of specific Asian American subgroups, or factors that may protect them from disease.

Research Question(s) or Hypothesis — This quantitative study examines how generation, ethnicity, occupation, education, language maintenance and acculturation stress impact their health outcomes based upon analysis of data gathered from the California Health Interview Survey (CHIS).

Method — CHIS is one of the few large-scale population data sets that oversamples for Asian American ethnic groups so that ethnic specific analysis can be conducted. Another project that I am working on is developing a short educational video targeting the Chinese, Filipina/o, and Asian American populations regarding the role of physical activity and nutrition in Cancer Prevention.

Student Roles — Students can play a role by conducting literature review, developing culturally relevant content, conducting interviews and focus groups with community folks and health professionals, and video making. Students will also participate and gain skills in conducting a literature review, research design, statistical analysis, and manuscript preparation.

Expectations — Students with strong writing skills and coursework on immigrants and minorities, social sciences, Asian American Studies, ethnic studies, public health, epidemiology, health education are particularly encouraged to apply. Familiarity with Chinese, Filipino, and Korean populations are also a plus. Students will gain training in conducting health research with Asian American populations.

Conferences Typically Attended — Association for Asian American Studies; American Public Health Association; American Sociological Association

Publications — To view publications, please visit: https://www.csun.edu/humanities/asian-american-studies/edith-chen

Department of Chicano/a Studies

Ana Sánchez-Muñoz

Mentor Bio — Dr. Sánchez-Muñoz Professor in the Department of Chicana/o Studies and in the Department of Linguistics at CSUN. She teaches Sociolinguistics, Language and Gender, Language Acquisition, especially related to English Language Learners (ELL), and other linguistics/language courses including Spanish for heritage speakers.

Background & Purpose — My current research explores Latina/o identity formation through the use of language. It examines the vocabulary choices and communicative exchanges in the vernacular varieties of Latina/o immigrant groups. The main goal is to investigate the negotiation of ethnic and linguistic identity as different languages and dialects come into contact sharing the same multicultural urban space. Previous research has identified patterns of dialect change and formation in the Spanish used by different Latino groups in Los Angeles. Parodi (2004, 2009, 2011), for instance, has been tracking the formation and evolution of EVLA (*Español Vernáculo de Los Angeles*), a Spanish koiné in Los Angeles which has a distinct Mexican flavor spiced with features typical of the situation of contact between Spanish and English; these linguistics features include convergence, borrowings, calques, and switches among other (Sánchez-Muñoz 2013). EVLA is the variety spoken by Chicanos in L.A. and, according to Parodi, it is also the one acquired by second generation Latinos/Hispanics in the city regardless of their self-identification as Chicana/o or other.

Research Question(s) or Hypothesis — My research investigates dialect contact in Los Angeles between Chicanas/os and other Latinos. The main research question is related to specific phenomena of dialect contact; namely) accommodation and code-switching. Specifically, given that Chicana/o Spanish (or EVLA) is the main Spanish dialect in Los Angeles, the questions that my research is looking into are: **1.** Is there evidence of linguistic accommodation towards EVLA in the Central American varieties used by Salvadorians and Guatemalans in Los Angeles? **2.** If so, is there a tendency to convergence into a koine (EVLA) or is bi-dialecticism a choice to maintain a Central-American identity different from that of the Latino majority?

Method — In order to answer the research questions above, the lexicon and the phonology are analyzed in two different groups of speakers: first and second generation Central Americans in Los Angeles (mainly Guatemalan, Nicaraguan, and Salvadorian). The participants are recruited using ethnographic and sociolinguistic methods (community contacts and data collection sessions at family events). The data collection instruments include a picture naming task and a semi-guided sociolinguistic interview (with the goal of obtaining speaker's reflections on their identity as it relates to language use). The data will be analyzed using quantitative and qualitative methods (i.e. The picture naming task will yield measurable results; and the interview will provide qualitative data).

Student Roles — So far, I have collected data from 15 Central Americans and I am in the process of collecting more. I anticipate involving junior and senior students with data collection, and, mainly, transcription in the coming months. All data is in Spanish, **thus being a native speaker, or having native-like competency in Spanish, is a must** for this particular project. On the other hand, both Spanish and non-Spanish speakers can participate in sociolinguistic interviews as I will continue to interview Latinos/Chicanos in L.A. both in Spanish and English.

Conferences Typically Attended — National Meeting of the Association of Teachers of Spanish and Portuguese (AATSP), Linguistic Association of the Southwest (LASSO), Heritage Language Symposium (HLS), Spanish in the U.S. and Spanish in Contact (SiUS).

Publications — For publications, please visit: http://www.csun.edu/asanchezmunoz/documents/CV_001.pdf

College of Engineering & Computer Science

Department of Computer Science

Ani Nahapetian

Mentor Bio — I grew up in the San Fernando Valley. As a researcher, I am inspired by reading the research of others, discussions with other researchers, and learning about new solutions and tools to known problems. I see a lot of myself in many of our students. I try to bring to the class and to the research lab experiences and opportunities that I have benefited from during my educational and research career. **Ph.D.** 2007, University of California Los Angeles **M.S.** 2004, University of California Los Angeles **B.S.** 2002, University of California Los Angeles.

Background & Purpose — With the exponential growth in mobile computing, mHealth, and now wearable computing, applications that promote healthy lifestyle choices and early monitoring of health issues can have a disproportionately large impact on individuals from underserved groups.

Research Question(s) or Hypothesis — This research effort looks at developing non-intrusive, engaging, and cost-effective systems to address health needs, with a specific focus on heart failure, diabetes, and chronic conditions affecting children.

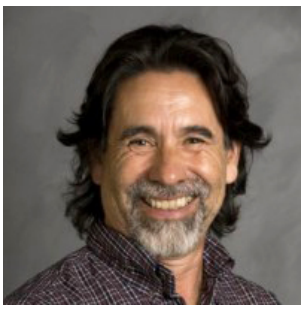
Method — Develop mHealth (mobile health) systems.

Student Roles — CSUN students working on these projects will assemble end-to-end mHealth system, develop mobile apps to interface with users, and process aggregated data in the cloud. Students will target IEEE and/or ACM conferences in mobile computing, wireless health, and/or wearable computing.

Expectations — The research experience will enhance their programming and systems engineering skills. It will also expose them to the interdisciplinary nature of developing, testing, and validating wearable and mHealth systems, and processing time-series sensor data.

Department of Electrical & Computer Engineering

Bruno Osorno



Mentor Bio —I have been running projects on this campus for many years, and I am getting into the fifth year of a mentoring program at the college of engineering and computer science. My industrial experience combined with my academic experience and my mentoring experience helps me recognize the value of the collaboration and its mentorship component. Research areas include Electrical Machines and Energy Conversion, Electric Power Systems, Power Electronics, Fault Analysis in Power Systems and Power Distribution Systems. **M.S.E.E** 1978, University of Colorado **B.S.E.E** 1970, Polytechnic Institute of Technology Mexico City.

Background & Purpose — The goal of the proposed research is to investigate how wearable electronics technology (apparel textile and devices) can improve the physical activity of people in different socioeconomic environments. Specifically, the technology exists to keep track of physical activity as well as sleeping patterns and energy generation.

Research Question(s) or Hypothesis — Since this is a broad topic, part of the research would be to identify the most promising emerging technology and apply it to our proposed research. After all this will be a $70 billion industry by 2020 (IDTechEX wearable-technology-2014-2024).

Method — The proposed research requires use of quantitative research methods. My background in engineering will allow me to deal with software and hardware as needed to carry on this research.

John Valdovinos

Mentor Bio — John Valdovinos is an assistant professor in Electrical and Computer Engineering (ECE) at California State University Northridge. He received his Ph.D. from the University of California Los Angeles in Biomedical Engineering in 2014. In addition, he worked as a postdoctoral fellow at the Yale School of Medicine under the American Heart Association Postdoctoral Fellowship in 2015. Professor Valdovinos has expertise is in the design of circulatory support medical devices for adult and pediatric heart failure patients. In his three years at CSUN, Professor Valdovinos has supervised a various senior design teams and served as a mentor for students participating in programs like BUILD PODER and AIMS2. Professor Valdovinos also serves as the faculty mentor for the CSUN Society of Hispanic Professional Engineers (SHPE) and as a board member of the Diversity Committee for the Biomedical Engineering Society.
Ph.D. 2014, University of California Los Angeles **M.S.** 2010, University of California Los Angeles **B.S.** 2009, University of Southern California.

Background & Purpose — There have been great advancements in the design and implantability of medical devices that can monitor and assist patients with various cardiovascular diseases. While the miniaturization of electronics has enabled these medical technologies to become fully implantable, their lifespan is still limited by the batteries that power them. Often, batteries necessitate eventual re-operation to replace the unpowered devices. The focus of my research at California State University, Northridge is on the development of wireless powering technologies that can improve the implantability of therapeutic cardiovascular devices. This entails utilizing traditional radio-frequency (RF) electrical systems (also known as transcutaneous energy transfer systems, TETs) as well as integrating the use of smart material like piezoelectric and magnetostrictive materials to miniaturize and power implantable medical devices.

Research Projects — My research will focus on two thrusts.

The first thrust focuses on powering traditionally low-power cardiovascular devices like pacemakers and other stimulators with magnetoelectric structures (essentially piezoelectric and magnetostrictive composites). This technology will allow for miniaturized receivers that can extract power from an outer transmitter to recharge or continuously power these small devices without sacrificing their small foot print. Magnetoelectric receivers can accomplish this because of their large energy density and excellent coupling between piezoelectric and magnetostrictive phases.

The second thrust will focus on improving the wireless technology for powering higher-power devices like blood pumps for patients with heart failure. The aim of this thrust is to improve current close range wireless powering systems to achieve higher efficiency and longer range for powering the device. This can have implications on the development of intravascular blood pumps that can eventually be continuously recharged or powered. This will be achieved by utilizing ferromagnetic materials like Metlgas to increase the efficiency and coupling between a receiving antenna and transmitting antenna.

Student Roles — Undergraduate students will play a key role in these projects. As sophomores, students will learn about real-world applications of classes they have taken like ECE 240 (Fundamentals of EE). During this time, students will get familiar with the research process, including literature reviews, keeping a laboratory notebook, contributing to group discussions/collaborations and using design software like Cadence and COMSOL Multiphysics. They will also gain some familiarity with the equipment that is used in the lab. I have access to the Printed Circuit Board Lab (JD 1564), which houses my 3D printer (for prototyping) and other equipment like pediatric blood pump, Metglas magnetic core ribbon, and electrical measuring equipment. During their Junior and Senior years, students will be involved in designing and prototyping devices and test rigs as well as planning and carrying out experiments.

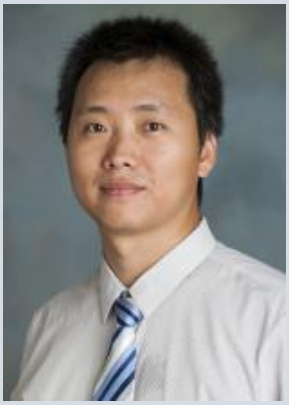
Expectations — The hope in the future is that these students will also experience the work it takes to design a medical device from start to in-vivo implantation in an animal (via our future collaborations with UCLA and Yale Schools of Medicine).

Conferences Typically Attended — Annual Biomedical Engineering Society Meeting (held in September/October every year), IEEE EMBS (Engineering in Medicine and Biology Society), and ASAIO (American Society of Artificial Internal Organs, held in June) Conferences.

Publications — Dr. Valdovinos's publications can be found on his CV.

Department of Manufacturing Systems Engineering and Management

Bingbing Li (No longer available, lab is full)



Mentor Bio — Dr. Bingbing Li is an Assistant Professor in Manufacturing Systems Engineering, and Director of the Laboratory for Sustainable and Additive Manufacturing (LSAM). Ph.D. 2012, Texas Tech University M.A. 2008, Hefei University of Technology B.A. 2005, Hefei University of Technology. His research focus is in Additive Manufacturing, Smart Manufacturing, and Sustainable Design and Manufacturing.
http://www.ecs.csun.edu/~bingbing/

Title of Research Project — Additive Manufacturing for Health

Background & Purpose — The objective of biomedically relevant research in LSAM is to enable 3D printing of plastics, metals, functional biomaterials, cells and supporting components into complex medical implants and functional living tissues.

Research Question(s) or Hypothesis — 3D printing is being applied to regenerative medicine to address the need for implants, tissues and organs suitable for transplantation.

Method — Mixed method involving experiments, biofabrications, new materials and processes development. Different 3D printing technologies (including 3D Bioprinting, Selective Laser Sintering/Melting (SLS/SLM), Laser Cladding, Stereolithography (SLA), Fused Deposition Modeling (FDM), and Jetting) will be applied to fabricate the medical implant, tissues, and organs.

Student Roles — Students will be responsible for experiments setup, biomaterials fabrication, cell culture, ink solution preparation, data collection, preliminary data analysis and presentation.
Expectations — Students will gain a broad set of research-related skills, including experimental design, 3D printing processes, biomaterial science, environmental mentoring, equipment calibration, data analysis and public communication of findings.

Conferences Typically Attended — CSUPERB's Annual CSU Biotechnology Symposium; Annual UC Systemwide Bioengineering Symposium; Annual International Solid Freeform Fabrication Symposium; CIRP International Conference on Life Cycle Engineering; SME North American Manufacturing Research Conference (NAMRC) and ASME's Manufacturing Science and Engineering Conference (MSEC).

Publications — To View Dr. Li's publications, visit his website:
http://www.ecs.csun.edu/~bingbing/publication.html

Vibhav Durgesh

Mentor Bio — **Ph.D.** 2008, University of Wyoming **M.S.** 2004, University of Wyoming **B.Tech** 1999, Indian Institute of Technology. http://www.csun.edu/~vdurgesh/research.html

Background & Purpose — An aneurysm is the abnormal ballooning or bulging of the wall of a weakened blood vessel. While the rupture of an aneurysm can be fatal, corrective surgeries for aneurysms are also very high-risk operations. It is estimated that six million people in the USA have un-ruptured aneurysms (Brain Aneurysm Foundation). A detailed understanding of the fluid flow quantities that can lead to rupture of the aneurysm sac, like wall shear stress, velocity flow profile, and pressure distribution, can help researchers in developing/designing effective stents and thereby help medical professionals in mitigating the risk associated with aneurysm treatment. Therefore, this project focuses on the experimental investigation of fluid flow within an aneurysm sac to quantify crucial fluid flow parameters inside an aneurysm, like wall shear stress, pressure and velocity distribution.

Research Question(s) or Hypothesis — This investigation aims to: 1) characterize the impact of inflow parameters like Reynolds and Womersley numbers (typically observed in blood flow) on key fluid flow quantities inside the aneurysm, like wall shear stress and impinging velocity that are responsible for aneurysm growth and rupture, and 2) identify the complex three dimensional flow structures that directly influence regions of high and low shear stress on the aneurysm wall. This research will use advanced experimental tools, including a a 3-D Particle Image Velocimetry (3-D PIV) for measuring fluid flow velocity, and 2-component Laser Doppler Velocimetry (LDV) to accurately measure wall shear stress inside an aneurysm sac.

Method — For this study, glass aneurysm models will be designed with varying shapes and sizes. The physiological flow profile will be generated using an ViVitro Labs Inc super pump system. This pump system is capable of generating flows with Reynolds and Womersley numbers between 100-600 and 1- 4, respectively. The velocity distribution inside the aneurysm will be measured using the 3-D PIV system. The velocity flow field information will allow for the identification of 3-D flow structures, wall shear stress distribution, and impinging velocity. Data Analysis: Fluid mechanics concepts will be used in conjunction with Matlab for wall shear stress estimation. The Matlab image processing toolbox, along with proprietary PIV image analysis software, will be used to identify the complex flow structures.

Student Roles — Junior and senior students with a fundamental understanding of fluid mechanics and programming will be primarily responsible for conducting experiments and data analyses for this study. The sophomore students will be involved in designing aneurysm models, setting up experiments and assisting senior researchers in their experiments.

Expectations — Students working on the aneurysm project should (a) enjoy practical work (b) be interested in building complex systems and models, (c) be interested in working with high power lasers and (d) have a detail-oriented approach.

Conferences Typically Attended — Student researchers will be encouraged to attend three international conferences: (a) American Physics Society – Division of Fluids Dynamics (APS-DFD), (b) Biomedical Engineering (BME) conference, and (c) American Society of Mechanical Engineering (ASME) conference-Biofluids division.

Publications — To view Dr. Durgesh's publications, visit his Google Scholar page.

Abhijit Mukherjee

Mentor Bio — Dr. Mukherjee grew up in Kolkata, India. His teaching areas of interest include heat transfer and renewable energy. His research interests include boiling, two-phase flow and microfluidics. He is also the Director of the CSUN Energy Research Center. **Ph.D.** 2004, University of California Los Angeles **M.A.** 2000, University of California Los Angeles **M.M.E** 1998, Villanova University **B.P.P.E** 1993, Jadavpur University.

Research Project — The goal of the project will be to develop a numerical model to study the flow of insulin inside the human body at various delivery rates and different catheter dimensions. The human tissue will be modeled as a porous media using properties that closely resemble the human tissue. We will optimize the efficiency and reliability of the insulin delivery system by conducting a parametric study on variations in the cannula design and insulin properties on the depot formation and subsequent absorption process. Utilizing our current Computational Fluid Dynamics (CFD) depot formation model we will investigate longer timescales taking into consideration the process of absorption of the insulin by the blood vessels. It is expected that during the basal delivery with creeping flow, the effects of absorption will play a significant role on the depot formation process. We propose to develop a multilayer porous media model for the subcutaneous skin with varying lateral and perpendicular resistances. The numerical CFD solutions will be complemented with development of analytical porous media models of the subcutaneous tissue.

Student Roles — Students will work to develop understanding of the physics of the problem as well learn to use CFD tools.

Conferences Typically Attended — ASME Fluids Engineering Conference.

Publications — View his publications at his CSUN mechanical engineering profile.

Vidya Nandikolla

Mentor Bio — **Ph.D.** 2005, Idaho State University **M.A.** 2001, Idaho State University **B.A.** 1998, Andhra University

Background & Purpose — Diabetic mellitus patients have problems with loss of sensation in their feet, insufficient blood flow to lower extremities and alterations in shape of their pressure patterns causing concentrated high pressure regions. These peaks due to dysfunctional feedback system from their mechanoreceptors may lead to complex problems such as amputation if they are not identified and treated in timely manner. Our main objective is to protect the foot by sensing these abnormal peaks and redistribute the pressure from excessive pressure regions.

Research Question(s) or Hypothesis — The foot anatomy and its mechanical loading effects the loading pattern which is very critical to determine the pressure distribution. The research is to create a study of anatomy, and connect the analysis to the foot pressure distribution. The main goal is: *Measurement of the plantar pressure and shear forces actively using foot insert and examine the interrelationship of these forces.*

Method — In this research we are developing a design prototype for an adaptable shoe insert useful for diabetic foot care and comparing to the existent diabetic foot wears. The proposed design will consider human anatomy and anthropometry of the foot to properly sense the sensory regions during standing and walking. The developed design will be evaluated to the existent diabetic foot care available to validate and for market analysis.

Student Roles — This research will include the pros and cons of the existent technology. It is indeed an STEM multi-disciplinary research opportunity, which gives our undergraduate students a good knowledge and experience of how to

integrate the science (biology, physics), technology, engineering and mathematics fundamentals into a biomechanical footwear design for diabetic foot care. The students who are in junior level with understanding of system design and modeling will get a hands-on experience developing and simulating a real world biomedical problem. This will not only help them understand how to relate the mechanical design concepts into biomedical modeling but also use modern computing tools such as Solid works and Matlab to simulate and show the pressure pattern.

Expectations — The students will get an opportunity to present in such organizations giving them a great opportunity to connect with the scientific network. The results will also be published in poster to share the research with the CSUN community. The primary deliverable will be a comprehensive report that provides the detailed design, modeling, and simulation results.

Conferences Typically Attended — The research results will be disseminated to promote the findings to peer reviewed conference proceedings and journals in American Society of Mechanical Engineers (ASME) and Institute of Electrical and Electronics Engineers (IEEE) societies.

Publications — To view her publications, visit her mechanical engineering page.

Christoph Schaal

Mentor Bio — Dr. Schaal is an Assistant Professor in the Department of Mechanical Engineering at CSUN and the Director of the CSUN Ultrasonics and Applied Mechanics Laboratory as well as of the CSUN Keck Composites Laboratory. His research interests include wave propagation, nondestructive testing, medical ultrasound and experimental techniques. His teaching interests are in the areas of solid mechanics, smart structures and controls. **Ph.D.** Mechanical Engineering 2014, University of Stuttgart **M.S.** Engineering Cybernetics 2009, University of Stuttgart. http://www.csun.edu/~cschaal/

Title of Research Project — Focused ultrasound for treatment of pain along the spinal cord

Background & Purpose — This project is motivated by the possible medical applications of focused ultrasound in the non-invasive treatment of a variety of musculoskeletal disorders that are responsive to thermal treatment. We are developing a new experimental setup that will feature a fully functional test bed for focused medical ultrasound.

Research Question(s) or Hypothesis — The challenge to overcome is to understand focused ultrasonic wave propagation and absorption in various human tissues, as well as the scattering at tissue interfaces, in order to accurately target tissue deep inside the human body. With this setup, data will be collected from various experiments on tissue-like constructs. The findings from this non-invasive ultrasound therapy will be applied in the clinic, directly benefiting people who suffer from, for example, spinal disk herniation. This method has the potential to completely alleviate the pain and thus to prevent complicated surgeries

Method — Our new experimental setup will employ non-invasive actuator technology: focused ultrasound transducers will be used to induce ultrasonic waves in the targeted tissue from multiple angles. Following this approach, a deep penetration of the ultrasonic waves is achieved while the surrounding tissue remains unaffected. In order to correctly align the focused ultrasound transducers, custom fixtures will be made and combined with high-precision optical stages. Detailed pressure maps for various transducer configurations and ultrasonic wave signals will be recorded using a hydrophone. Secondly, thermocouples will be used to carefully monitor the increase in temperature in the targeted area along with the surrounding area. In addition to experiments, numerical simulations and analytical modeling will be carried out in the interest of gaining more detailed insight into the wave propagation through different human tissues and the resulting temperature fields, allowing for controlled heating of deep target areas.

Student Roles — At the sophomore level, students will be involved in the design process of the ultrasonic test bed, and continuous improvement thereof. With a fundamental understanding of measurement equipment and signal processing at the junior and senior level, students will also be responsible for carrying out experiments and analyzing the data. An

alternative pathway for students to be involved in this project is to support the research group on how to achieve an optimal pain treatment using the proposed method from a medical perspective.

Expectations — Students working on this project should enjoy practical work, and have the curiosity to investigate the complex interaction of ultrasonic waves with human tissues.

Conferences Typically Attended — SPIE Smart Structures/NDE (Health Monitoring of Structural and Biological Systems) conference or the IEEE International Ultrasonics Symposium.

Publications — To view his publications, visit Dr. Schaal's website.

For More Information:

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