Undergraduate Research and Creative Work

8 May 2015 – 8:00a to 3:30p
Sakamaki Hall
Campus Center Ballroom
Honolulu, Hawai‘i
<table>
<thead>
<tr>
<th>TIME</th>
<th>ACTIVITY</th>
<th>LOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00-8:45a</td>
<td>Registration and Breakfast</td>
<td>Location</td>
</tr>
<tr>
<td>8:45-8:55a</td>
<td>Opening Ceremony</td>
<td>Location</td>
</tr>
<tr>
<td>9:00-10:20a</td>
<td>Oral Presentations Session One</td>
<td>Breakout Rooms</td>
</tr>
<tr>
<td>10:20-10:30a</td>
<td>Break</td>
<td>Courtyard</td>
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<tr>
<td>10:30a-11:50a</td>
<td>Oral Presentations Session Two</td>
<td>Breakout Rooms</td>
</tr>
<tr>
<td>11:50-12:00p</td>
<td>Break</td>
<td>Courtyard</td>
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<tr>
<td>12:00-1:00p</td>
<td>Oral Presentations Session Three</td>
<td>Breakout Rooms</td>
</tr>
<tr>
<td>1:15-2:00p</td>
<td>Lunch and Awards Ceremony</td>
<td>Campus Center Ballroom</td>
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<tr>
<td>2:00-3:30p</td>
<td>Poster Presentation Session</td>
<td>Campus Center Ballroom</td>
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</tbody>
</table>
Campus Center & Sakamaki Hall

Lunch & Posters

Oral Sessions

Campus Center

Sakamaki Hall

Sakamaki Detail

Social Sciences (C rooms)

Engineering & Computer Sciences (B103)

Arts & Humanities (B101, B102)

Natural Sciences (A rooms)

Registration & Refreshments

Entrance
Sakamaki Hall

Oral Presentations Session One  9:00 - 10:20a
Oral Presentations Session Two  10:30 - 11:50a
Oral Presentations Session Three  12:00 - 1:00p

A101  Natural Sciences
A102  Natural Sciences
A103  Natural Sciences
A104  Natural Sciences
B101  Arts & Humanities
B102  Arts & Humanities
B103  Engineering & Computer Sciences
C101  Social Sciences
C102  Social Sciences
C103  Social Sciences

Campus Center Ballroom

Lunch and Awards Ceremony 1:15 - 2:00p
Poster Presentations 2:00-3:30p

* next to name in schedule indicates student is also presenting a poster
A101  Natural Sciences Projects

9:00  Daniella Orias  Regulation of Sphingosine Kinase 1 and Adipose Inflammation by *Momordica charantia* (Bitter Melon) in High-Fat Diet-Fed Mice

9:15  Lashelle Eguires  Monitoring for *Mouse Parvovirus* in the Mānoa Vivarium at the University of Hawai‘i at Mānoa

9:30  James Miller  Cultivation, Isolation, and Identification of Single Bacterial Cells from Coral Mucus


A102  Natural Sciences Projects

9:00  Kimberly D. Bowman  Pharmacogenetics: Interpretation and Guide for Drug Dosage in Clinical Applications

9:15  Yun-Wen Betty Fletcher*  An Observation of Range-of-Motion Exercises Undertaken by Elders while Gardening

9:30  Cherie Joyce Guillermo  Assessing the Effects of Plants and Exercise Locations on Individuals in Hawaii

9:50  Nathaniel Saul  Quantitative Analysis of the Biomechanical Effects of Kinesio Tape

10:05 Chloe Yester*  Examining Student Perspectives of Learning Effectiveness in High Fidelity Simulation
A103  Natural Sciences Projects

9:15  Jinny Ching  Locating Hydrogen Atom Positions in Proteins

9:30  Kellie Kurasaki  In vitro Tubule Formation of Yop1 Expressed in E. coli

9:50  Eddy Leung*  Assessment of Viral Reservoirs in HIV Eradication Studies

10:05 Carissa Nakao*  Characterization of the Expression Pattern of Triggering Receptor Expressed on Myeloid Cells (TREM) Family Receptors following West Nile Virus Infection

A104  Natural Sciences Projects

9:00  Monica N. Dittbern  Identification of Airborne Algae on O‘ahu using Next-Generation Sequencing Technology

9:15  Lisa Hall  Exploring the Ecology of Reoccurring Associations between Eukaryotic Phytoplankton and the Nitrogen-Fixing Cyanobacterium, Trichodesmium

9:30  Justin Shortell  'Small Kine' Manipulations of Deep Sea Bacteria

9:50  Melissa Walker  Cyanobacterial Biodiversity in Hawaiian Freshwater Streams

10:05 Faline Williams  Analyzing Groundwater and Algal Distribution in Maunalua Bay using GIS Software
Oral Presentations Session One
9:00 – 10:20a

B101  Arts & Humanities Projects

9:00  Ronia Salamasina Auelua  Samoan Attitudes Towards People with Disabilities in Samoa and American Samoa
9:15  Noahlani Fata  Barriers that Hinder Native American Samoan Students from Attending College Off-Island
9:30  Lilia Merrin  I ka wai hālau a i Wailua (The expansive water of Wailua): Investigating Wailua River and it's Tributaries in the Social-political Development of Ancient Kaua’i

B102  Arts & Humanities Projects

9:00  Jennifer Boranian  Endeavors of National and Ethnic Identity: Examining Pluralistic Education Reform
9:15  Mary Campany  Motifs of Immortality in Osamu Tezuka's "Phoenix" series
9:30  Joanna Fagan  Through the West: The Transference of African American Imagery to Japan
9:50  Avree Ito-Fujita  Beyond Shattered Lenses: Exploring Visual Effects Techniques and Encouraging Student Collaboration
10:05  Alyssa-Marie Yukiko Kau  Changing the Tides: Effective Techniques for Female Politicians in Contemporary Times
<table>
<thead>
<tr>
<th>Time</th>
<th>Name(s)</th>
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<tbody>
<tr>
<td>9:00</td>
<td>Christopher Ahuna, Chaz Bajet,</td>
<td>Human Powered Vehicle</td>
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<tr>
<td></td>
<td>Eric Caldwell, Sandrick Cristobal, Quincy Crowell, Joshua Globa, Wonjun Jung, Kelsey Kawaguchi, Nathan Maldonado, Jayme Navor, Ryan Saito, Russell Shigeoka</td>
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</tr>
<tr>
<td>9:15</td>
<td>Bryan Fewell*, Jonathan Kutsunai, Kevin Sonoda, Chauncey Tom</td>
<td>Investigation of Mesh Networking Capabilities of Picosatellites for Mission Flexibility</td>
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<td>9:30</td>
<td>Mael Flament</td>
<td>Real-Time Determination of Ocean Surface Currents Using Land-Based and Satellite Imagery</td>
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<tr>
<td>9:50</td>
<td>Tri Do, Julian Price</td>
<td>Research and Development of an Aerodynamics Package for Formula Society of Automotive Engineers</td>
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<tr>
<td>10:05</td>
<td>Holm Smidt*</td>
<td>Design and Integration of a Feedback-Control Algorithm for an Autonomous Path-Following Space Mining Rover System</td>
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**Oral Presentations Session One**

9:00 - 10:20a

**C101 Social Sciences Projects**

9:00  Anton Aberg  WHAT ARE YOU DOING? VS. ARMY STRONG: An Analysis of Cultural Values and Subcultural Differences in the Advertising for Armed Forces Recruitment in Sweden and the United States

9:15  Chelsey-Mei Borge*  Exploring the Economic Impact of the University of Hawai‘i on O‘ahu’s Tourism

9:30  Patricia K. Carreño*  Ethnic Identity and Posttraumatic Emotional Expression in Combat Veterans

9:50  Li P. Philips  An Analysis of Cultural-Historical Tourism in Bagan, Myanmar using the Repertory Grid Technique

10:05  Chonnikarn K. Sherman*  Seeking Angkor’s Elites: Roof Tiles and Residence from the 9th through the 15th Centuries in Northwest Cambodia

**C102 Social Sciences Projects**

9:15  Brenda Duong*  A Qualitative Exploration of Dancing Hula for Health

9:30  Zoeann Goya*  Documenting the Nursing Process: A Community Based Participative Research Study

9:50  Rebekah Noël Harter*  Horticulture as Therapy in University Settings: A Manual for University Mental Health Allies

10:05  Lana Hudson  Motivations Behind Fast Food Consumption in University of Hawai‘i Mānoa College Students: A Qualitative Study
Oral Presentations Session Two
10:30 - 11:50a

A101 Natural Sciences Projects

10:30 Adam Bajinting Dong  
  Dong Kuk Huh  
  Optimizing the Expression of FGFR2 Using the Cell-free Reaction

10:45 Uyen H. Freitas  
  Molecular Taxonomic Identification of the Oriental Fruit Fly (Bactrocera dorsalis) and the Melon Fly (Bactrocera cucurbitae): How Similar Are They at the DNA Level?

11:00 Michelle Hu  
  Improving the Crystal Formation of mCrimson 29

11:20 Jaymes Lonzanida  
  Identification of Proteins Translated by Alternative Ribosomes in Mycobacterium Smegmatis

11:35 Sonya Tran  
  Screening for Kinases that are Essential for Preimplantation Development

A102 Natural Sciences Projects

10:30 Coral Bielecki*  
  Maria Daisy Dean  
  Dane Gonsalves  
  Noweo Kai  
  Melissa Walker  
  An Assessment of Critically Endangered Plant Species of the Kingdom of Tonga

10:45 Michael Coe  
  Ethnomedical Components of the Ayahuasca Complex

11:00 Zachary Olds  
  Analysis of Topography and Rock Fractures at the Fletcher Granite Quarry, Massachusetts

11:20 Lisa Hinano Rey  
  Language of the Backyard: Community Subsistence and Island Sustainability in Ra’iātea, French Polynesia

11:35 William Thompson  
  Importance of Biochar Ash Contributions to Corn Growth in a Highly Acidic Infertile Hawaiian Soil
### A103 Natural Sciences Projects

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<td>Full-term Offspring Derived from Oocytes of Primordial Follicles Activated Using Three Dimensional (3-D) Matrigel Culture System</td>
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<td>10:45</td>
<td>Mona Iguchi</td>
<td>Conservation of Habitat Utilizing Estrogen Receptor Reporter Gene Assays</td>
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<tr>
<td>11:00</td>
<td>Rance Okudara</td>
<td>Binding Affinity of G-Protein Coupled Estrogen Receptors for 17-B Estradiol</td>
</tr>
<tr>
<td>11:20</td>
<td>Shayne Janne Jossef D. Rasay</td>
<td>Intrauterine Growth Restriction in Babies Born to HIV-Positive Women: Identification of Possible Mechanisms Responsible for Low Birth Weight</td>
</tr>
<tr>
<td>11:35</td>
<td>Tanis Leonhardi</td>
<td>Dynamics of the 114ka Explosive Volcanic Eruption at Pu<code>u Wa</code>awa<code>a (Hawai</code>i)</td>
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### A104 Natural Sciences Projects

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<th>Time</th>
<th>Presenter</th>
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<tbody>
<tr>
<td>10:30</td>
<td>Charmaine Alontaga</td>
<td>The Performance of Honeybees in a Series of Color Oddity Problems</td>
</tr>
<tr>
<td>10:45</td>
<td>Echelle Burns</td>
<td>The Electro-Response of Captive Scalloped Hammerhead and Sandbar Sharks to Anthropogenic Electrical Fields</td>
</tr>
<tr>
<td>11:00</td>
<td>Megan Chi*</td>
<td>Response of <em>Scotorythra</em> Caterpillars (Geometridae) to Drought Simulation and Nutrient Augmentation of Koa (Fabaceae: <em>Acacia koa</em>)</td>
</tr>
<tr>
<td>11:20</td>
<td>Sonja Dobbs</td>
<td>Control of Jackson’s Chameleons using Decoys</td>
</tr>
<tr>
<td>11:35</td>
<td>Kathleen Quiambao*</td>
<td>Anti-Corrosion Effects due to Biofilm Formation on 1018 Carbon Steel</td>
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## Oral Presentations Session Two
### 10:30 – 11:50a

### B101  Arts & Humanities Projects

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<th>Title</th>
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<tbody>
<tr>
<td>10:30</td>
<td>Troy Ballard</td>
<td>LeBron James, Self-Determination and the Slavery of the African American Athlete</td>
</tr>
<tr>
<td>10:45</td>
<td>Jessica N. Ciufo*</td>
<td>Color Me In: A Novel</td>
</tr>
<tr>
<td>11:00</td>
<td>Ryan Canoneo Mandado*</td>
<td>Learning &amp; Teaching Historical Complexity in Hawai‘i: The King Kamehameha V Judiciary History Center, Two Teachers, and Two Seminars on Native Hawaiian Legal Challenges</td>
</tr>
<tr>
<td>11:20</td>
<td>Matthew Williams</td>
<td>Imagining Oneself as Another: Autism and the Problem of Other Minds</td>
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<tr>
<td>11:35</td>
<td>Michael Sanes</td>
<td>Changing Social Norms on Nutritional Behavior</td>
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### B102  Arts & Humanities Projects

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<tbody>
<tr>
<td>11:00</td>
<td>Robert King</td>
<td>You and I: Reflections on Rumi and Kahlil Gibran</td>
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<tr>
<td>11:20</td>
<td>Robert L. G. L. Sassone</td>
<td>Hand-Drawn Animation: An Old-Fashioned Art Form in Modern America</td>
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<tr>
<td>Time</td>
<td>Speaker(s)</td>
<td>Title</td>
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<tr>
<td>10:30</td>
<td>Chastyne Cabanas</td>
<td>Estimation of Soil Cation Exchange Capacity from Easily Measurable Soil Variables</td>
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<tr>
<td>10:45</td>
<td>Kathryn Hu</td>
<td>Multi-Walled Carbon Nanotube Nanoforests as Gas Diffusion Layers for Proton Exchange Membrane Fuel Cells</td>
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<tr>
<td>11:00</td>
<td>Heath Larner</td>
<td>Diffusion-Driven Accumulation of Particulates in Tight Corners of Microfluidic Circuits</td>
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<tr>
<td>11:20</td>
<td>Alexander Yang</td>
<td>Genetically Encoded Fluorescent Bio-Sensors for Rapid Analysis of Protein Processing in Plants</td>
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<tr>
<td>11:35</td>
<td>Tylynn Ai, Robinson Bucaneg,</td>
<td>Kinesthetic Energy Generator</td>
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<td></td>
<td>David Kuntz</td>
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**C101 Social Sciences Projects**

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<tbody>
<tr>
<td>10:30</td>
<td>Mason Dahlquist*</td>
<td>The Sedition Act: Free Speech Restrictions in Early America</td>
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<tr>
<td>10:45</td>
<td>Kelly Keita Kunikane*</td>
<td>Dynamic Mapping of the Somei-Yoshino</td>
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<tr>
<td>11:20</td>
<td>Von Dickens Ulsa</td>
<td>American History through the Board Games of the Gilded Age</td>
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<tr>
<td>11:35</td>
<td>William Wainwright</td>
<td>Changes in Japan’s trade Policy: Has Japan Jumped on the Bandwagon of Bilateralism</td>
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</tbody>
</table>
Oral Presentations Session Two
10:30 – 11:50a

C102 Social Sciences Projects

10:30 Nick Kawelakai Farrant*  Mapping the Way Back to Ancestral Abundance on O‘ahu’s North Shore

10:45 Abigail Alabanza Sy*  Underrepresented Ethnicities in the Physician Workforce: Filipinos in Hawaii

11:20 Carl Lorenzo Thompson  Insights into Hawai‘i’s Prehistoric Climate based on Carbon Isotope Analysis of Native Land Snail Shells

11:35 Michelle H. Tong*  Effects of Health Literacy on Cardiovascular Disease in Chinese Americans

C103 Social Sciences Projects

10:45 Victoria Chang*  Development of Olfactory Memory in Young Rats using the Novel Object Recognition Task

11:00 Jodi Chee  Human Terrain System in Afghanistan: Success or Failure?

11:20 Vania Simmons  Oddity Learning in Honeybees with Pattern Stimuli

11:35 Bryson Yee  Coalition Formation with Multiple Incentive Pots
A101  Natural Sciences Proposals

12:00  Corinna S. Hong
Temporal survey of the effects of coral bleaching on fish diversity in Kāne‘ohe Bay

12:15  Andrea Unzueta Martínez
Potential probiotic bacteria *Pseudoalteromonas rubra* can protect the coral *Montipora capitata* from infection by pathogen *Vibrio coralliilyticus* strain OCN 008

12:30  Stephanie Matthews
Metagenetic Sequencing of Zooplankton Species Richness Across Pelagic Depth Zones

12:45  Blake Pinell
The Role of HIF1-Regulated Variant Splicing in the Hypoxic Heart

A102  Natural Sciences Proposals

12:00  Jennifer Erica Bright
A Locally Inspired Sustainable Textile and Fashion Industry for Hawai‘i

12:15  Mael Flament
Improving Computer Aided Neutron Tomography with Track Reconstruction and Direction Finding

12:30  Rebecca Weible
Bioaccumulation of Microplastics in the Marine Food Web
Oral Presentations Session Three
12:00-1.00p

A103 Natural Sciences Proposals

12:00 Michelle Hu
Uncovering the Pharmacogenetics between Aromatase and Breast Cancer

12:15 Brysa Kato
Increasing Unprocessed Carbohydrates in the Diet on Hemoglobin A1c and Hyperglycemia

12:30 Jarin Loristo
Ruthenium Complexes and Anticancer Agents

12:45 Jasmine Tyson
Expression of Dengue Virus-Like Particles in Drosophila Cells as Vaccine Candidates

A104 Natural Sciences Proposals

12:00 Sidra Jabbar
Evaluation of Fibroblast Gene Expression Differences in Internal Organs

12:15 Saide M. Karratti-Abordo
Calcium Channel Expression Patterns In HIV-Tat Transgenic Mouse Cells and the SH-SY5Y Cell Line

12:30 Jessi Tsukayama
Peptide Constructs Derived from P. falciparum MSP1-33 Effect the Immunogenicity of MSP1-19

12:45 Dustin Vuong
Expression of Recombinant Human Apoferritin in Escherichia Coli
### Oral Presentations Session Three

#### B101  Arts & Humanities Proposals

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<tbody>
<tr>
<td>12:00</td>
<td>Veronica Freeman</td>
<td>A Quick Glance at Food: An Investigation into the Use of Food Terminology in Advertising</td>
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<tr>
<td>12:15</td>
<td>Caitlin Kelly</td>
<td>Suicide Prevention</td>
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<tr>
<td>12:30</td>
<td>Tierra Mendez</td>
<td>Observing War through Literature: The Effects of the Iraq Wars on the Family Unit</td>
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#### B102  Arts & Humanities Proposals

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<tbody>
<tr>
<td>12:30</td>
<td>Aira Kariah Iglesias*</td>
<td>Magic Island: The Permeable Park</td>
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<tr>
<td>12:45</td>
<td>Tatiana Omokawa*</td>
<td>Exploring the Potentials of Ordinary Individuals to Generate Pathways leading to Awareness, Discourse, and Development of Strategies to Respond to the Warning Bells of Climate Change</td>
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## Oral Presentations Session Three

**12:00 - 1:00p**

### B103  Engineering & Computer Sciences Proposals

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<tbody>
<tr>
<td>12:00</td>
<td>Jaclyn Guenther</td>
<td>Numerical Modeling for Undergraduates</td>
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<tr>
<td>12:15</td>
<td>Evan Kawamura</td>
<td>Managing Renewable Generation Fluctuations</td>
</tr>
<tr>
<td>12:30</td>
<td>Man Chon Kuok</td>
<td>Machine Learning and its Application</td>
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### C101  Social Sciences Proposals

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<td>12:00</td>
<td>Alexander Bitter</td>
<td>Turkish Membership in the European Union: Will it ever happen?</td>
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<tr>
<td>12:15</td>
<td>Gerard G. Dabu</td>
<td>Online Social Justice Movements and Countermovements</td>
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<tr>
<td>12:30</td>
<td>Brian C. L. Cheung (Zhuolin Zhang)</td>
<td>Nationalism, Propaganda and Media Policy of Mainland China</td>
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<tr>
<td>12:45</td>
<td>Michelle Herr</td>
<td>A Study of Historical and Modern Religious Freedom in Spain</td>
</tr>
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Oral Presentations Session Three
12:00 - 1:00p

C102  Social Sciences Proposals

12:00 Sasha Madan*  Combating Obesity through Advocacy for a Sugar Sweetened Beverage Policy
12:15 Aprilei T. Ramirez*  Insalubrious Snapshots of Kalihi: Adolescent Empowerment through Photovoice
12:45 Sally Voss  Diabetes Awareness and Prevention Among at Risk Adults in Nanchang, China

C103  Social Sciences Proposals

12:00 Kalina L. R. Calantoc  Developing and Implementing an Elementary School Garden Program in Honolulu
12:15 Joan Lanzaderas  School Community Services in Hawaii
12:30 Danielle Lazarus*  Implementing a Preschool Curriculum to Promote Health
12:45 Ronnie Vazquez*  Health, Fitness, and Academic Achievement in Hawaiʻi Schools
**Poster Presentations**  
2:00p-3:30p - Campus Center Ball Room

**Arts & Humanities**

Jessica Ciufo  
Color Me In: A Novel

Aira Kariah Iglesias  
Magic Island: The Permeable Park

Ryan Mandado  
Learning & Teaching Historical Complexity in Hawai‘i: The King Kamehameha V Judiciary History Center, Two Teachers, and Two Seminars on Native Hawaiian Legal Challenges

Tatiana Omokawa  
Exploring the Potentials of Ordinary Individuals to Generate Pathways leading to Awareness, Discourse, and Development of Strategies to Respond to the Warning Bells of Climate Change

Michael Sanes  
Changing Social Norms on Nutritional Behavior

**Engineering & Computer Sciences**

Bryan Fewell  
Investigation of Mesh Networking Capabilities of Picosatellites for Mission Flexibility

Jonathan Kutsunai  
Kevin Sonoda  
Chauncey Tom

Holm Smidt  
Design and Integration of a Feedback-Control Algorithm for an Autonomous Path-Following Space Mining Rover System
## Poster Presentations

**2:00p-3:30p - Campus Center Ball Room**

### Natural Sciences

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<td>Lashelle Eguires</td>
<td>Monitoring for <em>Mouse Parvovirus</em> in the Mānoa Vivarium at the University of Hawai‘i at Mānoa</td>
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<td>Anti-Corrosion Effects due to Biofilm Formation on 1018 Carbon Steel</td>
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<tr>
<td>Alexander Spurr</td>
<td>The Ecology of Endemic Species: The Interaction between the Endemic Koa Tree (Fabaceae: <em>Acacia heterophylla koa</em>) and the Endemic KoaLooper Moth (Geometridae: <em>Scotorythra paludicola</em>)</td>
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2:00p-3:30p - Campus Center Ball Room

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Abstracts of paper 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:

**Christopher Ahuna**, Chaz Bajet, Eric Caldwell, Sandrick Cristobal, Quincy Crowell, Joshua Globa, Wonjun Jung, Kelsey Kawaguchi, Nathan Maldonado, Jayme Navor, Ryan Saito, Russell Shigeoka

**Adam Bajinting**, Dong Kuk Huh

**Coral Bielecki**, Daisy Dean, Dane Gonsalves, Noweo Kai, Melissa Walker

**Lashelle Eguires**, Andrew Haro

**Bryan Fewell**, Jonathan Kutsunai, Kevin Sonoda, Chauncey Tom

Abstracts are direct from presenters; wording and content are the author’s responsibility.
WHAT ARE YOU DOING? VS. ARMY STRONG: An Analysis of Cultural Values and Subcultural Differences in the Advertising for Armed Forces Recruitment in Sweden and the United States

The purpose of this study will be to analyze the cultural values and appeals present in armed forces recruitment advertising in Sweden and the United States. Previous research has indicated that even though Sweden and the United States are both considered individualistic cultures, there are vast differences in masculinity and femininity between the cultures. This will likely reflect the appeals used in the marketing for both armed forces. While Sweden is expected to prime feminine values to persuade, the United States is expected to prime masculine values to persuade their population to join the armed forces. The cultural content of the ads will be coded on coding sheets and 4 coders (2 bilingual Swedish coders and 2 native English coders) will analyze the cultural content of two pools of army recruitment ads published in Sweden and the United States. This study could potentially advance the understanding of previously suggested frameworks that deal with different cultures and their differences and similarities. By understanding subtle cultural differences within different societies, there is an opportunity to target messages for effective persuasion.

Mentor: Dr. Dana Alden
Human Powered Vehicle

Human power is an inexpensive source of clean renewable energy. However, it is often overlooked as an alternative source of energy because of the speed and the efficiency of modern transportation. Bicycles are a form of human powered vehicles (HPV) that have been in use for over a century. In the past decade, bicycles have evolved into recumbent bikes and trikes which have gained popularity due to their comfortable riding style and high speed potential. In an effort to promote sustainable living and improve HPV design and technology, the American Society of Mechanical Engineers (ASME) holds the Human Powered Vehicle Challenge (HPVC) each year.

Nā Koa O Ka Alahele is comprised of Mechanical Engineering students from the University of Hawai‘i who are dedicated to engineering a vehicle for the 2015 ASME HPVC. The competition will develop engineering fundamentals, analytical thinking, and most importantly, team building. Our main competition objective is to produce a Human Powered Vehicle in compliance with the 2015 ASME HPVC Safety Rules. The next objective is to score in the top 5 of all schools entered. To achieve this objective, the team has outlined the following goals:

- Produce a vehicle that can obtain a top speed over 30 mph.
- Produce a vehicle that weighs less than 65 lbs.
- Produce a versatile vehicle capable of competing in all events.

The involvement and support from the University of Hawai‘i will help pave the way for future students to participate for years to come.

Mentor: Dr. A Zachary Trimble
Tylynn Ai, Mechanical Engineering
Robinson Bucaneg, Mechanical Engineering
David Kuntz, Mechanical Engineering
Psychology & Anthropology Major, Ethnic Studies (Minor)

Finished project in Social Sciences
Participation for UROP
Oral Presentation: 11:35a in B103

Kinesthetic Energy Generator

During an hour-long workout, an average human has the potential to generate 100 watts of energy. Normally, this energy is dissipated into the atmosphere as heat. The purpose of the Kinesthetic Energy Generator (KEG) is to convert the energy that is regularly wasted into electrical energy that can be either used directly to power low-wattage electronics or tied to an existing electrical grid. It will power these items via a translational-to-rotational motion converter which is attached to the exercise equipment on the translational end, and an electric motor on the rotational end. While this idea is not a new one, it is not currently utilized on translational lifting exercises. In the future, the KEG will also implement a user interface to provide feedback to the user to increase motivation and optimize the user’s performance via accurate energy production values collected from the KEG.

Mentor: Dr. James Spira
The Performance of Honeybees in a Series of Color Oddity Problems

The learning of honeybees is remarkably similar to that of vertebrates despite the distant evolutionary relationship between invertebrates and vertebrates and their different brain structures. Recent research has begun to explore the advanced capabilities of honeybees, including concept learning. In this series of experiments, the concept of oddity was studied with free-flying honeybees pretrained to visit a laboratory window for sucrose solution. In Experiment 1, bees were trained with three colored circles, two identical and one odd. There were two kinds of trials intermixed in training: two yellow circles with one blue circle and two blue circles with one yellow circle. The bees were rewarded with sucrose for choosing the odd color and punished with a highly-aversive stevia solution for choosing a nonodd color. The bees showed better-than-chance performance. In Experiment 2, bees were trained in the same way but with a five-stimulus instead of a three-stimulus oddity problem. There were five-colored circles, four identical and one odd. Choice of odd was rewarded and choice of nonodd was punished with stevia. The bees did not solve the problem. In Experiment 3, bees were trained in the same five-stimulus oddity problem used in Experiment 2. In this case, two of the nonodd colors contained stevia and two contained water. Interestingly, the variation in punishment resulted in better-than-chance performance. Taken together, the results show learning of oddity in honeybees. The difference in the results for Experiments 2 and 3 raises questions about the role of punishment in the learning of honeybees.

Mentor: Dr. Patricia Couvillon
The Impact of the OECD BEPS Action Plan on the Global Business Environment

In recent years, tax morality and tax transparency have become growing concerns for governments and citizens alike. Although some companies self-regulate, there is little oversight over corporate taxation paid, and there are copious tax avoidance strategies that result in little to no corporate taxation paid. To crackdown on tax avoidance strategies, the Organization for Economic Co-operation and Development (OECD) has released an extensive proposal to create a global framework for international taxation. This research will identify key ways in which the Base Erosion and Profit Sharing (BEPS) Action Plan will impact the business environment, and will investigate some organizational practices and strategies that will help firms transition into the new age of global corporate taxation. This research will also identify how companies can better integrate corporate social responsibility into their taxation accounting practices.

Data will include interviews from leading tax accountants from international accounting firms such as Deloitte, KPMG, Ernst & Young, and Pricewaterhousecoopers. Interviews with major international firms help identify the concerns and potential strategies for navigating through the changes. It will use quantitative and qualitative measures to identify the results. It will also include companies with different perspectives on global taxation and their potential impacts.

Mentor: Dr. Thomas Pearson
Ronia Salamasina Auelua
Pacific Islands Studies
Finished project in Arts & Humanities
Participation for UROP
Oral Presentation: 9:00a in B101

Samoan attitudes towards people with disabilities in Samoa and American Samoa

For the Undergraduate Research Opportunity Program (UROP), I propose to do a PowerPoint presentation on my Project called “Samoan attitudes towards people with disabilities in Samoa and American Samoa.” Through a study on Samoa and American laws on disability rights my presentation will overview my library and archive research as well as in person interviews. It will inform and educate others about differences and similarities between American Samoa and Samoan government laws for disability people perhaps through a video and discussion. I will also talk about the shared cultural attitudes and beliefs amongst Samoan culture and how it’s affected the treatment of disabled people from both a government and society level.

Mentor: Dr. John Mayer
Optimizing the Expression of FGFR2 Using the Cell-free Reaction

Fibroblast Growth Factor Receptor 2 (FGFR2) is a receptor tyrosine kinase (RTK) which dimerizes upon ligand binding triggering downstream signal transduction pathways. The major target signaling pathways of FGFR2 are involved with the proliferation, growth, and survival of the cells. Therefore, mutations in FGFR2 can result in the failure to regulate such aspects of cells and cause tumorigenesis in various body parts, including breast, lung, ovary, endometrium, uterus, and stomach. Due to the difficulty of expressing the transmembrane domain of the receptor protein, most studies focus on the extracellular and intracellular domains of FGFR2, with limited understanding of the transmembrane domain. In order to better understand this protein through its transmembrane domain, expression of the fully structured FGFR2 protein had been attempted using an E. coli host system in a previous project. However, overproduction of the eukaryotic transmembrane protein was proven to be toxic for the host, and the cells were constantly rejecting the FGFR2 construct forming undesirable protein aggregates. In order to overcome this problem, the cell free expression system was explored. The cell free protein synthesis system utilizes the key components of the cellular transcription and translation system to mimic and enable the cellular protein expression pathway in the test tube. We hypothesize that due to the relative easiness and simplicity to control, manipulate, and produce the expression environment for the protein, the cell free protein synthesis system may better suited for the full-structure FGFR2 expression.

Mentor: Dr. Ho Leung Ng
LeBron James, Self-Determination and the Slavery of the African American Athlete

A belief of racial superiority has been a constant dominating undertone in American history, and because of this, there has been irrefutable prejudice and discrimination towards those of African American descent. Demonstrations of white supremacy are constantly visible within popular culture, most being tucked into the subscript of a popular sitcom, buried in the lyrics of the newest pop single or thinly veiled in a clothing advertisement, and professional sports are no exception. This project argues that black athletes are exploited by a predominately white consumer base that values a win-loss column and statistics more than understanding the long-term and historical precedent of professional sports as an institution that forcefully rejects self-determination, promotes negative historical stereotypes and ideologies, and ultimately, serves as a contemporary form of slavery.

To substantiate this claim, I will examine several prominent examples of the public sphere broadly rejecting LeBron James’ desire to self-determine. This project will analyze public letters written by a team owner, fan and public responses on Twitter and articles written for ESPN following comments made James about his salary and the “The Decision.” By examining the career of James, arguably the most popular black athlete in the world, he is viewed as the ideal metaphor for all other African American athletes.

Mentor: Dr. Jeffrey Tripp
Full-term Offspring Derived from Oocytes of Primordial Follicles Activated Using Three Dimensional (3-D) Matrigel Culture System

Cancer patients are at risk of losing their future fertility due to ovarian damage from chemotherapy and/or radiation treatment. To preserve the fertility of these patients, ovarian cryopreservation combined with a subsequent in vitro culture is a very promising technology. Our group previously developed a three-dimensional (3-D) ovarian tissue culture system using Matrigel and obtained full-term murine pups derived from the oocytes within the secondary follicles. Matrigel consists of extra cellular matrix (ECM) and growth factors, and supports normal architecture of the tissues. In this study, we examined if our 3-D system supports the normal growth of primordial follicles, the earliest stage follicles, to generate developmentally competent oocytes. Neonate ovaries at 3-day old were cut into four pieces and cultured on a Matrigel drop or mesh insert (control) for 4 days to determine follicle activation (Exp.1). After culture, the tissues were transplanted under the kidney capsule of a recipient female for 15 days to allow further follicle development (Exp.2). Ovarian tissues obtained from Exp.1 and 2 were subject to paraffin sections for morphological analysis. In Exp. 3, we evaluated developmental competence of oocytes grown through in vitro follicle activation and ectopic transplantation. The ovarian tissues were isolated from the kidney and large follicles were punctured to obtain full-grown immature oocytes. These oocytes were subject to in vitro maturation (IVM) and in vitro fertilization (IVF). After IVF, 2 cell embryos were transferred into surrogate mothers (Exp.3). Three full-term pups were achieved from oocytes derived from the 3-D Matrigel cultured tissues.

Mentor: Dr. Yukiko Yamazaki
An Assessment of Critically Endangered Plant Species of the Kingdom of Tonga

`Eua is the most biologically diverse island in the Kingdom of Tonga. Its unique origin and conserved habitats make the island an ideal site to study the interaction of biota and Tongan culture. However, baseline floristics data is limited in scope and fragmented. The objective of this project was to ground-truth previous botanical surveys to aid in the interpretation and analysis of the status of Tonga's threatened and endangered plants. The research was integrated into a 4-week ethnobiological field school which included language lessons and cultural activities. Thirteen endangered endemic terrestrial plant species were targeted for our survey: *Aglaia heterotricha* A.C. Sm., *Podocarpus pallidus* N.E. Gray, *Arytera bifoliata* Whistler, *Meiogyne amicorum* A.C. Sm., *Syzygium crosbyi* (Burkill) Whistler, *Pittosporum yunckeri* A.C. Sm., *Discocalyx listeri* (Stapf) Mez & Stapf, *Guioa lentiscifolia* Cav., *Phyllanthus amicorum* Webster, *Connarus sp. nova*, *Xylosma smithiana* Fosberg, *Robiquetia tongensis* Cribb & Ormeod, and *Dysoxylum tongense* A.C. Sm. Our team located, identified, and collected herbarium specimens of vascular plants, algae, fungi and land snails resulting in over 150 specimen and carpological collections for deposit in the National Herbarium. Seed germination experiments were conducted for two rare species: *Polyalthia amicorum* and *Pittosporum yunckeri*, both resulted in no successful propagation. We found hundreds of the endangered *Podocarpus pallidus*, many more than previously reported and clarified the undocumented status of the other target species. Lack of information about Tonga’s botanical diversity, effects of climate change and anthropogenic activity threaten `Eua’s rare plant species, highlighting the need for continued quantitative assessments in Tonga.

Mentor: Dr. Michael B. Thomas
Turkish membership in the European Union: Will it ever happen?

The European Union (EU) has expanded its membership significantly in the post-Cold War era, welcoming many countries that have made rapid political transitions. Now, with expansion slowing, new emphasis has been placed on the efforts of Turkey to join the EU. While Turkey has been attempting to join the EU and its predecessor organizations for half a century and membership negotiations with the EU have been ongoing for a decade, the country is still not close to meeting all of the necessary membership criteria. Surrounding these accession talks are a variety of dynamics in the relationship between the EU and Turkey, including the role of Muslim immigrants in Western Europe, a challenge to the secular authority of the military in the country, and destabilizing conflicts in nearby Iraq and Syria.

This project will examine the progress Turkey has made toward becoming a member of the EU since accession negotiations were opened in 2005, identifying specific membership criteria that have proven to be areas of contention between Turkey and the EU. For reference, Turkey’s progress on these criteria – specifically, the progress the country has made on implementing reforms to meet them – will be compared with similar adjustments made by countries that have joined the EU in post-Cold War expansions. At the same time, often-cited factors that make the Turkish case unique, such as religion and geographic location, will be discussed.

Mentor: Dr. Carolyn Stephenson
Jennifer Boranian
Spanish
Finished project in Arts & Humanities
Participation for UROP
Oral Presentation: 9:00a in B102

Endeavors of National and Ethnic Identity: Examining Pluralistic Education Reform

Bolivia made incredible progress in overcoming its hegemonic roots with the passing of La Ley de reforma educativa de 1994 (the National Education Reform of 1994), which sought to bring indigenous language and culture to a new level of recognition: the fifth of eleven foundational points asserts that all Bolivian education is to be intercultural and multilingual “because it assumes the sociocultural and heterogeneity of the country in an atmosphere of respect for all” (Bolivia 1994: Article 2, #5).

While in Bolivia, I examined how indigenous language, culture, and ways of knowing are implemented in the classroom, assessed responses to these reforms and tentative changes in both urban and rural communities, and explored the challenges that pedagogues face in meeting these new standards. I will present data I have collected in the form of interviews with community members and archival work. This project has provided a case study of pluralistic intercultural educational reform that could be used to make useful comparisons and critiques to other such reforms around the world in order to continue progress in the recognition and empowerment of peoples with non-European background.

Mentor: Dr. Christine Beaule
Exploring the Economic Impact of the University of Hawai‘i on O‘ahu’s Tourism

The purpose of this study is to determine whether or not the University of Hawai‘i at Mānoa (UH-Mānoa) is a major contributing factor to O‘ahu’s tourism. This study argues that the University of Hawai‘i at Mānoa should be valued as a factor that promotes tourism on O‘ahu. Being the largest campus on O‘ahu, UH-Mānoa attracts various types of visitors such as current/prospective students and their parents/relatives, visiting scholars, researchers, and tourists annually. All of the visitors relating to the University of Hawai‘i at Mānoa will bring significant economic benefits to O‘ahu’s tourism industry. However, these economic benefits to O‘ahu’s tourism industry have not yet been thoroughly investigated. The objectives of this study are: 1) to investigate the economic impact of visitors to the University of Hawai‘i at Mānoa on O‘ahu’s tourism industry and local economies using data from the Hawai‘i Tourism Authority and RIMS II input-output model and 2) to create awareness and emphasize the importance of UH-Mānoa on O‘ahu’s tourism industry and local economies. This study expects to find the University of Hawai‘i at Mānoa as one of the major contributors to O‘ahu’s tourism industry and local economy. Therefore, the findings of this study can encourage the academic and industry collaboration to enhance the value of partnerships in Hawai‘i.

Mentor: Dr. Kwanglim Seo
Pharmacogenetics: Interpretation and Guide for Drug Dosage in Clinical Applications

The concept of individualized patient care is not a uniquely new concept. There have been many attempts to make pharmacogenetic testing in the clinic a reality. While the technology is widely available, it is also widely unused. Electronic medical records (EMR) have become standard under the Affordable Care Act, and pharmacogenetics implementation is being proposed under the Precision Medicine Initiative. The goal of this research is to investigate the missing link between genetic testing and personalized drug prescription in clinical setting. As well as, to explore the previous attempts at implementing personalized medicine.

Mentor: Dr. David Haymer
A Locally Inspired Sustainable Textile and Fashion Industry for Hawai’i

As a fashion designer enamored with Hawai’i, the preferred textiles used in creating designs inspired by Hawai’i are ones made in Hawai’i. As these textiles are quite limited, the true forms of my designs may not exist, and so new sustainable Hawaiian textiles must be made. Creating limited products in an extraordinary and exotic place offers locals something additional to be proud of and the rest of the world something to desire. Hawai’i is in need of an exclusive, locally provided, sustainable textile industry. The textiles and products produced from them would be unique and intrinsically invaluable. This study aims to discover evidence that a sustainable textile industry could exist in Hawai’i. Research about natural fibers that might produce long lasting quality textiles, such as *Broussonetia papyrifera*, the paper mulberry tree, or *Cannabis sativa*, industrial hemp, needs to be conducted. Additional research addressing possibilities of organically and sustainably growing these raw materials in Hawai’i and responsibly producing fibers and textiles from them, would be beneficial. Fiber research should include natural fibers as well as synthetic fibers, and recycled polymers that ideally could be harvested from Hawaiian beach and ocean trash. 3D printing has recently presented itself as a viable technology worthy of research as a possible contribution to the solution. Data collected from surveys provided to local business owners and local consumers on the concept of, and willingness to purchase, sustainable products would provide essential data. Results will be defined by information gleaned in surveys and through actual research.

Mentor: Dr. Harry Ako, Marie Abigail Cristi
The Electro-Response of Captive Scalloped Hammerhead and Sandbar Sharks to Anthropogenic Electrical Fields

More and more recreational ocean users are taking electronic devices, such as GoPro™ cameras, with them when they enter the ocean. Because seawater conducts electricity much better than air, there is a possibility that weak electric currents will emanate short distances from the device. Sharks have been shown to be extremely sensitive to weak electric fields. It is possible that devices similar to GoPro™ cameras could alter the behavior of sharks that come within close proximity to those carrying the device. This behavioral alteration may be attraction or repulsion. Using two captive sharks (Sphyma lewini and Carcharhinus plumbeus) at the Hawai‘i Institute of Marine Biology (HIMB), I will test the response of sharks to GoPro™ cameras. Specifically I will consider five questions: 1) do GoPro™ cameras exhibit electric fields with voltages and frequencies similar to common shark prey items; 2) can sharks be conditioned to associate an activated camera with the motivation to feed; 3) are there any interspecific differences in attraction toward cameras; 4) what is the drop off rate of the camera’s emitted fields; and 5) does camera distance affect attraction? Findings from this study may help to shed light on the effect of electronic devices on foraging sharks in coastal areas with high human-marine interaction, and address possible implications for safety and management.

Mentor: Dr. Kim Holland
Estimation of Soil Cation Exchange Capacity from Easily Measurable Soil Variables

The soil Cation Exchange Capacity (CEC) is defined as the total exchangeable cations that a soil can hold by electrostatic forces at a specific pH. It is one of the most important soil properties and its accurate determination is vital in soil science and environmental studies. CEC directly affects soil fertility by controlling the exchange of ions on the clay surfaces. A low CEC value implies that the soil is able to hold only a small amount of nutrients that are applied through fertilization. Hence, accurate determination of CEC has of vital importance in agricultural engineering and food production. *In situ* measurement of CEC is tedious, expensive and labor extensive. The primary objective of this study is to estimate CEC via the Genetic Expression Programing (GEP) approach using easily measurable soil variables including soil pH, clay, and organic matter (OM) content. Its secondary purpose is to find the most and the least important variables affecting the soil CEC. A novel equation is derived for estimation of the soil CEC from soil pH, clay, and OM. Through a number of sensitivity analysis tests, the GEP approach allows us to understand which of the variables (i.e.., pH, clay, and OM) have the most and least significant impact on CEC. The results show that the GEP model without OM has the highest root mean square error (RMSE) and therefore the ability of GEP model to retrieve CEC is significantly degraded when OM is omitted. This implies that OM has the most significant effect on CEC. In contrast, pH has the least significant impact on the soil CEC. The effect of input variables on CEC can be ranked from higher to lower as OM, clay, and pH.

Mentor: Dr. Sayed Bateni
Developing and Implementing an Elementary School Garden Program in Honolulu

This study focuses on developing and implementing a school garden program at a public charter school in Honolulu during the school year 2015-2016. Research reveals that school garden programs are beneficial to our children’s education and have great potential, but can be difficult to implement and maintain. While there are local resources in Hawaii that provide general guidelines on developing a school garden program, these guidelines lack the detailed instructions necessary to address the challenges of building a garden specifically designed for elementary school use in Hawaii. The primary objective of this study is to develop the professional knowledge, skills and experience necessary to implement a school garden program that is integral to the elementary curriculum at a public charter school in Honolulu. The research project for this study, specifically, will provide insight on the perceptions of faculty, staff, parents and students related to developing and implementing a school garden program. The research methodology includes analyzing qualitative data collected from interviews, surveys, observations, student notebooks and professional communications. Quantitative data gathered will include information related to program costs, time devoted to developing and implementing the project, program volunteers, the value of resources donated, and the yield of produce in pounds during a specific time frame. The research findings and recommendations will identify and describe ways to overcome the challenges of developing a school garden program and may also help the classroom teacher to better understand the impact school gardens may have on the school community and student learning.

Mentor: Dr. Jennifer Herring
Motifs of Immortality in Osamu Tezuka's "Phoenix" series

Osamu Tezuka is well known for having written many famous manga over his long life, such as Black Jack (ブラクジャック), Phoenix (火の鳥), and Buddha (ブッダ). In his manga “Phoenix”, an ever-present motif is immortality and reincarnation. This investigation analyzes the first five stories in the 12-volume series. I intend to analyze each story’s discussion of those themes, especially in the context of events that happen in the series such as the reappearances of the characters Saruta and the Phoenix. This project discusses the different types of immortality that are described in the manga in order to show how immortality connects the stories even though each story takes place in a vastly different time. This research is significant to the larger topic of manga as literature because although there are articles arguing that manga is a respectable form of literature like novels, short stories, or poetry, very few articles read manga as literature with themes and motifs that the author is trying to present about the world. Immortality is an important motif to the work as a whole, and therefore must be examined because it is what ties the series together.

Mentor: Dr. John Rieder
Ethnic Identity and Posttraumatic Emotional Expression in Combat Veterans

Posttraumatic Stress Disorder (PTSD) is defined as having been exposed to a traumatic event and experiencing symptoms associated with the event (e.g., intrusive thoughts, avoidance, emotional numbing, negative alterations in cognition, mood, arousal and reactivity) (APA, 2013). Between 11-20% of OIF/OEF veterans are diagnosed with PTSD any given year (Tanielian & Jaycox, 2008), and prevalence rates range from 5-20% across studies (Ramchand et al., 2010). Additionally, the number of veterans suffering from PTSD-related symptoms may be much larger, given that half of OIF/OEF veterans have not received VHA services (Vaughan et al., 2014). Research over the past twenty-five years indicates that race and ethnicity influence the likelihood of developing PTSD (Kulka et al., 1990). However, members from different ethnic groups appear to express emotions differently following exposure to traumatic events (Pole et al., 2001; Galea et al., 2002; Archambeau et al., 2010). No prior research has examined the influence of ethnic identity on PTSD symptoms for individuals not fulfilling full criteria for PTSD nor seeking treatment for their symptoms. The following research addresses the influence of ethnic identity on combat veterans’ expressions of trauma-related PTSD symptoms. Questionnaires were distributed to post-combat male service members across O’ahu, which included measures of PTSD and other mood factors, coping, and ethnic identity. Multiple regressions and correlations were utilized to assess the impact of ethnicity on these dependent measures. Our findings provide an avenue for understanding the various expressions of distress, which can allow us to better identify posttraumatic symptoms and design interventions that can be better tailored to ethnic and culturally diverse minorities.

Keywords: PTSD, trauma, race, ethnicity, ethnic identity, military, combat, veterans

Mentor: Dr. James Spira
Development of Olfactory Memory in Young Rats using the Novel Object Recognition Task

Mammals naturally approach, explore, and investigate novel objects. Recognizing new stimuli in an environment indicates an ability to recall a memory of familiar objects and distinguish familiar from unfamiliar stimuli. The acquisition and consolidation of memory is often investigated in adult mammals, but virtually no research examined the ability of young to discriminate novel from familiar odors. This study investigated whether familiar odors were retained, for at least 24 h, by young weanling rats compared to adults using a modified version of the Novel Object Recognition (NOR) task. To acquire familiarity or habituation to an odor, young and adult rodents were first exposed to one odor – vanilla or almond extract - over a period of five consecutive 2-min trials. The animals were then presented with the familiar and novel odor 5-min, 3-hr, or 24-hr after habituation trials. Results showed that adult rats spent more time exploring the novel odor compared to the habituated odor 24 hr after testing. In contrast, novel odor investigation in weanlings increased 5-min after testing but not after 24 hr. These results suggest that odor memory retention is not as robust in the young rodents compared to adults. This difference in odor memory recall between young and adult rats may be due to alterations in how neural structures such as the olfactory bulb and hippocampus process odor acquisition and consolidation at different ages.

Key words: olfactory memory, odor learning, odor recognition, odor recall, odor habituation, rat ontogeny, novelty preference, novel object recognition task

Mentor: Dr. Lorey Takahashi
Human Terrain System in Afghanistan: Success or Failure?

In reaction to the attack America experienced on September 11, 2001, the Bush Administration launched a worldwide War on Terrorism, prompting the Department of Defense to establish the Human Terrain System (HTS) in 2006. However, in 2008, the American Anthropological Association (AAA) and its ad hoc committee, the Commission on the Engagement of Anthropology with the U.S. Security and Intelligence Communities (CEUSSIC) deemed the HTS operation as unethical for embedding anthropologists with armed military forces in order to gain access to communities within Afghanistan. This research project will investigate the HTS component of the military’s mission in terms of its use of anthropologists with a comprehensive analyses of: (1) the U.S. Army’s Field Manual 3-24 on counterinsurgency and how its mission transforms into ethnocentrism; and (2) the use of Edward Said’s theory of Orientalism to understand why the HTS operation has been unsuccessful with regard to the utilization of anthropologists within the U.S. military’s occupation in Afghanistan. I will then use the evolution of the Taliban and Jihadi groups and how their mission translates into a demonstration of their political power to further substantiate the HTS’ unsuccessfulness. My research project is essential to the community of aspiring anthropologists interested in joining the U.S. Army’s HTS in order to determine whether their “moral duty” undermines the “ethical responsibilities” as outlined by AAA.

Key words: HTS, AAA, counterinsurgency, Orientalism, extremist groups.

Mentor: Dr. Ibrahim Aoude, Professor of Ethnic Studies
Nationalism, Propaganda and Media Policy of Mainland China

China experienced a successful economic reform and transferred its economic system to capitalism during the past three decades, but their political system is remaining in the single-party system with a Soviet structured government. The Chinese Communist Party (CCP), is not only the authoritarian ruler of the central and regional government, but also the monopoly of mass media everywhere in China. CCP manipulates people’s opinion and ideology by raising propaganda and controlling mass media. This project will analyze original government documents, media reports and people’s opinion on internet such as online forum and blog articles in Chinese language, to learn the Chinese government’s role in this campaigns with their manipulation of mass media, control of public opinion and strong nationalist propaganda. This project will research the a case of contemporary social issue of China to understand CCP’s propaganda strategy: the anti-Japanese movement. With China’s economic reform, Chinese people have more social and cultural contact with Japan. These exchanges did not give deeper understanding of Japan to Chinese people, however. Instead, China raised nationalist campaigns to protest Sino-Japanese political conflicts against Japan in the past decade. These campaigns increased the negative view of Japan and spreaded the anti-Japanese sentiment in Chinese society. With this case, this project will help people to understand the authoritarian Chinese government’s media and propaganda policies.

Mentor: Dr. Eric Harwit
Response of *Scotorythra* Caterpillars (Geometridae) to Drought Simulation and Nutrient Augmentation of Koa (Fabaceae: *Acacia koa*)

Insect outbreaks are often mysterious, but are commonly caused by a release from one or more limiting factors. This study specifically explores the role of “bottom-up” factors, which are factors that affect resource availability. The study focuses on the interaction between koa (Fabaceae: *Acacia koa*) and the endemic koa looper moth (Geometridae: *Scotorythra paludicola*), which experiences sporadic outbreaks that cause mass defoliation of the important native tree. While the trigger of these population explosions is unknown, climate and foliage nutrient content may play a role. We tested two of the most significant ecological hypotheses central to plant-herbivore interactions: the plant stress and plant vigor hypotheses. We subjected potted koa to water stress or nutrient augmentation, and evaluated how this affected the performance of *Scotorythra* caterpillars. This study is still ongoing, however if caterpillars perform better on stressed koa, this will support the plant stress hypothesis, while on the other hand, if caterpillars perform better on unstressed, nutrient-enriched koa, this will support the plant vigor hypothesis. We hope to gain insight into whether drought or other environmental changes may trigger koa looper outbreaks, which will have important implications about whether outbreaks will be more frequent in a warmer, drier climate.

Mentor: Dr. William Haines
Proteins are biological macromolecules that are essential to life. Their role in living cells encompasses a wide variety of actions, such as acting as enzymes, facilitating the movement of substances, and serving as receptors on the cell membrane. Due to their vital role in every living cell, knowing the exact three-dimensional structure of a protein of interest is invaluable information to researchers. Currently, the most widely used method for determining the structure of proteins is x-ray crystallography. X-ray crystallography is a technique based on the fact that crystals are composed of repeating units, and that x-rays are diffracted by the electron clouds of atoms. Since hydrogen atoms contain only one electron, they diffract x-rays very poorly. As a result, the three-dimensional protein structures determined through x-ray crystallography are often lacking all hydrogen atoms, which make up about half of a protein's atoms. In this project, a specific type of electron density map obtained through x-ray crystallography called an electron density difference map was analyzed to devise a method capable of resolving hydrogen atom positions in the protein trypsin. Electron density difference maps were compared with neutron diffraction data to determine the viability of electron density difference maps in resolving the hydrogen atom positions in proteins.

Mentor: Dr. Ho Leung Ng
Color Me In: A Novel

*Color Me in: A Novel* originated as a short story for a class assignment. The original piece had one main-character. It featured a female protagonist who narrated from a first-person point of view. So the story was told through her eyes, and her thoughts and actions were the focus on the short story.

My objective was to develop that short story into a novel. So one of the most influential decisions was to use two narrators instead of one. I created a male protagonist who also told the story from a first-person point of view. Both characters, male and female, then took turns narrating chapters. This technique allowed me to expand the story in terms of length. It also allowed me to explore how men and women interrupt situations differently.

I also approached the storyline in a non-linear fashion. Flashbacks occur in almost every chapter of the book. Flashbacks work to interrupt present-action and move the story back in time to earlier events. This technique allowed me to develop my protagonists and foreshadow important events later in the novel.

As a result of three semesters of work, *Color Me in: A Novel* is currently in its final phase of editing. It will be completed by the end of spring 2015.

The novel explores themes of memory, addition, and faith. It also works compare and contrast genres of realism and romance.

Key Words: First-person point of view, Flashback

Mentor: Dr. Gary Pak
Ethnomedical Components of the Ayahuasca Complex

Ayahuasca is a psychoactive tea utilized within healing and shamanic practices of various groups throughout the Amazon region. The use of ayahuasca within ethnomedical practices of Peruvian healers (vegetalistas) has been well documented; however, the botanical variations of source and admixture plants employed in preparation of the types of ayahuasca are in need of further investigation. Participatory methodology, qualitative semi-structured interviews, and botanical collections (using walk in the woods approach) were used to assess the variation in preparation and ethnomedical applications of cielo ayahuasca, ayahuasca negra, and trueno ayahuasca. This preliminary investigation has shown that the folk taxonomy, preparation of the types of ayahuasca, and their applications within ethnomedical practices of healers vary among cultural groups of the Peruvian Amazon region.

Mentor: Dr. Merlin
Online Social Justice Movements and Countermovements

Online interactions, primarily in the form of social media, have played a key role in many recent conflicts over social justice issues (such as sexism, racism, classism, homophobia, etc.), such as bringing attention to and hosting arguments about the events in Ferguson. While both social justice issues and online interactions have been studied, the expanding intersection of these remains relatively untouched. This proposed investigation will explore the nature of online conflicts over social justice issues, in order to ascertain common patterns, structures, and future lines of inquiry. Traditional survey, interview, and observation methods, along with computational analysis (including machine learning techniques) of text and other bulk data (especially social network structures) will be employed.

Mentor: Dr. Sun-Ki Chai
The Sedition Act: Free Speech Restrictions in Early America

Why did the American public allow the passage of The Sedition Act within a decade of adopting the First Amendment? The Alien and Sedition Acts were four bills passed by the Federalist controlled Congress, and Federalist President John Adams in 1798. These bills encouraged debate between two political parties, Thomas Jefferson led Democratic-Republicans and John Adams led Federalist. This study focuses on the Sedition Act and restrictions it imposed on free speech and press. Restrictions led to resistance like the Kentucky and Virginia Resolutions, which declared the Sedition Act unconstitutional, but were largely rejected. We should learn from the 1790's and avoid an atmosphere that would allow restrictions today, as we place a strong emphasis on free speech and press as necessary for functional democracy. The Sedition Act was passed soon after the Revolutionary War, when America was being dragged into conflicts between Britain and France. America was dealing with foreign policy issues surrounding events like the Jay Treaty and XYZ-Affair which contributed to America’s Quasi-War with France. This research will also explore the consequences of the Sedition act on people like the late 18th-century political philosopher Thomas Cooper. The methodology will be focused on using various American newspapers, pamphlets and other political documents from the time period around 1798. I believe the Sedition Act was allowed passage by the American public because of the popular belief it was within the bounds of the First Amendment as well as Common Law.

Mentor: Dr. Marcus Daniel
Identification of Airborne Algae on O'ahu using Next-generation Sequencing Technology

Airborne algae have been studied ever since Charles Darwin collected dust samples on the H.M.S. Beagle, but still there are major gaps in understanding airborne algal diversity, the mechanisms by which they enter the airstream and how far they travel. Not only can these algae directly cause allergic reactions, but they can carry toxic particulates from the environment into the respiratory tract. Several studies have examined algae as allergens, but it is still uncertain to what degree the algae we breathe affect our health, because little is known about their diversity and distribution in most regions of the world. The characterization of the diversity of species in the air has been limited in the past by culturing media and DNA sequencing technology and price. The airborne algae of O‘ahu, Hawai‘i was studied on the windward side and south shore of O‘ahu in Spring of 2015. Algae were collected using rainwater collection jars. Illumina sequencing of the Universal Plastid Amplicon (UPA), part of the 23S rRNA gene region in cyanobacterial genomes and the chloroplasts of eukaryotes, was performed to characterize biodiversity from the samples. This study is the first in Hawai‘i to incorporate next-generation sequencing techniques into the identification of airborne algae.

Mentor: Dr. Alison Sherwood
Research and Development of an Aerodynamics Package for Formula Society of Automotive Engineers

The use of aerodynamic devices has played an increasingly important role in the success of today’s motorsport vehicles. An effective aerodynamics package for a Formula SAE vehicle has three main objectives: drag reduction, downforce, and cooling components. Drag is a force, which opposes an object’s ability to move in its desired direction. When dealing with automobiles, drag can negatively affect its performance in aspects such as top speed and fuel economy; it should be minimized as much as possible in order to achieve an optimum-performance vehicle. The objective of our research is to develop an effective aerodynamics package for The University of Hawaii’s 2015 Formula SAE competition vehicle, which will aid in its performance in the dynamic events. The dynamic events of a Formula SAE competition, account for 675 out of the 1000 total points. These events are a means of measuring the car’s ability, including acceleration, cornering, endurance as well as fuel efficiency. Using only body panels and no aerodynamic devices, it was a struggle for the Formula team of 2014 to earn enough points to be remotely competitive. Being able to place within the top teams at this year’s competition will be a milestone for The University of Hawaii.

Mentor: Dr. Reza Ghorbani
Control of Jackson's chameleons using decoys

The Jackson’s chameleon is an invasive east African species prevalent on the island of Oahu and other Hawaiian islands. This species poses a direct threat via predation to already-endangered native invertebrates, which are integral to the maintenance of a healthy forest ecosystem. Current population management strategies are ineffective at best, requiring extensive, labor-intensive manual removal. This project endeavored to determine whether decoys of female Jackson’s chameleons would visually attract males out of their arboreal habitat, making them more easily accessible to resource managers. This hypothesis was tested by producing a number of female decoys of varying size and deploying them in the field; male response was assessed via proximity to the decoys deployed. Unfortunately, researchers failed to observe an increase in the number of male chameleons in the area immediately surrounding the decoys. However, these results are not prohibitive, and additional trials coupled with a modified experiment design may yet produce the desired male response. If successful, the use of decoys in the field would provide a scalable, cost-effective solution to controlling Jackson’s chameleon populations in sensitive native habitats statewide.

Mentor: Dr. Brenden Holland
A Qualitative Exploration of Dancing Hula for Health

This study sought to illicit views about hula, the traditional dance of Native Hawaiians, as connections to health and well-being. Dancing hula was selected as the intervention of focus since prior research demonstrated the energy expenditure of dancing hula is equivalent with moderate and vigorous intensity exercise.

Two focus group interviews were held: one with cardiac rehabilitation participants of a hālau hula (hula school) (n=6), and the other with participants of a structured women’s life management and drug abuse treatment program (n=4).

Analysis resulted in 4 major themes:
Hula fosters dimensions of health (social, physical, mental)
Hula reflects cultural practices, producing cognitive and behavioral outcomes
Hula creates social support group/relationships
Hula establishes spiritual wellness

Dancing hula for health was perceived as teaching self-regulation. For hālau dancers, the strong and enduring connections provided a social and cultural avenue for achieving physical and mental cardiac rehabilitation activities. For life management participants, dancing hula taught attention to task, instilled a disciplined approach and developed the group’s confidence that additional effort will lead to positive outcomes.

Nurses must be willing to explore meaningful and culturally acceptable ways for clients to achieve health outcomes. Hula is a cultural, effective, convenient, and low-cost exercise activity for patients, families, and communities. Empowering client groups to build their own capacity to achieve health outcomes through holistic approaches is needed. In conclusion, hula holds promise as an effective integrated modality for interventions designed to improve health and wellness. The incorporation of hula into healthcare warrants future exploration.

Mentor: Dr. Alice Tse
Lashelle Eguires, Animal Science
Andrew Haro, Animal Science

Finished project in Natural Sciences
Participation for UROP
Oral Presentation: 9:15a in A101

Monitoring for *Mouse Parvovirus* in the Mānoa Vivarium at the University of Hawai’i at Mānoa

*Mouse Parvovirus* (MPV) can confound cancer and immune studies using mice as a model, and most vivariums test for this virus and exclude it when present. The purpose of this study was to monitor for possible MPV presence in colony-raised (laboratory) mice in the vivarium, and wild-caught mice in the vivarium and the grounds surrounding it to determine if the latter might be a source of MPV infections. In this study fecal pellets were collected from laboratory and wild-caught mice and then sent to IDEXX BioResearch (Columbia, Missouri) for MPV testing and strain identification via polymerase chain reaction (PCR) analysis. Despite the previous history of MPV being sporadically present in the Mānoa vivarium for more than a decade, the survey conducted in this study indicated that MPV was not detected by fecal PCR in the mouse colony. Results indicated that the wild-caught mouse was also negative for MPV. Therefore, we were not able to demonstrate that wild-caught mice may have been a source of MPV in colony-raised mice in previous years. However, the techniques and methodologies used in this research can be applied to survey spaces in and around vivariums for possible sources of MPV and other adventitious agents (viruses, bacteria, fungi and parasites that could potentially be introduced into the mouse-colony).

Mentor: Dr. Sylvia Kondo
Through the West: The Transference of African American Imagery to Japan

This research project will explore the dissemination of popular U.S. depictions of African Americans to Japan and the duplication of U.S. hip-hop/rap – namely gangsta rap - imagery in Japanese music culture. The focus of the project will be twofold: Helen Bannerman’s 1899 book “Little Black Sambo,” its pictorial renderings and movement to Japan, and its role in the proliferation of stereotypical images of African Americans. I will also discuss U.S. hip-hop as a visual construct of African Americans and its transmission from an American hegemonic source to Japan. These two conduits of ethnic culture to Japan – “Little Black Sambo” and U.S. hip-hop – represent noteworthy junctures in the construction and re-construction of Black visual representations in America. American hegemonic interpretations of Black culture in media and print has allowed for the mimicry and the amalgamation of Japan’s own Black visual constructs – as embodied in children’s literature and Japanese hip-hop; I will be conducting semiotic and content analyses of “Little Black Sambo,” Chibikuro Sanbo, and videos by Japanese rap artists King Giddra. I propose that by enlisting Western interpretations of Black culture, through adoption of stereotyped imagery, Japan’s theories of homogeneity and the preservation of Japanese ‘self’ are undermined. Although, “Little Black Sambo’s” image preservation in Japanese culture is a reinforcement of Japanese identity and Nihonjinron/‘uniqueness,’ King Giddra’s adoption of the hip-hop genre furnishes an avenue for re-examination of Japanese identity.

Mentor: Dr. Gay Satsuma
Mapping the Way Back to Ancestral Abundance on Oʻahu’s North Shore

Concerns for food security, public health and the development of the few remaining rural lands on Oʻahu’s North Shore inspired community leaders to organize the first annual North Shore Food Summit (NSFS) in 2013. After second summit in 2014, the North Shore Food Council (NSFC) was formed to adopt the planning responsibilities for the annual conference as well as actively implement projects that help to grow the North Shore food system year-round.

One such project is the North Shore Food System Assessment (NSFSA), an effort initiated by University of Hawaiʻi West Oʻahu (UHWO) faculty and a professional cartographer to compile publicly available data on the North Shore food system and represent that information through Geographic Information System (GIS) maps. Building off this project’s momentum, I propose a methodology of taking observations of North Shore farms and food establishments, interviewing key food system partners and experts, and administering surveys to the broader community of residents and stakeholders invested in this region’s food system. NSFC members will assist me in gathering these data.

This research intends to continue to grow the understanding of the North Shore food system by gathering more detailed information about its history and present state. As the initial efforts of UHWO et al. were shared at last year’s food summit, this year’s findings will be shared at the third annual event this October, thus building a culture of seeking and sharing the information necessary to affect the future of our community’s regional food system.

Mentor: Dr. Noelani Goodyear-Kaʻōpua
Barriers that hinder native American Samoan students from attending college off-island

Native Samoans who presently live in American Samoa can only receive a two-year degree at most from the American Samoa Community College. There are no other higher post-secondary institutions that offer four-year degrees on the island of American Samoa. According to Pacific Island Reports, the Department of Education reported this past July that more than 50% of all teachers on the island only hold an Associate of Arts degree or less. The ASDOE also reported that only 37% of all teachers hold a Bachelor’s degree, while 8% hold a Master’s. Director of Education, Dr. Salu Hunkin is currently declaring that all teachers who work in the school system must obtain a bachelor’s degree by 2016. For close to 30 years in American Samoa, assessment of student academic performances report that 70% of local students tested below basic in reading and math. This study aims to find what barriers are hindering students from attending college off-island. A total of 300 popcorn surveys were administered to students and adults ages 17-35.

Mentor: Dr. Meripa Godinet
Investigation of Mesh Networking Capabilities of Picosatellites for Mission Flexibility

Satellite miniaturization has the advantages of lower cost, faster development time, and less risk to single-point catastrophic failures. Recently, a type of picosatellite known as a PocketQube has emerged, having a form factor of only 5 cm x 5 cm x 5 cm. The objective of this study is to develop a cluster of multiple PocketQubes working together toward a common goal, forming a distributed satellite architecture composed of many duplicates of the same design. A reliable system for creating a mesh network between multiple PocketQubes is currently being developed in a way that will take advantage of their size and quantity. Each PocketQube consists of four different subsystems: communications, command and data handling, electrical power, and mechanical structure. Each satellite contains a radio module interfaced with a microcontroller to form the mesh network. The entire system is designed to be modular to maximize flexibility, leading to the long-term goal of a flexible foundation for future missions.

Mentor: Dr. Wayne Shiroma
Mael Flament
Physics
Finished project in Engineering & Computer Sciences
Participation for UROP
Oral Presentation: 9:30a in B103

Real-Time Determination of Ocean Surface Currents Using Land-Based and Satellite Imagery

Near-shore boundaries, harbors, and small basins are energetic regions with complex fluid motions dynamics, and turbulent waters. These are generated principally by the underlying bathymetry, land/sea atmospheric interactions, and industrial activities (i.e. pumping or rejecting water). Coastal current monitoring is restricted by the high costs of near-real time aerial photography. Other measurements of ocean currents, such as ADCPs, HF Radars and drifter buoys, are single-point measurements or require constant maintenance. Here, a cost-effective technique is developed to extrapolate surface currents in near-shore mooring areas by observing the dynamics of moored boats, using images obtained from security webcams in harbor and mooring bays. The technique relies on a simple principle. When moored at a single point, a boat automatically reduces its drag by progressively pointing its bow in the direction of the prevailing wind/currents, eventually reaching an equilibrium. Mooring bays comprise generally a few dozen boats, enough to provide data on near-shore surface currents. By using shape recognition, positioning, and extrapolation, the orientation of individual boats and clusters can provide an approximate map of wind direction or surface currents. Such method produces a low-cost and real-time monitoring capabilities with little equipment deployment necessary. This approach could also facilitate coastal salvage operations in the event of near-shore chemical spills or drifting debris.

Mentor: Dr. Jason Leigh
Benefits of Directional Neutron Detection for 3-Dimensional Tomography

Neutron imaging is a prominent and rapidly evolving field. Recently, novel neutron detectors with directional sensitivity have been developed. We propose to investigate how existing transmission imaging techniques, in particular neutron tomography, can be improved with such detectors by developing computer simulations of proof-of-principle detector setups. In particular, we will research the reduction of contrast in transmission tomography reconstructions due to scattering events and the possibility to filter and group scattering events by using directionality information. We will also evaluate whether the exploitation of scatter filtering can improve the quality of the reconstructions, factors influencing this quality, and if we can extract further information on the irradiated sample by using directional detectors. The proposed approach consists in constraining our simulations on a certain class of directional detectors to validate our hypothesis and the performance of our algorithms. We will focus on gas target time projection chambers, which can detect the position of a neutron interaction and provide information on the direction of the detected neutron. Later, these detectors may be built to demonstrate the feasibility of the proposed approach.

Mentor: Dr. Sven Vahsen
An Observation of Range-of-Motion Exercises Undertaken by Elders while Gardening

According to the Administration on Aging (AoA) persons 65 years or older comprised 12.9% of the U.S. population in 2009. By 2030, this number is expected to increase to 19% (U.S. Department of Health and Human Services). It is important for healthcare providers to learn to manage and promote the health of the elderly as this population continues to grow. One important consideration is physical activity, which is integral to the health and well-being of older adults. It can help to prevent chronic disease, maintain physiologic function, prevent falls, and positively impact cognition (Francois, Brach, and Studenski, 2014). A subset of physical activity is exercise, of which there are various kinds such as: aerobic, strength, balance, and flexibility (Francois, Brach, and Studenski, 2014).

Gardening is one form of aerobic exercise (Francois, Brach, and Studenski, 2014). Besides offering physical benefits, a study conducted by Wang and Glicksman (2013), found that seniors who garden have many reasons for doing so including but not limited to: mental health benefits, connection to growth, having something to do, and being able to learn something new.

This research is an observational study of elders working in a community garden in Manoa. It will examine the range of motion exercises done by this population during gardening. A tool composed of various range of motion exercises will be used to identify which range of motion exercises are performed and how often they are performed.

Mentor: Dr. Estelle Codier
Veronica Freeman  
English  
Proposal in Arts & Humanities  
Participation for Honors  
Oral Presentation: 12:00p in B101

A Quick Glance at Food: An Investigation into the Use of Food Terminology in Advertising

The loss of transparency in large food corporations has lead journalist to investigate the causes. This has lead to an onslaught of documentaries, articles, and studies about how Americans currently view food. With the rise of specialized food terms that are found in supermarkets today, this study will be conducted to observe why food terminology is so prominent in modern food advertising, and how this prominence in specialized food terminology will change food advertising in the future. First, a wide expanse of research, outside knowledge, and studies on the advertising industry will be examined and contribute to research. Second, interviews with employees in varying food organizations will offer an insider viewpoint on the topic. Lastly, a survey of University of Hawai‘i at Mānoa students will be conducted to provide context to show how young individuals make food choices based on labeling. This in turn will allow for a better understanding of how individuals within the food industry and college students interpret food terminology and will permit a growing transparency between consumers and the advertisers of health food through food advertising in the United States.

Mentor: Dr. Kristin McAndrews
Molecular Taxonomic Identification of the Oriental Fruit Fly (Bactrocera dorsalis) and the Melon Fly (Bactrocera cucurbitae): How Similar Are They at the DNA Level?

Two species of fruit flies inflict massive amounts of agricultural damage throughout the Asia-Pacific region, including Hawaii. These are the oriental fruit fly, *Bactrocera dorsalis*, and the melon fly, *Bactrocera cucurbitae*. Many programs use chemical insecticides to control and eliminate the damage caused by these species, but biologically based methods are considered to be desirable alternatives. The biological methods, however, require the ability to make accurate and reliable species identifications, but these species can be difficult to properly identify when traditional methods relying on morphological characters are used. The traditional methods depend entirely on the use of adult characters, but many specimens are captured at pre-adult stages that are difficult or impossible to identify to the species level using this approach. Fortunately, taxonomic methods based on the use of DNA characters (known as molecular taxonomy) have a number of advantages for identification of species, even for those found within closely related groupings known as species complexes. This method uses genetic markers found in an organism's DNA to identify it and characterize it as belonging to a particular species. This project proposes to use molecular taxonomic methods to show the extent to which specimens of *B. dorsalis* can be discriminated from *B. cucurbitae* using DNA level markers. This will augment the use biologically based control measures, allow for more robust agricultural development and create a stronger foundation for more sustainable farming in Hawaii as well as in other parts of the world.

Mentor: Dr. David Haymer
Documenting the Nursing Process: A Community Based Participative Research Study

This community based participative research (CBPR) study evaluated the Joint Commission (JC) required nursing process documentation in the electronic medical records for patients at Wahiawa General Hospitals (WGH). The study’s research question asked the following: Did 1 on 1 education improve documentation of the nursing process in electronic health records?

Quantitative data was collected over the course of one year that included pre-education baseline data and post-education data. Pre-education data was taken from medical records during the months of November 2013 to January 2014 for patients who had targeted diagnoses using WGH’s care-plan audit tool. Post-education data collection took place from mid March 2014 to the second week of July 2014. A total of 30 charts each month (5 charts from the ICU, 10 charts from the telemetry unit, and 15 charts from the Medical surgical unit) were used for pre-intervention baseline data collection. Diagnoses targeted for chart review included the following: Congestive heart failure (CHF), pneumonia, sepsis, diabetic ketoacidosis (DKA), chronic obstructive pulmonary disease (COPD), acute myocardial infarction (AMI) or cellulitis. These 7 diagnoses were chosen due to the high frequency and high risk of these diagnoses for the population served by WGH. Descriptive and inferential statistics were utilized to analyze study data. It was hoped that findings from this research result in an improvement in nurses compliance with the nursing process in documentation, thus improving care as well as compliance with federally mandated documentation procedures.

Key words: The Nursing Process, Documentation, Teaching Nursing Process, and The Joint Commission

Mentor: Dr. Estelle Codier
Numerical Modeling for Undergraduates

Numerical modeling is a powerful quantitative tool for predicting phenomena as diverse as the uplift of a mountain range, the flow of magma, and the path of a hurricane. Many undergraduates would benefit from numerical modeling, but few are even exposed to it. For example, of the numerous numerical modeling courses at the University of Hawai‘i at Mānoa lists over ten graduate courses; and the sole undergraduate course is a one year senior level course in the mathematics department. The pre-requisites for these courses-typically differential equations, linear algebra, and computer programming- are sufficiently numerous and advanced that few undergraduates can take the courses. I propose research to set the basis for an introductory undergraduate numerical modeling course. I will examine three different methods of numerical modeling; the finite difference method (FDM), finite element method (FEM), and boundary element method (BEM). I will apply and contrast these different methods in the treatment of two problems of broad utility; heat flow and beam bending. This non-traditional approach will develop some of the necessary background in calculus, linear algebra, and coding. The goal is to introduce numerical modeling to undergraduate students in a way that provides topical relevance, sufficient breadth, and appropriate accessibility, yet that still shows the power of the three methods.

Mentor: Dr. Stephen Martel
Assessing the Effects of Plants and Exercise Locations on Individuals in Hawaii

Adult obesity is one of the main concerns in the United States. According to the Centers for Disease Control and Prevention (CDC), 78.6 million or 34.9% of the US adult population are obese. Of that, 22.7% of Hawaii’s adults are obese, while 56.4% of Hawaii’s adults are overweight. This project focuses on studying the effects that plants and exercise locations have on individuals in Hawaii. By understanding if plants and exercise locations affect physical activity among individuals in this target population, new recommendations can be made to help them gain a healthier lifestyle. Participants’ psychophysiological responses were measured by determining their heart rate (ECG), brain waves (EEG), muscle contraction (EMG), and skin responses (GSR). Participants’ stress levels were also measured using cortisol saliva test and Enzyme Linked Immunosorbent Assay (ELIZA) to determine their cortisol’s level of expression. The data generated from this pilot study will add greatly to the exercise habits of individuals in this health category and the associated environmental conditions in which exercising are preferred.

Mentor: Dr. Andrew Kaufman
Exploring the Ecology of Reoccurring Associations between Eukaryotic Phytoplankton and the Nitrogen-Fixing Cyanobacterium, *Trichodesmium*

Nitrogen (N) is one of the basic building blocks of life; however, biologically available forms of N, such as ammonium, nitrate, or nitrite, are found in very low concentrations throughout much of the surface waters of the world’s oceans. Diazotrophs, or $N_2$-fixers, have the capability to convert N2 to biologically available forms for other producers, such as eukaryotic phytoplankton. Thus, N2-fixing organisms play a major role in regulating the biological productivity of the oceans. A previously unpublished physical association between an important diazotroph *Trichodesmium spiralis* and pennate diatoms was observed in plankton net tow samples collected at Station ALOHA (22°45’ N, 158°W), a long-term open ocean monitoring site located 100 km north of Oahu, HI. In this study, we characterized this potential symbiosis by using microscopic and molecular biology based approaches. Our results reveal observations regarding the physical nature of the association and molecular identification of the diatom species and the diazotroph using the *rbcL*, *hetR*, *nifH*, and 18S rRNA gene markers. Investigating this potentially symbiotic relationship is important for understanding N cycling and plankton ecology in the oligotrophic North Pacific Ocean.

Mentor: Dr. Matt Church
Horticulture as Therapy in University Settings: A Manual for University Mental Health Allies

It is no surprise to anyone that university campuses are hubs of mental illness. Pressures from bosses, professors, peers, and parents, push many students into a constant state of anxiety and depression. With limited outlets for students to seek sanctuary, there is a desperate grab for anything that offers solace. This in turn leads many to addiction, alcoholism, eating disorders, self-injury, and depression. University counseling centers are often stretched thin as they attempt to accommodate the rise of new clients and create a welcoming environment, which eliminate any intimidation students may feel due to the stigma of mental illness. How do we improve the mental health on university campuses, change negative beliefs concerning help-seeking behavior and mental illness, and alleviate some of the burden felt by university counseling centers? Horticulture Therapy might very well be the answer to these questions. Horticulture therapy is defined as the use of plants and the natural environment to achieve a clinically defined goal. These goals, while unique for each individualized client, therapist, and setting, often include increased social interaction, productivity, creativeness, positive coping, personal reflection, wellbeing, physical activity, and decreased anxiety, depression, and stress. The main objective of this project was to bring research regarding the therapeutic use of horticulture into the hands of university mental health allies, and in doing so, encourage the implementation of these programs into the mental health strategic plan of universities. In order to do this, a centralized, easily-accessible, comprehensive, coherent, and free resource regarding the basic therapeutic concepts and the development of such a program was produced.

Mentor: Dr. John Cusick
A Study of Historical and Modern Religious Freedom in Spain

Religions have unified communities for hundreds of centuries. Historically, religions have been pitted against each other in the name of power. It is critical that we find the ways in which we can have functioning societies with different religious beliefs as the world expands and so do religions. I will compare religious freedom in Spain from 711-1492 (Andalusian period) and modern day religious freedom in order to understand the various benefits of a society in which citizens are able to practice religion freely. To do this, I will study and analyze historical and current documents, laws, and sources in order to understand the parameters of religious freedom during the Andalusian period and present day. Next, I will analyze social and political influences that have contributed to the two different types of religious freedom. Lastly, I will synthesize my sources in order to find the ways a society that can practice religions together. This research will serve as a model for countries to create better political conditions for citizens to practice their religion freely.

Mentor: Dr. Nevzat Soguk
Temporal survey of the effects of coral bleaching on fish diversity in Kāneʻohe Bay

Since the Hawaiian Islands are home to a variety of beautiful topical fish and coral species, it is important to study coral ecosystems to see how environmental changes affect it. Many fish feed on algae growing on coral colonies or on the actual coral polyp itself and use the crevices in coral colonies as hiding places. Because coral reefs are heavily utilized habitats, bleaching events can negatively impact the abundance of animals in that area. Recent studies have identified rising water temperatures, increasing ocean acidification, and pollution as direct and indirect causes on the health of coral communities. All of these factors can lead to continued coral bleaching events in Hawaiʻi, which is why it is important to examine the effects of this phenomenon. This project will study coral reef bleaching events and their effects on the surrounding fish communities. Spatial differences in fish populations will be analyzed to show the difference between before and after a coral bleaching event in Kāneʻohe Bay.

Mentor: Dr. Peter Marko
Multi-Walled Carbon Nanotube Nanoforests as Gas Diffusion Layers for Proton Exchange Membrane Fuel Cells

Proton exchange membrane fuel cells (PEMFCs) are emerging as power conversion devices for stationary, automotive, and portable devices compared to other types of fuel cells. The PEMFCs operate at elevated temperatures to improve the conductivity of electrolyte and enhance the kinetics of electrode reactions resulting in higher operating efficiencies. However, operation at elevated temperatures requires external humidification to fully humidify the reactant gases to avoid low proton conductivity which results from membrane dehydration. Gas diffusion layers (GDLs) have been developed to manage water as well as to promote gas distribution to the active catalyst regions in an attempt to obtain higher power density at all current density regions. For several years, carbon papers or carbon cloth substrates (macroporous layer) with polytetrafluoroethylene (PTFE) based microporous layer coatings have been the major choice for GDLs. This research focuses on implementing carbon nanotube nanoforests (CNNs) as GDLs in order to increase fuel cell performance in terms of stability, humidity, power density, and operation efficiency, while lowering the weight, size, and costs. Multi-walled carbon nanotubes (MWCNTs), used in this research, have been proven to transport large currents with low resistance, have extremely high hydrophobic properties and inherent oxidation resistance, all of which make the potential application of MWCNTs as GDLs very promising.

Mentor: Dr. Mehrdad Nejhad
Michelle Hu
Biochemistry
Finished project in Natural Sciences
Participation for UROP
Oral Presentation: 11:00a in A101

Improving the Crystal Formation of mCrimson 29

Fluorescent proteins have important properties which have been exploited for the benefit of biomedical research. As a result, a variety of red fluorescent proteins have been produced to improve the quality of cell imaging. One of these variants being studied now is mCrimson 29. While the overall objective was to determine the structure of mCrimson 29, the main purpose of this project was to obtain better-looking crystals. This was done through testing a larger variety of crystal conditions to improve crystal formation. Based on these results, the increase of crystal conditions did not improve crystal formation. Because of this, more research should be pushed towards understanding the reason for mCrimson 29’s crystal formation difficulties.

Mentor: Dr. Ho Leung Ng
Uncovering the Pharmacogenetics Between Aromatase and Breast Cancer

Breast cancer occurs in 1 out of 8 women while 2,360 new cases of breast cancer were discovered for men just in 2014 (Breastcancer.org, 2014). Aromatase, an enzyme that produces estrogens by converting androgens found throughout the body, is linked to majority of breast cancer development (Chumsri et al., 2011). Because of this, there are various types of aromatase inhibitors being created that can be used to treat breast cancer. However, the understanding between aromatase and these drugs is still relatively small. The objective of this project will be to determine the structure of aromatase when it is bound to a variety of aromatase inhibitors. The mutant-type aromatase would first be harvested from the transformed *E. coli*. After harvesting the estrogen receptor from the transformed *E. coli*, it would be crystallized with a range of aromatase inhibitors to see where they are binding to on aromatase. From there, the specific location these inhibitors bind to can be determined using X-ray crystallography. By finishing this research, we hope to not only add to the increasing information on aromatase but to also help push the development of new aromatase inhibitors for breast cancer treatments that are more effective and less toxic.

Mentor: Dr. Ho Leung Ng
Motivations Behind Fast Food Consumption in University of Hawai‘i Mānoa College Students: A Qualitative Study

The fast food industry has increased by over 150 billion dollars since 1970 and obesity rates in the United States have skyrocketed. Fast food consumption has increased to never before seen rates, especially in college students, but the cause of this increase has not yet been determined. With a focus on University of Hawai‘i Mānoa college students, this study aims to discover particular motivating factors that may be contributing to the increase in fast food consumption. This study will use secondary data, as well as primary data collected through survey tools, to examine the relationships between fast food consumption and the following variables: time constraints, price, accessibility, stress levels, and parental influences. A 15-question survey will be issued online through Qualtrics, an online questionnaire tool, to University of Hawai‘i Mānoa college students. The findings will be analyzed using association and chi-square analyses as well as a logistical regression analysis. The results of these analyses will validate that particular variables selected in this study, such as stress and parental influences, do significantly affect students’ fast food consumption habits.

Keywords: fast food, obesity, college students

Mentor: Dr. Dana Alden
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. Research will also be conducted to detect urban growth, and to assess the impact of new residential and commercial construction along with other new forms of transportation. Once the initial set of information is gathered, a concept can be developed and an initial design will take shape. 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
Conservation of Habitat Utilizing Estrogen Receptor Reporter Gene Assays

Steroid hormones, including estrogen, play important roles in the reproduction, growth and development in all vertebrates. Estrogenic pharmaceuticals have been found to affect fish reproduction. Estrogenicity of chemicals can be screened using an in vitro reporter gene assay using estrogen receptors. The goal of this research is to establish in vitro alligator and dolphin ER reporter gene assay system and screening environmental chemicals having estrogenic activity. To achieve them, cloning of alligator and dolphin ER genes is essential. Then, the genes of alligator and dolphin ERs will be transfected into HEK293 cells (human embryonic kidney cell line lacking ERs) with estrogen response element (ERE) and reporter construct. Then, environmental chemicals will be screened using this system whether they have strong estrogenic activity towards dolphins. Using this screening system for chemicals with estrogenic activity, I hope to identify, and thereby, minimize the release of estrogenic chemicals in habitats of dolphins and other aquatic mammals.

Mentor: Dr.Grau Gordon
Beyond Shattered Lenses: Exploring Visual Effects Techniques and Encouraging Student Collaboration

With advances in technology and demands for innovative visual experiences, filmmakers increasingly draw upon inspiration from the worlds of live-action and animated filmmaking to create original pieces. As an independent group project within the Academy for Creative Media (ACM), Beyond Shattered Lenses is a short film that encourages collaboration between ACM students through the use of animated and live-action footage to create effects. This Senior Honors Project focuses on the director’s efforts to incorporate and combine different mediums of footage as well as facilitate a learning experience for digital cinema and animation students to explore each other’s fields.

Following the film from script to screen, the director demonstrates how the initial visual effects design for Beyond Shattered Lenses evolved as the film progressed from pre-production to post-production. Editing techniques are tested as unexpected problems arise with the live-action footage, pushing the team to be flexible and creative when finding solutions. The project also focuses on how ACM students collaborated during all phases of the film and what students learned about each other’s specializations. Through this experience, the director aims to understand the visual effects techniques and teamwork methods used in today’s filmmaking industry.

Mentor: Daniel Boulos
Evaluation of fibroblast gene expression differences in internal organs

Fibroblasts are large, elongated, spindle-shaped cells found in the connective tissue. These cells play an important part in supporting the structure and function of many organs, as well as in wound healing by migrating to the site of injury and replacing damaged cells with new extracellular matrix (ECM). Fibrosis arises, however, when fibroblasts secrete and deposit excessive amounts of ECM. In the case of cardiac fibroblasts after a heart attack, these cells deposit too much ECM which ends up restricting heart movement, making it difficult to pump. At the same time, without this process of ECM acting as filler the heart would not be strong enough to function. Cardiac fibrosis is detrimental to heart function and there is currently no treatment strategy.

Cell populations can be identified by specific genes that they express. Recent publications have focused on identifying genes expressed by cardiac fibroblasts. However, there is still a gap in knowledge as to which genes are expressed in the fibroblasts of internal organs relative to each other. Identifying the gene expression profiles of fibroblasts from different organs will elucidate the exact function of these cell populations. By targeting fibroblasts genes expressed by specific organs, it would be possible to treat fibrosis in one organ without effecting other fibroblast populations in the body.

Using mouse models, the project will evaluate gene expression of fibroblasts from the heart, lungs, liver and kidney through quantitative polymerase chain reactions. The data analyzed between organs will contribute to filling the current gap in knowledge.

Mentor: Dr. Michelle Tallquist
Calcium Channel Expression Patterns In HIV-Tat Transgenic Mouse Cells and the SH-SY5Y Cell Line

Previous reports have shown that HIV-Tat and methamphetamine (METH) independently affect calcium levels inside the cell. In vitro, METH increases intracellular calcium concentrations and enhances calcium oscillations in rat ventral tegmental area (VTA) dopamine neurons. Similarly, the HIV-Tat protein amplifies calcium levels in hippocampal neurons in response to glutamate. The mechanisms by which neurons mediate calcium responses are poorly understood. The preliminary data in our laboratory show that in SH-SY5Y cells, model of dopaminergic neurons, HIV-Tat and METH influence the expression of calcium channel genes. SH-SY5Y cells express different types of calcium channels: the L-type calcium channels, encoded by the genes CACNA1C and CACNA1D, and the N-type calcium channels, by the CACNA1B gene. This study aims to determine whether the dopamine rich region of the brain of the HIV-Tat transgenic mouse, a model of HIV, shows similar calcium channel expression patterns as SH-SY5Y. To achieve this aim, we will employ molecular biology approaches that include DNA/RNA extraction, cDNA synthesis, and real time PCR or qPCR.

Mentor: Dr. Marilou A. Andres
Increasing Unprocessed Carbohydrates in the Diet on Hemoglobin A1c and Hyperglycemia

Diabetes is a chronic condition that is a growing problem among Americans due to poor diet and sedentary lifestyle. A detrimental complication that stems from diabetes is hyperglycemia. An excess of glucose in the blood leads to organ or tissue damage and can even result in a diabetic-coma. My study intends to control hyperglycemia by increasing the amount of unprocessed carbohydrates together with a plant based diet. Unprocessed carbohydrates are not only more nutritious and fibrous than the processed ones, but they are also lower in excess sugars and fats, which allow people to eat more in volume and still decrease caloric intake. My project compares the long term effects of increasing unprocessed carbohydrates in the diet using the hemoglobin A1c (HbA1c) test. The HbA1c test measures a 2-3 month average of glycated hemoglobin in the blood. If blood sugar levels decrease to a healthy range solely through changes in diet, dependence on blood glucose-controlling prescription drugs can be minimized.

Mentor: Dr. Terry Shintani
Leadership is a dynamic process in which there is one individual that influences others to contribute to achieving group tasks. The emphasis on traditionally feminine behaviors of creating a sense of community and communicating effectively seems to be in competition with taking on the role of a politician, which is associated with masculine traits. Masculine traits are associated with power seeking, which is better suited for leadership roles, as opposed to the communal style associated with females. Asian-American women continue to be characterized with the stereotypes of being obedient, demure, and victims of patriarchal traditional Asian culture. Because Asian-American women face these obstacles that stand in the way of being perceived as a competent, trusting leader, I predict that these individuals should be rated lower for perceived competence and sociability when compared to Caucasian women. To test this prediction, impressions of female political candidates were collected from college students from a large university in the Pacific (N = 60) via an online survey. The results demonstrated that while there were no significant differences in the perceptions of competence but that, there were significant differences in the perceptions of sociability in both ethnic groups. There were differences in ratings between paired videos, but not in a pattern consistent with ethnicity.

Mentor: Dr. Jessica Gasiorek
Managing Renewable Generation Fluctuations

Energy and power production are essential to daily life. By the year 2030, HECO desires to increase renewable energy production up to 65%. However, when not enough power is produced from solar panels and wind turbines, then spinning reserves, which are back-up power generating units, or energy storage are used to help compensate to meet that energy deficiency. This poses a problem because when renewable energy production increases, then these main two back-up plans must be very efficient and cost effective. When there is cloud blockage, lack of winds, or when nighttime occurs, these back-up methods must be fuel and power efficient by selecting the correct fuel and turbines to ramp up. This will help to significantly limit fuel burning to hopefully minimum. The first step is to obtain input and output power curves from HECO to determine the best-fit daily model of power demand and production in Hawaii. Once these curves are obtained, then the next step will be to create a differential equation make the best selection for certain circumstances by accounting for several variables such as cost, cloud blockage, rain, lack of winds, ramp rates, and fuel efficiency. The aim of this study is to determine the best proportions of alternative energy production to meet the energy demands of Hawaii. This project is relevant and significant to Hawaii because there will be a drastic change in renewable energy production by the year 2030, which means that the future renewable energy back-up plans must be extremely efficient.

Mentor: Dr. Ghorbani
Suicide is a public health issue that occurs across the span of life and in all areas of the globe. Hawaii is no exception to this trend, with suicide being the leading cause of death in 15-24 year olds (SOHDOH, 2011). Self-reported suicidal behavior is higher in Asian, Native Hawaiian, and Pacific Islander high school students than their general U.S. peers. Protective factors like mental health care, social integration, and contact with trusted adults help to minimize the risk of suicidal behavior. For these reasons, I am aiming to increase protective factors in youth from Hawai‘i. This project will address youth suicide prevention at the E Malama ‘Ola (“Caring for Life”) Suicide Prevention, which will be open to approximately 40-60 youth and their trusted adults. I will be co-facilitating one youth track session, offered twice, by using interactive activities about leadership skills and self-care, which are protective factors against suicide. I will also be helping to develop a facilitator’s manual that includes interactive skills building activities based on manuals that have been used in the past for youth suicide, bullying, substance use, and adventure therapy. Such activities have served as the cornerstone of community youth groups approach to suicide prevention. Surveys will be used before and after the sessions to measure the change in knowledge about suicide prevention, their comfort level with referring people to proper resources, and the likelihood of them implementing new skills. Open-ended questions will be used to assess whether key messages were conveyed using adventure activities.

Mentor: Dr. Deborah Goebert
You and I: Reflections on Rumi and Kahlil Gibran

Throughout history poets have expressed profound and enlightened realizations. Two examples are the Sufi poet Rumi and the mystic poet Kahlil Gibran. These men, who lived roughly 800 years apart, have come to be some of today’s most read poets in America. Rumi, the thirteenth century Persian spiritual master, dictated his teachings to scribes, much like other enlightened masters before him. Kahlil Gibran, a modern twentieth century mystic from Lebanon, wrote his own work in Arabic and English.

The focus of this creative thesis is to create a selection of my own poetry based on my reflections of these poets’ themes. I will use two translation sources: Coleman Bark’s *The Essential Rumi* and Kahlil Gibran’s *The Collected Works (Everyman’s Library)* which together consist of over 1200 pages of poems, parables and prose. My intent is to challenge my poetic skills by engaging in a difficult spiritual journey, and engage with readers to explore the texts by encouraging contemplations of central themes concerning human relationships.

Alongside the two translation texts I will research scholarly sources regarding the poets’ influences. Some Sufi spirituality texts I will review are William Chittick’s *The Sufi Doctrine of Rumi* and Seyyed Hossein Nasr’s *The Garden of Truth*. For Kahlil Gibran, some texts will include a biography written by his nephew entitled *Kahlil Gibran*, and Eugene Paul Nassar’s essay explaining Gibran’s struggle to live in two different cultures, entitled “Cultural Discontinuity in the Works of Kahlil Gibran.”

Mentor: Frank Stewart
Dynamic Mapping of the Somei-Yoshino

In the field of cartography, animated maps are a relatively undeveloped area, where few established standards or specialists exist, leaving much room for exploration. In recent years, the rise of the Internet has created an explosion of popularity in animated maps through social media, blogs, and news articles.

Traditional static maps are great at representing information about location. However, they have difficulty displaying information such as time-based patterns, in a way that the average audience can comprehend. The importance of animated maps is that it adds an additional dimension of time, which allows for the display of not only spatial, but also temporal information.

In this technical project, *The Dynamic Mapping of the Somei-Yoshino*, over 60 years of phenological data of the Japanese cherry tree collected by the Japanese Meteorological Agency, is interactively mapped through a custom web-based interface. The interface was created from scratch due to the limits of traditional GIS (Geographic Information System) programs. The animated map, based on a combination of the coding and programming languages HTML, JavaScript, and Python, is generated upon demand, based on the data stored on a web-based server. The interactive map allows the user to gain a better understanding of information such as differences between historical blooming times, or even predictions of future blooming times based on climate model data.

Keywords: Maps, Cartography, Geography, GIS,

Mentor: Dr. Hong Jiang
Machine Learning and its Application

As advance as it is today in this world, technologies have made communication easier, people from across the sea can share news to each others. However, even though the geological difference is no longer a concern for information sharing, language differences still remain as a barrier to many. Reviewing the translator tools, the level of confidence in accuracy and completeness of Google Translate is only at 26%. This unsatisfactory number indicates the untrustworthiness of translators available. Thus this research aims to bring up the percentage of confidence in accuracy by introducing a new method of translating, solely from English to Chinese. First we will be implement a prototype using an Example Base Machine Translation Method. Next we will implement a Machine Learning mechanism to pick up translation mistakes, the more examples and corrections we feed in, the more accurate the result. Lastly we will develop a library that help the machine understand the context of the sentence for dual meaning words. The improvement from implementing this method will suggest the possibilities of extending the model to other language translations.
In vitro tubule formation of Yop1 expressed in *E. coli*

The endoplasmic reticulum has three distinct regions: sheets of the nuclear envelope, peripheral ER sheets, and peripheral ER tubules. ER tubules are spread throughout the cell giving them contact with other organelles, which may allow for the transfer of lipids or for calcium signaling. The protein Yop1, found in *S. cerevisiae*, is one of several proteins necessary to maintain these ER tubules. For this project, Yop1 was conventionally cloned into pMCSG28 and then transformed into *E. coli* because of its ease of growth and genetic manipulation. The focus of this project is to determine an optimal expression and purification method of Yop1 from *E. coli*, while still yielding functional protein. Protein functionality will be tested via Electron Microscopy after Yop1 has been reconstituted with lipids into proteoliposomes.

Mentor: Dr. Ho Leung Ng
Contemporary school reforms suggest implementing services to counter the effects of outside risk factors students face such as poor home environments, youth violence, drug use and more. These problems are commonly found in low-income communities and are believed to impede student learning. Despite the increasing public and expert support for school community services, insufficient funding is allocated for such services, and available funds are often concentrated in elementary and middle schools. There is limited information on school community services at the high school level, a gap which this study will begin to fill. Data will be collected through interviews, surveys, and quantitative analysis of student assessments. The findings will identify ways schools can better administer and utilize school community services to help at-risk and low-income students obtain higher academic achievement.

Mentor: Dr. Bum Jung Kim
Heath Larner  
Mechanical Engineering  
Finished project in Engineering & Computer Sciences  
Participation for UROP  
Oral Presentation: 11:00a in B103

**Diffusion-Driven Accumulation of Particulates in Tight Corners of Microfluidic Circuits**

Accumulation of actively swimming particles amidst various geometries is an area of active research with potential applications to self-healing materials and drug delivery systems. To establish a baseline for the influence of Brownian motion on the accumulation of particles in dead angles, a diffusion-based accumulation model was developed and tested with passive swimming particles in microfluidic circuits. The accumulation behavior, described as particle flux into a wall cavity, was tested against a set of input Reynolds numbers controlled by a syringe pump at the pressure head. Soft lithographic techniques were used to produce microfluidic channels disrupted by wall cavities containing dead angles. A suspension of 3 μm diameter polystyrene microspheres was subjected to pressure-driven flow through the circuits. Time lapse photography was used to record accumulation trends. In trials which exhibited accumulation, parameters describing the extent of accumulation demonstrated a time dependency similar to that expected of a diffusive process. This result has important implications on the distribution of particles near corrugated structures in various biological and engineered systems.

**Mentor: Dr. Aaron Ohta and Dr. Daisuke Takagi**
Implementing a Preschool Curriculum to Promote Health

The prevalence of childhood obesity has more than doubled in the past thirty years. Children and adolescents who are obese are likely to be obese as adults and are therefore more at risk for developing immediate and long-term health effects. The dietary and physical activity behaviors of children are influenced by many sectors of society, including families, communities, and schools. Preschool learning environments offer significant opportunities for building healthy attitudes and awareness about food and nutrition. This project’s focus will be to review the Preschool Wellness Policy assessment data, improve wellness policy training for school personnel along with parents, assist educators with implementing related activities within a classroom setting, and engage the community to participate in this development. This project will be conducted in Waimanalo Head Start Programs and promote the six behavior strategies of the Children’s Healthy Living Program. Local wellness policies are an important tool for parents and school districts to promote student wellness, prevent, and reduce childhood obesity. A long term goal for this project would be to achieve a healthy weight in young children by maximizing the potential for effective implementation of this program and engage the community in this process. Working together is key to finding simple solutions for healthier living and eating. Associations can improve health outcomes for children and raise the quality of life for all. By accomplishing this, it will highlight ways that schools, local advocates, parents, and communities can work together to help families modify their style of living into a healthier one.

Mentor: Dr. Denise Nelson-Hurwitz
Silica-rich, highly evolved compositions are atypical of Hawaiian lavas. In fact, only four distinct volcanic deposits of this composition have been found in the Hawaiian Islands, one of which was the subject of this study. In this study we used a combination of field-work, textural observations, and geochemical analysis to constrain the dynamics of the 114ka Pu`u Wa`awa`a trachyte eruption on the Island of Hawai`i. The event erupted a large volume (> 5km$^3$) of volcanic material including a tephra cone (~1.6km in diameter) and a lava flow (>250m thick). The ejected fragments, called volcanic tephra, contain a variety of texturally distinct classes (including pumice, scoria, obsidian, microcrystalline and banded clasts) that can be linked through the nucleation and growth of feldspar microlites and degree of magmatic degassing. The frequency of clast occurrence within distinct stratigraphic layers and clast density were used to understand how the eruption varied between different stratigraphic units. Textural and petrographic observations were used to help constrain degassing and crystallization dynamics during the eruption, while bulk rock geochemical analysis was used to test if the lava flow and tephra cone had the same composition, and whether their compositions could be used to distinguish if the two units formed in the same eruption. Crystal abundances coupled with vesicularity were then used to reconstruct a devolatilization and crystallization history accounting for the collection of field, textural, and geochemical observations.

Mentor: Dr. Thomas Shea
Assessment of Viral Reservoirs in HIV Eradication Studies

HIV compromises the human immune system and establishes life long infection. While HIV can be effectively suppressed with anti-retroviral combination therapy (cART) in blood to undetectable levels, the establishment of the latent reservoir in immune cells stands as one of the greatest obstacles in developing a cure for HIV. The resilience of this latent cellular HIV reservoir is due to its ability to adopt a dormant provirus form in immune cells, from which HIV may emerge to re-establish an active infection if cART is stopped. It is well understood that CD4 T cells are the chief cellular sanctuaries for the latent reservoir. However, current evidence points to an alternative reservoir in the form of monocytes and macrophages. In this study, we sought to understand the role of monocyte characteristics that are critical in the establishment of the HIV reservoir. We obtained highly purified monocyte sub-populations from the blood of HIV-infected participants on virally suppressive cART and evaluated the viral content and composition using flow cytometric and PCR technologies. We observed unique HIV viral signatures among the monocyte populations. Comparisons drawn between the viral reservoir and cellular characteristics may lend to new insights on the role of monocytes in seeding and maintaining the latent HIV reservoir.

Mentor: Lishomwa Ndhlovu MD, PhD
Identification of proteins translated by alternative ribosomes in Mycobacterium Smegmatis

Alternative ribosomal proteins (AltRP) are duplicated proteins expressed in addition to the full set required for a complete ribosome. Since AltRPs may possess distinct features that provide adaptation to certain stresses, the aim of this study was to isolate and identify a discrete set of proteins translated by alternative ribosomes in Mycobacterium smegmatis, a non-pathogenic model organism for tuberculosis-causing Mycobacterium tuberculosis.

Logistic difficulties importing the M. smegmatis strain delayed the experiment; therefore, attention was initially diverted to a similar project involving AltRPs in M. tuberculosis. Primary ribosomal protein S18-1 and AltRP S18-2 were purified, refolded, and tested for activity in vitro. My effort on this project helped optimize an assay and earned co-authorship in a recent publication in Molecular Microbiology.

Once we imported M. smegmatis, a plasmid containing flanking regions of the altRP operon and a selectable marker was created and transformed into M. smegmatis by electroporation. Single recombinant mutants were isolated followed by selection and confirmation of double recombinant mutants. The (ΔaltRP) mutant lacking all four AltRPs in one operon and a wild type strain of M. smegmatis were grown in low zinc medium to stimulate alternative ribosome production in the wild type but not in the ΔaltRP deletion mutant.

Our data with the wild type showed that we can successfully identify over 250 proteins in one run. Furthermore, zinc depletion was seen to be mandatory for AltRP expression. Ongoing proteomic trials are being facilitated to extract protein from both strains, run mass spectrometry (MS) and identify and quantify the proteins.

Mentor: Dr. Sladjana Prisic
Ruthenium complexes as anticancer agents

The landmark discovery of cisplatin opened the doors of cancer research to organometallics. *Cisplatin* and its derivatives are highly active pharmaceuticals, but typically somewhat unselective, leading to patient side effects. Anticancer targets based on ruthenium, rhodium, osmium and iridium have been discovered but their mechanism of action is unidentified. By synthesizing new ruthenium complexes, we hope to correlate structure-property relationships between the steric and electronic profile of the ruthenium complex and its activity and selectivity as a cancer drug. This could ultimately lead to an understanding of the mechanism of action and the rational design of new drugs.

Mentor: Dr. Matthew Cain
Combating Obesity through Advocacy for a Sugar Sweetened Beverage Policy

Obesity is a pressing issue in the lives of many Americans throughout the U.S. Although Hawaii has the second lowest obesity rate in the country, it is still a matter of concern. The objective in combating this issue is to work with the Hawaii Public Health Institute (HIPHI) and advocate for a sugar sweetened beverage (SSB) tax. The main focus of this project will be to analyze the effectiveness of the SSB law in other states and countries, and advocate to the legislative branch to secure support for regulations for added tax on sugar sweetened beverages in Hawaii. To address this, skills of health promotion and policy analysis will be applied to appeal to the legislative branch, and to members of the community to gain more public support.

Due to the prevalence of obesity in Hawaii, this policy analysis and promotional piece will serve as an effective means for implementation of the law. If policies are adopted, expectations are to see an increased awareness of the causes of obesity and higher regulations that promote healthy eating in community settings. Declines in obesity rates are a long-term objective and, hopefully with stricter regulations and community support, in a few years there will be a drastic decrease in obesity rates in Hawaii. Looking at the big picture, if proposed regulations are successful in Hawaii, it can serve as an example to other states, and hopefully lead country-wide initiatives to establish obesity prevention regulations.

Mentor: Dr. Denise Nelson-Hurwitz
Many teachers do not have the educational tools to address complex historical topics in the classroom. In Hawai‘i, Native Hawaiian Sovereignty and American democracy are contradictory issues for some teachers. These teachers feel uncomfortable if they uphold American ideals of justice and equality while teaching students about Native Hawaiian legal challenges. Classroom discussions may become too controversial and emotional for them. How can we assist educators to teach topics that question and criticize the actions of the American government? How can teachers use what they learn from museum education programs to guide young people to think critically about American historical, political, social, and cultural issues?

Museums and similar institutions are continually looking for ways to engage with their local communities. Today, teachers often look to museums for resources that their classroom textbooks may not offer. The King Kamehameha V Judiciary History Center (JHC) is an example of one of these places in Honolulu, Hawai‘i.

This project examined two seminars held at JHC: *The Constitution and Native Hawaiian Self-Determination* (2009) and *Challenges of American Citizenship for Native Peoples* (2011). It is important to understand what the teachers learned and how they learned the information in these seminars (e.g. listening to legal scholars, historians, and community activists; developing innovative curriculum; and participating in mock congressional debates). To accomplish this I interviewed teachers and JHC staff. By researching these two seminars, I present how museums and educators work together to teach students about complex, contradictory, and potentially controversial historical events and issues.

**Mentor:** Dr. Karen Kosasa
Metagenetic Sequencing of Zooplankton Species Richness Across Pelagic Depth Zones

Marine zooplankton are important intermediate trophic level consumers in the ocean, and the subtropical waters offshore of Hawaii hold global maxima in species diversity for these communities. Zooplankton in this region also include a wide array of species complexes, with many understudied and morphologically cryptic species. This project aims to use metagenetic sequencing to analyze how zooplankton community composition changes across depth zones in the ocean, establish which taxonomic groups contain undescribed species, and determine which of these undescribed species are potentially important to biogeochemical cycling in the upper ocean. We will analyze mesozooplankton species richness across depth (0-1500m) at an open ocean time series site (Station ALOHA), using depth-stratified 1m² MOCNESS samples that were size fractionated into 5 size classes (0.2-0.5 mm, 0.5-1 mm, 1-2 mm, 2-5 mm, >5 mm). Next generation sequence analysis of three DNA barcoding regions will enable determination of species presence or absence within each sample. We will compare our sequence-based results to prior species lists from the region, in order to detect taxonomic groups with high cryptic diversity. The results of this study will enable us to quantify the fraction of the mesozooplankton community that is undescribed or new to science, as well as identify which new species are migratory and therefore likely important to biogeochemical cycling of the oceans.

Mentor: Dr. Erica Goetze
Tierra Mendez
English Major
Proposal in Arts & Humanities
Participation for Honors
Oral Presentation: 12:30p in B101

Observing War through Literature: The Effects of the Iraq Wars on the Family Unit

This research discusses the effects of the current U.S war (Iraq/Afghanistan) on the family unit, with emphasis on children. The aim of this research is to create awareness to the psychological trauma and hindrance inflicted on children when they are exposed to a disturbance in the family unit due to war. This project will not only discuss works of literature in existence, but will also discuss articles, medical journals, documentaries, as well as ongoing research being conducted on the psychological trauma of children affected by war. The studies referenced in this research suggest that children with an absent parent or a parent suffering from PTSD may be at risk for developing some form of psychological disturbance. By analyzing literature (addressing children affected by this specific war) the goal of my research is to stimulate an increase in works being produced for children discussing the hardships of war.

Mentor: Dr. Mark Heberle
Wailua was one of twelve windward ahupua’a (socio-political land units) that comprised the district of Puna, and was the seat of political power as well as one of the most sacred regions for the Kaua‘i chiefdom. As an important wahi pana (storied place), it is unique in the sense that it has the longest and only navigable river (32 km) in our homeland, formed by the confluence of its north and south forks and numerous permanent and semi-permanent streams and tributaries that begin near Wai‘ale‘ale, the wettest spot on Earth and that drains into a vast productive inland agricultural region. Along the major geographical feature, Wailua River, are alluvial flats which were once used for agricultural cultivation in the prehistoric period, found along with a number of significant sacred sites and features.

The rich history of Wailua’s features, place names, and ali‘i (chiefs) can be found through documented oli (chants), mele (songs), ‘ōlelo no‘eau (proverbs), pana no‘eau (sayings that celebrate place), and mo‘olelo (histories, stories literature) which clearly emphasize the importance of water demonstrating cultural and historical significance. This study looks at understanding the timing of societal development by examining two lines of evidence—Hawaiian oral traditions and archaeology. It addresses methodological issues of developing a database to track Hawaiian chiefly genealogies and radiocarbon dates that mark the construction of important cultural sites. By creating this integrated historical chronology of settlement for the area we can begin to see how Wailua emerged as a center of ali‘i power in pre-contact times.

Mentor: Dr. Kekuewa Kikiloi
Marine microbiologists have long aimed to determine how bacteria interact with coral, such as in the initiation, progress and defense against diseases that lead to the loss of coral reefs. However, microbial community-based approaches have provided little information about the mechanisms involved. A new approach that focuses on single or small numbers of cells might provide such insights. This ‘proof of concept study’ aimed to identify which bacteria are in the mucus of Porites sp. collected off Kewalo through two methods: 1) Enrichment media in 96-well plates were inoculated with small volumes of mucus. Changes in turbidity were considered indicators of microbial growth. Each turbid well generally contained a pure culture of bacteria, precluding the need for typical purification practices. Among the 190 pure bacteria cultures prepared, 81 different ‘species’ were distinguished based on nucleotide identity in their 16S rRNA genes. 2) Coral mucus and associated microbes were preserved immediately on collection. Single presumed bacterial cells were collected from the sample in a Laser Catapulting and Microdissection (LCM) system. The genomes of single cells were partially amplified, after which the identity of each cell was tentatively determined through sequencing of the 16S rRNA gene. This is the first time this approach has been used in an investigation of bacteria in coral mucus.

Mentor: Dr. Stuart Donachie
Since its introduction in the US in 1999, West Nile Virus (WNV), a single-stranded RNA Flavivirus has caused several epidemics. About 1% of infected individuals develop serious neurological disease seen as encephalitis, which may result in permanent neurological complications. There is no vaccine or anti-viral licensed for humans to control WNV. WNV detection by dendritic cells and macrophages initiates innate immunity through pattern recognition receptors such as TLRs and RIG pathways and result in production of inflammatory cytokines and type I IFN to clear infection in peripheral organs and prevent virus-CNS entry. However the mechanisms that fine-tune the inflammatory response are not well understood. One modulator of innate immune regulation is the TREM family of receptors. TREM-1 plays an important function in amplification of inflammation, while TREM-2 exhibits anti-inflammatory functions. Though TREMs plays important role in immunity to bacteria, their roles in virus infections are not yet characterized. The goal of this study was to test whether WNV infection in vitro can induce expression of TREM-1 and -2. Our results demonstrate that WNV induced TREM-1 mRNA expression in a cell specific manner in mouse cells such as macrophages and microglia, which correlated with increased virus replication while TREM-2 expression was reduced. This is the first report showing that WNV can induce TREM-1 expression. Ongoing research will validate TREM-1 increase in mouse model and understand its role in modulating inflammation. Characterizing the expression of TREM-1 by WNV is the first step towards understanding of fine-tune mechanisms of WNV immunity and pathogenesis.

Mentor: Dr. Saguna Verma

This thesis will explore the influence of the monetary policies of countries in the Asia-Pacific region on valuation of residential real estate in Hawai’i. Monetary policy is the process in which the monetary authority of a country, typically a central bank, directly and indirectly controls macroeconomic factors, such as interest rates, foreign exchange rate, and GDP based on PPP.

A comparative analysis of these macroeconomic variables will be conducted between the periods of the Asian Financial Crisis of 1997, which was the period of economic decline throughout most of East Asia, and the U.S. Sub-Prime Mortgage Crisis of 2008, also known as the “Great Recession”. This quantitative analysis will use linear and multiple regression analysis to determine how well various economic variables predict the price of residential real estate in Hawai’i.

The domestic macroeconomic variables of Hawai’i that will be studied are: U.S. 10-year treasury bond yield, real GDP growth of Hawai’i, and real GDP growth of the United States. The foreign economies that will be studied are: Japan, Canada, South Korea, China, Hong Kong SAR and Taiwan. The macroeconomic variables of these foreign economies that will be used in this study are: interest rate, foreign exchange rate relative to USD, and GDP growth rate based on PPP. These variables will be regressed against the median price of a single-family home in Honolulu. The research in this thesis hopes to suggest the growing influence of international macroeconomic factors on the valuation of residential real estate in Hawai’i.

Keywords: Hawai’i, Real Estate, Development, Investment, Economics, Microeconomics, Macroeconomics, Markets, Finance, International Business, Foreign Exchange

Mentor: Dr. O. Nicholas Ordway
Binding Affinity of G-protein Coupled Estrogen Receptors for 17-B Estradiol

It is known that some cancer cells have receptors for hormone ligands. For example, breast cancer cells many times have receptors for estrogens. When estrogens bind to the receptors of these cells, a response—such as growth—is generated within the cells. Recently, a new trans-membrane protein has been found to be associated with estrogentic pathways called GPER (G Protein coupled Estrogen Receptors). GPER are believed to be embedded in the endoplasmic reticulum of cells. Study of GPER raises exciting new questions [Prossnitz et al 2011].

Previous research has already demonstrated the binding of other estrogen receptors to estrogens. However, direct molecular evidence of GPER’s ability to bind estrogen is still lacking. So far, only assays demonstrating biological effects of estrogen in cells expressing GPER have been performed. In addition, there also needs to be more exploration to see if there are other estrogen receptors in addition to GPER.

I have been able to detect Estrogen Receptor Alpha (a positive control) and GPER in the crude lysate of MCF-7 breast cancer cells via a Western blot. However, there are currently reproducibility issues with the Western Blot. To address this issue, I plan on testing out different antibodies and different conditions to optimize the blot. Once the Western Blot is optimized, an estradiol column will be utilized to test if GPER binds to estradiol.

Mentor: Dr. Ho Leung Ng
Analysis of Topography and Rock Fractures at the Fletcher Granite Quarry, Massachusetts

Topography affects many Earth processes (e.g. rockfalls and erosion) that shape the world we live in. This project focuses on the formation of rock fractures called sheeting joints, which form sub-parallel to the surface of the Earth at shallow depths. These fractures reflect how topography mechanically perturbs stresses arising from gravity and regional horizontal tectonic forces. This perturbation has recently been described theoretically and applied to model sheeting joints, but only in one site in California. Predictions of this mechanics-based theory differ substantially from those of the widely held explanation that the erosion of overburden is the primary cause of sheeting joints. This project tests whether the mechanical theory accurately describes the distribution of the sheeting joints at Fletcher granite quarry, MA. To achieve this, elevation contours digitized from a detailed topographic map of the quarry region are interpolated onto a regular grid that is rectangular in map view. We then filter out short wavelength features that are unlikely to cause sheeting joints but that complicate analyses of larger regional features that are likely to yield sheeting joints. Principle curvatures calculated from the filtered topography help us identify and characterize long-wavelength features predicted to favor sheeting joint formation (e.g. valleys, domes). Results to date indicate that sheeting joints mapped more than 70 years ago are preferentially located on topographic forms near the quarry that the mechanical theory predicts are favorable for sheeting joints.

Mentor: Dr. Stephen Martel
Exploring the Potentials of Ordinary Individuals to Generate Pathways leading to Awareness, Discourse, and Development of Strategies to Respond to the Warning Bells of Climate Change

Global climate change is a serious, complex, and contentious environmental challenge of our times with too many people uninformed, unconcerned, and unengaged. The failure to engage climate change has serious consequences: the glacial ice is melting, global warming is increasing, sea levels are rising, and extreme weather conditions are increasing. This study arose from a personal interest in nature studies and a deep concern that science alone cannot resolve the complex issues of climate change. These issues will be fought on the geopolitical stage. This study will explore the potentials of ordinary individuals to generate pathways to awareness, discourse, and development of strategies to respond to climate change. The scope of this study is Hawaii and Japan. In Hawaii, the study will focus on the creation of an environmental club at both Leeward Community College and the University of Hawaii at Manoa by ordinary college students and their mentors. It will follow their efforts to organize and respond to the issues of climate change. In Japan, the study will explore how ordinary individuals respond to climate change initiatives in light of the failure of the Fukushima Daiichi Nuclear Power Plant and the environmental disaster stemming from that failure. This study will provide a comparative analysis of how two different cultures respond to serious environmental and climate change issues.

Mentor: Dr. Frank G. Stanton
Regulation of Sphingosine Kinase 1 and Adipose Inflammation by *Momordica charantia* (Bitter Melon) in High-Fat Diet-Fed Mice

In Hawaii, Native Hawaiian and Pacific Islanders have the highest rates of obesity as compared to Caucasians. Lifestyle changes such as diet and exercise form the cornerstone of obesity therapies. We have demonstrated that tropical functional foods such as *Momordica charantia* (bitter melon) reduced weight gain and improved glucose metabolism in mice fed a high-fat diet (HFD). Studies indicate that sphingosine kinase 1 (SPK1) is an intracellular regulator of adipose inflammation that precedes systemic inflammation. Since our published data indicated that BM juice (BMJ) improved systemic inflammation in HFD-fed mice, we tested the hypothesis that BMJ will reduce adipose inflammation by regulating SPK1. Male C57BL/6 mice were randomized to four groups: 1) control diet (10% kCal fat), 2) BMJ (1.5% lyophilized juice, w/w), 3) HFD (60% kCal fat) and 4) HFD + BMJ. Body weights were measured three times a week for 16 weeks. Our preliminary results indicate that BMJ significantly reduced weight gain, adipose tissue weights and adipose inflammation in HFD-fed mice. Interestingly, BMJ-associated reduction in adipose inflammation was not associated with SPK1 regulation in HFD-fed mice. Future studies will identify alternate BMJ-associated mechanisms involved in ameliorating HFD-induced adipose inflammation. **Significance:** Mechanistic studies of functional foods are expected to offer cost-effective treatment strategies to alleviate obesity and associated disorders. Supported in parts by UROP, NIFA, USDA (HAW05023-R, HAW00598-H) and NIH (R21AT003719, G12RR003061 and P20MD000173) grants.

**Mentor: Dr. Pratibha Nerurkar**
An Analysis of Cultural-Historical Tourism in Bagan, Myanmar using the Repertory Grid Technique

After a long period of isolation, Myanmar has recently opened up to tourism once again. This makes Bagan, Myanmar, an up-and-coming destination that is experiencing a sharp increase in the number of visitors. Bagan also has the rare opportunity to implement tourism and destination management strategies before it becomes too busy. Understanding travel motivation is the first, important step in coming up with effective destination management plans. This paper uses the repertory grid technique (Kelly, 1955) to investigate what tourists’ motivations are for visiting Bagan. The grid was used to elicit constructs on travel motivation through comparison between Bagan and other cultural-heritage sites in Southeast Asia. The results indicated that qualities that tourists value and prioritize when travelling to Bagan includes; less crowds, sparse development, and easy accessibility. Qualities that were not important to the tourists included; easy access to Western food and amenities, five-star accommodation, and proximity to major cities. In order to implement successful destination management in Bagan, these motivational qualities have to be considered and maintained in the planning process.

Mentor: Dr. Brian Szuster
Hypoxia-inducible factor 1 (HIF-1) is a heterodimeric transcription factor that plays a crucial role in the regulation of cellular processes associated with hypoxia. Although both subunits HIF-1α and HIF-1β are expressed during normoxic conditions, the HIF-1α subunit is specifically targeted for degradation due to post-translational hydroxylation of conserved proline residues. Following hydroxylation, the von-Hippel Lindau tumor suppressor gene helps to flag HIF-1α for proteasomal degradation. During hypoxia, the HIF-1α subunit cannot be recognized for degradation due to the limiting amount of oxygen present for hydroxylation. Thus, stable HIF-1 is able to aid in the cellular response in an environment containing low oxygen. In prior studies, RNA sequencing revealed that HIF-1 expression in murine hearts led to the occurrence of splice variants of genes which encoded enzymes such as Ca$^{2+}$/calmodulin-dependent protein kinase II (CAM kinase II). In the proposed study, HIF-1’s effects on variant RNA splicing will be evaluated by examining CAM kinase IIγ, a specific isoform of CAM kinase II. A hypoxic chamber along with real-time PCR and western blotting will be utilized in order to confirm the occurrence of splice variance and to analyze the differentially spliced gene products in an HL-1 cell line. CAM kinase IIγ protein expression will be analyzed to see how it correlates with HIF-1 expression. By better understanding the role of HIF-1 in the various pathways relating to hypoxia, this can lead to the development of specific and effective treatments in order to assist those afflicted with various cardiovascular diseases.

Mentor: Dr. Ralph Shohet
Anti-corrosion effects due to biofilm formation on 1018 carbon steel

Microbiologically-influenced corrosion (MIC) refers to the corrosion of metallic and non-metallic materials resulting from the colonization of microorganisms on the material surface. The cellular metabolic processes of the microorganisms may produce changes in pH of the medium, induce redox reactions, and ultimately influence the corrosion rates at the biofilm-material interface. Presented here are the results of the corrosion of 1018 carbon steel which has been introduced to the bacterial species *Desulfovibrio desulfuricans* and *Bacillus subtilis* in a standard seawater medium.

The *Desulfovibrio* genus is known as sulfate-reducing bacteria (SRB) and is commonly used in the study of MIC, while *Bacillus subtilis* is a ubiquitous bacteria and model organism. Analytical techniques employed for corrosion-rate determination over several time periods include scanning electron microscopy with energy dispersive x-ray spectroscopy (SEM/EDX), RAMAN spectroscopy for determination of organic and inorganic corrosion products, and determination of steel mass loss and pH change of the saltwater medium, with comparison to the corrosion rate of 1018 steel in a sterile aquatic environment.

Mentor: Dr. Lloyd Hihara
Insalubrious Snapshots of Kalihi: Adolescent Empowerment through Photovoice

Obesity, and associated chronic diseases, have increased rapidly and continue to rise over the last decade. One of the primary causes of this is a lack of nutrition education and limited access to healthy food sources. This problem is exacerbated in low income and disadvantaged families. Previous studies have shown adolescents play a particularly critical role as meal planning gatekeepers for their families. Therefore, there is a need to focus on understanding the perception of nutritional choices and how the built environment affects food choices for adolescents in low-income neighborhoods.

The project will focus on the perspectives of adolescents on the food environment, and what they feel would improve their ability to eat healthy. To assess this, this project will utilize photovoice (PV) methodology. Photovoice is an emergent qualitative voluntary program that is based off a participatory methodology. This process allows the participants to identify, represent, and enhance their community through a specific photographic technique. This project will utilize PV methodology because participants are more invested and more willing to talk about the issue- this allows them to have a voice and gain perspective in their lives. The end result of this project is to improve the understanding of factors affecting adolescent food choice in low-income neighborhoods. This project should also support understanding of what is driving food choices and empower adolescents to engage in addressing community needs.

Mentor: Dr. Denise Nelson-Hurwitz
Intrauterine Growth Restriction in Babies Born to HIV-Positive Women: Identification of Possible Mechanisms Responsible for Low Birth Weight

Young women in sub-Saharan Africa bear a disproportionate burden of the HIV epidemic. HIV increases the risk of intrauterine growth restriction (IUGR), which results in the delivery of low birth weight (LBW) babies, who are 40 times more likely to die during their first year of life. However, the mechanism for IUGR among HIV-exposed newborns remains unknown. In addition to socioeconomic and cultural factors, hypotheses have been proposed to explain the biological component of IUGR. These include reduced 1) angiogenesis and vasculogenesis of the placenta, 2) production of growth hormones by fetal tissues, and 3) transportation of nutrients. The first two hypotheses were examined in this investigation.

In order to evaluate altered vessel formation, placental plasma levels of angiopoietins, ANG-1 and ANG-2, were measured. Levels of the insulin-like growth factor axis, comprised of insulin-like growth factor-1 (IGF-1) and one of its binding proteins, IGFBP-1, were also measured to evaluate the growth hormone dysregulation. In this case-control study, placental blood samples from 21 HIV+ and 30 HIV- pregnant mothers were collected at delivery from the Central Hospital of Yaoundé, Cameroon, Africa.

Results showed that angiopoietin and growth hormone levels in HIV- women were similar to literature values for healthy adults; however, no significant differences were observed in the levels of angiopoietins or growth hormones between HIV+ and HIV- women. Further studies using additional biomarkers of angiogenesis and growth factors, and nutrient transport are necessary to identify the combination of social, economic and biological risk factors that contribute to HIV-associated LBW babies.

Mentor: Dr. Diane Wallace Taylor
The need for sustainable food production and marketing systems is one of today's critical global issues. Pre-contact Polynesians lived by a pronounced conservation ethic, which featured mixed tree-cropping systems which are inherently sustainable and high yielding. This research presents a snapshot of one community’s tree cultivation knowledge in order to apply these methods, which promote environmental conservation and sustainable food production. Through household surveys discussing backyard trees in Tahitian language, as well as remote sensing to map food tree cover, this research presents a view of ecological and societal interactions. Quantitative data on nature and extent of urban agroforestry in Uturoa, Ra’iātea as well as descriptions of cultivation practices and extent of consumption are included. A large majority of households were found to derive a substantial portion of their diet from locally cultivated food trees themselves or procured through network and the majority of the respondents indicated that their cultural core values influenced them to cultivate trees, plant new trees as well as guide the ways in which they put their foods to use. The example of Uturoa shows that the incorporation of food bearing trees in urban landscaping design can have significant impact on degree of food security and food sustainability in a Pacific Island setting.
Changing Social Norms on Nutritional Behavior

The State of Hawai‘i, Department of Health, Behavioral Risk Factor Surveillance System (HBRFSS) 2013 reported less than one-fifth (19.1%) of the adults and less than 18% of high school youth eat at least five fruits or vegetables a day. Furthermore, 44.5% of individuals living in the Kalihi community had test for high blood sugar or diabetes and 53.1% reported their weight status as overweight or obese (HBRFSS, 2013).

This project would primarily involve government funded programs that support low-income families; specifically, programs like Supplemental Nutrition Assistance Programs (SNAP), which is also known as food stamps. The target population would be families living Hawai‘i within the Kalihi community. The research conducted would include data on government programs for low-income families and if those programs provide healthy choices for families in the community. After assessing nutritional behaviors, the access to healthy foods (fruit & vegetables), and evaluation of the level of education on nutrition, this project will determine the best choice for intervention to promote healthy nutrition among SNAP families.

The ultimate goal is develop and implement Public Health education that involves changing individual’s awareness of nutrition throughout the Kalihi community. In addition, it is important to change social norms that surround individuals eating behaviors that increase the consumption of fruits and vegetables, but decreases consumption of unhealthy foods. Lastly, this project would aim to provide, families with healthier but enjoyable food choices that the whole family would be willing to eat.

Mentor: Dr. Denise Nelson-Hurwitz
Hand-Drawn Animation: An Old-Fashioned Art Form in Modern America

The goal of this study is to determine whether or not traditional animation has any remaining relevancy within the modern American film industry, which has largely become dominated by 3D animation. Research will primarily focus upon animation as a method of storytelling with the objective of assessing the merits of both traditional and nontraditional mediums. I will also inquire into the place of traditional animation in the artistic world. Research will be conducted in two ways: first, extensive interviews with animators from both veteran and student backgrounds, and second careful longitudinal observations of the job market for traditional animation. I intend to find some indication as to what the future of traditional animation may be and where individuals currently interested in the art form might find it despite its absence in the theaters.
Quantitative Analysis of the Biomechanical Effects of Kinesio Tape

Since its allowed use in the 2008 Olympics, Kinesio Tape has gained popularity among athletes as a method to diminish pain, prevent injury, and increase performance. Currently, these purposed benefits are purely testimonial; there has been no objective evidence to substantiate these claims and many people believe that they are purely a result of marketer hype. It is hypothesized that the claimed reduced pain and increased performance is the result of expansion of the subcutaneous region under the tape, relieving pressure on nerves and increasing fluid movement. This study aims at comparing changes in the region of interest for 20 participants with iliotibial band syndrome and 20 healthy patients. To do this, we have developed novel shape analysis techniques which allow us to quantify and characterize minute shape changes of MR images. These techniques will be employed to examine the subcutaneous region near the tape application in order to determine if the changes are in accordance with the claimed benefits. We will present the novel methods and preliminary results of the efficacy of Kinesio Tape.

Mentor: Dr. Yuriy Mileyko
Seeking Angkor’s Elites: Roof Tiles and Residence from the 9th through 15th Centuries in Northwest Cambodia

Seeking Angkor’s Elites: Roof tiles and Residence is the research that was conducted in Northwest Cambodia in Summer 2014 to document and compare variability of roof tiles. The research was done under the direction of Professor Miriam Stark. Spring 2014 I did library research that my mentors and the co mentor; Assistant Professor Paul Lavy suggested. According to the 13th century journal of Zhou Daguan, notes the roofs of the royal family shrine are tiled, while the other parts of the house are thatched. It leads to questions of how were these rooftiles used? Does their recovery indicate that elites lived in these areas? Might rooftiles have been used on structures other than elite residence and temples?

I spent times looking for answers by observing at the archaeological sites around Siem Reap that have remnant of wooden structure and bas-relief. I went to museums and kiln sites to learn about rooftiles making method. I studied rooftiles that were stored at Angkor conservation, measuring, photographing 45 of rooftiles, sketching, inventorying and sorting them into groups. I also had chances to participate in excavations that took place in Ta Prohm temple and Tamol Chul under advice of Chhay Rachna; a Khmer ceramic specialist.

Solid conclusion cannot be made since there is not enough evidences, whether rooftiles were used for only elites as Zhou Daguan had mention or they were used in general area; Market, as depicted on the Bayon bas-relief. According from the research I have done the bas-relief is a state propaganda.

Mentor: Dr. Miriam Stark
'Small Kine' Manipulations of Deep Sea Bacteria

Techniques to investigate *in situ* activities of bacteria in the environment usually consider microbial communities as a whole. Their data reflect the mean response of the community, and say little if anything of individual cells. This project applied a modification of ‘traditional’ cultivation techniques to grow heterotrophic bacteria in multi-well plates from small volumes of deep seawater collected north of Oahu, and laser catapult-microdissection (LCM) to collect single bacterial cells from the same water for genomic work. Bacteria cultivated in the different media were tentatively identified through sequencing of their 16S rRNA genes. Most of the resulting 86 pure cultures affiliated with known species in 18 genera. However, three appear to be novel species. Genomes of single cells collected by LCM were partially amplified. Sequencing of the 16S rRNA gene in each product enabled taxonomic assignment of the source cell. This approach has never been attempted with single cells of deep-sea bacteria. This study aimed to determine the feasibility of applying the technique to non-clinical bacterial cells, for which the technique was developed. If successful, this approach may provide insights into gene expression in individual bacterial cells in the ocean, and bring another approach to the study of bacterial activities in the environment.

Mentor: Dr. Stuart Donachie
Oddity Learning in Honeybees With Pattern Stimuli

The oddity problem was used to study same-different concept learning in honeybees. In the basic task, a set of three stimuli is presented, two identical and one “odd,” with choice of the odd stimulus rewarded. In previous experiments using colors as the stimuli, honeybees were able to solve oddity problems. In order to explore the generality of those findings, black and white geometric patterns were used in this series of experiments. Freely-flying honeybees were trained to visit a laboratory window where choice of the correct pattern was rewarded with sucrose and choice of an incorrect pattern was punished with stevia solution. In Experiment 1, one group of bees was trained to discriminate between a stripe and a circle pattern, and a second group was trained to discriminate two different circle patterns. Both groups were able to discriminate the patterns. In Experiment 2, honeybees were trained in an oddity task with the stripe and circle patterns. The bees had trials with two identical circle patterns and one stripe pattern intermixed with trials with two identical stripe patterns and one circle pattern, with choice of the odd pattern always rewarded. The bees learned to choose the odd pattern. In Experiment 3, honeybees were trained exactly as in Experiment 2, except that two different circle patterns were used. Again, the bees learned to choose the odd pattern. These results, along with those for colors, provide strong evidence of conceptual learning in honeybees and raise questions about the mechanisms of such complex learning.

Keywords: honeybees, concept, learning, oddity, same-different

Mentor: Dr. Patricia Couvillon
Design and Integration of a Feedback-Control Algorithm for an Autonomous Path-Following Space Mining Rover System

When considering Mars as a possible location for life in near future, it will be compulsory to collect surface samples in order to ascertain the feasibility of this goal, and utilize surface mining for in-situ resource utilization (ISRU). Such purposes impose the need for robots that can perform such tasks as traversing, collecting, and depositing regolith. My research specifically considered the control of a wheeled mobile robot (WMR) capable of autonomously traversing unknown terrain.

The nonholonomic differential-drive wheeled robot was composed of a fibre-reinforced plastic (FRP) Unistrut chassis, an actuator controlled shovel-type collector, and a pivoting deposit bin. Brushed DC motors were used as actuators on the rover. The dynamics and kinematics of the robotic system were modeled and simulated using MATLAB to develop feedback tracking control laws that allow the rover to move to a desired position while avoiding obstacles. Hardware-in-the-loop simulation was used in the development of the control algorithm.

The control algorithm was physically implemented using a single-board microprocessor, the Beaglebone Black, interfaced to an Arduino microcontroller, and motion sensors. Accurate odometry was critical for closed-loop control as it was used to estimate the rover’s position from motion sensor data. Visual sensors were implemented for obstacle avoidance.

The entire robotic system is expected to be tested at the Pacific International Space Center for Exploration System (PISCES) analogue test site on the Big Island, Hawai‘i, at the 2015 annual PISCES Robotic International Space Mining competition.

Mentor: Dr. Peter Berkelman
Island plant-herbivore interactions are poorly understood and have been predicted to be of low ecological significance due to absence of some herbivore guilds on islands (such as grazing mammals). In Hawaii, the relationship between the native koa tree (*Acacia heterophylla koa*, Fabaceae) and the specialist endemic herbivore, the koa looper moth (*Scotorythra paludicola*, Geometridae), offers a unique opportunity to investigate a native island plant-herbivore interaction. Furthermore, because this pair co-occurs throughout the archipelago, it is possible to examine whether the intensity or nature of the interaction varies among islands, as predicted by the geographic mosaic of coevolution. To test geographic variation, we conducted a lab experiment rearing *S. paludicola* caterpillars on mature phyllodes collected from *A. heterophylla koa* on three different Hawaiian islands, Big Island, Maui, and Oahu. We measured three components of caterpillar performance (survival, days to pupation, and pupal weight) to assess whether caterpillar performance varied in response to the island source of leaves. In addition to this bioassay, we also quantified several leaf traits that are predicted to affect herbivore preference and performance, including leaf toughness (leaf mass per area), nutrient status (inferred from chlorophyll and photosynthetic performance), and tested whether any of these putative resistance traits correlated with caterpillar performance. We found that caterpillars had the highest survival rate on Maui phyllodes, followed by Oahu and Big Island. Additionally, we found that *S. paludicola* caterpillars reared on phyllodes from Oahu took the longest on average to pupate, followed by Big Island and then Maui.

Mentor: Dr. Kasey Barton
Abigail Alabanza Sy
Public Health
Proposal in Social Sciences
Participation for Honors
Oral Presentation: 10:45a in C102

Underrepresented Ethnicities in the Physician Workforce: Filipinos in Hawaii

It is widely known that patients of minority ethnic groups are more comfortable and willing to seek medical help from healthcare providers of the same ethnicity. Unfortunately, there is an increasing health disparity between minority healthcare consumers and providers. Without the presence of minorities in the upcoming medical workforce and insufficient intervention to attract and attain minority students to the medical field, this dire health disparity gap will only worsen.

Filipinos are the largest ethnic group in Hawaii and Filipino-Americans are the second largest ethnic group in America; however, Filipinos still remain a small percentage of the population of medical students and medical doctors. Filipino patients have emphasized the importance of culturally-sensitive care, with recommendations of increasing Filipino representation in health professions. Many young Filipinos dream of becoming medical doctors, yet only a small portion actually succeeds in completing the educational path.

This study is designed to investigate the challenges, motivations, and pressures of Filipino students in high school, college, and medical school. This study is a stepping-stone to help empower Filipino students by exploring future endeavors that will help guide them on their path to a successful career in medicine. These endeavors include but are not limited to providing support from outreach educational organizations and connecting Filipino students with Filipino physicians in order to enhance and/or initiate medical mentorship programs.

Mentor: Dr. Denise Nelson-Hurwitz
Importance of Biochar Ash Contributions to Corn Growth in a Highly Acidic Infertile Hawaiian Soil

Biochar is a renewable material that can be used to improve soil fertility and productivity, but due to its complex nature its performance is difficult to predict. The ash component of biochar has been proposed as the primary source of nutrients for plant growth and liming to correct soil acidity. The primary research question addressed: What is the importance of ash contributions to plant growth? To evaluate this we looked at removing the ash component through hot water and acid/base extractions, comparing deashed to untreated biochar additions’ effect on plant growth. Five biochars with varying ash amounts were chosen; eucalyptus flash carbonization (1.5%), wood chip (2.3%), eucalyptus kiln (2.9%), anaerobic digester (14.2%), and sewage sludge (61.2%). The acid/base extraction removed ash more effectively than hot water bath with 31% to 91% more ash being removed. To test the effect of deashing on plant growth, a greenhouse bioassay was installed with untreated and deashed biochars (five treatments each) with and without a fertilizer application. Biochar additions were made on a 2% wt/wt basis to an acidic, infertile Oxisol with 4 replicates per treatment, for a total of 136 experimental units. Corn seedlings were allowed to grow for 4 weeks. Ash content proved to have the highest impact on plant growth with anaerobic digester and sewage sludge biochar resulting in higher dry weight than the low ash biochars regardless of extraction method. Additional results will be presented on biochars effect on soil fertility and plant nutrient uptake.

Mentor: Dr. Jonathan Deenik
Insights into Hawaii’s Prehistoric Climate based on Carbon Isotope Analysis of Native Land Snail Shells

Terrestrial shells may hold crucial signals evidence concerning past environmental, ecological and evolutionary profiles locally and globally. Research focusing on isotopic analyses of terrestrial snail shells is proving to be informative for inference of past global temperature regimes (Pigati et al., 2010). Carbon-12/13 values are higher in (Carbon fixation) C-3 plants than they are in C-4 plants due to the unique carbon fixation mechanisms of each type of plant. By measuring the C-12/13 ratio, the results can be correlated known parameters for each type of plant (O'Leary, 1988). Carbon-14 is an unstable carbon isotope which has a half-life of roughly 5600 years. Therefore, objects containing carbon-14 can be dated back to about 50,000 years with high confidence based on fixed number of half-life cycles for carbon-14 (Kitzler et al., 2012). In recent decades, up to 90% of the land snail species in Hawaii have gone extinct (Cowie et al., 1995) and range reductions and ecological services have been equally devastated (Holland, 2009). We propose to collect Hawaiian snail shell samplings from a number of sites across Hawaii. The stratum core or soil layers will be stratigraphic analyzed for paleo-geographical age. This procedure allow for a cross reference between the ages of the soil core or stratum layer in order to validate age range of snail shells. The analysis is predicted to not only provide information about environmental conditions at specific time periods but also conditions of the ecological systems (Zaarur et al., 2011).

Mentor: Ryan Longman
Effects of Health Literacy on Cardiovascular Disease in Chinese Americans

As the leading cause of death in America, cardiovascular disease (CVD) is a chronic illness that especially plagues minority groups across the country due to health disparities such as lack of education and socioeconomic status. Hawaii’s population is constituted by a variety of ethnicities, which promote a rich cultural diversity. Health disparities often arise when the needs of minority groups are not met. Having higher health literacy can improve health status and quality of life by preventing risk factors that may lead to negative health outcomes. These risk factors that lead to CVD range from genetics to lifestyle components. Preventative CVD measures typically arise from implementing a series of lifestyle changes, such as eating a nutritious diet, exercising daily, and reducing stress.

This project takes a public health approach by analyzing health literacy and its effects on cardiovascular disease in population-based data with a goal of reducing health disparities in minority sub-populations. The sub-population of focus will be Chinese Americans due to their rapid population growth in America. The primary objective of this study is to provide researchers and health professionals with valuable insight towards reducing health disparities across different populations. Statistical analyses will be run on data taken from three governmental health surveys, two from Hawaii and one from California, which will then be formed into multivariate logistic models. Long-term goals of this study include improving the overall quality of health care and reducing cases of chronic and acute heart disease throughout Hawaii and eventually across the nation.

Mentor: Dr. Denise Nelson-Hurwitz
Screening for Kinases that are Essential for Preimplantation Development

Multiple molecular mechanisms are involved in blastocyst formation, but not all of them are known yet. The purpose of this study is to identify kinases that may be involved in the development of blastocysts. By identifying these kinase inhibitors, it is possible to determine the types of kinase that may play a role. If a blastocyst fails to properly form, there may be adverse effects on the embryo. For instance, if the inner cell mass fails to form, then there will be no body. Another example would be if the kinase inhibitor targets a kinase involved in cell division. This would result in an embryo not being able to get past the 8-16 cell stage and dying due to that. In order to study this problem, embryos were treated with different concentrations of 12 kinase inhibitors from the Enzo Kinase Inhibitor Library. As a result of the treatment with kinase inhibitors, phenotypes observed include cell division arrest, cell death, inhibition of cavity formation, and an increase in cell adhesion. The kinases that seem to be involved in blastocyst formation include MEK, P38 MAPK, PKA, Pan-specific, EGFRK, HER1-2, and EGFRK. Based on the phenotypes of the embryos, MEK, Pan-specific, and EGFRK seems to play a role in cell division, while kinases P38 MAPK, PKA, and HER 1-2 have a role in cavity formation.

Mentor: Dr. Vernadeth Alarcon
Peptide Constructs Derived from *P. falciparum* MSP1-33 Effect the Immunogenicity of MSP1-19

According to the WHO, 207 million cases of malaria occur annually, 627,000 of those resulting in death. There is no licensed malaria vaccine. Thus, the development of an effective vaccine remains a top priority for malaria control. The *P. falciparum* Merozoite Surface Protein 1 (MSP1) is a leading blood-stage malaria vaccine candidate. The MSP1 (195kDa) is proteolytically cleaved into four fragments, one being MSP1-42. This protein is further cleaved into 33kDa (MSP1-33) and 19kDa (MSP1-19) fragments. Anti-MSP1-19 antibodies are protective and have parasite inhibitory capability, but MSP1-19 alone is unable to induce broad immune responsiveness due to lack of T-helper epitopes. The MSP1-33 on the other hand, contains many T-helper epitopes that can potentially aid in MSP1-19-specific antibody production. However, studies have demonstrated positive and negative effects of certain regions of MSP1-33 on the production of anti-MSP1-19 antibodies. Previously, we identified three putative epitopes on MSP1-33 that may selectively enhance the quality of antibody response to MSP1-19. We hypothesize that peptides representing these epitopes linked to MSP1-19 either singly or in combination will have varying effects on the immunogenicity of MSP1-19. Accordingly, three new vaccines were made by linking these single epitopes to MSP1-19 and expressing them in a eukaryotic cell line. The ability of each of these vaccines to induce a response in outbred mice will be measured in terms of level of antibody production, vaccine responsiveness, and antibody-mediated parasite growth inhibition. These studies will hopefully lead to the development of a more effective MSP1-42-based human malaria vaccine.

Mentor: Dr. George Hui
Expression of Dengue Virus-Like Particles in Drosophila Cells as Vaccine Candidates

Dengue virus (DENV) belongs to the *Flaviviridae* family and four serotypes of DENV cause the most important arthropod-borne diseases found in the tropical areas of the world. It was recently reported that over 390 million people are newly infected each year with 25% apparent infections including dengue fever and potentially-fatal dengue hemorrhagic fever/dengue shock syndrome. There are currently no licensed dengue vaccines despite several live-attenuated tetravalent vaccine candidates undergoing clinical trials. One of the biggest challenges is the difficulty to achieve balanced immune responses against all four serotypes due to interserotype viral interference. Co-expression of the precursor membrane (prM) and envelope (E) proteins of DENV can form virus-like particles (VLPs), which are antigenically similar to DENV and have potential as vaccine candidates. The objective of this study is to express DENV VLPs in drosophila S2 cells and use them as vaccine candidates. The first aim is to express VLPs of four serotypes in S2 cells; the second aim is to test the immunogenicity of VLPs. To accomplish this, the prM and E genes of the four serotypes are cloned into the pMT vector in the absence or presence of the furin gene (to increase maturation of VLPs), and then amplified in *E. coli* cells. The S2 cells will be transfected with each construct to establish S2 clones stably expressing VLPs, which will be used to immunize C57BL/6J mice. The sera will be collected pre and post-immunization and be tested for binding and neutralizing antibodies to determine the immunogenicity of VLPs.

Mentor: Dr. Wei-Kung Wang
American History through the Board Games of the Gilded Age

The board games we enjoy today possess one of the most interesting yet complex histories. The golden age of these board games can be traced back to the Gilded Age, a period of economic and cultural change in America following the Civil War. It is a period of political development, geographical expansion, and cultural dynamism. Rapid urbanization and industrialization allowed labor opportunities and business pursuits that contributed much to the country’s economic prosperity. However, these glorified achievements thinly disguised the country’s struggle with corruption and social inequalities. This study investigates how Gilded Age boarded games reflect the existing knowledge on one of the country’s most illusrious periods. Analyzing the various aspects revolving around the world of board games reveals the historical significance of these games, from their makers’ history mirroring to the success of stories of business tycoons of the time period to the games’ distribution reflecting the evolving nature of businesses. More than just a symbol of leisure, board games from the Gilded Age offer a fascinating window to the moral, cultural, and political ideologies of the Americans at the turn of the century.

Mentor: Dr. James Kraft
Potential probiotic bacteria *Pseudoalteromonas rubra* can protect the coral *Montipora capitata* from infection by pathogen *Vibrio coralliilyticus* strain OCN 008

Coral reefs are among the most diverse and productive ecosystems in the ocean. Unfortunately they are being threatened by a number of coral diseases caused by bacterial infections. It has been hypothesized that some species of bacteria on healthy coral can act as probiotics by protecting their host from bacterial pathogens. This project will investigate a potential probiotic *Pseudoalteromonas rubra*, and its coral host *Montipora capitata*, a major reef building coral in Kāneʻohe Bay. When *M. capitata* fragments are exposed to cultures of *P. rubra*, they are more resistant to infection by the pathogenic bacterium *Vibrio coralliilyticus*. This pathogen causes *Montipora* White Syndrome, a devastating tissue loss disease. The proposed project will focus on the colonization of *M. capitata* by *P. rubra* and the production of antibiotic compounds by *P. rubra*. By investigating the following questions: (1) How many bacterial cells of *P. rubra* colonize the mucus of *M. capitata*? (2) How long does colonization take and how long will *P. rubra* stay on the mucus of *M. capitata*? (3) What gene or genes are responsible for the antimicrobial activity of *P. rubra*? Studying coral probiotics can lead to a better understanding of coral disease dynamics and consequentially aid in identifying factors that influence infection.

Mentor: Dr. Sean Callahan
Health, Fitness, and Academic Achievement in Hawaii schools

Research has shown that children who are physically active have higher grades, increased school attendance, increased cognitive performance, and better classroom behaviors. Due to this research, the entire project will consist of many different tasks. The first would be to bring this information to the legislators and increase their awareness of the health status of youth and to help incorporate better health programs in schools. Second, a “How to Guide” will be created with the help of Department of Health and Education representatives for physical education teachers to use in their classes to conduct fitness tests. The “How to Guide” will include assessments recommended, proper techniques, and targets for healthy fitness zones. An informal script will also be made for teachers as an aid to better encourage their students about their individual fitness scores. Lastly, a few District-wide Elementary Fitness Meets will be attended to have a clearer idea of how the fitness tests are conducted. The final long term goal of this project is to have the youth of today grow up to be healthy individuals, having learned how important it is to stay active throughout their childhood.

Mentor: Dr. Denise Nelson-Hurwitz
Diabetes Awareness and Prevention Among at Risk Adults in Nanchang, China

Type 2 diabetes rates in China are raising at an alarming rate as physical activity is declining and obesity rates are raising. Several large epidemiological studies have shown that the increase of type 2 diabetes in China has reached epidemic proportions and it will continue to increase unless it is addressed rapidly and effectively. As China continues to evolve and develop, it is crucial to understand what is stimulating the increase in obesity, in order to implement intervention programs for diseases like diabetes, which are strongly associated with obesity. The purpose of this project, that will include collaboration with the Nanchang University to collect data, is to understand the knowledge of diabetes and willingness to modify behaviors to prevent diabetes, in the population at risk of developing diabetes. A cross-sectional survey will be conducted in five locations in Nanchang, China in the summer of 2015 using face-to-face, anonymous questionnaires. This study aims to look at the correlation between the knowledge of diabetes and the willingness of at risk adults to modify their behavior to prolong or prevent the onset of diabetes. By identifying individuals at risk for diabetes and evaluating their attitudes towards behavior modifications aimed at preventing diabetes, the most appropriate and effect route of intervention can be identified. Based on the response to behavior modification appropriate intervention and prevention measures can be implemented. This project aims to identify an adequate approach to reduce the increase of diabetes in China.

Mentor: Dr. Denise Nelson-Hurwitz
Expression of Recombinant Human Apoferritin in Escherichia Coli

Ferritin, an iron storage protein, has the potential to be developed into a magnetic resonance imaging contrast agent to noninvasively detect deterioration in the glomerular basement membrane, a symptom of kidney diseases. Further research is needed to assess the toxicity of ferritin nanoparticles in humans and determine how to target other basement membranes in the body using ferritin. A cost-effective means of obtaining the human variant of this protein is necessary for its development as an MRI contrast agent. Obtaining human apoferritin rather than animal ferritin is necessary to lessen incompatibility issues with the human immune system. This project proposes to develop a protocol for the expression and production of human apoferritin in *Escherichia coli* by recombinant DNA techniques for diagnostic purposes. The expression of eukaryotic proteins in *E. coli* is very challenging. No universally applicable protocol exists for the correct folding of eukaryotic proteins in an *E. coli* host. Systematic analytical tests for growth variables such as temperature and media composition will be conducted to determine the best method for the expression of human apoferritin. Following development and confirmation of an expression protocol, purification and functional tests will be done on the produced apoferritin. Production of human apoferritin will then be scaled up for quantitative purification.

Mentor: Dr. Heinz Gert de Couet
Changes in Japan's Trade Policy: Has Japan Jumped on the Bandwagon of Bilateralism

Since its reopening to the rest of the world in 1868, Japan’s economy and trade policy has continued to evolve. In less than 50 years Japan has propelled itself to becoming the world’s 3rd largest economy. Japan’s trade policy like the state of its economy has changed as well.

The formation of free trade agreements (FTAs) is a relatively new phenomenon worldwide; however, since the early 1990s the number of free trade agreements has skyrocketed. Despite their popularity worldwide, FTAs were almost nonexistent in Asia until the formation of the Japan-Singapore FTA (JSEPA) in 2002. Using a qualitative choice model this paper attempts to identify the economic and political factors that determine the formation of FTAs in the case of Japan.

Mentor: Dr. Baybars Karacaovali
Cyanobacterial Biodiversity in Hawaiian Freshwater Streams

Cyanobacteria, organisms with roots back as far as 3.5 bya, are unicellular or colonial prokaryotes known as Earth’s earliest terra-formers. They now function as nutrient cyclers and foundations of marine, aquatic, and terrestrial ecosystem food webs. Today, the combination of global warming, anthropogenic activity, and invasive species threatens biodiversity, exerting pressures to study the changing Hawaiian landscape before it disappears. Algae collection on Oahu in the past has demonstrated a wide variety of freshwater algae including cyanobacteria, diatoms, green, and red algae. My research focuses on cyanobacterial communities within three Hawaiian streams in the Ko’olau watershed region on the windward side of Oahu. Samples are being collected along an elevational gradient from randomly selected transects. Data including pH, conductance, and temperature are being taken for each stream site. Identification is being executed through a combination of microscopy and next generation sequencing. This data can potentially help to establish a baseline for cyanobacterial biodiversity within each stream. Comparisons both within and between stream sites may also answer questions about community composition, trophic water status, impacts from surrounding land usage, and create a more comprehensive database for Hawaiian algal diversity. Future studies are needed to better understand implications of shifts in these communities over time in response to environmental changes resulting from both anthropogenic activity and global warming.

Mentor: Dr. Alison Sherwood
Bioaccumulation of Microplastics in the Marine Food Web

Many studies have focused on what microplastics are, how they end up in the ocean, and what harmful affects they have on the organisms and ecosystems around them. However, not many studies have been done on whether or not microplastics bioaccumulate in the marine environment. The goals of this project is to provide a better understanding of microplastic presence locally, as well as the feeding preferences of planktonic and higher trophic organisms in exploration of the possibility of bioaccumulation and magnification. There are two parts to the study: collecting and identifying planktonic organisms that have ingested microplastics as well as viewing higher trophic levels of organisms found in the same environment. Microplastics and organisms will be collected from Palolo Valley stream, the Alawai Canal, and Kewalo Harbor in attempt to compare these three sites for correlations in microplastic accumulation both between the sites and throughout the individual site’s food web. Fluorescent microscopy will then be used to detect the plastics in the water column as well as those ingested by collected planktonic organisms. In collaboration with Trees to Seas nonprofit organization, the results from this project will be presented to the Palolo Valley community and public schools, as well as at the Honors Symposium at the University of Hawaii at Manoa.

Mentor: Dr. Karen Selph
Imagining Oneself as Another: Autism and the Problem of Other Minds

The primary focus of my Honors thesis has been on a number of problems that Autism presents to the philosophies of mind and language. However, before any such analysis of these problems can take place, it is necessary to pin down what, exactly, is meant and understood by ‘autism’. What are the constraints and criteria of the diagnosis? What type of definition should a diagnosis be? Stipulative or of a Word-Thing (e.g. object in reality)? What are the background features that influence the common understanding of the definition?

This presentation focuses on the first chapter of the thesis, which focuses upon these issues. I will begin by analyzing the exact type of definition that a diagnosis should be. Proceeding from this, I will choose between the two major competing definitions that fulfill these requirements, that of the American Medical Association’s (and DSM-V backed and recognized) and Great Britain’s the National Autism Society definition (which, admittedly, is the one used by most researchers). This will include examining the strength of the various criteria. After the choice is made, I will proceed to investigate the background influence of medicine and language on the way we think about autism’s diagnosis and psychopathologies in general. I will conclude by raising a few questions about the normative descriptions of psychopathologies and whether or not all these normative features are necessary.

Mentor: Dr. Arindam Chakrabarti
Analyzing Groundwater and Algal Distribution in Maunalua Bay using GIS software.

Algal populations can be positively or negatively affected by increased nutrients. One source of these nutrients can be groundwater. The distribution of algae was mapped for Maunalua Bay, Oahu, Hawaii for comparison to the distribution of nutrient delivery to the system. In this study, data collected on algal distribution at two sites within the bay, Black Point and Wailupe were mapped using GIS. These maps were compared to maps of indicators of groundwater input to determine if groundwater impacts the distribution of algal species.

Mentor: Dr. Florence Thomas
Genetically Encoded Fluorescent Bio-sensors for Rapid Analysis of Protein Processing in Plants

Globally important crop biotechnology had an estimated world market of $15 billion dollars in 2012. Trait/gene stacking has become an essential tool in crop biotechnology. Conventional methods of trait stacking are incredibly tedious and time consuming. In order to develop quicker and more precise methods of gene expression, we created an assay to test the efficiency of self-cleaving polyprotein vectors. This assay aims to quickly determine the polyprotein cleavage efficiency. In the polyprotein constructs tested in this study, an intein and a "2A" sequence were linked and sandwiched between a green fluorescent protein (GFP) and a Gaussia luciferase. Active intein and 2A lead to autocatalytic release of GFP and luciferase, respectively. Together, the intein and 2A peptide create the auto-excising domain (AED). The efficiency of cleavage was tested using a positive and negative control. The positive control would have the AED fully excised after translation, in contrast to the negative control, where the 2A peptide would not cleave. The expected results were that GFP would be expressed and secreted by the transected protoplasts, whereas luciferase would be secreted into the supernatant depending on 2A cleavage. The localization of these translated proteins indicate how successful the particular AED was. The results of our experimentation showed that the transfection expression levels of the polyprotein sensor constructs were too low to accurately detect bioluminescence or fluorescence secreted into the protoplast supernatant. However, in *Arabidopsis* protoplasts transfected with a vector containing only Gaussia luciferase, we were able to detect luminescence in the spent media.

Mentor: Dr. Winston Su
Coalition Formation with Multiple Incentive Pots

We study the behaviors of individuals who form groups in order to cumulate power to win incentives. Individuals are given an arbitrary power and must form coalitions in multiple successive game rounds with multiple incentive pots of varying and decreasing value. Individual powers are additive in a coalition and must be large enough in order to overcome the collective powers of other coalitions that may form. All individuals have the option to form, join, or not join a coalition presented by either themselves or other agents in a given round. A pot in a later round may yield a higher payout for a certain agent if that agent does not need to share it with other agents, exposing a high level of strategy for each individual playing the game. We present several different theoretical scenarios using test groups of 3 individuals with predetermined powers and calculate the rational course of action for each individual based on their power. Generalized 3-agent models are presented. Additionally, scenarios of larger coalitions are also analyzed for the best courses of action. Focus is put on analyzing the differences in strategy that arises in differences in sharing type and incentive pot size.

Mentor: Dr. Ruben Juarez
Examining Student Perspectives of Learning Effectiveness in High Fidelity Simulation

High-Fidelity Simulation is defined as a representation of an actual event, which can be presented through different methods such as computer software, case studies, written scenarios, acting, or using manikins (Bearnson and Wiker, 2005). Simulation allows students to interact and participate in scenarios, gaining experience and the opportunity to practice in a mock clinical setting. In 2012, an $8 million simulation center opened at the University of Hawaii; with these resources now available in the field of nursing simulation, it is an opportune time to examine the effectiveness of simulation as a learning tool.

Participants in the study included nursing students with experience in simulation environments. Focus groups were conducted to explore students' perceptions of simulation learning. Focus group data was recorded, transcribed, and analyzed according to the Theory of Experiential Learning (Kolb, 1984).

Twenty-five nursing students were included in focus group discussions. Data from focus group sessions was analyzed and sorted into the 4 categories described by Kolb's theory. These phases include "Concrete-Experience," "Reflective-Observation," "Abstract-Conceptualization," and "Active-Experimentation." An overwhelming amount of data was categorized in the "Reflective-Observation," phase. This could have been influenced by the debriefing process that is performed immediately following simulation. While all categories were represented in the data, data clearly indicated that the phase of learning simulation addressed most often was the Reflective-Observation phase.

Overall, 88% of participants reported performing differently in clinical situations as a result of learned simulation learning. Participants reported that simulation activities directly applied to their actions in real life clinical experiences. This suggests that students perceive simulation to be an effective tool for learning.

Mentor: Dr. Estelle Codier
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