Undergraduate Research and Creative Work

11 December 2015 – 8:00 a.m. to 3:00 p.m.
Sakamaki Hall
Campus Center Ballroom
Honolulu, Hawai‘i
<table>
<thead>
<tr>
<th>TIME</th>
<th>ACTIVITY</th>
<th>LOCATION</th>
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<tbody>
<tr>
<td>8:00-8:45a</td>
<td>Registration and Breakfast</td>
<td>Sakamaki First Floor</td>
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<tr>
<td>8:45-8:55a</td>
<td>Opening Ceremony</td>
<td>Sakamaki First Floor</td>
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<tr>
<td>9:00-10:00a</td>
<td>Oral Presentations</td>
<td>Breakout Rooms</td>
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<td></td>
<td>Session One</td>
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<tr>
<td>10:00-10:10a</td>
<td>Break</td>
<td>Courtyard</td>
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<tr>
<td>10:10-11:10a</td>
<td>Oral Presentations</td>
<td>Breakout Rooms</td>
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<td>Session Two</td>
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<tr>
<td>11:10-11:20a</td>
<td>Break</td>
<td>Courtyard</td>
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<tr>
<td>11:20a-12:20p</td>
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<td>Session Three</td>
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<tr>
<td>12:30-1:30p</td>
<td>Lunch and Awards Ceremony</td>
<td>Campus Center Ballroom</td>
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<tr>
<td>1:30-3:00p</td>
<td>Poster Presentations Session</td>
<td>Campus Center Ballroom</td>
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LOCATION

**Sakamaki Hall**

- Oral Presentations Session One 9:00a - 10:00a
- Oral Presentations Session Two 10:10a - 11:10a
- Oral Presentations Session Three 11:20a - 12:20p

**Campus Center Ballroom**

- Lunch and Awards Ceremony 12:30 - 1:30p
- Poster Presentations 1:30 - 3:00p

*next to name in schedule indicates student is also presenting a poster*
Oral Presentations Session One
9:00 - 10:00a

A102  Natural Sciences Projects

9:00  Echelle Burns          The Response of Captive Hammerhead and Sandbar Sharks to GoPro™ Cameras

9:15  Taylor Jackson        Testing the Enemy Release Hypothesis by Quantifying Leaf Herbivory on Invasive and Native Mangroves


B101  Arts & Humanities Projects

9:00  Katarina A. Brewbaker   Old Wine, New Skins: Models of Roman Leadership in the Court of Charlemagne

9:15  Jon H. Omuro           Queering the Gay/Christian Intersection: An Exploration of Celibacy, Ex−Gay, and the Closet in Gay Christian Narratives

9:30  Cindy Huynh            Remember Me

9:45  Geovante Joseph,       Long−form Improvisation at the San Francisco Improv Festival: An Investigation into Approaches
      Charles Moreland,        Erik Wagenmann,
      Courthney Pruyn,         Malia Wessel
      Leiney Rigg,
## Oral Presentations Session One
### 9:00 - 10:00a

### B102  Natural Sciences Projects

<table>
<thead>
<tr>
<th>Time</th>
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<tbody>
<tr>
<td>9:00</td>
<td>Abraham Kwan</td>
<td>Bioremediation of Dibenzothiophene with the Bacteria <em>Burkholderia</em> sp. C3</td>
</tr>
<tr>
<td>9:15</td>
<td>Melissa Walker</td>
<td>Uncovering Aquatic Mysteries: Algal Diversity in Freshwater Systems</td>
</tr>
<tr>
<td>9:30</td>
<td>Bertram Booker, Rommel Yanos</td>
<td>Algal Wastewater Treatment, Carbon Capture, and Biofuel Production</td>
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<td>9:45</td>
<td>Kristen Jamieson*, Michael Rogers, Benjamin VanEgtern</td>
<td>Feasability Study of Implementing an Aerated Static Pile Compost System for Food Waste in University of Hawaii Housing</td>
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<td>Zhaotong Xu</td>
<td>The Genetic Knockdown of PRAF1 in Drosophila melanogaster</td>
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<td>Adam Bajinting*</td>
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<td>9:15</td>
<td>Cassandra M. Ferguson</td>
<td>Perceptions of Biotechnology in the Hawaiian Islands</td>
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<tr>
<td>9:30</td>
<td>Nicholas Kawelakai Farrant</td>
<td>Understanding the Community Food and Energy Movement on O'ahu's North Shore</td>
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<tr>
<td>9:45</td>
<td>Kaile J. Luga</td>
<td>Mai Ka Ho'oku'i A Ka Hālāwai From Hawai'i to Kahiki – Pōhaku Ku'i 'Ai of East Polynesia</td>
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<tr>
<td>9:00</td>
<td>Jason P. Cahela</td>
<td>The Effects of Stress on the Recall of Long-Term Contextual Fear Memories</td>
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<tr>
<td>9:15</td>
<td>Nicolyn H. Charlot*</td>
<td>Poached Partner? Jealousy Influenced by Masculinity, Self-Esteem, and Gender Role Stress</td>
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<td>Ram Lal BK*</td>
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## C103 Social Sciences Projects

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<td>Behavioral Effects of Youth Asthma in Nanchang, China</td>
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<td>Sally Voss*</td>
<td>Assessment of Diabetes Awareness Among Adults in Nanchang, China</td>
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Oral Presentations Session Two
10:10 - 11:10a

A102 Natural Sciences Projects

10:10 Coral R. Bielecki* Underlying Mechanisms of Temperate Butterfly Diversity in Anthropogenic Habitats

10:25 Margaret Moeller* Development of Larval Rearing Techniques for the Hawaiian Slipper Lobster Scyllarides squammosus

10:40 Michellei C. Fisher* Using Primary Human Renal Proximal Tubule Epithelial Cells as a Model to Study Human Polyomavirus JC Pathogenesis

B101 Arts & Humanities Projects

10:10 Aira Kariah Iglesias Magic Island: The Permeable Park

10:25 Cory Kamehanaokalā Holt Taum Māori and Maoli Art Exchange: A Creative Project Inspired by the Correlation of Contemporary Māori and Hawaiian Art

10:40 Vanessa Maldonado*, Kevin Morita, Charles Mukaida, Jerilyn Ornellas, Erin Richardson Severin, Megann Salā Voices of Aloha: Preparing for Travel through Research, Practice, and Sharing
B102  Natural Sciences Projects

10:10  Jennifer Erica Bright*  A Sustainable Fashion Industry for Hawai’i

10:25  Hannah Azouz*  Aftermath of Fukushima: How Low is Too High?

10:40  Trista McKenzie*  Quantifying Atmospheric Fallout of Fukushima-derived Radioactive Isotopes in the Hawaiian Islands

B103  Natural Sciences Projects

10:10  Ashley Heikkila  Regional Aerosol–Cloud Analysis: Vertical Distributions and Seasonal Fluctuations from CALIOP

10:25  Cynthia Li  Exploring the Impact of Toll–Like Receptor Signaling on Memory B Cell Differentiation and Cytokine Secretion

10:40  Anthony Chen  Investigating Differences in Substrate Preference and Binding in 7,8-Diaminononanoic Acid Synthase from E. coli and B. subtilis via Site Directed Mutagenesis
C101 Social Sciences Proposals

10:10 Ksenia Bussard* Human Papillomavirus (HPV) Vaccination Among Students in Hawai‘i

10:25 Dejah Fa'asoa* Care and Prenatal Health Services in the Communities of American Samoa

10:40 Carolyn Marie Burk* Assessing Prenatal Healthcare Provider Knowledge and Practices: An Approach to Improve Prenatal Health Outcomes in the Hawaiian Islands

C102 Social Sciences Proposals

10:10 Christopher D.H. Chow* Promoting School-Based Hearing Screenings Among Hawai‘i’s Youth

10:25 Stephanie Cacal Kalusugan at Kayamanan (Health and Wealth) of Filipinos in Kalihi

10:40 Annalyn Tagabi Oliveros* Promoting Early Detection of Breast Cancer Among Filipino Women in Hawai‘i

10:55 Hide Yee Ching Wu Urinary Tract Infection: Importance in Detection, Diagnosis, and Treatment
Oral Presentations Session Three  
11:20a - 12:20p

A102  Natural Sciences Proposals

11:20  Coral R. Bielecki  
Hybrid Populations of *Bidens sandvicensis* and *Bidens asymmetrica*

11:35  Marissa Kuo  
The Liver Support System: The Potential Roles of PDGF Receptors in Liver Fibroblasts

11:50  Brandon K.C. Taylor  
The Identification of the Predisposing Gene That Influences the Epidemic of Malignant Mesothelioma in Cappadocia, Turkey

A103  Natural Sciences Proposals

11:20  Nicolina Pascua  
Young Stars of High Variability

11:35  Mc Millan Nicol Ching  
Expression of *Leucaena* mimosinase in a *Rhizobium* mutant defective in *mimosine* degradation

11:50  Janal Kim  
Regulation of the Transcription Factor Six2 by miRNAs
### A104  Engineering and Computer Sciences Projects & Proposals

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<thead>
<tr>
<th>Time</th>
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<tbody>
<tr>
<td>11:20</td>
<td>David Aghalarpour</td>
<td>An Analysis of Traditional and Real-Time Web Application Frameworks: Meteor vs. Play Framework</td>
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<tr>
<td>11:35</td>
<td>Michael She</td>
<td>Creating Videogame</td>
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<tr>
<td>11:50</td>
<td>Britton Warfield</td>
<td>Ergonomics of a Car Seat</td>
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### B101  Arts & Humanities Proposals

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<tbody>
<tr>
<td>11:35</td>
<td>Tani Mei Loo</td>
<td>The Labyrinth: A Kafkaesque Reality Reinterpreted</td>
</tr>
<tr>
<td>11:50</td>
<td>Madisyn Uekawa*</td>
<td>Enhancing Suicide Prevention for College Students through Literary Text</td>
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### B102  Natural Sciences Proposals

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<td>Brandon M. McMurtry*</td>
<td>On the Formation of Pyridine Carboxylic Acids in Interstellar Model Ices</td>
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<tr>
<td>11:35</td>
<td>Leo V. Louis</td>
<td>Identification of Tongan Fungi Using Morphology and DNA Fingerprinting</td>
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<tr>
<td>11:50</td>
<td>Diana Z. Holden</td>
<td>Particle Tracking of HIV: Investigation of Monocytes as Potential Reservoirs</td>
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B103  Natural Sciences Proposals

11:20  Mayumi Fernandez  Expression of Ovarian Markers in Developing Testes of Males Lacking Y Chromosome Genes During the Window of Sex Determination

11:35  Shalin Zhang  Expression of Aromatase in *Escherichia coli* for Ligand Binding Studies

11:50  Eric Ramos Agluba*  Identification of the Molecular Components of a *Calanus Finmarchicus* Toll Like Receptor

12:05  James Green  Agroinfiltration of the coat protein gene of *Tobacco mosaic virus* (TMV) to confer resistance to TMV in transgenic *Nicotiana benthamiana*

C101  Social Sciences Proposals

11:20  Palo Teuila Kararaina Memea  The Blue Zones Project

11:35  Alissa Harada*  Factors Associated with Leadership Behaviors in Nursing Students

11:50  Xuefang Chen*  Attitudes toward Seeking Professional Psychological Help and Psychotic Symptoms in Asian American College Students

12:05  Hye Won (Judy) Chung  Expanding Rural Access to Health Resources and Investigating the Role of Stigma as Barrier of Access
C102  Social Sciences Proposals

11:20  Sarah Imanaka  Accounting for Climate Change

11:35  Atsuko Itakura  Social Implications of Challenges Faced by University Sustainability Movements

11:50  Todd Simeroth  Why Have Rates of Unequal Representation in America's Election System Increased Over Time?

12:05  John Paul Arios*  Knowledge Assessment of Leptospirosis Among O'ahu Hikers

C103  Social Sciences Proposals

11:20  Sakaria Auelua-Toomey  Autism Spectrum Disorder: Testing Perceptions of Reality through the Monty Hall Problem


11:50  Robert L. Fread  Limitations of White Privilege: Examining the Intersection of State Power and Race
Poster Presentations
1:30 - 3:00p - Campus Center Ballroom

(P) next to name in schedule indicates student is presenting a proposal poster

Arts & Humanities

Vanessa Maldonado, Kevin Morita, Charles Mukaida, Jerilyn Ornellas, Erin Richardson Severin, Megann Salā

Madisyn Uekawa (P)

Voices of Aloha: Preparing for Travel through Research, Practice, and Sharing

Enhancing Suicide Prevention for College Students through Literary Text
### Poster Presentations

1:30 - 3:00p - Campus Center Ballroom

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**Natural Sciences**

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<td>Brien Haun, Scott O'Farrell</td>
<td>Construction of scFv Cloning Vector for Heterologous Expression, Molecular Characterization, and Standardization of Monoclonal Antibodies</td>
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**Poster Presentations**

1:30 - 3:00p - Campus Center Ballroom

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**Social Sciences**

- **John Paul Arios (P)** Knowledge Assessment of Leptospirosis Among O'ahu Hikers
- **Ram Lal BK** Citizenship and Gender in Nepal: The Case of Badi Caste
- **Carolyn Marie Burk (P)** Assessing Prenatal Healthcare Provider Knowledge and Practices: An Approach to Improve Prenatal Health Outcomes in the Hawaiian Islands
- **Ksenia Bussard (P)** Human Papillomavirus (HPV) Vaccination Among Students in Hawai‘i
- **Nicolyn H. Charlot** Effects of Masculinity Priming on Jealousy in a Mate Poaching Scenario
- **Xuefang Chen (P)** Attitudes toward Seeking Professional Psychological Help and Psychotic Symptoms in Asian American College Students
- **Christopher D.H. Chow (P)** Promoting School-Based Hearing Screenings Among Hawai‘i’s Youth
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Abstracts of oral and poster presentations are listed in alphabetical order of presenter’s last name. Information below the name includes the student’s major, the category of their presentation, and time/location of presentation. The faculty mentor, if appropriate, is listed below the abstract.

Group abstracts are listed alphabetically by the Last Name of the group member whose name occurs in this list:

Bertram Booker, Rommel Yanos

Nicole Davis, Traci Oba

Brien Haun, Scott O’ Farrell

Kristen Jamieson, Michael Rogers, Benjamin VanEgtern

Geovante Joseph, Charles Moreland, Courthney Pruyn, Leiney Rigg, Erik Wagenmann, Malia Wessel

Stephen Macaspac, Ashley–Ryan Vidad

Vanessa Maldonado, Kevin Morita, Charles Mukaida, Jerilyn Ornellas, Erin Richardson Severin, Megann Salā

Abstracts are direct from presenters; wording and content are the author’s responsibility.
An Analysis of Traditional and Real–Time Web Application Frameworks: Meteor vs. Play Framework

Perhaps more so than any other discipline in software engineering today, the technologies and tools involved in the development of web applications are evolving at an increasingly rapid pace. Web application frameworks are a package of tools that aid in the development of complex web applications. These frameworks have traditionally been built on top of the request–response architecture – however in recent years, there has been a growing shift toward the reactive architecture. We investigate the consequences of this paradigm shift through the comparison of the Play Framework, a more traditional request–response web application framework – and the Meteor Framework, an emerging web application framework built on top of the reactive architecture. The comparison of these two fundamentally opposing frameworks may lead to new insights about the software development process as a whole.

Mentor: Dr. Philip Johnson
Identification of the Molecular Components of a *Calanus Finmarchicus* Toll Like Receptor

Global warming, including warming of the oceans, is now an accepted concept. Changes in environmental conditions can have profound effects on an organism’s physiology, including its ability to combat disease. Copepod crustaceans form an important link in many marine food webs, serving both as primary consumers of phytoplankton as well as the primary food source for organisms at higher trophic levels. Dramatic decreases in the abundance of some copepods has been documented, for example the North Atlantic copepod *Calanus finmarchicus*, and attributed to global warming. What caused these populations to have crashed remains unknown, but it is possible that compromised immune system function may play a role. Currently, nothing is known about the protein components of copepod immune systems, though they are likely similar to those present in other Arthropods. My project is directed at identifying the set of *C. finmarchicus* proteins that are involved in the Toll-Like Receptor Pathway, which is one component of the innate immune system and which is highly observed across phylogeny. I will use the known Toll Pathway proteins of the fruit fly *Drosophila melanogaster* as a template to mine mRNA transcripts encoding homologous proteins from two *C. finmarchicus* transcriptomes, one from individual from the Gulf of Maine and the other from individuals collected in the Norwegian Sea. Successful completion of my project will produce the first description of an innate immune pathway from a copepod, and allow for determining if there are population-specific variations in this signaling system.

Mentor: Dr. Andy Christie
Knowledge Assessment of Leptospirosis Among O‘ahu Hikers

Recently there has been an increase in hiking on the Island of O‘ahu. At a majority of these hikers on O‘ahu, there are waterfalls and freshwater pools that many hikers like to swim in to cool off. Within these waterfalls and freshwater pools, the Leptospira bacteria can be found. At these hikes, there are no signs that inform hikers of possible Leptospirosis infection. There are also some people who have little to no knowledge of what Leptospirosis is, how dangerous it can be, and how to prevent from getting infected. If infected, a person can experience many symptoms such as high fever, headache, and chills. If the infection is severe enough an outcome of the disease is death. Working in collaboration with Dr. Alan Katz, who has done research and worked on projects dealing with Leptospirosis, this project will incorporate two aspects of Public Health: research and education. A knowledge assessment will be done at various hikes around the island, with a majority being done at Maunawili Falls in Kailua due to the high levels of the Leptospira bacteria present there. In addition to working with Dr. Alan Katz, this project will also possibly work in collaboration with the Department of Health to take action on educating hikers and others about this disease, or implementing a universal warning sign that can be found on all hiking trails with a waterfall or freshwater pool.

Mentor: Dr. Denise Nelson–Hurwitz
Autism Spectrum Disorder (ASD) is most commonly characterized by frequent deficits in social, emotional and communication skills and persistent repetitive behavior. Individuals with ASD may have trouble empathizing. Symptoms can lead ASD individuals to develop unique ways of learning, interacting and paying attention. Although ASD has been studied since the late 1900’s, exact causes of ASD are still not known. Past research examined the effects of framing effects on adult ASD and non-ASD individuals. Results indicated that ASD individuals were less affected by framing effects than non-ASD individuals. According to two systems theory, framing effects are attributed to using affect heuristics, which are the result of heuristic processing. This could suggest that ASD individuals may use different heuristic processing than non-ASD individuals. The objectives of this project are to measure and compare the use of heuristics and systematic processes within adult ASD and non-ASD individuals using the Monty Hall Problem (MHP). Results could indicate a need for a new model for cognitive processes of ASD individuals. Clearer understanding of cognitive processes within ASD could lead to more effective and appropriate therapy. The current study is intended to contribute to disability-related literature by determining how heuristics presented by the MHP influence decision-making of adult ASD individuals.

Mentor: Dr. James Campbell
Aftermath of Fukushima: How Low is Too High?

To this day there are global efforts in evaluating the effects in wake of the 2011 Fukushima Nuclear Power Plant disaster. The estimated 500 tons of contaminated wastewater that entered the nearby marine ecosystem (1) was dispersed into the Pacific Ocean and due to biological uptake in migratory fish species (2) and was detected as far as the West coast of US. Although the accepted intervention limit for cesium isotope intake is 300 Bq/kg of fish, only 50 Bq/kg concentrated in the human body causes irreversible damage to tissues of vital organs. The question we are left with is how much cesium is in the fish we consume, a thought the community of Hawai’i should consider since our fish products are caught in the Pacific Ocean.

Fourteen most commonly consumed, locally bought fish samples were analyzed using gamma spectrophotometry to measure Fukushima-derived cesium 134 and cesium-137 isotopes. All fish samples had detectable cesium-137 and 5 out of the 14 samples had detectable cesium-134, an isotope indicative of Fukushima releases. The highest cesium-137 concentration in the examined species was the Alaskan Dover Sole carrying 3.6 Bq/kg. The highest concentrations occurred in high trophic level species with migratory patterns from Japan to Hawai’i or residing in the most northern Pacific Ocean. All activities were significantly below intervention limits but are informative to the community on what is being consumed. Results should also provide a basis for future work on cesium bioaccumulation in fish.

Mentor: Dr. Henrietta Dulai
Testing the Functionality of the MBP–Fusion Construct of FGFR2’s Extracellular and Transmembrane Domains

Fibroblast Growth Factor Receptors are a subgroup of Receptor Tyrosine Kinases (RTKs) characterized by three domains: an extracellular domain, a single transmembrane helix, and an intracellular tyrosine kinase domain. These transmembrane receptors, when activated by ligands called Fibroblast Growth Factors (FGF), are responsible for activating complex mechanisms via transautophosphorylation that result in angiogenesis, skeletal formation, and cell differentiation, proliferation, survival, and growth. Within the subfamily are five types of FGFRs. Due to their critical roles in the life of a cell, mutations of FGFRs are known to lead to developmental disorders all of which involve craniosynotosis. More recently has FGFR mutations been found to be associated with cancers. This project focuses on one type of FGFR, the FGFR2. Mutations in FGFR2 are known to lead to constitutive activation of the protein which have been associated with endometrial and breast cancer. There were four stages of the project. First, constructs with only combinations of two domains instead of all three and discontinue use of GFP as a fusion protein. FGFR2 ectodomain (ECD) + TM fused to MBP was the most promising candidates based on western blot analysis. Secondly, dialysis was conducted on FGFR2. Third, functional FGF1 was expressed and purified to test the functionality of FGFR2. Fourth, functionality tests using heparin columns, FGF1 and Size exclusion chromatography were conducted. Preliminary results possibly suggest that the transmembrane domain of the FGFR2 may be intact with the ECD when using DDM throughout all procedures including dialysis.

Mentor: Dr. Ho Leung Ng
Underlying Mechanisms of Temperate Butterfly Diversity in Anthropogenic Habitats

The underlying mechanisms that create and perpetuate temperate butterfly diversity are not well understood, but are particularly important for developing informed management plans. In simple correlations, past butterfly diversity studies found both positive and no relationships between plant richness and butterfly richness at multiple scales. In contrast, another study using multiple regression analysis found plant productivity, not plant richness correlated with butterfly richness. To explore the explanatory power of productivity hypothesis and the niche–assembly model, this study examined the relative importance of resource abundance, plant richness, and inflorescence abundance to butterfly diversity in two anthropogenic habitats: old field and lawn. Utilizing an information theoretical approach, I found old field habitats explained butterfly abundance and evenness, while plant richness best explained butterfly richness. Resource abundance measured as plant productivity was not explanatory. Furthermore, I found abundance of inflorescences to be negatively correlated with butterfly richness, abundance and evenness. This study suggests that butterfly diversity may be managed by habitat and plant richness, but that the floral resources available in these habitats are less important to butterfly distribution than other factors. Here I suggest that future studies explore relationships between the larval stage of butterflies and botanical resources in these habitats to explain the patterns seen in this study.

Mentor: Dr. Kyle Haynes
Hybrid Populations of *Bidens sandvicensis* and *Bidens asymmetrica*

The Bidens genus in Hawaii is an excellent example of adaptive radiation, an important process by which diversity emerges. Molecular work to date has demonstrated that genetic diversity of the terrestrial plant genus in Hawaii is similar to that within a single continental species. Even the rapidly evolving nuclear and plastid loci studied thus far show little genetic divergence among the Hawaiian species despite over 1.3 million years of ecological specialization. I propose a comparative study of *Bidens sandvicensis* subsp. *sandvicensis* and *Bidens asymmetrica* populations that show morphological evidence of intergradation in the Ko'olau mountains on Oahu island. The intent of this project is to assess genetic diversity and population structure, and to compare the utility of different approaches in the taxonomy of Hawaiian endemic Bidens spp. I will utilize two different molecular techniques: sequence related amplified polymorphism (SRAP) population markers and restriction–site associated DNA (ezRAD) genotyping with next generation sequencing (NGS) technology. The approaches for both are different, yet they have been used to answer the same kinds of questions in different model systems. Three questions are to be addressed. Is a genetic delineation between *B. sandvicensis* subsp. *sandvicensis* and *B. asymmetrica* possible? Are the morphological intermediate individuals of hybrid origin? Furthermore, are SRAP markers sufficient to answer questions about genetic variation between these species, or are higher throughput sequencing methods necessary? I hypothesize that these techniques will make evident genetic polymorphisms and that the sympatric populations are hybridizing. I hypothesize the SRAP population will prove their utility.

Mentor: Dr. Clifford Morden
Citizenship and Gender in Nepal: The Case of Badi Caste

This study examines the problems that members of the Badi caste face in getting legal Nepali citizenship through their mothers. The Badi caste, of which many women are sex workers, suffers greatly from lack of citizenship due to Nepal’s laws which, until recently, allowed citizenship only through one’s father. The study aims to find the main problems that the Badi people face in obtaining citizenship, and also to determine some of the main reasons for those problems. It also aims to describe what life is like for them living in their own country without citizenship rights. The study is based on three months of ethnographic research among Badi people in the villages in Dang district and in the capital city, Kathmandu. I conducted participant observation and interviews in both places. During the research, Nepal promulgated a new constitution that guarantees citizenship through the mother, but there are limits to this provision of citizenship: the individual applying for citizenship must prove that their father was a Nepali citizen, and children of Nepali mothers and foreign or unidentified fathers are ineligible for Nepali citizenship. The further issue has emerged of stigma: citizenship through the mother, among Badis, has come to be seen as a sign of being a child of sex work. Thus, this study argues that this new law will not solve the problems that Badis face, and that implementing citizenship through the mother will have to become fully equal in order to move toward justice and elimination of stigma for all.

Mentor: Dr. Jan Brunson
Algal Wastewater Treatment, Carbon Capture, and Biofuel Production

This study investigated sustainable wastewater treatment, CO$_2$ capture and biofuel production using locally-occurring microalgae when an economical algal bioreactor was applied to treated wastewater (post-biological treatment). When the locally-isolated microalgae was cultivated in three different modes (autotrophic, mixotrophic and heterotrophic cultivation) in a laboratory algal bioreactor over 2–3 week periods, the mixotrophic culture of algae showed highest cell growth and chlorophyll content compared with the autotrophic and heterotrophic culture of algae. The mixotrophic and autotrophic culture of algae was kept in 12 hour light/12 hour dark conditions while the heterotrophic culture of algae was grown under a completely dark condition. The mixotrophic culture of algae also exhibited its removal of carbon (organic contaminant), nitrogen, and phosphate (nutrients in wastewater) much higher than the autotrophic and heterotrophic culture of algae at the typical load of organic contaminants and nutrient in domestic wastewater. The potential production of lipid from the algae grown on wastewater indicated high productivity of biodiesel associated with wastewater treatment. In addition to algal wastewater treatment, algal capture of CO$_2$ in CO$_2$–containing waste gas showed slow but substantial removal of CO$_2$ as an additional benefit from the algal bioreactor. Overall, these results seemed to indicate that the algal treatment of wastewater could be developed as a sustainable way to effectively remove organic contaminants, nutrients (N and P), and CO$_2$ as well as produce algal biodiesel.

Mentor: Dr. Eunsung Kan
Old Wine, New Skins: Models of Roman Leadership in the Court of Charlemagne

Modern western society looks back on the Roman Empire as a model for politics, economics, and social relations. The use of the Roman Empire as a foundation for political organization began in the Early Middle Ages with the development of the idea of Christian kingship. However, in early medieval Francia these Roman principles were adapted selectively and Constantine as the first Christian Emperor was not necessarily the model used. During his rule of the Frankish Empire, Charlemagne (747–814 C.E.) consciously choose and incorporated elements from the model for Roman leadership based on the first Emperor Augustus. A comparison of ancient and Frankish historical, biographical, literary, and chronicle sources reveals how Frankish courtiers amended these Roman imperial ideas to establish Charlemagne’s Christian rulership, in part through an educational reform program. Set against the backdrop of an emerging Europe after the fall of the Roman Empire, Charlemagne’s court helped establish the legacy of Christian kingship usually attributed to Constantine.

Mentor: Dr. Karen Jolly
A Sustainable Fashion Industry for Hawai‘i

Hawai‘i would benefit from a locally provided, sustainable textile industry that could help to support a local sustainable fashion industry. As a fashion designer striving for sustainable fashion in Hawai‘i, the preferred textiles used in creating designs inspired by Hawai‘i should be ones made in Hawai‘i. Products produced from these unique Hawaiian textiles would be limited, exclusive, and intrinsically invaluable. Textiles, as products of Hawai‘i, would offer people who live in Hawai‘i something additional to be proud of and the rest of the world something extraordinary to desire. Literature reviews were done on the possible fiber sources in Hawai‘i, and the history of the Hawaiian garment industry. Further research was conducted on the locally produced Hawai‘i specific items that are currently in the luxury market. Some ASTM textile tests were done on kapa made from Broussonetia papyrifera, wauke, and kapa made from Cannabis sativa, hemp. Water spray and impact tests could not be conducted because the kapa textile structure became immediately unstable. ASTM tearing, burning, stiffness, pilling, and abrasion tests were conducted and revealed that kapa textile is not suitable for regular garment use, but that may be viable for alternative textile usage. There is speculation on the use of hemp for textile production in Hawai‘i. A presentation of the design philosophy of an emerging Hawai‘i fashion designer, who promotes sustainable Hawaiian fashion through the intrinsic and extrinsic nature of the designs, as well as the intended company modus operandi, is offered as example and support for sustainable fashion.

Mentor: Dr. Andrew Reilly
Assessing Prenatal Healthcare Provider Knowledge and Practices: An Approach to Improve Prenatal Health Outcomes in the Hawaiian Islands

Throughout the U.S. many people struggle to maintain optimal health due to restricted access to health insurance and other basic healthcare resources. In March of 2010, the Affordable Care Act (ACA) was enacted with the purpose of expanding access to health insurance and healthcare services for thousands of Americans. In the past decade, improving maternal and child health has become one of the top public health goals in the U.S.. While restricted access to healthcare is a commonly identified factor contributing to inadequate prenatal health outcomes in the U.S., recent provisions to the ACA aim to increase access to prenatal healthcare services for thousands of women nationwide.

The Healthy Mothers Healthy Babies Coalition of Hawai’i (HMHB) is a local nonprofit agency that is a part of a national network of organizations and individuals committed to improving Hawai’i’s maternal, child and family health. Since the beginning of this year HMHB has been working to evaluate the utilization of preventative health screenings for women who are now covered with no cost sharing under the ACA. HMHB has developed a Needs Assessment Survey which will be administered to physicians, medical workers, hospitals and health clinics throughout the state of Hawai’i form May to July 2015. Assessing the knowledge of prenatal health care providers can help assess the implementation of the ACA and determine whether additional support and training for preventative screenings is needed.

Mentor: Lisa Kimura
The Response of Captive Hammerhead and Sandbar Sharks to GoPro™ Cameras

Many recreational beach-goers are taking electronic devices, such as GoPro™ cameras, with them when they enter the ocean. While some ocean users claim that top elasmobranch predators (sharks) are attracted their devices, little to no research has been done to support this notion. Though sharks use a multimodal sensory mechanism to detect prey, the present study addresses the visual properties and electric field of these cameras and their effect on predator behavior. Using two captive sharks (*Sphyrna lewini* and *Carcharhinus plumbeus*) at the Hawai‘i Institute of Marine Biology (HIMB), this study tested the hypothesis that GoPro™ cameras, namely their appearance (*e.g.* shape, color, reflectivity) and potential electric fields, illicit either an attractive or repulsive behavioral response. Results found that the electric fields produced by the cameras were negligible and sporadic and had an insignificant effect on either species’ behavior. Furthermore, the visual properties of the cameras induced no response when the sharks were in not actively foraging. Alternatively, sharks were attracted to the cameras after they had assumed a feeding-motivated state, suggesting that the prey items in the water column had a direct effect on both species’ reactions to the cameras. That being said, a shark’s attraction to GoPro™ cameras is not a function of the camera itself, but rather a function of the surrounding environment.

Mentor: Dr. Kim Holland
Human Papillomavirus (HPV) Vaccination Among Students in Hawai‘i

Human Papillomavirus (HPV) is the most common sexually transmitted disease in the United States. Some strains of the virus can cause cancer of the mouth, throat, anus, penis, and cervix, and lead to genital warts in both males and females. Some people infected with HPV might be asymptomatic, but can still transmit the virus to their sexual partners. There are three FDA-approved HPV vaccines that can prevent most of the HPV-caused cancers and genital warts. They can protect young people from developing an HPV infection and can, ultimately, even save their lives. Despite the vaccine’s benefits, the uptake of it is low in the nation and in Hawai‘i in particular. This research project is designed to understand the reasons for the low HPV vaccine coverage.

The study design is a cross-sectional survey where the target population consists of college students in Hawai‘i who are 18 and older. The survey will include questions about the knowledge of HPV and HPV vaccine, the HPV vaccination history, and the reasons for not getting vaccinated against HPV among unvaccinated students. The survey results will help to estimate the prevalence of HPV-vaccinated students, identify the barriers in getting an HPV vaccine and might serve as a stepping stone for further interventions.

Mentor: Dr. Eric Hurwitz
Kalusugan at Kayamanan (Health and Wealth) of Filipinos in Kalihi

The leading causes of mortality for Filipinos are cardiovascular disease and stroke. Filipinos in Hawaii have higher rates of obesity, diabetes, hypertension, and the worst measures of behavioral risk factors like tobacco use and poor diet. To address these issues and create a healthier community, culturally competent programs need to be implemented. However, a healthier community cannot be achieved until health is defined. The definition of health is different for every community, so we must first discover their definition of health.

This study is working with a local community health center, Kokua Kalihi Valley (KKV) under the Civic Engagement Community Education (CECE), to have the Filipinos in the Kalihi community define wealth, not related to money. These definitions of wealth are all factors that define their health. By doing this we will find the root causes of unhealthiness and assess the barriers to a healthy Kalihi community for Filipinos. Through culture circles with members of the Filipino community in Kalihi, this study will evaluate how determinants of health and factors like history, community, culture, education/understanding, and spirituality affects their overall health. In doing so, we are not only helping the Filipino residents understand the public health issues specifically for their community but we empower the population to take action towards their health despite some obstacles. Through successful intervention, a greater understanding of the health and health issues of Filipinos in Kalihi can be obtained which can be used to develop better programs to improve overall health in Kalihi.
The Effects of Stress on the Recall of Long–Term Contextual Fear Memories

Several animal studies have investigated the relationship between stress and fear memory recall and generally reported an impairing effect of stress on the retrieval of contextual fear memory. However, virtually all studies have measured only the animal’s freezing behavior as an index of fear while the absence or reduction of freezing is considered impairment in fear recall. The current study re-examined the role of acute stress on contextual fear memory recall by measuring responses in a runway apparatus with a hide box. This unique test apparatus allows measurements of not only freezing but also hiding, head–out vigilance–like behavior, and locomotion activity. Rats were initially trained to associate a stream of auditory clicks with a cat–odor cloth in the runway test box. The next day, rats were placed in a shock box and exposed to 10 footshocks (0.8 or 1.2 mA, 1–s duration) with each shock delivered at 2 min intervals. A no-shock control group was also tested. Immediately after shock trials, rats were returned to the runway apparatus and contextual fear–related behavior was measured for 22 min. All rats were retested for contextual fear over the next 4 days without further exposure to footshock stress. Results suggest that although shock groups exhibited low freezing levels comparable to the no–shock control group, rats exposed to footshock stress exhibited high levels of head–out vigilance–like behavior from the entry of the hide box. The increased occurrence of vigilance–like behavior suggests that exposure to stress enhances the retrieval of a contextual fear memory.

Mentor: Dr. Lorey Takahashi
Poached Partner? Jealousy Influenced by Masculinity, Self-Esteem, and Gender Role Stress

Jealousy in intimate relationships can lead to intimate partner violence. Mate poaching (i.e., when someone attempts to take another’s partner) can induce jealousy, and may threaten masculinity. Prior research indicated manhood is “precarious” and men who experience masculinity threats often react aggressively. However, whether high or low masculinity affects levels of jealousy in males is unclear. The present study investigates this gap in the literature. Seventy-seven male participants completed a narrative-priming task that required them to write about an experience in which they felt highly masculine, highly emasculated, or neutral. Next, participants completed gender role measures. Participants then read vignettes describing increasingly severe mate-poaching scenarios. With each new vignette, participants were asked whether they wanted to intervene, and to report how jealous they felt. Finally, participants completed measures of relationship quality, jealousy, self-esteem, and demographics. Heart rate was recorded throughout the study. Men primed to feel either highly emasculated or highly masculine were hypothesized to experience elevated heart rates and levels of jealousy, and make earlier decisions to intervene during the mate poaching scenario. Results suggest that men in the highly emasculated condition experienced more jealousy during the first and third intervals in the mate poaching scenario than those in neutral or highly masculine conditions. However, these results were influenced by several other variables, including sexual orientation, self-esteem, gender role stress, and chronic jealousy. Heart rate was not examined due to reliability errors, and the priming condition did not influence point of intervention in the mate poaching scenario.
Investigating Differences in Substrate Preference and Binding in 7,8-Diaminononanoic Acid Synthase from *E. coli* and *B. subtilis* via Site Directed Mutagenesis

The enzyme cofactor and essential vitamin biotin is biosynthesized in bacteria, fungi, and plants through a series of enzyme catalyzed chemical transformations. One step in the pathway involves the substitution of the C7 ketone of 7-keto-8-aminopelargonic acid with an amine, and is catalyzed by the pyridoxal phosphate-dependent enzyme BioA. Prior studies demonstrated that *Escherichia coli* and other bacteria use S-adenosylmethionine (SAM) as a source of the amino group, while recent findings indicate that *Bacillus subtilis* uses lysine as the source of this nitrogen. The purpose of the present study is to examine BioA of *E. coli* and *B. subtilis* and determine which residues favor SAM vs. lysine binding, respectively. Preliminary studies have shown multiple sequence differences between the BioA enzymes in *E. coli*, *M. tuberculosis*, and *B. subtilis*. Based on protein crystal structures, the residues located at positions 17, 53, and 82 of the BioA enzyme are likely to participate in substrate binding. The residues of BioA in *E. coli* and *M. tuberculosis* at these positions are tyrosine, tryptophan, and glycine, while the residues of *B. subtilis* BioA are phenylalanine, valine, and leucine. These differences will be used as a guide to introduce site-directed mutations to both *E. coli* and *B. subtilis* *bioA* genes. The mutant enzymes will be expressed and purified, and the activity and substrate preference (SAM vs lysine) will be examined by monitoring the production of dethiobiotin using high-performance liquid chromatography (HPLC) and mass spectrometry.

Mentor: Dr. Joseph Jarrett
Attitudes toward Seeking Professional Psychological Help and Psychotic Symptoms in Asian American College Students

High prevalence of mood disorders and underutilization of mental health services are major issues impacting Asian American mental health. Studies found that Asian Americans had more negative attitudes toward seeking professional psychological help than other ethnic groups. Cultural barriers such as acculturation and demographical and personal factors are correlated with Asian American mental health and underutilization of treatment services. Additionally, psychotic disorders and experiences have a high prevalence among ethnic minorities in the United States. Asian Americans have been shown to have higher scores on both disorganization and interpersonal schizotypal subscales of a commonly used STPD measurement than white Americans. However, how Asian Americans’ psychosis experiences varies from other ethnic groups is still not completely understood due to limited studies. The two purposes of the current study: (1): to examine how acculturation, multi-ethnic identity and generational status affect Asian American college students’ attitudes toward seeking professional psychological help and (2) to explore how acculturation, multi-ethnic identity and generational status are associated with the manifestation of schizotypal personality disorder in Asian American college students.

Key words: Asian American, seeking-help, acculturation, multiethnic identity

Mentor: David Cicero
Expression of *Leucaena* mimosinase in a *Rhizobium* mutant defective in mimosine degradation

*Leucaena leucocephala* (*Leucaena*) is a tropical leguminous tree important for agro-forestry. It functions as a windbreaker and soil-erosion controller and its legumes are a valuable source of high quality protein livestock fodder. Despite these benefits, *leucaena* contains a toxic free amino acid called mimosine, which chelates bivalent metallic ions, and gets metabolized to 3-hydroxy-4-pyrodone (HP). Mimosine causes toxicity in animals, plants, and microorganism by cell division inhibition. Mammalian mimosine toxicity is typified by physiological abnormalities such as enlarged thyroid glands, fetal deformities and hair loss. *Rhizobium* *sp.* strain TAL1145 is a *leucaena* root microsymbiont that can overcome mimosine toxicity using rhizomimosinase, an enzyme encoded by *mid* genes for mimosine degradation. *MidD* mutant of TAL1145 cannot degrade mimosine, but its derivative containing cloned *midD* gene can degrade it. Recently, *leucaena* has been found to have an enzyme for mimosine degradation known as mimosinase, which has been characterized as biochemically similar to rhizomimosinase. In this research, mimosinase cDNA will be cloned to a broad-host-range plasmid vector. The resulting plasmid will be then transformed in an *Escherichia coli* (*E. coli*) and then be transferred to *midD* mutant of rhizomimosinase by conjugation. The derivative of the *midD* mutant will be grown in an agar medium containing mimosine to verify its regained capacity to degrade mimosine. We expect the recombinant plasmid containing mimosinase cDNA to complement the *midD* mutant for mimosine degradation activity. We also expect the complimented derivative strain to nodulate *leucaena* as effectively as TAL1145. This will establish that rhizomimosinase and mimosinase are functionally similar.

Mentor: Dr. Dulal Borthakur
Promoting School–Based Hearing Screenings Among Hawai‘i’s Youth

The hearing of a child can often be taken for granted. Hearing is not only important in day-to-day communication, but is vital in the overall development of infants and children. Although hearing loss is generally associated with aging, concerns for hearing conditions can start as early as one day of age. For every infant born in any hospital in the state of Hawai‘i, it is mandatory for each newborn to go through the Department of Health's newborn hearing screening program. This comprehensive screening system is able to identify infants suffering from ear-related issues such as congenital and conductive hearing loss.

Although extremely effective, the newborn hearing screening program is not able to identify future hearing impairments that may occur once the infant leaves the hospital. With the newborn screening program being the only state program dedicated to the prevention of hearing loss, a large and noticeable gap exists between one’s time of birth and the crucial stages of development. Fortunately, the Hawai‘i Lions Club have recognized this health concern in Hawai‘i and therefore initiated their statewide hearing screening program. The Lions Club’s screening initiative covers Hawai‘i Department of Education schools, with a focus on students from kindergarten to second grade. Through collaboration with the Hawai‘i Lions Club, this project hopes to spread awareness in the importance of hearing screenings for youth and further the program's reach to more school. If successful, this project will increase the number of Hawai‘i’s youth who have had their hearing screened.

Mentor: Dr. Denise Nelson-Hurwitz
Expanding Rural Access to Health Resources and Investigating the Role of Stigma as Barrier of Access

The problem of access to health resources in rural or geographically remote communities continues to prevail despite the extensive literatures on the issue. Additionally, emerging literatures identified the role of mental health stigma (MHS) as a barrier of access to health services and resources. In order to investigate the issue as it persists in a specific cultural community setting, the current study focused on rural and Native Hawaiian (R/NH) communities across the state of Hawai’i and attempted to investigate the extent of MHS held by rural health professionals. An online survey containing professional development items and MHS items was constructed and distributed via professional listservs. Collected data will be analyzed via SPSS software in order to obtain descriptive statistics.

Mentor: Dr. Susana Helm
The Authorization For Use of Military Force: A Shift in the Balance of Power

The terrorist attacks in the United States on September 2001 created new complications for the separation of powers within the war powers sphere. Days after September 11, the United States Congress passed the Authorization for Use of Military Force (AUMF). While the AUMF did not officially declare war, the legislation provided the President with more authority upon which to exercise his constitutional powers as Commander in Chief. The AUMF, authorizes the President of the United States to use:

All necessary and appropriate force against those nations, organizations, or persons he determines planned, authorized, committed, or aided the terrorist attacks that occurred on September 11, 2001, or harbored such organizations or persons, in order to prevent any future acts of international terrorism against the United States by such nations, organizations or persons.

The AUMF has been used to authorize United States military action since the terrorist attacks. From drone strikes to the legality of Guantanamo Bay, AUMF’s interpretation has allotted more power to the executive branch. I will concentrate my research on the interpretation of the AUMF, the power it provides the President, its effects on national defense, and the constitutional powers of Congress to declare war.
Behavioral Effects of Youth Asthma in Nanchang, China

Asthma is the most common disease in children, with a high rate of both morbidity and mortality. In the United States, one in every ten children have asthma and most will have their first asthmatic episode before they turn three years old. There are a lack of studies performed in China to determine the prevalence of asthma in youth and the possible effects the disease has on youth behavior. The purpose of this project was to conduct surveys with parents of children with and without diagnosed asthma, and to then determine the behavioral differences between children with and without the disease. The behavioral differences were based off of four aspects: physical activity, diet, sleep, and school performance. The study took place in Nanchang, China with the cooperation of Nanchang University. From the results received through the surveys there was a significant difference in daily physical activity; children without asthma had significantly higher rates of participating in daily physical activity as opposed to children who had asthma. Children without asthma also had higher rates of participating in after-school sports, as opposed to children who had asthma. The rates of hours slept per night, consumption of fast food, and grades received in school, were too similar to conclude significance. Additional questions were also conducted among asthmatic Chinese youth to gain a basic understanding of their behaviors. Further research should be performed on these subjects to confirm these findings and to further an understanding of behavioral differences in youth with and without asthma.

Mentor: Dr. Yuanan Lu
Care and Prenatal Health Services in the Communities of American Samoa

The purpose of this study is to assess the prenatal health care knowledge and practices of the pregnant women of American Samoa. The study is designed to measure how much information women know about their health care services in American Samoa, if they are or planning to become pregnant. By assessing this knowledge, the study outcomes can support new programs for pregnant women of American Samoa. The methodology behind this study is to ask women their opinion on the quality of their prenatal care and what they already know about the services provided in American Samoa. This study plans on working with the clinics and the hospital on the main island. This study is important because it targets an at risk population, and could possibly lead to the development of awareness programs on the island, that link to prenatal health care. This study is important because it can give the women a voice on the matter of prenatal health in their community and providing evidence to see if prenatal health care needs to be a focused topic in the American Samoa islands. This project will shine light on what ministry of health in Samoa can do to aid this process of knowledge of health options, health care, and future plans for the women of American Samoa. In a global health perspective universal and timely accesses to quality health care is a health priority as indicated by the Millennium Development Goals #5. Women worldwide should know what is being provided in their communities and this project’s goal is to ensure that the women of American Samoa know what is provided by the government to them.

Mentor: Dr. Denise Nelson-Hurwitz
Understanding the Community Food and Energy Movement on O‘ahu’s North Shore

Recognizing opportunities to improve public health, promote regional food security, and protect agricultural land, community leaders of O‘ahu’s North Shore organized the First Annual North Shore Food Summit (NSFS) in 2013. Building off the momentum established since that inaugural event, the Third Annual NSFS explored the theme of "Community Food, Community Energy" through interactive breakout sessions in which a diverse group of North Shore community members, food and energy system professionals, and other supporters collaboratively addressed a variety of food and energy connections, including: the economic and environmental costs of food and fuel import dependency, the effects of high energy costs on local food production, the use of agricultural lands for clean energy and bio-fuel production, and the overlap of energy and food justice community organizing strategies.

This research focused on the compilation and analysis of qualitative data recorded anonymously by skilled facilitators during the 3rd Annual NSFS' aforementioned interactive breakout sessions; data including food and energy topics summit participants identified as important to the North Shore, participants’ shared visions for the future of such topics within this region, and participants’ proposed plans of action for the pursuit of their food and energy visions.

Conclusions drawn from these data not only serve as a guide for North Shore community members' continued efforts, but also as a record of this movement to inform and inspire other communities involved in similar efforts.

Mentor: Dr. Noelani Goodyear–Kaʻōpua
Perceptions of Biotechnology in the Hawaiian Islands

Currently, in the state of Hawai‘i, genetically engineered (GE) crops have been a controversial issue as demonstrated by recent legislation and protests. The objectives of this study were to assess Hawai‘i residents’ knowledge and general awareness of biotechnology, as well as to explore differences in perceptions of attributes of biotechnology within demographic populations between counties. A public opinion survey was conducted in the Spring of 2014 featuring 16 questions that asked about opinions and favorability regarding biotechnology. Descriptive statistics and ANOVA tests were used for analysis of opinion data. Of the 700 survey participants, approximately one-third had read or heard a lot of information regarding biotechnology, and approximately one-third of participants defined biotechnology as “unnatural/altered/modified.” The top three attributes of biotechnology that residents favored were “lower the cost of food”, “clean the environment”, and “increase nutritional value.” There was a significant difference in favorability toward plant applications of biotechnology between Hawai‘i and Kaua‘i Counties. Also, Kaua‘i County significantly differed in opinion from Hawai‘i and O‘ahu Counties when considering the application biotechnology to reduce food costs. It was found that the demographics, years of residence and gender, significantly affected favorability scores toward biotechnology applications in Hawai‘i and Kaua‘i Counties. The importance of this study lies within agricultural education efforts in Hawai‘i and general understanding of how various populations perceive controversial topics, such as genetic modification. This understanding will allow for the development of more targeted and efficient programing that will advance the understanding and future of agriculture.

Mentor: Dr. Ania Wieczorek
Expression of Ovarian Markers in Developing Testes of Males Lacking Y Chromosome Genes During the Window of Sex Determination

Disorders of sex determination (DSDs) is a term describing medical conditions, in which chromosomal, gonadal, or anatomical sex is atypical. DSDs affect 1 out of 4,500 births and can be caused by mutations in the genes involved in sex determination. Specific diagnoses of DSD are rare due to limited research on these sex-determining genes. Genes on the Y chromosome are known to be important for the development of males and male gametes. Previous studies aiming to define the function of genes on the Y chromosome led to the creation of male mice without any Y chromosome genes, XOSox9,Eif2s3x. Many of the adult XOSox9,Eif2s3x males had poorly developed testes, in which an expression of ovarian factors FoxL2, Wnt4, and Rspo1 was observed. These factors are typically expressed in female but not male gonads, and their presence in testes can be indicative of impairment in sex determination. In mice sex determination takes place during fetal life, between 10.5 and 12.5 days post coitum (dpc), and involves complex molecular regulatory pathways directing developmental fate of the fetus. In this project I will test the hypothesis that abnormal testes in XOSox9,Eif2s3x males result from incomplete antagonism between pro-testis and pro-ovary factors during sex determination. I will quantify the expression of FoxL2, Wnt4, and Rspo1 in genital ridges (gonad precursors) of XOSox9,Eif2s3x mice at 12.5 dpc.

Mentor: Dr. Monika Ward
Using Primary Human Renal Proximal Tubule Epithelial Cells as a Model to Study Human Polyomavirus JC Pathogenesis

Thirty percent of healthy individuals who are seropositive for JCV excrete archetype JCV in their urine. RPTE cells lining the human kidney, are hypothesized to be a possible site of JCV infection and/or latency. The objective of our study is to develop an in vitro model system using primary RPTE cells to study JCV pathogenesis. We hypothesized that urine-derived archetype JCV will infect and replicate in primary RPTE cells. RPTE cells were infected with urine-derived archetype JCV and virus replication was monitored for 35 days after infection. Virus replication kinetics was confirmed by qPCR and qRT–PCR for JCV TAg and VP–1 genes. Protein was collected at various time points for detection of TAg using a Western Blot assay and on days 15 and 25 for detection of VP1 protein by immunofluorescence assay (IFA). Detection of infectious virions was conducted by infecting naïve RPTE cells with JCV isolated from previously infected RPTE cells and monitored for replication for 15 days after infection, and for JC virions by electron microscopy (EM). Archetype JCV TAg and VP–1 DNA and RNA were detected as early as 3 days after infection and archetype JCV continued to replicate through day 35 after infection. VP–1 protein was detected by IFA at day 15 after infection. Reinfection demonstrated presence of JC virions by EM, and archetype JCV DNA and RNA was observed as early as day 3 and continued to replicate through day 15. Based on these data, archetype JCV infects and replicates in RPTE cells, producing DNA, RNA, protein, and infectious virions. RPTE cells can be further explored to study archetype JCV pathogenesis.

Mentors: Dr. Vivek R. Nerurkar; Nelson Lazaga
Limitations of White Privilege: Examining the Intersection of State Power and Race

The history of race relations in the United States is an unquestionably troubling aspect of a nation claiming to be founded on enlightened principles of liberty and justice. From the genocide of the First Nation peoples to the horrors of the Trans-Atlantic Slave Trade, countless generations have faced unspeakable acts of terror and suffering throughout our history. Even in contemporary society, remnants of this racial bias leave many people facing a systemic corruption which fails to recognize the inherent value of human life. Thus, it is no surprise that the argument for a pervasive, universal, and often invisible white privilege has become relatively dogmatic in both academia and the public sphere. But do these historical facts automatically exclude whites from facing similarly brutal effects of state mechanisms? This paper will focus on the death of Kelly Thomas in 2011; a homeless white man diagnosed with schizophrenia who died five days after a severe beating by police officers. Through an examination of persistent conditions found in the criminal justice system that sanctioned his murder, both the limitations and absence of white privilege can be revealed at this intersection of race and state privilege. This research will illustrate how an argument for an implicitly universal white privilege, which presumably attempts to foster equality, instead creates a false dichotomy that perpetuates the ‘Other’ by marginalizing those whose class or status denies them an allegedly advantageous role in society.

Mentor: Dr. Jonathan Goldberg–Hiller
Agroinfiltration of the coat protein gene of *Tobacco mosaic virus* (TMV) to confer resistance to TMV in transgenic *Nicotiana benthamiana*

CRISPR–Cas genome editing technology heralds the dawn of facile genome editing, enables and simplifies many exciting applications in the life sciences including engineering transgenic resistance to plant pathogens. To demonstrate the potential of the CRISPR–Cas system in the field of plant virology we will transform *Nicotiana benthamiana* through agroinfiltration with two DNA vectors using Cas protein, guide RNA and a DNA template of the coat protein (CP) gene of Tobacco mosaic virus (TMV) to initiate homology directed repair (HDR) of the targeted loci. We will inoculate transgenic *N. benthamiana* with the infectious clone pTMV 30B–GFPC3 encoding a transcript of TMV tagged with a Green fluorescent protein (GFP). GFP, from the jellyfish *Aequorea victoria* fluoresces green when exposed to ultraviolet (UV) illumination. Upon infection of pTMV 30B–GFPC3 in transgenic *N. benthamiana* pTMV–30B–GFPC3 will be visualized by illuminating the infected *N. benthamiana* plants with UV light to evaluate virus accumulation. This research will contribute towards assessing the potential of CRISPR–Cas in the development of virus resistant transgenic plants to control plant diseases.

Mentor: Dr. John Hu
Factors Associated with Leadership Behaviors in Nursing Students

Nurse leaders achieve goals and ensure health-care system outcomes (Vitello–Cicciu, Weatherford, & Gemme, 2014). From 1992 to 2008, nurse leader positions declined 30% (Westphal, 2012). This decline may affect health-care system outcomes (Vitello–Cicciu, Weatherford, & Gemme, 2014). The objectives of the study are to identify and describe factors associated with leadership behaviors in nursing students. Nursing students participating in Hawai‘i’s Academic Progression in Nursing Leadership and Mentorship (L&M) program were asked to complete a leadership survey. The L&M program was developed using modules from the New Careers in Nursing Leadership Development Toolkit (4th edition) and the New Careers in Nursing Mentoring Program Toolkit and Handbook published by the Robert Wood Johnson Foundation. The program was originally piloted with students in the ADRN Executive program. The recent L&M program has integrated the modules into the curriculum of two undergraduate nursing cohorts. Quantitative and qualitative data regarding student demographics, education, experience from employment, and personal understanding of leadership and definition of being a leader was collected using a paper and pen survey questionnaire with the ADRN Executive program and will be collected with the two undergraduate nursing cohorts. Correlational analyses will be conducted on the data collected to explore factors associated with leadership behavior in the 3 nursing student cohorts. Identifying and examining factors associated with effective leadership behavior may aid in recruiting nurses and nursing students to partake in leadership development and roles.

Mentor: Dr. Sandra LeVasseur
Monoclonal antibodies (mAb) have revolutionized medicine and research, accounting for a multitude of applications, from immunotherapeutics to disease diagnostics. The utility of mAb stem from their single–epitope binding capacity. mAb are secreted by immortalized cells called hybridomas. Despite its utility, hybridoma technology bears numerous flaws, including binding variances, genetic instability, and high production costs. Therapeutic mAb often induce an immunogenic response, attributable to exogenous constant regions. Additionally, the size of mAb (~150 kDa) limits therapeutic applications and effectiveness due to insufficient tissue penetration. One approach to address these issues utilizes single–chain variable domain (scFv) antibodies. A scFv comprises the variable domains from both the heavy and light chains of a single mAb line, and is expressed recombinantly as a single, contiguous polypeptide, which preserves the binding affinity and specificity of the original mAb. Molecular characterization achieves reliable reproducibility and genetic rescue from hybridomas altogether. Furthermore, the absence of constant domains reduces immunogenicity, and the smaller size (25–30 kDa) more readily penetrates tissues. A novel scFv plasmid backbone was constructed comprising purification and assaying features, and has been genetically validated. The variable genes from three previously established hybridoma cell lines were sequenced and prepared for plasmid integration. Plasmids containing variable gene inserts were transfected into Escherichia coli for validation and expression. Genetic confirmations and protein validations are ongoing.

Mentor: Dr. John Berestecky
Regional Aerosol–Cloud Analysis: Vertical Distributions and Seasonal Fluctuations from CALIOP

Aerosols are tiny suspended particles that play a multi-faceted role in the atmosphere. They act as cloud condensation nuclei (CCN) during cloud formation by providing a platform for water vapor to condense. In addition, some aerosols may reflect solar radiation back into space, while others have the ability to absorb solar radiation. Until recent advancements in satellite instrumentation, aerosol type and vertical distribution were challenging to study. In 2006, to ameliorate this issue, NASA launched the vertical profiling satellite CALIPSO containing the LiDAR instrument CALIOP. For this study, fourteen regions were chosen for observation based on fire count data from Aqua satellite’s instrument MODIS for locations known to have occurrences of biomass burning. Biomass-burning aerosols can have diverse effects on cloud properties making their interactions an important topic of study. Simply stated, biomass-burning aerosols may increase cloud formation by providing additional CCN to the atmosphere creating longer lasting non-precipitating clouds, or conversely, may provide larger CCN creating a higher chance of precipitating clouds. Additionally, by absorbing solar radiation, these aerosols may cause cloud evaporation due to the direct heating of the atmosphere by the aerosol when present in the environment surrounding the clouds. Gridded profiles were created based on the latitude and longitude of these specific regions. Each CALIPSO satellite pass through these regions was extracted and averaged over a nine year time period (2006–2015) to create a climatological average of the dominant aerosol and cloud type, their maximum and average heights, and their seasonal fluctuations in the atmosphere.

Mentor: Dr. Jennifer D.S. Griswold
Human immunodeficiency virus (HIV) is a retrovirus that specifically targets immune system cells. Combination antiretroviral therapy (CART) is frequently used to combat HIV at multiple points in the viral lifecycle and has proven to reduce the spread of infection and extend the life span of patients. However, approximately half of patients still show only mild to moderate cognitive function when compared to healthy controls. It has been suggested that HIV infected monocytes of the immune system can act as a reservoir for viral entry into the central nervous system (CNS). The influx of HIV infected monocytes can lead to neuronal death, breakdown of the blood brain barrier, and HIV associated neurocognitive disorders (HAND). However, the biological pathway for HIV infection of the CNS has not been elucidated. The proposed project aims to understand the process of monocyte infection with HIV. Specifically, this project will investigate if HIV infected monocytes can act as a reservoir for HIV by infecting healthy monocytes or neural tissues. To execute this project, monocyte cells will be transfected with HIV-EGFP via electroporation. Fluorescence fluctuation spectroscopy and 3D single particle tracking microscopy will be used to analyze HIV infection of monocytes, characterize the functional response of monocytes to HIV infection, and track HIV transmission from infected monocytes.

Mentor: Dr. Nicholas G. James
Remember Me

*Remember Me* is a novella that focuses on generational conflicts in Vietnamese–American families. The creative work deals with the conflicts between Western and Eastern culture, but also aims to address the similarities by using death as a universal concept. The story follows a young woman’s partnership with one half of a Heibai Wuchang, a character from Chinese folklore responsible for escorting the dead. In exchange for saving her mother’s life, the protagonist must help the dead ‘move on’ by taking within herself a precious memory from their lives. Each memory provides introspection to her own life, and encourages her to question aspects of her identity that she has long ignored. The work is divided into three narratives, all done entirely in first person point of view. The first narrative presented is that of a diary narrative of the protagonist. The second narrative is linear, providing a plot for readers to follow. The third narrative consists of multiple characters’ single experiences, or the ‘memory’ that is received by the main character as a form of catharsis following their deaths. This work also explores familial dynamics, relationships, suicide, and other social issues that plague us as human beings.

Mentor: Dr. Katharine Beutner
Aira Kariah Iglesias
Environmental Design
Finished Project in Arts & Humanities
Participation for Honors
Oral Presentation: 10:10 a.m. in B101

Magic Island: The Permeable Park

Beginning March, 2015 Honolulu Mayor Kirk Caldwell has called for the public’s suggestion on what they would like to see for the future of Ala Moana Beach Park & Magic Island. Previously predicted by the National Oceanic & Atmospheric Association (NOAA), coastal zones worldwide will face a sea level rise within the next 100 years. One such coastal zone is the popular Ala Moana Beach Park & Magic Island on Oahu, Hawaii. In order to face the rising tides and changing weather patterns, the parks should be redesigned to incorporate inundation and turbulent weather into its landscape. Possibilities may include hard defense systems, living shorelines, elevated developments, or any combination of strategies. Cultural heritage is also a key factor within the redesign. The parks should maintain their identity and provide patrons ample space for existing activities within the next hundred years. It is also important to promote growth of the native flora and fauna, harvest sustainable forms of renewable energy, and reduce water pollutants using biofilters. Analysis of Ala Moana Beach Park & Magic Island will begin with photographic records of activities and defining characteristics, followed by historical research, and then continued with case studies that take a critical perspective on other coastal designs. The project will develop through a series of iterations of research, redesign, and critique. When a final design is concluded, a detailed focus area along with the final floor plans and elevations will be delivered, and a model of the focus area will be presented for final review.

Mentor: Judith Stilgenbauer
Climate change affects business operations. Under the 2010 Securities Exchange Commission (SEC) guidance on the disclosure of climate change, companies may voluntarily report the residual effects on climate change from business operations. Walmart's 2015 annual report disclosed information on how climate change affects their business operations and opportunities to improve the environment, but it does not follow the 2010 SEC guidance on how to report climate change. If a company claims that climate change is important, then users of financial statements should expect the company to report climate change according to the SEC guidance. This study will explore whether or not companies should be required to report climate change information. A case study methodology will be used to analyze companies that committed to the “American Business Act on Climate Change Pledge.” By comparing what these companies disclose in their annual reports to their sustainability commitments or petitions, this study will determine the effectiveness of the 2010 SEC guidance and if there should be stricter standards for climate change reporting.

Mentor: David Yang, PhD
Social Implications of Challenges Faced by University Sustainability Movements

Recent trends suggest an increased international interest in implementing sustainable practices on university campuses. As University of Hawai‘i at Manoa mobilizes efforts to fit criteria enabling it to be considered a green campus with zero emissions and a zero waste output initiative, I will be looking at some of the social and cultural factors that play a role in challenges faced by UH student and faculty sustainability organizations, while synthesizing research on sustainable practices, organizations and movements as they are conducted at Kansai University in Osaka, Japan. As in the research of Professor Michael Striberg of the School of Natural Resources & Environment at the University of Michigan, I will be taking a theoretical approach in analyzing some of the institutional assessment tools used to form criteria around what defines a sustainable campus both here at UH and at Kansai University as a way to uncover how culture plays a role in the face of movements towards change, particularly those that require day-to-day behavioral and conceptual changes of individuals in the university community.
Testing the Enemy Release Hypothesis by Quantifying Leaf Herbivory on Invasive and Native Mangroves

The red mangrove *Rhizophora mangle* was introduced to Hawai‘i in the early 1900s and has since spread to all major islands. Many invasive species, like red mangroves, are hypothesized to be so successful because they are introduced without their natural enemies that normally control them (predators, pathogens, parasites; known as the Enemy Release Hypothesis, ERH). To test the ERH, I compared herbivory on leaves collected from three sites in Belize, where mangroves are native, and five sites in Hawai‘i. The leaves were scanned and then analyzed using image analysis software to quantify the percentage of leaf area damaged or missing due to herbivory. Previous surveys revealed two commonly co-occurring species in the invasive mangroves (the crab *Metopograpsus thukuhar* and snail *Littoraria scabra*); thus I conducted experiments to determine if these species would feed on mangrove leaves. Leaves from Belize were significantly more damaged via herbivory (7.1±1.9) than leaves from Hawai‘i (0.4±0.2, p=0.004). Leaves from Belize also exhibited a greater diversity of herbivore damage including bites, scraping damage from crabs, leaf miners, and galls. In contrast, conspicuous herbivore damage was limited to rare marginal bites in Hawaii. Feeding experiments in Hawai‘i suggest that co-occurring snails and crabs do not eat mangrove leaves. The low level of herbivory on Hawai‘i leaves, and lack of observed herbivory by species inhabiting the mangroves supports the ERH. This project tests another possible mechanism of how invasive species can become so prolific in Hawai‘i.

Mentor: Dr. Celia Smith
Feasibility Study of Implementing an Aerated Static Pile Compost System for Food Waste in University of Hawaii Housing

The use of compost in production systems can increase the nutrient and water holding capacity of the soil, provides optimal habitat for soil microbes and contributes to disease and pest suppression while reducing the need for nutrient inputs. Despite the benefits, there are currently no facilities on Oahu that are capable of recycling post-consumer food waste generated in Honolulu into nutrient rich compost. Typical composting systems such as static piles or turned windrow systems are often time consuming and labor intensive, making them expensive to operate. By applying forced aeration through a fan blower to static compost piles, aerobic microbial activity is accelerated therefore piles do not require hand turning, potentially making the system more feasible for on-site composting where local infrastructure does not support municipal composting. In this study, local household and commercial food scraps were collected and mixed with mulch and wood chips generated by the UH Manoa campus. The predicted feedstock ratio of 1:3.7 food waste to wood chips was evaluated using pile temperature, humidity and carbon to nitrogen composition measurements. Here, temperature data is an indicator of biological activity. Humidity measurements signal if the pile has adequate moisture for efficient biological processing. The carbon to nitrogen (C:N) ratio is a measure of compost quality and was used to make a recommendation for future input ratios of food waste and wood chips to produce compost with a C:N around 13:1 for agricultural and household use.

Mentor: Dr. Theodore Radovich
Long-form Improvisation at the San Francisco Improv Festival: An Investigation into Approaches

The U.H. Manoa Double Improv Rainbows is the first and only Long-Form Improvisation troupe officially connected with the University of Hawaii at Manoa. Founded in Fall 2013 by Master’s Candidate Timothy Callais, the troupe was invited in January of 2015 to compete in the Chicago Improvisor’s College Improv Tournament. As a reward for taking second place in the region, which included teams from U.C. Berkeley and Stanford among the competitors, the Double Improv Rainbows were invited to perform at the San Francisco Improv Festival in September of 2015. The goal of the research project was for the troupe to attend this festival, take workshops to learn new methods and forms, perform and receive critique from professionals of the craft, and culminate with a final performance at the end of the Fall 2015 semester to demonstrate everything that was gained from the festival.

Mentor: Dr. Lurana O'malley
Caitlin Kelly  
Psychology and Sociology  
Finished Project in Social Sciences  
Participation for Honors  
Oral Presentation: 9:00 a.m. in C103

Preventing Suicide in Hawaii Through Youth Empowerment

Suicide is a public health issue in Hawaii, especially for Native Hawaiian youth. The purpose of this study was to empower youth to prevent suicide in their communities by enhancing protective factors for suicide related behaviors. The Hawaii Youth Leadership Council on Suicide Prevention brought together youth from around the state for a two day training workshop in April 2015. Youth and their trusted adults participated in interactive skills building activities and were given resources to use in their own communities. Participants completed pre and post surveys measuring knowledge about suicide prevention, comfort level with referring people to proper resources, and the likelihood of participants implementing new skills. The data shows improvement in each most of these focus areas, with a notable 15% increase in the perception of suicide as a largely preventable phenomenon and a 43% increase in the knowledge that youth who attempt suicide frequently tell someone in advance. The power of youth voice was a common theme in the data, exemplified by the statement: “We can actually make a difference in the community and erase the stigma of suicide.” These findings suggest that positive youth development is crucial in preventing suicide. Challenging youth to build upon their strengths requires community investment, and the Youth Leadership Council provides one model for uniting youth and supportive adults.

Mentor: Dr. Deborah Goebert
Janal Kim
Microbiology and Korean for Professionals
Proposal in Natural Sciences
Participation for Honors
Oral Presentation: 11:50 a.m. in A103

Regulation of the Transcription Factor Six2 by miRNAs

The transcription factor, Six2, plays a critical role in kidney development by promoting proliferation of kidney stem cells. In its absence, the kidney will fail to differentiate properly, resulting in kidney-related diseases such as renal hypoplasia and chronic renal failure. Furthermore, the misexpression of Six2 is associated with various types of cancer, including Wilms Tumor. However, how Six2 is regulated and what intrinsic mechanisms drive the progenitor cells to expand is still unclear. The goal is to determine the molecular mechanisms that control the expression of Six2; in which this study will focus on the regulation of microRNAs (miRNAs). It is hypothesized decreased Six2 expression in part associated with renal hypoplasia is mediated due to miRNAs targeting the Six2 gene.

Luciferase reporter assay system and HEK cells will be utilized to experimentally verify the bioinformatically predicted miRNA/Six2 gene interactions. In order to assess the regulatory impact of miRNAs on Six2 expression, the mRNA and protein levels in response to the miRNA(s) overexpression in HEK cells will be evaluated. This study has important implications and will assist in the research on developmental tissue regenerative therapies for kidney malfunction; as well as the identification of new mechanisms to control the Six2 gene expression in cancers.

Mentor: Dr. Zoia Stoytcheva
The Liver Support System: The Potential Roles of PDGF Receptors in Liver Fibroblasts

Fibroblasts provide a stable framework of extracellular matrix during organ formation through deposition of extracellular proteins. Although essential for normal development, excess matrix deposition can also lead to fibrosis and organ disruption. Liver fibrosis is very common and can lead to liver disease and failure. A better understanding of the signals controlling fibroblasts can provide novel information about the disease process of liver fibrosis. This understanding could help elucidate treatments to help prevent or reverse liver damage. Our lab has previously shown that knockout mice for the receptor tyrosine kinase platelet derived growth factor receptor (PDGFR) α do not form cardiac fibroblasts during development, and preliminary data indicates that this receptor is also required for fibroblast survival in the adult heart. This has led to the hypothesis that PDGFRα, as well as family member PDGFRβ may be required for the development and maintenance of the fibroblasts in other organs. The purpose of this study is to investigate the role of PDGFRα and PDGFRβ and to determine if they play a role in cell maintenance and survival in liver fibroblasts. Mice were used to determine the expression of both receptors in liver fibroblasts using immunohistochemistry and both receptors are expressed in our cells of interest. In future studies we will use mice that contain genetic modifications that permit tracing and genetic manipulation in liver fibroblasts. Preliminary data indicates that both receptors are expressed in liver fibroblasts and that loss of PDGFRα and PDGFRβ signaling leads to a reduction of these cells. Determining the role of PDGFRα and PDGFRβ will help elucidate the role of PDGF receptors in the liver and potentially lead to therapeutics able to attenuate fibrosis.

Mentors: Dr. Michelle D. Tallquist; Malina J. Ivey
Bioremediation of Dibenzothiophene with the Bacteria

*Burkholderia* sp. C3

Dibenzothiophene (DBT) is a sulfur containing polycyclic aromatic hydrocarbon (PAH) found in petroleum oil and incomplete combustion. The Environmental Protection Agency classified PAHs as ubiquitous, carcinogenic and persistent contaminants. Combustion of DBT emits sulfur oxides which cause acid rain, having a detrimental effect in the environment and human health.

Considered an environmentally friendly process, biodesulfurization involves the microbial removal of the sulfur fraction from crude oil through various enzymes the bacteria naturally produces. *Burkholderia* sp. C3 (C3), bacteria isolated from a PAH contaminated area on Hilo, Hawai’i, had the ability to degrade the PAHs: naphthalene and phenanthrene.

In this experiment, C3 was capable of degrading DBT in a minimal medium aqueous environment at a rate much greater than the abiotic degradation rate of DBT. The amount of DBT was measured through high performance liquid chromatography up to day 10. Proteins and enzymes active in the biodesulfurization pathway of C3 were identified using nano–liquid chromatography coupled with a mass spectrometer (LC–MS). The data from the LC–MS, was analyzed with IDPicker. By determining the specific enzymes active in the degradation of DBT, the Kodama Pathway seems to be the preferred DBT biodegradation pathway for *Burkholderia* sp. C3.

Mentor: Dr. Qing Li
Exploring the Impact of Toll–Like Receptor Signaling on Memory B Cell Differentiation and Cytokine Secretion

*Bordetella pertussis* is a gram–negative bacterium that is known to cause prolonged infection of the upper respiratory tract, causing the disease known as “whooping cough”. High rates of hospitalization and mortality, especially among infants under 12 months, lead to the increase of vaccination worldwide. Despite wide coverage in vaccination, the disease is reemerging since its dramatic decline in the 1950’s. We and others believe that the reemergence of Pertussis is due to the inadequate long–term antibody production against the acellular vaccine that consists of four pertussis antigens: pertussis toxin, pertactin, filamentous hemagglutinin, and fimbriae. Although there is currently little understanding of the waning immunity, we know that memory B cells play a significant role in the production of antibodies in a secondary response. Current research is investigating how to improve pertussis vaccine effectiveness with TLR ligands. We propose that by exposing memory B cells with both TLR ligands and different pertussis antigens, we will observe a more robust immune response that will be quantified through B cell proliferation and cytokine secretion using flow cytometry and real–time PCR.

Mentor: Dr. Sandra Chang
The Labyrinth: A Kafkaesque Reality Reinterpreted

The term “Kafkaesque” is frequently used when describing incomprehensible situations, and I aim to reinterpret this term through my creative project. Kafkaesque is derived from the existential concepts stemming from the works of Franz Kafka. It has been applied within, as well as outside of, the literary field in broader terms concerning that which is normally considered bizarre. As one of the most influential authors of the twentieth century, often referred to as the Father of Modernism, his works are considered revolutionary in both style and content. The bureaucratic language and unique themes in Franz Kafka’s short stories will influence my own writing. My focus will be on nightmarish, animalistic themes with a twist on its allegorical devices. I will employ a psychic distance, rather than taking a bureaucratic approach, through the third-person point of view. The narratives will re-examine multiple aspects of life in conjunction with the philosophical movement of Modernism, though they will vary in both plot and length. By doing this, I intend to insert my own voice, thereby reinterpreting the term Kafkaesque, in the creation of a collection of short stories. Or, as Ezra Pound would say, the goal is to: “Make it new!”

Mentor: Dr. Craig Howes
Identification of Tongan Fungi Using Morphology and DNA Fingerprinting

In 1991 it was estimated that there were 1.5 million fungal species worldwide, at the time only 70,000 had been described. With the increasing use of high-throughput sequencing methods the estimated number of fungal species has now risen to 5.1 million. Fungi are a hugely important part of the ecosystem; they form obligate relationships with many groups of organism; Can be potentially devastating pests; and may contain important compounds to synthesize new medicines. However none of this can be done if we don’t know what is out there.

In July of 2014 I made an expedition to ‘Eua Tonga along with five other University of Hawaii at Manoa (UH Manoa) students, and faculty mentor Michael B. Thomas. While there I made 67 collections of macrofungi (mostly mushrooms), which with the permission of the Tongan government were sent back to UH Manoa for further study. A subset of the 67 collected fungi was selected for further study using macro and micro-characteristics in tandem with DNA “fingerprint” analyses to identify and describe specimens. Tonga being an understudied region it is likely that this research will result in new island records, and possibly the discovery of fungi as of yet unknown to science.

Mentor: Dr. Nicole Hynson
Kaile J. Luga  
Anthropology  
Finished Project in Social Sciences  
Participation for UROP  
Oral Presentation: 9:45 a.m. in C101

Mai Ka Hoʻokuʻi A Ka Hālāwai  
From Hawaiʻi to Kahiki – Pōhaku Kuʻi ‘Ai of East Polynesia

There is much variation amongst the pōhaku kuʻi ‘ai (food pounders) of East Polynesia. Pōhaku kuʻi ‘ai vary in body shape, head shape, decoration, and material make-up. The wide distribution of pōhaku kuʻi ‘ai and the similarities and differences between styles were influenced by the cultures and environments of the island groups in which the pōhaku kuʻi ‘ai were made and used. Their variation reflects patterns in migration, interaction, and early settlement of East Polynesia. A better understanding of this particular artifact class promises to provide us with new insights on ancient East Polynesia, and the relationship between Hawaiʻi and Kahiki (islands within central East Polynesia).

Mentor: Dr. James Bayman
Locating the Estradiol Binding Pocket of the G–protein Coupled Estrogen Receptor (GPER)

A proliferating mechanism of estrogen–related cancers is activation by interactions between estrogen and its receptors. High concentrations of estrogenic compounds overstimulate estrogen receptors that can potentially lead to breast, ovarian, and cervical cancers. Recently, a G–protein coupled estrogen receptor (GPER) has been discovered with no structural similarity to the profusely–studied estrogen receptor, ERα. Due to experimental challenges with GPCRs, GPER's three–dimensional structure has not been determined. Various computational approaches were utilized to predict its structure. Protein conservation analysis is a biological tool in which the conservation of amino acids is compared between evolutionarily divergent organisms. Ligand–binding sites of proteins are usually highly conserved due to their significance. Experimentally validated selections of GPER amino acid sequences from UniProt were analyzed with ConSurf for determination of conservation. Through Chimera, conservation results were combined with a homology model to create a color–coded representation reflecting the amino acids' degree of conservation while simultaneously docking with multiple estrogenic ligands from SwissDock results. The amino acids that participated in ligand binding differed from one ligand to another. Amino acids 119L, 307H, and 310N were found to participate in all ligand binding sites and their placement in GPER suggests the presence of an activation domain in GPER. Moreover, intermolecular H–bonding was found between 115E–estradiol and 275E–Tamoxifen, proposing a possible role of glutamate in GPER ligand binding. Overall, this study suggests that utilizing a range of proven scientific concepts greatly bolster the validity of molecular modeling research that deals with the identification of ligand binding sites in proteins.

Mentor: Dr. Ho Leung Ng
Voices of Aloha: Preparing for Travel through Research, Practice, and Sharing

Voices of Aloha: Preparing for Travel through Research, Practice, and Sharing is a set of creative group projects designed to support the larger vision of the Voices of Aloha 2016 tour: “Montréal to Manhattan” (June 2016). Firstly, students organized on-island “mini-tours” to local schools to share repertoire and build awareness for the tour. In addition, these mini-tours were designed to teach the choral students of Hawai’i about Western origins and influences of the Hawaiian choral tradition. Secondly, student teachers designed and executed a mini-curriculum to be used during these mini-tours, incorporating choral musicianship skills and information about the literature being presented on the tour. Thirdly, student researchers planned, developed, and researched repertoire for the tour program and created program notes incorporating musicological and thematic information about each piece and about the wider tour concept. Finally, students produced and performed in a benefit recital to raise awareness for the tour amongst the public and to explore repertoire related to the tour in a solo and chamber recital setting.

Mentor: Dr. Miguel Felipe
Quantifying Atmospheric Fallout of Fukushima–derived Radioactive Isotopes in the Hawaiian Islands

On March 11, 2011, the Fukushima Daiichi Power Plant suffered catastrophic damage and released the radioactive isotopes iodine–131, cesium–134, and cesium–137, amongst others into the atmosphere. On March 20, 2011, these isotopes were detected in aerosols over the state of Hawaii and were deposited onto the islands by means of wet deposition. Mushroom and soil samples were collected along precipitation gradients on Oahu and analyzed for Fukushima–derived isotopes using gamma spectroscopy. Fukushima–derived fallout was differentiated from historic nuclear weapons testing fallout by the presence of Cs–134, which has a half–life of 2.06 years. Fukushima–derived cesium in both mushrooms and soil was correlated with rainfall for March 2011. Cesium activity between the mushrooms and soil, however, were not well correlated with one another due to differences in bioaccumulation rates between mushroom species. This research confirms that Fukushima–derived fallout in Hawaii is present but it is many orders of magnitude lower than levels associated with negative health effects.

Mentor: Dr. Henrietta Dulai
On the Formation of Pyridine Carboxylic Acids in Interstellar Model Ices

The formation of pyridine carboxylic acids in interstellar ice grains was modeled by the electron irradiation of a binary pyridine (C₅H₅N)–carbon dioxide (CO₂) ice mixture at 10 K under contamination–free ultrahigh vacuum conditions through the utilization of a surface scattering machine. Chemical processing of the pristine ice and subsequent warm–up phase was monitored on line and in situ via Fourier transform infrared spectroscopy (FT–IR) and quadrupole mass spectroscopy (QMS) to probe for the formation of new irradiation induced species. In the infrared spectra of the irradiated ice, bands assigned to nicotinic acid (niacin; vitamin B₃; m–C₅H₄NCOOH) along with 2,3–, 2,5–, 3,4–, and 3,5–pyridine dicarboxylic acid (C₅H₅N(COOH)₂) were unambiguously identified along with the hydroxycarbonyl (HOCO) radical, a proposed reactive intermediate in the formation of generic carboxylic acids in ice grains. The observed suite of pyridine carboxylic acids formed mimics the results of a recent study on a series of CM–2 type carbonaceous chondrites as well as older studies on the Murchison and Tagish Lake meteorites.

Mentor: Dr. Ralf Kaiser
Palo Teuila Kararaina Memea  
Public Health  
Proposal in Social Sciences  
Participation for Honors  
Oral Presentation: 11:20 a.m. in C101

The Blue Zones Project

The purpose of Promoting Physical Activity and Greener Diets in the Ko’olaupoko Region, is to increase overall health and well-being within this area. The way this project will be put into action is by first educating and informing individuals multiple ways in making healthier decisions, where consistency in better decision making will eventually turn into natural habit. By promoting and educating via the Blue Zones Project, a community of well-being will increase through physical and nutritional improvement within specific targeted areas such as among citizens, and schools. These areas will make a difference where you live, work, and play, making healthy decision making unavoidable.

A main area targeted will be among schools. This is because by teaching kids healthier habits, we will increase healthy lifestyles for them to carry on throughout the rest of their lifetime. Another main area to center on will be among citizens. This area will be highlighted because by teaching healthy habits among citizens, the residents of the Ko’olaupoko Region will influence one another. By living a healthy lifestyle, citizens can be an example to their neighbors, co-workers, and other parents.

Hopefully through successful health education and promotion via The Blue Zones Project, members of this community not only will be able to recognize healthy decisions, but also want to make habits out of them. Hopefully this project will be a great success, where the Ko’olaupoko Region can even be a model and influence to other communities in Hawai’i.

Mentor: Dr. Denise Nelson-Hurwitz
Development of Larval Rearing Techniques for the Hawaiian Slipper Lobster *Scyllarides squammosus*

The long term goal of this ongoing project is to add to the development of a co-cultured open ocean cage system in Hawaii for both fish and slipper lobsters. Lobsters are detrivores, and the addition of lobster culturing under the fish cages would limit both the economic loss of fish feed and the nutrient influx to the surrounding environment. Although no gravid female slipper lobsters have been found, collection is still underway. Plankton nets have been towed in Kaneohe Bay and off the south shore of Oahu and cultures of different plankton species have been isolated. These cultures will be identified to genus using DNA barcoding techniques and used to feed larval slipper lobsters.

Mentor: Spencer Malecha
Women in the United States have reported having signs and symptoms of postpartum depression. Addressing maternal, infant, and early child health is extremely important because the first five years of a child’s life are crucial in terms of proper development. Additionally, the struggles that come with pregnancy, as well as the experiences associated with caring for a newborn, can hinder new mothers from properly raising their children. Home visiting programs are evidence-based programs that were created to help support mothers, pregnant women, and their families in the comfort of their own homes.

The purpose of this project is to observe home visiting and assess parent satisfaction, specifically amongst parents/caregivers on Oahu. This project focuses on the home visiting program called the Attachment and Biobehavioral Catch-Up (ABC) Intervention. Through a practice and research-based approach, this project observed how home visiting helps mothers develop the necessary skills to raise children (under five years) who are socially, physically, and emotionally healthy and ready to learn. In collaboration with Keiki O Ka ‘Aina Family Learning Centers, a local community organization, this project consolidated feedback – through a phone-interview satisfaction survey and follow-up questionnaire – from the parents/caregivers who have received home visiting services.

A qualitative analysis of parent satisfaction of the ABC program was conducted through anonymous phone interviews, with 53 parents/caregivers participants. Implementing home visiting programs to address issues regarding maternal, infant, and early childhood health and may encourage children to become physically, socially, and emotionally ready to learn.

Mentor: Dr. Denise Nelson-Hurwitz
Annalyn Tagabi Oliveros  
Public Health  
Proposal in Social Sciences  
Participation for Honors  
Oral Presentation: 10:40 a.m. in C102

Promoting Early Detection of Breast Cancer Among Filipino Women in Hawai‘i

Over the years of research there are many factors that may contribute to breast cancer, but the main cause of breast cancer is still unknown. Instead of using unnecessary research to find a cure to cancer, breast cancer mortality prevention is essential. Every year millions of women are being diagnosed and dying because of late detection. In 2002, The Asian American Network of Cancer Awareness, Research, and Training (AANCART) acknowledged that Filipino women in Hawai‘i had the highest mortality rate due to breast cancer. It was proven that fewer Filipino women had a mammogram within the past year. Those who did get a mammogram were diagnosed in the late stage. The reason Filipino women has such an excessive mortality breast cancer rate is because of late detection. AANCART discovered that there is a lack of breast cancer, detection knowledge, misconception, lack of time, issues with scheduling an appointment, barriers between the physician or professional provider and patient, and the fear of breast cancer. These are barriers that prevent Filipino women get annual mammograms.

AANCART conducted a four–year project to decrease breast cancer mortality rate among Filipino women. Focus groups and breast cancer awareness was projected across the state of Hawai‘i and it was successful. The purpose of this project is to continue promoting early breast cancer detection among Filipino women. Through both a practice and research–based approach. This project will help the mortality rates to remain low and increase the knowledge of breast cancer to the Filipino community.

Mentor: Dr. Denise Nelson–Hurwitz
Queering the Gay/Christian Intersection: An Exploration of Celibacy, Ex-Gay, and the Closet in Gay Christian Narratives

As the LGBTQ+ movement proliferates throughout U.S. discourse, it has become clear that it is inextricably involved with the institution of evangelical Christianity. LGBTQ+ rights, demands, and desires have continually been met with opposition, indifference, and even collaboration from the U.S. evangelical church. But what of those individuals caught in the intersection between queer desire and Christian faith? This project examines the narratives of such individuals, categorized as “gay Christian narratives.” By tracing the themes of celibacy, ex-gay, and the closet throughout these narratives, I elucidate moments of queerness, diverting paths, and ideological exchanges made by these individuals in the precarious position between gay/Christian. Furthermore, I utilize the works of queer theorists such as Judith Butler, Eve Sedgwick, and Jack Halberstam in juxtaposition with gay Christian narratives both to illuminate discreet moments of queerness and reveal the hegemonic structures and demands of U.S. evangelical Christianity. Ultimately, this is as much a literary project as a cultural one. While the gay Christian narratives I analyze are themselves indicative of the seemingly opposed stances of queer/Christianity, I also utilize contemporary Christian and LGB/Christian rhetoric to relate text to culture. Problematic tensions and struggles seen in gay Christian narratives are reflected throughout U.S. popular discourse, where discussions of LGBTQ+ and Christianity take place amidst the objectification, oppression, and institutionalization of queer individuals.

Mentor: Dr. Cynthia Franklin
Young Stars of High Variability

During star formation, a stellar disk is formed around the star, filled with dust and other material. In this process, many things can happen. Material can be falling onto the star, away from the star, or revolve around the star, creating asteroids and perhaps even planets. Thus, the start of creation of a young solar system. For my project, I am looking for young stars (about 3–10 million years old) that show variability, signaling activity in the stellar disks. I am finding this variability from data collected through photometry by the Las Cumbres Observatory Global Telescope Network. Using the software AstroImageJ, I am processing data in the collected images, in hopes of compiling a set of young variable stars that can be later investigated.

Mentor: Dr. Geoffrey Matthews
Creating Videogame

The technology of video games have progressed greatly from its inception, the objective of this project is to further this progression. The aim is to design a game using emerging technologies – so that players will gain a novel videogame experience. The game have a combat theme; players will be positioned within a virtual world and control the play with their bodies. It will incorporate Oculus Rift and Leap motion controller technologies. The Oculus rift is a virtual reality headset that places players within the game itself. The Leap motion controller allows for a deeper level of interaction between the person and the game, allowing the player to move their bodies to control their virtual characters’ motions. These technologies will enable the game to become an accessible entry point for a new generation of game players. It will attract a wide audience because it will be a personal and visceral experience, allowing players to experience an inside view of the virtual game-world and control characters actions with their bodies instead of a controller. Throughout the history of video games, much of the growth and expansion can be attributed to developments in technology. The game made in this project will demonstrate the potential of current new technologies to be the sort that have heralded leaps in the video game medium.
A genetic study reveals that in Palau the coral *Acropora hyacinthus* does not rely on asexual reproduction as a means of recovery after a mortality event, evidenced by the absence of clonal colonies. Microsatellites in the nucleic DNA of the coral tissue were isolated using 18 different primers and sequenced in order to identify clones in the population by comparing microsatellite lengths. Using microsatellite sequences to compare genotypes is a novel approach since traditional studies do not sequence the DNA, but rather obtain the total length of the PCR product for sample comparison. Sequencing the DNA has the potential to increase the accuracy of microsatellite studies, and allows for a more in-depth analysis of the genetic composition of these corals. In order to generate genotypes based on DNA sequences, a pipeline was developed to identify, isolate, and compare microsatellites. Two methods for microsatellite identification were applied and compared for best results, one by hand and the other an automated process. Apart from comparing methods, this research aimed to connect the mode of reproduction after a mortality event to a potential management strategy. A greater emphasis for protection should be placed on the coral reefs with a high occurrence of spawning corals to protect the progeny and allow for reef recovery.
Why Have Rates of Unequal Representation in America’s Election System Increased Over Time?

The United States of America was founded with the intention of creating a new system of representation for its people. In meeting this intention, the introduction of the Electoral College was the accepted compromise for electing the President. However, the function of the Electoral College creates various means of unequal representation among Americans. Although the number of Electors has been fixed since Hawai’i’s incorporation into the union, populations have continually grown and changed throughout America, resulting in disproportionately changing rates of voting power for Americans. This work utilizes Census state population data, which is also used in determining the apportionment of Congressional Representatives and subsequently the corresponding number of Electors, to show comparative rates of representation between states as well as rates of change in representation over time. Various considerations toward attaining less unequal voting power in an indirectly representative (or two-tier) system will be analyzed and compared to historical rates of voting power in order to determine the effectiveness in preserving rates of representation over time. This analysis will reveal increasing rates of unequal voting power over time in the current system, as well as greatly diminishing rates of voting power over time in alternative systems of representation. The results of this comparison support the utilization of the current electorate system over non-indirect systems in preserving individual voting power through periods of population growth.
The Jewish Cultural Experience in Post-War Germany, 1990–2015

The *Ashkenazi* Jews of Germany had developed a distinct and rich culture since the days they had first settled in the Holy Roman Empire. They had settled throughout Europe, prospered, and, by the rise of Nazi Germany, they constituted a large majority of the world’s Jewish population. The Holocaust decimated the Jewish population in most of Europe, and devastated *Ashkenazi* culture. Why, after such a terrible experience, do many Jewish people from various backgrounds wish to make Germany their home? During the time that Germany has become reunified (1990–2015) there has been significant growth in the Jewish population in that country. The Jewish culture that exists in present-day German society is different in many ways from the traditional *Ashkenazi* culture that existed before the Holocaust, and it is different because it has become an amalgam of influences from distinct subgroups of the Jewish population who have different origins, experiences, and reasons for making Germany their home.

Mentor: Dr. Peter H. Hoffenberg
Cory Kamehanaokalā Holt Taum  
Hawaiian Studies  
Finished Project in Arts & Humanities  
Participation for UROP  
Oral Presentation: 10:25 a.m. in B101

Māori and Maoli Art Exchange: A Creative Project Inspired by the Correlation of Contemporary Māori and Hawaiian Art

This was creative project where I researched various art making techniques used by well established Maori artist and art schools by observing and participating in various workshops.

Many of the sources dealing with Kanaka Maoli and many other cultures’ visual arts were lost due to many different reasons. The loss of the understanding of these practices and has played a major role in the identity crisis of the Kanaka Maoli people. Just as a culture has a verbal language we also had a visual language; containing specific patterns, colors, and overall aesthetic. Why is cultural identity important? The need for cultural identity is to give a sense of responsibility to those who feel disconnected to their own motherland. Kanaka Maoli are just one group of people within the larger group of pacific peoples. Our sibling cultures also experienced colonization from other nations, and we have all been affected in different ways. I believe that developing relationships with our other pacific cultures is an integral part of the “rebuilding” of one's own culture. We pacific people all share many practices and beliefs and at the same time both lost and held onto these different traditions. I would like to research “contemporary” Maori art by visiting with various established Maori artist and visiting various existing Maori art programs.

Mentor: Maile Andrade
The Identification of the Predisposing Gene That Influences the Epidemic of Malignant Mesothelioma in Cappadocia, Turkey

Malignant mesothelioma is a cancer that arises from the mesothelial cells that form the peritoneal, pericardial, and pleural cavities. The main cause of this cancer is from the exposure to certain mineral fibers such as erionite and crocidolite (asbestos). It was also found that this disease could be passed down genetically through a mutation within a gene called BAP1. The purpose of the following project is to identify any other genetically predisposed genes that influence the spread of malignant mesothelioma (MM) epidemic in Cappadocia, Turkey. It is hypothesized that there is another autosomal dominant trait predisposed gene for Malignant Mesothelioma. In order to approach this problem, the genetic data collected from approximately 2500 Turkish individuals will be used to construct a pedigree. This pedigree will be used for the purpose of analyzing and determining if there are any hereditary patterns. The DNA of the mesothelioma patients will also be analyzed and sequenced to find any gene mutations to determine whether there are any correlations between each of the individuals with and without mutations. This will be done by using next generation sequencing, DNA purification, and the polymerase chain reaction. All experiments will be carried out at the University of Hawaii Cancer Research Center.

In conclusion, data from this experiment will help pave the way to identifying patterns of mutations which cause the alterations of genes which influence malignant mesothelioma.

Mentor: Dr. Masaki
Madisyn Uekawa
English
Proposal in Arts & Humanities
Participation for Honors
Oral Presentation: 11:50 a.m. in B101

Enhancing Suicide Prevention for College Students through Literary Text

Throughout the state of Hawai‘i, there is a desperate need for sufficient and adequate suicide preventative measures. The University of Hawai‘i at Mānoa (UHM), the largest University in the UH system, is a prime example of this issue. This project will be a combined Public Health Capstone and Honors English project, and it will be focused on improving and enhancing suicide prevention at UHM, particularly through the means of literary text.

Currently, UHM has no protocol in responding to tragic events like student deaths and has slim-to-none active suicide prevention; this project will be involved in changing that. The project essentially includes two parts: One, involvement in suicide prevention on-campus, and two, a creative written collection containing relevant themes of death and tragedy. This written piece will include different forms of writing such as fiction, non-fiction, and poetry – which will bring the topic alive in a unique and creative manner. These pieces may also be used to elicit empathetic attitudes and educate individuals on the issue. In theory, empathy can be obtained through written works. The ability to understand internal struggle through literary text could then be a key element to providing a better social environment for those at-risk individuals and creating more effective suicide interventions. The project will essentially attempt to raise suicide prevention on-campus and create more sensitivity and awareness on the subject of student deaths. Overall, this project aims to enrich one’s understanding of suicide and move toward the larger goal of reducing student suicidal deaths.

Mentor: Dr. Susan Schultz
Due to the rise in childhood obesity rates, many studies have been conducted to explore the relationship between physical activity and academic achievement in students. Research has shown that children who are physically active have higher grades, increased school attendance, improved cognitive performance, and better classroom behaviors. Due to this research, there are three objectives for my applied learning project that may assist with increasing physical activity in schools. The first was to develop a policy brief that could be shared with Hawaii legislators to help them make an informed decision about a bill that would increase the requirements for health and physical education. Second, a “How to Instructional Guide” was created with the help of Department of Health and Education representatives for physical education teachers to conduct fitness tests. The “How to Instructional Guide” will include recommended fitness assessments, proper techniques, and targets for healthy fitness zones. Lastly, several District-wide Elementary Fitness Meets were held across the state and one of the goals of this event is to promote health and wellness among elementary schools. While one of the goals of this project is to better understand how physical activity can aid academic achievement, the overall goal is to understand the role of schools in promoting physical activity and physical education and how this can lead to improved health outcomes for youth.

Mentors: Dr. Denise Nelson-Hurwitz; Rebekah Rodericks, MPH
Assessment of Diabetes Awareness Among Adults in Nanchang, China

Rates of type II diabetes mellitus are increasing in China at an alarming rate, as physical activity is declining and obesity rates are rising. Several large epidemiological studies have shown the increase of type II diabetes in China has reached epidemic proportions, and will continue to rise unless it is addressed rapidly and effectively. As China continues to develop, it is crucial to understand factors stimulating the increase in diabetes, in order to implement intervention or prevention programs. However, before attempting to implement intervention programs, preliminary analysis must be done to assess the general awareness of diabetes and associated risk factors among Chinese adults.

The objective of this study is to assess the knowledge of diabetes among Chinese adults ages 19 to 49 in Nanchang, China. This project includes collaboration with Nanchang University, located in the city of Nanchang in Southeastern China. A cross-sectional survey was conducted using anonymous interview-assisted surveys in seven different locations around Nanchang over the summer of 2015. Data was collected from over 400 people. The hypothesis for this study is that low income, low education, and rural residents will be less likely to know that diabetes is preventable. By assessing the level of knowledge and awareness of diabetes among Chinese adults, the most appropriate and effective route of prevention and intervention can be identified. This study found that most people are aware about diabetes, but there is some variation by education and place of residence.

Mentor: Dr. Denise Nelson-Hurwitz
Algae, photosynthetic organisms exclusive of plants, are important members of benthic communities in both freshwater and marine aquatic environments. Communities of microscopic algae form the foundation of food webs for fish, mollusks, and crustaceans, help to cycle nutrients, increasing the bioavailability of inorganic compounds, and directly impact the biodiversity found within a stream habitat. These communities are influenced by environmental factors such as seasonality, leaf litter and debris inputs from the surrounding habitat, and competition between organisms found in the benthic populations. Additionally, Hawaii’s stream habitats may be largely impacted by anthropogenic activity including industrialization and agriculture. All of these factors need to be studied to understand natural and anthropogenic driven change in Hawaiian benthic algal communities. This research included sampling (Summer, 2015) of stream sites monitored by the Hawaiian Division of Aquatic Resources to establish baseline measurements of benthic algal diversity and to document possible changes to these communities in response to anthropogenic land use and natural seasonality.

Environmental DNA (from members of the microbial community) was extracted for each sample and submitted for high-throughput sequencing. Analysis of the results will allow for the characterization of the diversity present in Hawaiian streams, including species potentially unknown to science. These results also allow for the evolutionary relations of the species uncovered to be deduced in conjunction with species from Oahu and other islands of the Hawaiian archipelago as well as other regions of the world.
Ergonomics of a Car Seat

Lowering the center of mass of a vehicle allows it to handle better by decreasing the propensity to tip. An optimum driving position for a driver one of the heaviest objects in the FSAE formula 2015 car was found based on the driver’s center of mass and comfort. By lowering their center of mass it provided better handling of the vehicle. The comfort of the driver is paramount to their ability to control the vehicle to their maximum potential by limiting distractions. This was achieved by first testing the drivers for the car in a mock seat to find an optimum angle. In the end the optimum angle was 42 degrees but because of manufacturing concerns the final angle built was 37 degrees. The overall center of mass was lowered more but driver comfort was no longer optimal for shorter drivers.

Mentor: Dr. Ghorbani
Urinary Tract Infection: Importance in Detection, Diagnosis, and Treatment

A urinary tract infection (UTI), also referred to as cystitis, is an infection of the bladder, kidney, ureter, and/or urethra. Symptoms may include an uncommon and frequent urge to urinate, urination at an abnormally small volume, pain or burning sensation with urination, and/or urinating blood. It is important to take note of symptoms and seek help immediately. Treatment usually includes a ten-day course of antibiotics prescribed by a primary care provider. Urinary tract infections are found to be more prominent within the younger female populations. The selected population most vulnerable to this infection is adolescent females within the age range of 18–22 living in rural areas. Populations living in rural areas may not have access to knowledge or resources for preventing UTIs. They may also be living in environments that inhibit poor hygiene which in turns increases the chances of getting UTIs. Urinary tract infections are correlated with risky sexual behavior and affect more sexually active females than males. Those who have more than one sexual partner at a time or refrain from the use of contraceptives may increase their chances of obtaining a UTI.

This project focuses on the importance of diagnosis and treatment of urinary tract infections. The purpose is to investigate urinary tract infections in correlation to risky sexual behavior, and untreated infections leading to issues in one’s future such as cervical cancer and reoccurrence. In collaboration with Planned Parenthood, this project will practice evaluating and screening sexually transmitted infections, diseases, and conditions.

Mentor: Dr. Denise-Nelson-Hurwitz
The Genetic Knockdown of PRAF1 in *Drosophila melanogaster*

PRAF (prenylated Rab acceptor family) proteins are highly conserved among multicellular organisms and are associated with cellular transport and endo/exocytic vesicle trafficking. Several paralogous genes of PRAF exist and are expressed in a variety of tissues. PRAF1 is a transmembrane Golgi apparatus protein while PRAF3 plays a role in cell apoptosis. Currently, the function of the PRAF1 domain family, member 1 (PRAF1) is still not understood. This study investigates the effects of a genetic knockdown of PRAF1 in *Drosophila melanogaster* using RNA-mediated interference (RNAi) methodology. Knockdown flies are triple-transgenic and contain a GMR-GAL4 driver to drive the expression of the PRAF1 RNAi hairpin construct in *Drosophila* eyes and a copy of the DICER endonuclease to amplify the knockdown response. We hypothesized that the PRAF1 knockdown would cause developmental abnormalities in *Drosophila* eye ommatidia, resulting in a “rough-eye” phenotype in *Drosophila* eyes. We found that the knockdown flies exhibited a rough-eye phenotype, but we were unable to distinguish between specific and non-specific effects of the GMR-GAL4 driver and the PRAF1 RNAi. Further experiments will involve expressing the PRAF1 RNAi construct using different drivers to achieve more conclusive results.

Mentor: Dr. Heinz Gert de Couet
Expression of Aromatase in *Escherichia coli* for Ligand Binding Studies

Human aromatase is an enzyme necessary for estrogen biosynthesis from androgen precursors, and is often the target for chemotherapy drugs that fight against breast cancers with estrogen receptor positive breast cancer cells. Tamoxifen, a drug that acts as an estrogen receptor antagonist, was the primary method of treatment for women with hormone receptor positive breast cancer cells in the twentieth century and is still widely used today. More recent forms of chemotherapy drugs for breast cancer include aromatase inhibitors, which directly act on aromatase to inhibit the enzyme. Aromatase inhibitors are effective and highly selective for aromatase, but are limited by resistance issues, and therefore motivate researchers to produce drugs that will overcome those resistance mechanisms. Recent studies have shown that tamoxifen metabolites may be working to block estrogen synthesis through a second pathway; tamoxifen metabolites inhibit aromatase through noncompetitive inhibition. Although aromatase has been crystallized, there are no crystal structures that have elucidated the presence of these allosteric sites. The objective of this project is to express enough functional aromatase in *E. coli* cells to be able to perform ligand–binding studies on aromatase and identify allosteric sites with protein crystallography. Structural studies of aromatase and its allosteric sites will provide information on the obscure interactions of aromatase with other compounds and possibly shed light for a new generation of chemotherapy drugs.

Mentor: Dr. Ho Leung Ng
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The Honors Program provides opportunities for talented and motivated undergraduates to excel in their academic studies. Students complete a challenging enquiry-based curriculum that encourages independent research and creative expression. They enjoy intimate and personalized educational experiences within the setting of a large research university through small classes, dedicated advising, peer mentorship and faculty-guided projects. The Honors Program promotes critical thinking and oral, written and audio-visual communication skills; respect for diversity and commitment to social justice; and civic participation and capacity for leadership. It fosters among its students and faculty a sense of identity and a joy in scholarship, which it communicates to the university and the community.

manoa.hawaii.edu/undergrad/honors/

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