

College of Health & Human Development

Department of Child & Adolescent Development

Grote, Kandice

(a) Purpose/Content-

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

(b) Research questions or hypotheses-

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?

(c) 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.

(d) Analytic process

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.

(e) Roles students can play at sophomore, junior, senior levels

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).

(f) Conferences typically attended

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

(g) Other information that is pertinent to students selecting your research experience

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.

Guan, Angie S

(a) Purpose and background. Social relationships have a powerful effect on young adult well-being. Social support from peers can increase a sense of mattering on campus and reduce the negative effects of stress among minority and first-year college students (e.g., Crockett et al., 2007). Social relationships can also affect physical health by moderating stress systems like the Hypothalamic-Pituitary-Adrenal (HPA) axis (assessed via the hormone cortisol) and cardiovascular function (e.g., Uchino, Cacioppo & Kiecolt-Glaser, 1996). Feeling a sense of community may be particularly important for youth from interdependent cultures (e.g., Asia, Latin America) who emphasize group harmony and relationship maintenance (Markus & Kitayama, 1991). However,

Asian American and Latino young adults are less likely to seek help from parents and friends compared to European Americans (Guan & Fuligni, 2015). Individuals from interdependent cultures may be less likely to ask for help when in need for fear of eliciting criticism and losing “face” (Kim et al., 2008).

(b) Hypothesis. Instead of receiving social support, I hypothesize that providing social support may be more beneficial in stress reduction for Asian and Latino young adults from more interdependent cultures.

(c) Method. Healthy, college students from diverse backgrounds will complete a stressful lab task shown in prior research to elicit a stress response (Kirschbaum et al., 1993). They will be randomly assigned to (1) prepare for the stressful task for 5 minutes, followed by 5 minutes of writing advice and encouragement to the next participant; or (2) prepare for the speech in the entire 10 minutes (modified from Rini et al., 2013). Participants will complete post-task surveys on sociodemographics and cultural values. They will also provide cortisol every 10 minutes and heart rate and blood pressure every 3 minutes.

(d) Analytic Process. Hierarchical regressions will be modeled to examine (step 1) the relationships between cultural values (e.g., interdependence) to psychological (e.g., anxiety) and physical outcome measures (e.g., cortisol output, heart rate, blood pressure) and (step 2) the moderation of these relationships by support condition (i.e., support provision vs. preparation alone).

(e) Student Roles. Students will meet with me regularly and, depending on their level of preparation and timing of the project, will go through several stages. *Stage 1.* Students will be trained in material preparation (e.g., preparing surveys, creating saliva kits for cortisol). *Stage 2.* Students will be trained as experimenters and collect biological data. *Stage 3.* Students will work with me to develop independent projects, analyze data and submit to a conference. My work with undergraduate students from various socioeconomic backgrounds in the past have resulted in several conference presentations (e.g., Guan & Shen, 2013; Guan, Nguyen, Tsui & Robles, 2015). *Stage 4.* Students will help prepare manuscripts for publication as coauthors (e.g., Guan & Shen, 2014; Guan, Bui & Ho, under review). For my former undergraduates, these lab experiences, conference presentations, and publications have been instrumental in their pursuit of graduate school.

(f) Conferences Attended. I will attend the Society for Research on Adolescence and Society for Research on Child Development

Huynh, Virginia

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.

Miodrag, Nancy

The purpose of this project is 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). We will explore both quantitative and qualitative data on psychological stress, coping, and various health outcomes in female caregivers of individuals with ASD. 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. 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. *Note: This is an applied research project working with families and children.*

Moschetti, Roxanne

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 into 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. 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. 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)? 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?" Open-ended coding, followed by focus coding, was used to analyze the open-ended survey and focus group data. 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. 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. Dr. Moschetti typically attends and presents at the following professional conferences: Society for Research on Adolescence, Western Psychology Association, Society for Research in Child Development and American Educational Research Association.

Russell, Emily

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

Taylor, April

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. 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. Analyses will include sociometric and nonparametric analyses, multilevel regressions, and multivariate analyses of variance. Undergraduates will participate in recruitment, data collection, analysis, reporting, and presentation.

Department of Environmental & Occupational Health

Kennedy, Nola

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

Besnilian, Annette

The project goal is to implement, evaluate and conduct follow up to determine the effectiveness of an intervention program designed to affect healthful behavior in parent participants and their families in schools with a high percentage of Latino families in LAUSD. The program focuses on increasing awareness and providing guidelines on healthy nutrition choices, food-label reading, recipe modification, smart shopping, and related nutritional and healthy lifestyle information. A six-month and one-year follow up will determine long-term effects of school based obesity prevention programs. Research variables are: participants' knowledge regarding nutrition, cooking, and physical activity (pretest, posttest, follow up); cooking, eating and physical activity behaviors at pretest, posttest and follow up; changes in body mass index (BMI) and percent body fat. 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.

Bradley, Linda

Current research focuses on the impact of financial education for at-risk individuals and families with the intent of providing workable solutions that may alleviate the impact of financial stress. Research has shown that the decisions consumers make has an impact on their future financial well-being. Furthermore, financial well-being can be directly tied to both physical and mental well-being. The primary variables in my research include demographic variables (age, gender, ethnicity, educational attainment) as well as the impact of time on retention of financial knowledge gained and changes in financial behavior as measured by survey responses at three points in time. Student research assistants are working with mining qualitative data from primary and secondary sources and are responsible for data entry and analysis of data. Students will gain skills in developing research proposals, formulating hypothesis and research questions, collecting and analyzing data, and drawing conclusions and implications from the research study.

Cai, Yi

The study examines the social, cultural, and economic factors influencing Chinese Americans' savings, indebtedness, and retirement preparedness (or lack thereof). I will examine the participants' cultural beliefs, collectivism, trans-culturalism, and family traditions, in the framework of old-age support and retirement planning. Students' involvements and responsibilities include development of the survey and interview instruments, data collection and analysis, community outreach, and incorporating the project into class-room learning. They will work with qualitative data from focus groups and in-depth interviews and quantitative data from a survey questionnaire developed in this project; as well as the national Health and Retirement Survey data that can be compared with the data collected in this project. The students will learn a hands-on experience of conducting community-based research and connect with local ethnic communities to embrace the diverse demographics in Los Angeles. Also, the project will enhance students' cultural competences in their disciplines.

Herman, Dena

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

Mimura, Yoko

Potential projects will fall under my research theme related to literacy socialization among young adults from different economic, social, and ethnic backgrounds. In BUILD, the literacy area a student may investigate relates to health and health care.

The broad research question is what and how young adults learned about health and health care management from their parents. Additional related questions might include whether there are patterns to such responses and what differentiates health socialization experiences.

The methodological approach is likely qualitative in nature, based on in-depth interviews. However, students may explore the possibility of using a large public use data set, such as the California Health Interview Survey (CHIS), to answer related research questions. If so, I will assist and guide them through the process of using such survey data using one or more statistical software.

The analytic process of the qualitative study will involve in-depth interviews, transcribing, coding, analyzing, and reporting. The analytic process for the survey research study will involve downloading the data, preparing the data (recoding), and running descriptive and inferential statistics, interpreting the results, and reporting.

For the qualitative study, sophomores may be involved in the search for literature, note taking, and coding, and juniors and seniors may be involved in the literature review, interviewing, transcribing, coding, and analyzing. For the survey research, students may be involved in the literature search and review, identification of specific research questions, identification of a data set; downloading, recoding, and preparing the data; running the preliminary and final statistical analyses; interpreting the results; and reporting the findings---all in a team setting.

The conferences I typically attend include the American Association of Consumer Interests annual meeting and the California Affiliate of American Association of Family and Consumer Sciences biennial meeting, both of which generally meet in the spring.

My research has focused on these themes of household finance, poverty and economic hardship, and housing for special populations. The topic of health literacy socialization falls under household finance and poverty and economic hardship. My research experience includes writing papers with both undergraduate and graduate students. Currently, I have 26 peer reviewed journal publications, 11 of which were written with a student coauthor. I look forward to working with another enthusiastic 'young' scholar!

Sussman, Elizabeth

Dr. Sussman's research centers around nutrition in those with kidney failure. Dr. Sussman currently has two projects she is working on. The first one is using a smartphone application to facilitate dietary behavior change in predialysis patients. The second study is working with the National Kidney Foundation of Arizona evaluating the effectiveness of the nutrition patient assistance program. This program provides in-center nutritional supplements for malnourished dialysis patients. Dr. Sussman attends the International Society of Renal Nutrition and Metabolism's Congress on Renal Nutrition every two years. Dr. Sussman's students will learn the importance of research, how it's conducted, analysis of variables, and how research stimulates future projects.

Department of Health Sciences

Augustin, Frankline

(a) Purpose/Content

This three-part study, called “Workplace Readiness,” aims to increase the diversity of the healthcare administration workforce by examining whether the health administration college curriculum for undergraduates practically prepares its students for the healthcare workplace. Healthcare workplace skills, attitudes, and behaviors will be evaluated from the point of view of current health administration students, health administration faculty, alumni and current healthcare administrators at CSU-Northridge and CSU-Chico to determine what they see as marketable skills for recent graduates who are either newly employed or seeking employment. The literature mentions that a likely reason for the lack of workplace readiness may be due to the fact that the college curriculum does not “meet the new and emerging workforce needs” to match the constantly changing healthcare environment (Beida, 2011). An outcome of this study would be a review of the health administration curriculum to determine if undergraduate programs are adequately preparing its students to be marketable enough to compete in the industry.

(b) Research questions or hypotheses

Hyp 1: Healthcare administrators are more than likely to determine that college graduates lack workplace skills and behaviors.

Hyp 2: Health administration alumni are more than likely to determine that the workplace skills they lack should have been taught to them in the health administration curriculum.

Hyp 3: College seniors majoring in healthcare administration enrolled in their final internship class are more than likely to determine that the health administration curriculum does not include training for workplace skills and behaviors.

Hyp 4: Health administration faculty are more than likely to determine that the curriculum does include training for the required skills and behaviors that students need for the workplace.\

(c) Method

Focus groups and surveys(d) Analytic process

Conventional content analysis, SPSS, Qualtrics

(e) Roles students can play at sophomore, junior, and senior levels

Students will receive training and mentoring on: literature review, recruitment, data collection, transcribing, reporting, presenting, and potential opportunity to co-author a manuscript

(f) Conferences typically attended

Association of University Program in Health Administration (AUPHA)

(g) Other information pertinent to students selecting your research experience.

No experience is required. This study is open to student researchers from any major, just as long as they are open and willing to learn.

Benjamin, Stephanie

The goal of this research project is to examine risk factors for pre-diabetes and diabetes among students at California State University, Northridge (CSUN). The variables that will be analyzed include: age, sex, race/ethnicity, body mass index, level of physical activity, diet, perceived risk of developing diabetes, and willingness to be screened for diabetes. The type of data students will work with is survey data that has been collected by CSUN students enrolled in the Masters in Public Health program over the past 15 years. This survey data has already been approved by CSUN’s IRB to use for research purposes. Responsibilities of the student include: assist in conducting a literature review, assist in analyzing survey data, and assist in preparing either an abstract for presentation at a conference or a manuscript for publication. Students will gain skills in conducting a literature review, analyzing survey data, and preparing an abstract and/or publication.

Chung, Kyusuk

(a) Purpose/Content—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.

(b) Research questions or hypotheses—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.

(c) Method—focus group meetings and telephone/in-person interview targeting (1) IHSS caregivers; (2) hospice workers; (3) hospital discharge planners

(d) Analytic process—a qualitative analysis of interviews using Nvivo

(e) Roles students can play at sophomore, junior, and senior levels—

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.

(f) Conferences typically attended –American Public Health Association and Academy Health

(g) Other information pertinent to students selecting your research experience. – I have published more than 30 peer-reviewed journal articles and given more than 60 presentations at professional health services research conferences. Currently, I am working on three projects: 1) looking at state policies on hospice providers; 2) analyzing the cancer (SEER)-Medicare linked dataset to investigate the reasons underlying live hospice discharge; and 3) promoting the awareness of hospice care among the Hispanic population. Students will have (1) opportunity 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 Filmmaking 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.

Ebin, Vicki

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. The primary variables are: discrimination, BMI, ethnicity, gender, depressive affect, self-esteem and self-efficacy, social support, health-promoting and health risk behaviors. 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. 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. 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.

Emetu, Bobbie

A. Purpose/Context:

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.

B. Research Questions:

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?

C. Methodology:

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.

D. Analytic Process:

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.

E. 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.

F. 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

G. Additional Information for Student:

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

Young, Kathleen

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.

Department of Kinesiology

Angulo-Barroso, Rosa

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.

Flanagan, Sean

The main purpose of my research is to understand how the various joints of the body work together as an integrated chain. I am particularly interested in how these joints must work together to maintain a healthy and robust locomotor system, and how impairment at one joint may lead to compensatory motion and/or injury at another. My research questions involve: Which joint motions and torques are necessary for a given task? How do the joints involved in the movement compensate for one another? What are the implications of these compensations? I answer these questions by taking a three-pronged approach: 1) simple models of kinematic chains; 2) experiments; and 3) complex musculoskeletal models. I use simple models to uncover fundamental principles of multi-joint movement, which are then tested via experiments with human subjects. Some of the experiments involve quantifying coordination and compensation amongst different joints during fundamental movement patterns, while others involve creating an artificial impairment (such as a decrease in strength, range of motion, etc.) and examining the consequences of that impairment. Experiments make use motion capture and force platforms to conduct 3-D analysis of a movement. Since there is a limitation to the extent in which you can create an artificial impairment on people, the next step is to use complex musculoskeletal models to examine the role of an impairment and/or compensatory motion in producing injury. Students work with several types of data, including: motion capture, inverse dynamics, computer simulation, electromyography, and strength and range of motion assessments. Students are gradually responsible for data collection and computer modeling techniques (sophomore/junior/senior), hypothesis generation and testing (junior/senior), experimental design (junior/senior), and teaching less experienced students (junior/senior). Additionally, seniors have the opportunity to conduct an independent investigation of their own design. Students gain skills that are applicable to research in such diverse fields as biomechanics, motor control, orthopedics, and biomedical engineering. Typical conferences I attend include: American College of Sports Medicine (ACSM), American Society of Biomechanics (ASB), National Athletic Trainers' Association (NATA), and National Strength and Conditioning Association (NSCA). I like to tailor lab experiences to individual student interests, and hope that by doing so we can learn together and from each other in a dynamic and fun environment.

Jaque, Victoria

In our Performance Psychophysiology Laboratory (shared with Dr. Paula Thomson), we collect comprehensive physiologic and psychologic data from performing artists, athletes and control subjects. One of our primary research interests is examining the effects of childhood adversity and past traumatic events on psychological and physiological resilience in performing artists and athletes, including the role creativity may play in this resilience. To this end, we administer psychological self-reports, perform interviews and monitor the function of the parasympathetic and sympathetic nervous systems with ambulatory physiologic monitoring systems (LifeShirt, Mindware) at rest, under stress, during exercise, and during performance. Students use Vivonoetics, Vivometrics and Mindware software to analyze heart rate variability and pre ejection period of the heart. All data are entered and statistics run in SPSS software. Each year, both undergraduate and graduate students participate in research in our laboratory, both as interns and as part of their coursework. Each semester, we have 5-10 undergraduate students, and at least 5 graduate students working on research in our laboratory, including learning how to collect and analyze psychophysiological data from dancers participating in our fall and spring performances and from participants in Opera Works, an intensive opera training program. During the course of their time in the laboratory, the students learn techniques related to data collection, data cleaning and analysis, and data entry. Students collect psychophysiological data from performing artists both on stage and during laboratory tests (including both psychological and physiologic stressors), to gain a better understanding of how the autonomic nervous system responds to stress, whether there are optimal levels of autonomic balance necessary to experience flow during performance, and how underlying psychopathologies are related to function of the ANS during performance. Students start assisting with data entry and collection at the sophomore level. As juniors and seniors, they acquire the skills to analyze heart rate variability and impedance cardiography data in one of our three analytic software packages.

Recent reports from our laboratory suggest that performing artists have a greater prevalence of dissociation, shame, anxiety, fantasy proneness and traumatic experiences than is reported in the general population. What is intriguing is that our findings suggest that even in the face of psychopathologies, performing artists can attain high levels of flow onstage. Of interest, the attainment of flow during performance appears to be related to the appropriate response of the autonomic nervous system to the demands of performance. Participation in the performing arts can be regulating, and can provide individuals suffering from psychopathologies with positive and rewarding experiences. How they are able to experience flow and derive pleasure from performing, is another focus of our work.

Drs. Jaque and Thomson have an active research laboratory, and regularly present their research data (at meetings such as IADMS, APA, ISSTD, and SWACSM), as well as prepare manuscripts for publication from their database. Currently, they are writing a book.

Jung, Taeyou

My primary research interests focus on studying movements of people with disabilities and clinical outcomes after therapeutic exercise interventions. I have been examining biomechanical and physiological outcomes in populations with neuromuscular disabilities. My current research project includes investigating the effects of cardiovascular exercise on cognitive functions among people with multiple sclerosis. I am planning to continue clinical investigations on the effects of various exercise interventions on functional and cognitive outcomes of people with Parkinson's disease and multiple sclerosis. The primary variables in my research are: Biomechanical variables: gait and balance outcomes; Cognitive variables: memory, coordination, organization, executive functions and etc. Students will work with spatiotemporal and kinematic gait data, postural sway data for balance, and cognitive test scores. Students will be responsible for assisting me with literature review, data collection and analysis. Students will gain overall development of clinical research skills, data collection skills utilizing biomechanical and physiological instruments, and literature review skills.

Thomson, Paula

Dr. Thomson, along with Co-Director Dr. Victoria Jaque runs a performance psychophysiology laboratory. They investigate the effects of psychological and physiological stress on performing artists, athletes, healthy controls and patients with and without functional disorders. The main research questions include (1) understand the physiological effects of stress on performing artists, athletes and patients with functional disorders, (2) understand the psychological profiles of performing artists and athletes, (3) understand the psychophysiological responses in individuals with adverse childhood experiences and the relationship to post traumatic stress disorder, dissociation, shame and anxiety. The methods include a full battery of psychological tests that examine psychopathology, including posttraumatic stress disorder, unresolved mourning (Adult Attachment Interview), anxiety, depression, dissociation, shame, and emotional regulation difficulties. Psychological measures are also included to gather information regarding the positive effects of stress, such as optimal flow, creativity, and emotional regulation. As part of this work, and in collaboration with Dr. Victoria Jaque, we gather ambulatory physiological data during strength and endurance testing and during public performances (dancers, opera singers, musical conductors). We analyze markers of autonomic nervous system (ANS) function, including respiratory sinus arrhythmia, pre-ejection period, and heart rate variability, to understand the influences of stress on the ANS. Undergraduate students assist in collecting, analyzing, and interpreting the ANS data in performing artists and others. Students learn how to collect and interpret psychological and physiologic data, and also how to analyze it in SPSS. The laboratory involves both graduate and undergraduate students in the research process. The data findings are reported at the annual American Psychological Association conference and at the International Society for the Study of Trauma and Dissociation conference. Students have direct experience working in the laboratory as well as in the field (backstage in concert halls). They build strong working relationships with other students interested in conducting research.

Todd, Teri

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.

Department of Nursing

Moughrabi, Samira

My primary research interest is in investigating the social determinants of cardiac health and disease among minorities, primarily Hispanics. Specifically, I will investigate the relationship between stress, socioeconomic status, cultural influences/practices and adherence to prescribed treatments and re-hospitalization. I am also interested in the biological determinants of these health outcomes. My dissertation work showed lower socioeconomic status levels (consistent with existing evidence) and higher levels of immune-inflammatory markers (measured by tumor necrosis factor (TNF)- α) in Hispanics than non-Hispanics. Exploring the biological, psychosocial, and cultural determinants of cardiac health will provide vital data for my next research trajectory of developing interventions that are culturally sensitive and appropriate. During my research, I intend to engage students, especially minorities with Health-science or psychology majors in recruiting subjects, collecting data, and creating data sets. I will also involve students in data analysis and writing reports as appropriate. My experience with minorities has well prepared me for my investigations in minorities.

Department of Recreation & Tourism Management

Xie, Jimmy

My research focuses on physical activity, recreation, and health outcomes, with the main research questions being: 1) What factors influences individuals' involvement in physical activities and active living; 2) How to design and evaluate prevention intervention aimed at increasing individuals' (particularly ethnicity minority groups) physical activities and active living. I use both quantitative and qualitative approaches to explore the answers to these questions. On one hand, I conduct interviews and focus groups to obtain in-depth information from participants, and code and analyze qualitative data to inform the design of intervention. On the other hand, I collect data using surveys and experiments and test statistical models to evaluate the outcomes and impact of the interventions as well as the underlying psychological mechanisms. Undergraduate students can play different roles and assume various responsibilities in the research. I work with each student to develop a plan that helps achieve her or his learning objectives and research goals. Sophomores may be involved in survey data collection and entry, transcribing of focus groups/interviews. Juniors may assume more responsibilities such as recruiting research participants, assisting in focus groups/interviews, and conducting basic statistical data analysis. At senior level, students may assist in design of research instrument, perform intermediate/advanced statistical analysis, administer and analyze focus groups/interviews. I collaborate with researchers at CSUN and other universities such as Pennsylvania State University and Washington State University. Typical conferences my colleagues and I attend include Society of Prevention Research Annual Meeting, National Recreation and Park Association Annual Conference, Active Living Research Annual Conference, and Society of Behavioral Medicine Annual Meeting.

College of Social & Behavioral Sciences

Department of Geography

Jackiewicz, Edward

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. As this research evolves it seeks to answer several questions: 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? 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. 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. There are several geography conferences receptive to this type of research including: The Association of American Geographers (Spring), Association of Pacific Coast Geographers (Fall) and the California Geographical Society (Spring). There is also a Health Disparities Conference that I will be attending for the first time in Spring 2016.

Maas, Regan

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. My recent 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'. 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 Africana Studies

White, Theresa

This study uses a mixed-method approach to understand the effects of a nutritional, media-driven, psychosocial intervention, and the factors that contribute to changes in knowledge, attitude and behavior of African American females (ages 18-22) who are overweight and/or obese, and who live in the CSUN campus dormitories. Using marketplace metacognition training, will examine fast-food marketing in outdoors, personal and virtual spaces, as an influence on the fast-food consumption. We utilize social influence training to examine how cultural and peer networks influence knowledge, attitude and behavior, and examine how sedentary behavior, as a result of increased technological use, influence overweight and obesity. Students will work with mixed methods data (i.e., surveys, Facebook food diaries, media journals, focus-groups, interviews); assist with participatory photo mapping; assist with video production and visual data analysis. Students will acquire skills in protocol instrument design; mixed-methods analysis of visual images; GIS mapping; video production; leadership and media literacy.

Stanford, Karin

This study will examine the beliefs, attitudes and practices that influence decisions about health care in young African American men and women. Studying young adulthood may be the key to changing behaviors before they become permanent health problems. Using a grounded theory approach, rooted in a Community Based Participatory Research practices, a model of perceptions of healthcare will be built. The primary variables are health care attitudes, beliefs and experiences, and health care outcomes. Our research questions are: (a) How do African American young adults in different activities (college, the workplace, and unemployed) think about health in general, eating, exercise, risky behaviors, stress, family history and healthcare utilization? (b) What experiences of racial/ethnic disadvantage and discrimination have influenced decision-making in health and healthcare-related behaviors? (c) How do African American young adults relate their health beliefs to their health behaviors? Data will be collected through interviews with 21 young adults: 7 employed 7 unemployed and 7 college students. Undergraduate students will help select interviewees, support the design of interview questions and participate in the interview process. Students at the sophomore, junior and senior levels will also transcribe the interviews, conduct data analysis and present their findings at academic conferences, in particular the National Council for Black Studies. Students will learn hands-on field research and interview skills, grounded theory analysis, and participate in professional development opportunities.

Department of Political Science

Ricks, Boris

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. The purpose of this research is 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

Arentoft, Alyssa

My current research focuses on health disparities in HIV/AIDS. I am examining how well newer, more potent HIV medications control the HIV virus within the brain, and how this relates to downstream neurological outcomes, including how differences in outcomes may be affected by the prominent health disparities present in HIV. African Americans, specifically, are disproportionately affected by HIV, yet often receive inadequate medical care and have significantly worse long-term outcomes. Therefore, 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.

Study participants will be seen at the UCLA Semel Institute. They will be interviewed regarding their medical and psychiatric history and will complete several questionnaires (i.e., on their antiretroviral medications, medication adherence, quality of healthcare, etc.), provide copies of their recent HIV blood labs, receive a comprehensive neuropsychological assessment. Finally, they will receive a 30-minute MRI scan (i.e., diffusion tensor imaging), conducted at the UCLA Center for Cognitive Neuroscience (CCN). Data will be analyzed quantitatively using SPSS. Projected analyses will include ANOVAs, correlations, and linear regressions.

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 include International Neuropsychological Society, American Psychological Association, American Academy of Clinical Neuropsychology, and National Academy of Neuropsychology.

Banerjee, Meeta

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.

AIMS/HYPOTHESES: 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: 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.

ENGAGING STUDENTS: 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. 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: 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).

Research Interests: Racial/ethnic discrimination; Racial-ethnic socialization; academic achievement; academic engagement; mental health

Drew, Stefanie

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

Fahmie, Tara

The goals of the proposed research are to evaluate the effect of various teaching strategies on the development of play and social skills in preschool children with special needs. A secondary goal is to measure decreases in aggressive and injurious behavior as a function of the intervention. 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 play, interaction, and problem behavior 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. Students will be responsible for 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.

Fenn, Elise

In the proposed program of research, students have the opportunity to participate in two lines of research. The first addresses issues at the intersection of psychology and the justice system. The second investigates cognitive-science-based interventions for understanding math or science. In the United States, a disproportionate amount of minorities are charged with, and wrongfully convicted of crimes compared to non-minorities (U.S. Department of Justice, 2012; Innocence Project, 2012). One explanation is that minorities are susceptible to stereotype threat when accused of a crime. Stereotype threat may cause even innocent

minorities to appear guilty to investigators, setting off a chain of events within the justice system producing high rates of wrongful convictions for minorities. The proposed program of research examines the cognitive and physiological processes minorities and non-minorities experience when accused of a crime, and develops methods to reduce false accusations of guilt for innocent minorities. Using a previously developed paradigm, participants will complete a “mock-crime” and be interviewed about their experiences. During the interviews, physiological markers of anxiety and cognitive load (e.g., blood pressure and heart rate), as well as objective behavioral measurements of cognitive load (e.g., reaction time measurements) will be investigated. It is predicted that guilty and innocent minorities will experience more similar cognitive and physiological responses than non-minorities, causing outside observers to more often misattribute guilt to innocent minorities. Reducing barriers, such as stress and anxiety, to learning STEM-related concepts is important given recent declines in the number of graduates in STEM fields from U.S. universities (National Math and Science Initiative, 2015). Interventions to reduce stress-responses to STEM learning by activating related autobiographical memories, or by increasing metacognitive ease of accessing information will be investigated. One part of the intervention primes participants to recall specific instances when they have successfully learned a novel math or science concept. Another part of the intervention investigates ways to increase the metacognitive ease of accessing relevant information. It is predicted that these interventions will (a) reduce stress- and anxiety-responses towards math and science learning when compared to a control group, (b) increase cognitive resources available to comprehend novel concepts, and (c) improve comprehension scores. In both lines of research, students may develop research materials, conduct literature reviews, analyze data using SPSS, R, Excel, conduct qualitative analyses of linguistic and non-verbal behaviors, assist in writing research papers and conference presentations, and attend lab meetings. Students will be encouraged to develop skills in all areas related to conducting empirical research, with more hands-on mentoring time spent with students who have little experience conducting empirical research. Students who contribute for at least one year will be encouraged to submit and present at conferences such as the American Psychology - Law Society, the Society of Applied Research in Memory and Cognition, the Association for Psychological Science, and the Western Psychological Association. This research aligns with students interested in legal or forensic psychology, cognitive psychology, applied psychology, memory research, and using biomedical markers to infer cognitive and emotional responses of participants.

Kang, Sun-Mee

(a) Research Descriptions, Research Designs, and Analyses

Two projects are currently undergoing in my research lab (1) to explore the underlying neural markers of social working memory capacity of individuals with High-Functioning Autism and (2) to investigate the differences in emotion information processing between individuals with hearing impairment and normally hearing individuals.

a-1. Capacity of Social Working Memory and Autism. This study is designed to test whether individuals with social impairment have limited capacity of social working memory. To test this idea, possible differences in emotional information processing between adolescents with High-Functioning Autism (HFA) and normally developing adolescents will be explored using the Electroencephalography (EEG). Participants will be asked to take single (visual) and dual (visual-auditory) social tasks and their behavioral performance on those tasks will be compared. Changes in neural processing between single and dual social task conditions will be also measured, focusing on the amplitudes of N250 and P300 on frontal (F3, FZ, F4) and parietal (P3, PZ, P4) sites. It is hypothesized that although no salient group differences will be observed between the individuals with HFA and normally developing individuals in the single social task condition, the former group will perform significantly worse on the dual social task than their counterparts. Their incompetent performance on the dual social task would be also indicated by reduced amplitudes of N250 and P300, as the underlying neural markers of social working memory capacity. A 2x2x3 mixed ANOVA will be applied to measure the effects of sites, condition, and group on amplitude.

a-2. Hearing Impairment and Emotion Information Processing. In this project, the effects of hearing impairment and early adoption of American Sign Language on emotion information processing will be explored. Deaf signers rely heavily on facial information to read linguistic cues for communication and to detect emotions. Due to this unique form of communication, it has been speculated that deaf signers process facial information somewhat differently compared to those who are normal hearing individuals. The main purpose of this study is to investigate the difference in emotion recognition processing between deaf signers and normally hearing non-signers by focusing on N170. Two emotion recognition tasks will be administered to participants, one with full faces and another with half faces. It is expected that the differences in the latency and amplitude of N170 will be pronounced in the half face condition, implying that deaf signers have difficulty with comprehending emotional expressions in the

top halves without the critical facial information from the bottom halves. This difficulty will be reflected on slower latency and lower amplitude of N170.

(b) Roles students can play at sophomore, junior, and senior levels

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 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.

(f) 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

Kantner, Justin

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.

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.

Students have the opportunity to assist in multiple experiments related to understanding decision bias and training it in memory impaired individuals. 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. 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.

Kazemi, Ellie

My research involves methodological and conceptual issues in applied behavior analysis and alleviating the severe shortages of personnel qualified to provide evidence-based services to children with disabilities. My research is centered on examining effective teaching strategies (e.g., performance feedback) that lead to improvements in education, training, and supervision of parents, teachers, and staff who implement behavior plans. Undergraduates will be involved in applied and in experimental research that involves direct observation

and measurement of participants' skills as they behave across of a simulated client. Students are involved in all aspects of my research and have opportunities for co-authorships at conferences as well as peer reviewed manuscripts. Most students conduct literature searches, develop measurement tools, collect observational data, calculate inter-observer agreement, develop tables and graphs, help design experimental studies, co-author Human Subjects Committee protocols, recruit participants, conduct experiments, help develop training materials, and much more.

Lagana, Luciana

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.

Martinez, Jonathan

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

Oh, Janet

My research focuses on the development of children from backgrounds in a which a language other than the mainstream language is spoken. In particular, I am interested in the outcomes associated with heritage language loss and strategies for encouraging heritage language maintenance. My current project involves a collaboration with a community-based early childhood center for children ages 2 to 5 years in which we are working on the implementation and evaluation of a curriculum that will expose all children to three different languages — Spanish, Korean, and English. All children in the program come from homes in which at least one of these three languages is spoken. Students involved in the project would be engaged in all aspects of the research process, including literature reviews, development of assessment protocols, evaluations of children and the program, data entry and coding, and data analyses. Some conferences we typically attend are: the California Association for Bilingual Education (CABE), the California Association for the Education of Young Children (CAEYC), and the Society for Research in Child Development (SRCD) meetings.

Plunkett, Scott

The goals of my research are: (1) to examine ecological validity of mental health measures in ethnically-diverse emerging adults, and (2) to examine family, school, peer, and community influences on emerging adults' mental health. Emerging adulthood is when initial diagnosis of mental health problems often occurs; thus, valid measures are needed. I have access to large samples of emerging adults from Latino, Armenian, Russian, Middle Eastern, African American, and Asian populations from the university and from community samples. Undergraduates will work with cross-sectional and short-term longitudinal, self-report survey data. They will gain experience in (1) data collection, coding, and entering; (2) confirmatory factor analyses; (3) structural equation modeling; (4) multi-level modeling; (5) scale development and/or refinement; (6) SPSS; (7) Qualtrics; (8) coding qualitative data; (9) presenting and publishing research; etc. This research will provide valuable information about the ecological validity of mental health measures and insight into contextual factors that increase/decrease risk of mental health problems of emerging adults.

Quilici, Jill

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. 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)? 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.

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, though 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. 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 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.

Razani, Jill

Purpose and Research Questions Dr. Jill Razani has two major research projects in the area of health disparities. The first 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. **Methods and Analytical Process:** Both studies use a battery of neuropsychological tests designed to measure skills such as memory, attention/concentration, language, and reasoning. The dementia project also assesses activities of daily living skills, such as the ability to balance a checkbook, make a phone call, and carryout a shopping task. Patients in this study are assessed over several years. For both studies, various statistical methods are used to predict factors that affect functioning on neuropsychological and/or daily functional tasks. For example, in the multicultural study, level of acculturation is used to predict test performance, whereas in the dementia study, activities of daily living is predicted by cognitive functioning and neuroimaging. **Roles Students All Levels Can Play in This Lab:** 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. 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). 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. 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.

Rutchick, Abraham

The influence of priming, nonconscious exposure to stimuli, on thought and behavior has been well documented in cognitive and social psychology. To this point, however, applications of priming outside the laboratory context have been limited. My research program is aimed at filling this gap: it examines priming in

ecologically valid contexts. Specifically, my work focuses on exploring the use of mobile technology to administer health-promotive priming interventions. Currently, I am testing a priming intervention (based on subliminally presenting pleasant and relaxing images) to reduce pain. Students will help collect and work with self-report, behavioral, and physiological data. Students working with me will assist with all aspects of the research, including data collection and management, participant relations, study design, and training in analysis and interpretation.

Ruvalcaba, Omar

In my research, I focus on Latina/o children and youth's approaches to learning computer science concepts and learning in science, technology, engineering, and math (STEM) fields with the support of technology. The study focuses on turning points Latina/os and African American CS students' decision to pursue a computer science career. Interviews will include questions related to feelings of support, belongingness, stress, macroaggressions, and ethnic identity development. Interviews and surveys will be conducted with computer science students recruited at CSUN and possibly other nearby universities. The data will then be analyzed using qualitative and quantitative approaches. Students, regardless of year, will participate in data analysis, read articles on culture and science education, present at research conferences, attend weekly lab meetings, and run participants. Students who can stay for a long period of time (i.e. 1 year) will have opportunities to attend conferences. I typically attend the following conferences hosted by the American Educational Research Association, Society for the Research in Child Development, and the International Society for the Learning Sciences. Given the nature of the data, it is a plus if students are bilingual in Spanish. Students are NOT required to know any computer programming.

Tonyan, Holli

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. **Questions:** 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. **Analytic process:** 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). **Roles for students:** 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. **Conferences 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. **Other information for students seeking mentors:** 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.

Wohldmann, Erica

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

Department of Urban Studies and Planning

Covington, Kenya

(a) Purpose/Content

Mixed-income development is being widely adopted as an Urban Planning strategy that effectively decreases concentrated poverty, diversifies the population within the neighborhood by occupational, racial, and economic characteristics. Starting in the 1990s, the federal government moved to redevelop over 250 public housing complexes from entirely low-income designated housing to mixed-income housing in metropolitan areas spanning the U.S. It is important to gauge the potential health and psychological effects of living in mixed-income housing wherein the primary goal is to alleviate the consequences of concentrated poverty.

(b) Research questions or hypotheses

For this study, the primary Aims are:

1. To identify health effects (benefits), both physical and psychological, associated with relocating to mixed-income environments while considering tenant social dynamics.
2. To identify how the spatial dislocation, interruption of social networks and the creation of new ones in mixed-income housing effect overall household well-being.

(c) Method

The study will focus on federally subsidized mixed-income housing in the Los Angeles metro area. This is a quasi-experimental design that incorporates a control group for comparisons of health effects within federally subsidized mixed-income housing to federally subsidized low-income housing (public housing).

Utilizing a mixed-methods approach, the PI will conduct interviews, administer surveys and analyze archival documents to uncover the physical and psychological health effects associated with mixed-income housing including those effects related to the disruption and establishment of new social networks.

(d) Analytic process

The study requires **multiple analytical processes**. **Quantitative analysis conducted on current health conditions, psychological measures of stress** and life satisfaction and self reported health histories, which are paralleled to residential and social network histories of participants.

Undertake a **social network analysis** which follows the establishment and disruption of social networks.

(e) Roles students can play at sophomore, junior, and senior levels

Generally, students involved in this project will be trained and will perform a set of quantitative and qualitative skills typical to the social sciences. The tasks that students actually work on depend on the motivation exhibited. The list of possible tasks follows:

- Survey design (sophomores, juniors, and seniors)
- Conduct Interviews (sophomores, juniors, and seniors)
- Review, code, and enter data from archival documents (sophomores, juniors, and seniors)
- Conduct Psychological Assessments (juniors, and seniors)
- Administer surveys (sophomores, juniors, and seniors)

- Develop a dataset (sophomores, juniors, and seniors)
- Statistical Analysis (juniors and seniors)
- Write-up research findings (juniors and seniors)

(f) Conferences typically attended

Association of Public Policy, Administration and Management (APPAM) – Fall Conference

Urban Affairs Association (UAA) – Spring Conference

American Planning Association (APA) – Fall and Spring

(g) Other information pertinent to students selecting your research experience.

Students participating in this research project will be required to go out into the field and work with the poor.

Toker, Zeynep

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

Woldeamanuel, Mintesnot

Our cities face increases in obesity, and decreases 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. Thus, 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.). The data include a survey, field observation on the physical characteristics of the built environment and secondary data on health outcomes. Students are responsible for designing surveys, gathering primary and secondary data and making statistical and spatial analysis. Students will develop research and critical thinking skills that will help them succeed in their academic and professional endeavors.

College of Science & Mathematics

Department of Biology

Basu, Chhandak

(a) Purpose/Content: 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.

(b) Research questions or hypotheses: There are two major hypotheses

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

(c) 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.

(d) Analytic process: 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)

(e) Roles students can play at sophomore, junior, and senior levels: 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.

(f) Conferences typically attended: America Society for Plant Biologists, Society for In Vitro Biology, International Plant and Animal Genome Conference

(a) Other information pertinent to students selecting your research experience: Students are encouraged to enroll in BIOL 470 (Biotechnology) and Recombinant DNA (BIOL 572).

Bermudes, David

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, DNA 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.

Cooper, Kerry

The purpose of my research is to study the epidemiology, genetics, and pathogenesis of foodborne pathogens in order to develop effective intervention methods to help prevent human disease. I also investigate the role food plays in transmitting antibiotic resistant bacteria to people through their daily diet. **Research Questions:** 1. Since fresh produce is the number one source of foodborne disease, what types of produce have the highest rates of contamination? **Methods.** Students will learn to process food samples and isolate foodborne pathogens including *Salmonella*, *Listeria*, *Escherichia coli*, and *Campylobacter* from various types of fresh produce. Suspected isolated pathogens are confirmed using polymerase chain reaction (PCR). Confirmed

pathogens present in the food are quantified to determine how much of each pathogen is present in the different produce types. **Analysis.** Students will learn to quantify bacteria from food samples, determine epidemiological risk due to various produce products, interpretation of DNA gels, and perform statistical analysis on data. 2. Since 80% of all antibiotics used in the United States are used by the agricultural industry, what risk does food have in transmitting antibiotic resistant bacteria to consumers? **Methods.** Students will process various food samples including produce, poultry, beef, pork and seafood, and isolate bacteria that resistant to at least one of eight different medically important antibiotics. Isolated bacteria will then be identified by PCR amplifying the 16S rRNA gene of the bacteria, and then sequencing the DNA to determine the bacterial species. **Analysis.** Students will learn to quantify the total amount of bacteria that is present in our food, and also quantify the amount of bacteria resistant to the different antibiotics. Students will also determine the percentage of bacterial population in food that is resistant to the different antibiotics, and what type of bacteria is commonly antibiotic resistant in different types of food. **Student roles:** Sophomores: Will begin performing basic laboratory and microbiological techniques, assist in media preparation, learn to assist with food sampling, and also learn to identify the different pathogens. Juniors: Will perform food sampling, identify and quantify different pathogens, learn anaerobic cultivation methods, perform PCR screening for potential pathogens, and also begin bioinformatics (genome assembly and annotation). Seniors: Begin to take the lead on a major project, perform anaerobic cultivation, PCR and genotyping of different bacteria, and comparative analysis of bacterial genomes. **Conferences:** Local: CSU Biotechnology Symposium and American Society for Microbiology (ASM) Southern California Branch Annual Meeting; National: ASM General Meeting, Anaerobe Society of the Americas Annual Meeting; International: *Campylobacter, Helicobacter*, and Related Organisms and Clostridium. **Other information:** The Cooper laboratory is Biosafety Level-2 (BSL-2); therefore, working in the laboratory requires additional training that is provided by Dr. Cooper. However, this type of work provides excellent opportunities in particular for students who are interested in studying infectious disease, pathogenesis, genetics, comparative genomics, bioinformatics and epidemiology, although the opportunities are not limited to those areas. There are additional research projects going on the laboratory that could not be listed here.

de Bellard, Maria Elena

(a) Purpose/Content

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

(b) Research questions or hypotheses:

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.

(c) Method:

- Glia migration: here students work with cell lines and challenge them with chemoattractants while live imaging them. Then cells are individually tracked and compared with control cells behavior.

- Neural crest in evolution (evo-devo project): We collect embryos (chicken, shark, snakes, frog, turtle, etc) and immunostain them with a marker for neural crest cells. Thus we are able to see these cells in embryos at different stages of development.

(d) Analytic process:

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.

(e) Roles students can play at sophomore, junior, and senior levels:

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.

(f) Conferences typically attended

-Society for Neuroscience, CSUPERB and Society for Developmental Biology.

Espinoza, Robert

Research in my 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 (>7400 and >10,000 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. The current research themes in my lab include: (1) thermal adaptation, (2) diet evolution, and (3) invasive species ecophysiology. 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 the animal’s physiology. Invasive species are ideally suited for testing rapid evolution in physiology and ecology, as successful invasives can become established in climates that are radically different from their native ranges. We use a diverse array of methods and analytical tools to address the broad range of studies conducted in our lab. 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 biogeography. Nearly every new study brings with it new analytical tools. Students from sophomores to grads to postdocs have worked in my lab. New students are mentored by me or a senior undergrad or grad until proficiency is established, then given their own project. In weekly lab meetings we practice giving presentations, 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 career goals and create a plan to help them reach those goals. Our lab has also hosted several postdocs and visiting scientists from Argentina and Brazil from three months to a year. Members of my 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 Experimental Biology and other regional meetings from time to time as well.

Flores, Gilberto

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

Hong, Ray

- (b) Purpose/Content:** To understand the chemosensory genes involved in the interaction between invertebrates.
- (c) Research questions or hypotheses:**
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.
- (d) Method:** Molecular biology and genetics involving PCR, recombinant DNA technology, genetically modified organisms, bioinformatics.
- (e) Analytic process:** Reductive and quantitative, we try to isolate factors to characterize genetic function. Data collection and processing is quantitatively intensive.
- (f) Roles students can play at sophomore, junior, and senior levels:**
1. Sophomores: genetic screens, DNA extraction, PCR
 2. Junior: genetic crosses, advanced PCR, recombinant DNA “cloning”
 3. Senior: independent project involving the above techniques
- (g) Conferences typically attended:**
- CSUPERB conference (CSU Program for Education and Research in Biotechnology)(January)
 - CSUN Student Research Symposium (February)
 - CSUN Sigma-Xi Research Symposium (April)
 - International *C. elegans* Conference (June)
 - Society for Developmental Biology (July)
- (h) Other information pertinent to students selecting your research experience:**
- Sophomores: strong performance in BIOL106; will be paired with a more senior student (undergraduate or masters) on specific projects.
 - Junior: strong performance in BIOL107; BIOL360 Genetics; ready to be part of a team.
 - Senior: strong performance in BIOL380 Cell Biology and other advanced courses in biology. Ready to work on an independent project.

Kelber, Jonathan— NOT ELIGIBLE FOR NEW MENTEES

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.

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.

Trainees in our group will gain experience with the following techniques: 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, Bioinformatics, 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.

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

Loza Coll, Mariano

(a) Purpose of the Research. 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. (b) Hypothesis. In the context of Build PODER, we will test the following hypothesis: 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. (c) Methodology. We will 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 will also identify new genetic modules and pathways to test in flies through the bioinformatics integration of public datasets from genome-wide screens related to stem cells. (d) Analysis. Cell-type specific markers and genetic activity reporters will allow us to not only quantify adult stem cells in a tissue, but also the identity and function of their progeny. In a typical experiment, we would subject flies to an environmental stressor and/or a genetic manipulation in adult stem cells, dissect the relevant organs and use microscopy to quantify stem cells, their division rates, morphology, gene expression profiles, etc. (e) Student involvement. 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. (f) Dissemination. Every year, the Genetics Society of America (GSA) organizes the Annual *Drosophila* Genetics Research Conference, which is notorious for their appreciation of undergraduate research, including Poster and Platform sections dedicated exclusively to undergraduate research. I will encourage my students to submit abstracts and/or attend these meetings every year. 2015/16 Build PODER Mentor Application - Summary of Research Program Loza-Coll Lab (CSUN, Biology) (g) Additional information. 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.

Malone, Cindy- NOT ELIGIBLE FOR NEW MENTEES

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 a non-aggressive/indolent cancer by an analysis of genes expressed (turned on) in an aggressive mantle cell lymphoma (MCL) compared to the genes expressed a 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. 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. 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 regions 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. 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 and 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. Students present their work at conferences and are integral in the manuscript and publication submission process. Conferences include CSUPERB, CSUN symposia, Sigma Xi Symposia, UCLA Stem Cell symposia, CIRM Bridges Trainee meeting, Gordon conferences, ISSCR. Students performing research in my laboratory often go on to the CSUN UCLA Bridges to Stem Cell Research Program, PhD programs, industry jobs, and professional schools.

Murray, Sean

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. My research questions include: 1. What genes are differentially regulated during starvation? a. 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. b. Analysis. CSUN Professor Dr. Kerry Cooper and his 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? a. 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. b. Analysis. 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? a. 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. b. Analysis. 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. Sophomores will make bacterial growth media and solutions, culture bacteria using the aseptic technique, and clone PCR products into vectors to create transcriptional reporters. Juniors will confirm gene transcription using transcriptional reporters and create gene knockouts. 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 antibiotic-treated cells. 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. The Murray laboratory offers excellent training for students who are interested in becoming clinical laboratory scientists or public health microbiologists

Medh, Rheem

Purpose/Content: 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 Questions 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.

Analytic Process: 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 Role: 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, gel mobility shift assays, reporter gene assays, cell proliferation assays, apoptosis assays and flow cytometry.

Conferences 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.

Other Information: 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.

Rogers, Crystal

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. 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. 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. 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 such as the Society for Developmental Biology and American Society of Cell Biology national meetings to present their research with the PI. For more information look at www.crystalrogersphd.com.

Ruiz Rueda, Cristian

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”. 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. I am especially interested in the physiological role of multidrug efflux pumps such as AcrAB_{TolC}, the main multidrug efflux pump in *Escherichia coli* and many other pathogenic enterobacteria. 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. 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. 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.

Summers, Michael

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. 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.

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.

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.

My lab provides a supportive environment for students who wish to work hard and discover new things about this little known suborganelle in bacteria. 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.

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.

Van Buskirk, Cheryl

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. We posit that perturbations of cellular homeostasis drive sleep behavior, which in turn allows allocation of resources toward restoration of homeostasis. 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. 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! 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). Undergraduate students involved in my research program have been very competitive for PhD programs, as well as for entrance to health professional schools.

Department of Chemistry & Biochemistry

Fischhaber, Paula

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-SceI-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. 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.

Kelson, Eric

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

Medh, Jheem

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

(b) Research questions or hypotheses: 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.

(c) Methods: 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.

(d) Analytic process: 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.

(e) Roles students can play at sophomore, junior, and senior levels: 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. Students will learn experimental techniques, analytical skills, and the ability to communicate their research project and data.

(f) Conferences typically attended: All students usually attend the CSU-wide Biotechnology symposium held in January each year. (g) Other information pertinent to students selecting your research experience: Students will be co-authors on publications describing their work.

Minehan, Thomas

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. 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. 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 taken General Chemistry courses (Chem 101, 102 or equivalent). The synthetic and spectroscopic techniques used in this research can be learned in the lab in hands-on fashion. Conferences typically attended include American Chemistry Society National Meetings, Southern California ACS Meetings, and National Sigma Xi Student Research Symposium.

Oh, Taeboem

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 imaging 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 atropisomers based on imidazolium compounds capable of catalyzing various synthetic methods, investigate the mechanism that gives high stereoselectivities in ionic liquids at room temperature, and apply this method to asymmetric synthesis of biologically active compounds.

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 paramagnetic resonance (EPR) are important. The most important part of the analysis is the structure-activity studies, which utilizes computational modeling. 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. In doing so, 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. We have a history of students attending national ACS, NOS, local ACS, SCCAP, and symposia on campus.

Schrodi, Yann

There exists a critical need for new robust olefin metathesis catalysts based on innocuous and abundant metals, but little effort has been applied toward addressing it. The lack of reports in this area of organometallic chemistry is related to the relative difficulty in preparing alkylidene complexes of low-valent transition metals. This unmet need represents an important problem: until such catalysts are discovered, the development, production, and commercialization of olefin metathesis-enabled drugs will remain hampered by metal-contamination and economic concerns. Our long-term goal is to provide inexpensive, nontoxic, highly efficient, robust and selective olefin metathesis catalysts to the community of synthetic chemists. The overall objective

of this application is to develop olefin metathesis catalysts based on low-valent molybdenum and iron metals. A subordinate objective of this project is to develop a new method for the preparation of low-valent transition metal alkylidene complexes. The rationale behind this research is that the discovery of such catalysts will equip the pharmaceutical industry with a powerful tool that will ultimately yield more affordable, safer, and cleaner methods to produce therapeutics. Three specific aims will be pursued. In specific aim 1, a new method for the easy preparation of metal alkylidene complexes will be developed based on the reaction between metal precursors and derivatives of 1,1-diphenyl-2-propyn-1-ol where one phenyl group bears electron-donating groups in its meta positions. The working hypothesis for specific aim 1 is that the electron-donating groups will activate the ring and favor the formation of olefin metathesis-active metal alkylidene complexes over that of inactive metal allenylidene species. In specific aim 2, this new method will be used to prepare iron and molybdenum alkylidene complexes supported by diimine and bis(imino)pyridine ligands. Additionally, two alternative methods to prepare the targeted metal alkylidene complexes will also be investigated under specific aim 2. The first alternative method will be based on the reaction of metal-chloridehydride complexes with propargyl chloride derivatives, while the second will involve the preparation of metallacyclobutane compounds. The working hypothesis for specific aim 2 is the following: ligand-metal systems that have proven active in Ziegler-Natta olefin polymerization have a high potential to be active in olefin metathesis. Finally, specific aim 3 will focus on testing the catalytic activity of the new metal alkylidene complexes in different olefin metathesis. The completion of this work will yield new robust olefin metathesis catalysts based on inexpensive and innocuous metals and a new general method for preparing alkylidene complexes of low-valent transition metals. This research is significant, because it will facilitate the discovery and the commercialization of olefin metathesis-enabled drugs. Students from all levels (sophomore, junior, and senior) will be able to participate in this research. Less experienced students will contribute by preparing organic relatively simple molecules while more experienced students will tackle the synthesis and testing of organometallic catalysts. Students will attend and present at local (CSUN Research Symposium), regional (Southern California Undergraduate Research Symposium; American Chemical Society Regional Meetings) and national meetings (ACS National Meetings).

Vey, Jessica

Enzymes are capable of an enviable variety of chemical transformations. A thorough understanding of catalysis by an enzyme would allow us to harness its activity for new applications. The flavin monooxygenases are one example of an enzyme family capable of a useful set of reactions. Our goal is to make the flavin monooxygenases amenable to bioengineering by contributing to our understanding of the enzyme family. Here, we will characterize vlmH, a representative flavin monooxygenase. We will study the function of each vlmH active site residue by mutating the residue and assessing the effect of the mutation on catalysis. Students in our laboratory use a variety of techniques, including molecular biology, bacterial culture, protein purification and enzymatic characterization. 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.

Department of Mathematics

D'Osogna, Maria-Rita

I have been CSUN faculty since 2007 and my interests are in biomathematical modeling and computation. Students are very useful in helping dissect problems. The tasks they are given are appropriate to their level of training and include solving simplified ODEs or PDEs, numerical simulations and literature review. They learn critical thinking, how to best pick the proper tools to analyze problems, how to give presentations to their peers, they learn the basics of Python or C coding, how to write scientific documents in latex and how to present their work clearly and concisely. They are encouraged to attend seminars and are exposed to research opportunities outside of CSUN. My funding has come from the ARO and NSF. I work on the following topics: Swarming: Schools of fish, flocks of birds, swarms of insects are just a few examples of collective biological patterns formed by interacting individuals. We study these systems as discrete particles or as continuous densities identifying under which conditions flocks, rotating mills, rings and clumps can arise. We applied our results to two and three dimensional systems, to locust aggregations, fluid-based environments and towards the control of robotic systems.

Viral dynamics: HIV or influenza attach to host cells by binding to receptors on the cell surface. Entry occurs via membrane fusion after a sufficient number of receptors have engaged ligand proteins on the virion. We model viral entry dynamics via attachment/detachment stochastic processes that may include diffusion of receptors and analyze viral entry time as a function of receptor concentration and diffusivity, binding stoichiometry, attachment, detachment and degradation rates. We perform statistical analysis on data from a UCLA HIV virology lab.

PTSD: As war veterans return from the Middle East, understanding and helping them overcome possible psychological trauma, such as PTSD, is fundamental in returning to civilian life. The hypothalamic-pituitary-adrenal (HPA) axis, is a neuroendocrine system regulated by several peptide hormones that is greatly affected by PTSD. A proper mathematical quantification of the intricate relationships that regulate the HPA axis is still lacking. We develop dynamical systems models where external stress, such as explosive detonation or ambushes can trigger transitions between various basins of attractions. This is a novel field and there are many opportunities for exciting research.

Nucleation and Growth: Molecular aggregation in biology often takes place in confined spaces and leads to finite-size superstructures. Examples include actin filament and amyloid polymerization, virus capsid or clathrino-coated pits assembly, antimicrobial peptides aggregation into transmembrane pores. We study these systems via mass-action equations, with finite size constraints and as stochastic processes. We include diffusion, consider reversible and irreversible attachment and calculate the time to completion of a finite structure, for example, the time for a full viral capsid to form. We applied this work to the accumulation of prion proteins in brain amyloids, responsible for degenerative diseases such as Alzheimer's.

Li, Jing

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. My research questions concern the game theory of epidemic control and management. 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. 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. Conference typically attended include 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.

Shapiro, Bruce

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 own 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. 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. The project will focus on having students learn to develop computational models of disease metabolism, 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 an 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. 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.

Department of Physics & Astronomy

Luchko, Tyler

Safe, reliable pharmaceuticals are key to our health and quality of life. However, the time and money required to develop new drugs has rapidly increased at the same time as old drugs have started to fail (e.g., anti-biotic resistance) and large-scale threats have been recognized (e.g., pandemic influenza). The purpose of research in the Luchko group is to develop new physics-based tools for computer aided drug design. By making drug design easier, faster and more rational, the time and effort to produce new drugs will be reduced. This is expected to particularly benefit drug development for neglected diseases, where investment costs have previously outweighed returns, and emergent diseases, where traditional development models fail. The fundamental question in our group is 'can we predict how strongly a potential drug will stick to its biological, molecular target?' We are approaching this in two distinct ways. 1) Can we improve traditional physics-based approaches? Physics-based methods are the most accurate and flexible but are also the slowest. Using new theories from statistical physics, we aim to maintain realism and accuracy while significantly reducing the computational cost. 2) Can we guide the design of new drugs using the structure of the surrounding water? Water interacts strongly with the binding site of the target protein. Our new methods use water as a molecular probe to guide medicinal chemists as they modify and refine new drug candidates. Our methodology is a combination of theoretical and computational statistical physics. Fundamental concepts are developed from theoretical physics and then applied to real biological systems using computer simulations. Data analysis primarily consists of comparing our theoretical predictions against experimental results using standard statistical methods. Typical methods include bootstrap error analysis, covariance calculations and linear regression. In addition, we use a number of visualization methods to provide a more qualitative understanding of the data. Sophomore students will acquire new computational tools and learn the background of the methods used. Students will begin running simulations on biological or model systems toward the end of the year. Junior students will continue running simulations and begin analyzing to the resulting data. They will synthesize these results to produce figures and draw conclusions about the success or failure of trial methods. Senior students may apply tools they have acquired to a particular biological system, such as influenza, to generate or test new drug compounds. Alternatively, they could implement new, advanced methods and work with junior students to test them. In the three years that Dr. Luchko has been at CSUN, his students have attended American Chemical Society and Material Research Society national meetings and the Summer Training Workshop in Biomolecular Simulations. Dr. Luchko attends meetings of the American Chemical Society, American Physical Society and a number of smaller workshops and conferences. Your research in the Luchko group will be truly interdisciplinary, combining biology, chemistry, computer science, mathematics and physics. The work will require you to acquire a diverse set of skills and will put you at the leading edge of medicinal research.

Taheri Araghi, Sattar

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 quantitative 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.

Four student positions are available in our lab in 2016-2017. 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

Chen, Edith

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. 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). 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. 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 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. Students will also participate and gain skills in conducting a literature review, research design, statistical analysis, and manuscript preparation.

Conferences: Association for Asian American Studies; American Public Health Association; American Sociological Association

Department of Chicano/a Studies

Sanchez-Munoz, Ana

a) Purpose/ context

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.

b) Research questions

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?

c) Methodology

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)

d) Data Analysis

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)

e) Student involvement

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.

2. Conferences

I have presented my research at various National and International Conferences, including the following: 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).

Department of Religious Studies

Baugh, Amanda

A 2014 national survey of over 3,000 Americans found that Hispanic Catholics were twice as likely as white Catholics to be very concerned about climate change, just as Black Protestants were more likely to be concerned than white Protestants. This finding came as a great surprise, because American environmentalism continues to be associated with the concerns of white elites, despite efforts to diversify the movement. Environmental deprivation theory offers one possible explanation for the survey's results. According to this theory, marginalized communities will express greater concern about environmental problems because they are the first to suffer from catastrophes caused by global warming and other environmental hazards. But is this reasoning actually expressed in minority communities? The release of *Laudato Si*, Pope Francis' historic encyclical on climate change and the environment, offers a powerful and timely opportunity to examine that question.

My preliminary research among Catholic Latinos in Los Angeles, conducted just before the encyclical's release, challenged environmental deprivation theory as the primary explanation for Catholic Latinos' greater concern. In focus groups that I conducted in May 2015 among English- and Spanish-speaking Catholics, my interlocutors offered idealized visions of a Latin American homeland as a primary explanation for Latinos' greater climate change concerns. They also expressed heartfelt, religiously grounded commitments to the environment more broadly, thus challenging a prevalent assumption that theologically conservative religious groups are unlikely to consider environmental conservation an important religious issue.

As the project continues, I will build on my preliminary research by conducting in-depth ethnographic research among white and Latino Catholics in Los Angeles. The release of *Laudato Si* has created an opportune moment for exploring these issues, because it provides a springboard for discussing religiously grounded environmental values in Catholic communities. Through participant-observation, ethnographic interviews, and focus groups, I will investigate whether and how ethnoreligious worlds contribute to distinctive environmental values, attitudes, and behaviors.

STUDENT ROLES: Student researchers are involved with the project by helping to conduct outreach, focus groups, and interviews, and by transcribing and coding research data. **STUDENTS WITH A STRONG COMMAND OF SPANISH ARE ESPECIALLY NEEDED.**

CONFERENCES: I have attended the conferences of the American Academy of Religion, the Association for Environmental Studies and Sciences, and the International Society for the Study of Religion, Nature, and Culture.

White, Claire

The main goal of the research is to investigate the interaction between bereavement practices and mental health outcomes of Chinese American (CA) adults in LA. To establish the extent to which: (1) Aspects of CA bereavement are still practiced. (2) Are understood by professional services. (3) CA access to health care services. (4) The effectiveness of those services when used. Students will assist with the following: Conduct a literature review of traditional CA funerary practices, advertise the survey, recruit CA and mental health practitioners as participants, construct electronic survey, analyze data. Students will gain skills in conducting a systematic literature review, outreach/promotion of a project to minority groups and mental health services, participant recruitment of individuals and organizations, constructing electronic survey in Qualtrics online platform, and analyzing data: cleaning data using excel, performing content analyses of free text, performing descriptive statistics using SPSS.

College of Engineering & Computer Science

Department of Computer Science

Nahapetian, Ani

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. 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. 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. 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. Students will target IEEE and/or ACM conferences in mobile computing, wireless health, and/or wearable computing.

Department of Electrical and Computer Engineering

Osorno, Bruno

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. 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). 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. 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.

Valdovinos, John

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.

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 thrusts 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 Metglas to increase the efficiency and coupling between a receiving antenna and transmitting antenna.

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. 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). The conferences which can attend the 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.

Department of Manufacturing Systems Engineering and Management

Li, Bingbing

I have dedicated research projects in 3D printing technology to manufacture and remanufacture products through laser cladding technology, selective laser sintering/melting technology, fused deposition modeling technology and inkjet bioprinting technology. I am the Director of Laboratory for Sustainable and Additive Manufacturing (LSAM) in the Department of Manufacturing Systems and Engineering Management. The objective of biomedically relevant research in LSAM is to enable inkjet 3D printing of biocompatible materials, cells and supporting components into complex 3D functional living tissues. 3D inkjet bioprinting is being applied to regenerative medicine to address the need for tissues and organs suitable for transplantation. The research will reproduce the complex microarchitecture of extracellular matrix (ECM) components and multiple cell types in sufficient resolution to recapitulate biological function. I am using drop-on-demand (DOD) inkjet printing approach for the replacement of damaged or injured human organs, providing a promising solution to the challenge of organ donor shortage. The specific objective is to investigate the droplet formation process (in terms of the breakup time, droplet size and velocity, and satellite formation using a time-resolved imaging approach) during the DOD inkjetting of cell-laden fluids. This is the basic research for 3D bioprinting process and will be applied to construct the zigzag cellular tubes, vascular-like alginate tubular constructs. This research will utilize an existing inkjet fluid Microdispensing Subsystem (MicroFab Technologies Inc) in LSAM. In this Microdispensing Subsystem, thermal forces are used to eject drops of liquid onto a substrate which will support or form part of the final functional living tissues. Students will be responsible for experiments setup, biomaterials fabrication, ink solution preparation, data collection, preliminary data analysis and presentation. Students will gain a broad set of research-related skills, including experimental design, 3D bioprinting process design, biomaterial science, environmental mentoring, equipment calibration, data analysis and public communication of findings. I am also supervising the CSU I-Corps Faculty-Led Team, Epicenter University Innovation Fellows Program, Epicenter Pathways to Innovation Program, and VentureWell E-Team Program. Students who work with me will obtain additional experiences and opportunities from these great programs. Conferences typically attended include: CSU Annual Biotechnology Symposium, International *Solid Freeform Fabrication Symposium*, *CIRP International Conference on Life Cycle Engineering (LCE)*; *SME North American Manufacturing Research Conference (NAMRC)* and *ASME's Manufacturing Science and Engineering Conference (MSEC)*; and *IEEE International Symposium on Sustainable Systems & Technology (ISSST)*.

Department of Mechanical Engineering

Durgesh, Vibhav

(a) Purpose/Content

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.

(b) Research questions or hypotheses

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 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.

(c) 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.

(d) Analytic process

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.

(e) Roles students can play at sophomore, junior, and senior levels

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.

(f) 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.

(g) Other information pertinent to students selecting your research experience.

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.

Mukherjee, Abhijit

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. Students will work to develop understanding of the physics of the problem as well learn to use CFD tools. Conferences typically attended include the ASME Fluids Engineering Conference.

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

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

Methods and Analytic Process

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.

Students Roles and Research Experience

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.

Conferences Opportunities

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. 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.