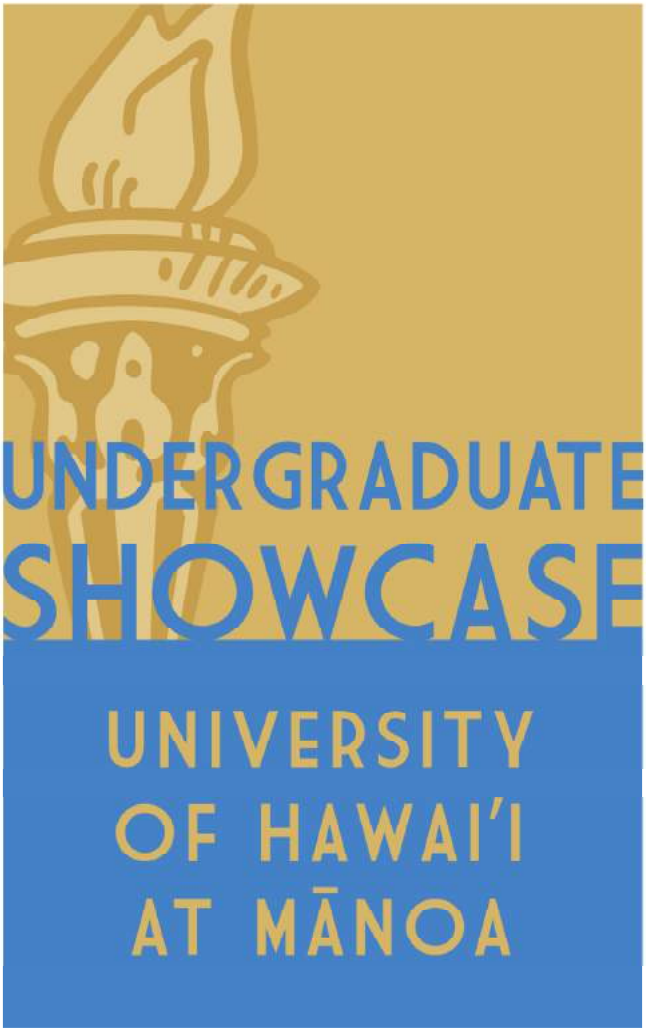


Undergraduate Research and Creative Work

5 May 2017 – 8:30am to 2:30pm
Sakamaki Hall
Campus Center Ballroom
Honolulu, Hawai'i

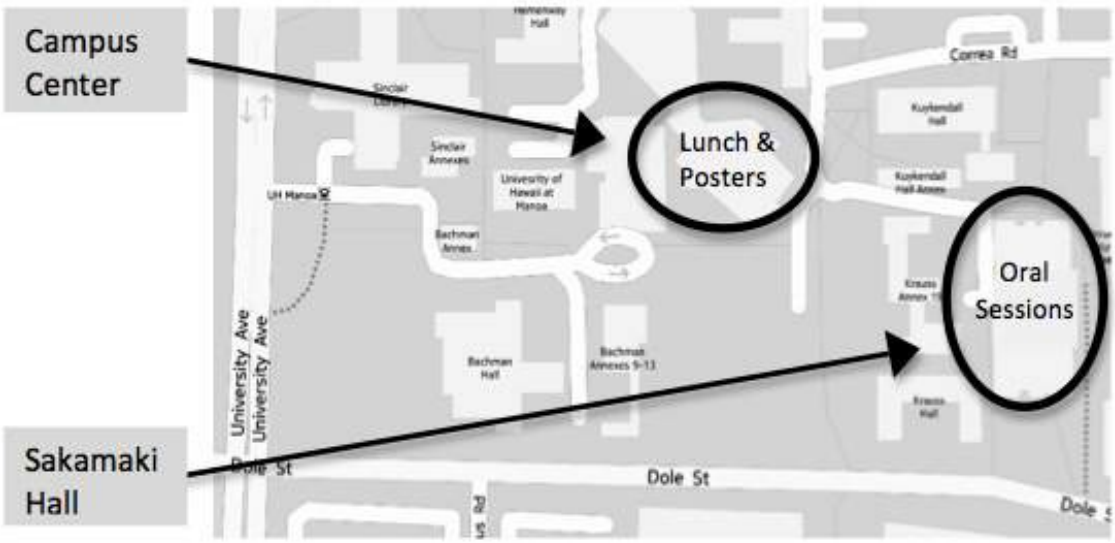
SCHEDULE

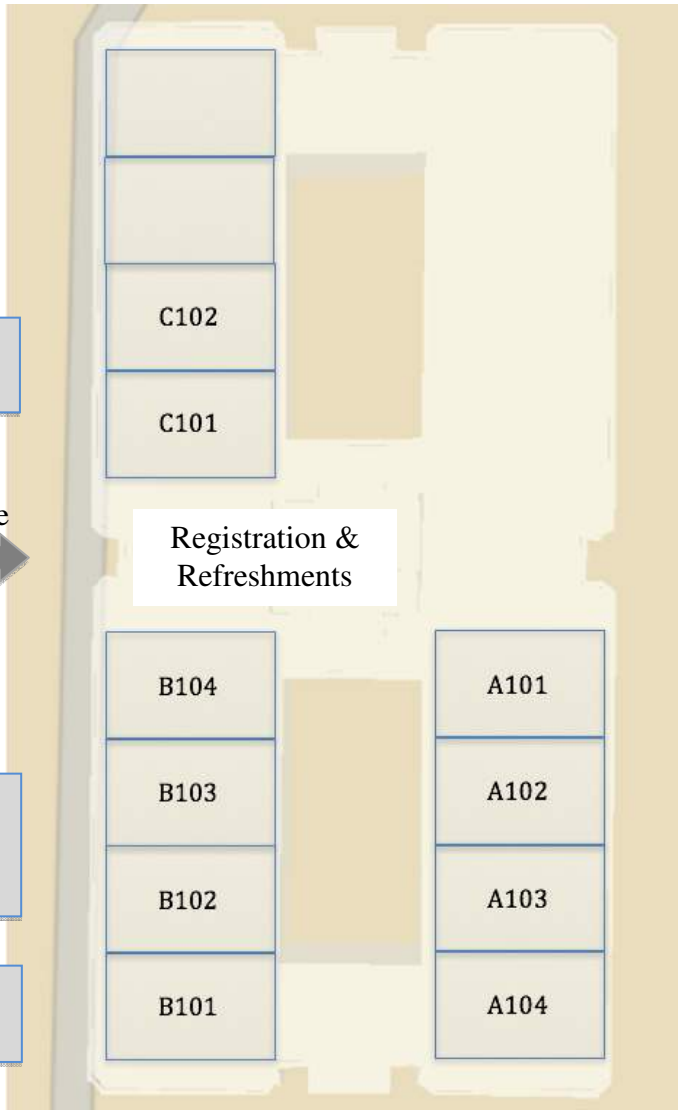
TIME	ACTIVITY	LOCATION
8:30-9:00a	Registration and Breakfast	Sakamaki First Floor
9:00-9:10a	Opening Ceremony	Sakamaki First Floor
9:15-10:05a	Oral Presentations Session One	Breakout Rooms
10:05-10:15a	Break	Courtyard
10:15-11:20a	Oral Presentations Session Two	Breakout Rooms
11:20-11:30a	Break	Courtyard
11:30a-12:20p	Oral Presentations Session Three	Breakout Rooms
12:30-1:30p	Lunch and Awards Ceremony	Campus Center Ballroom
1:30-2:30p	Poster Presentations Session	Campus Center Ballroom

SAKAMAKI HALL

CAMPUS CENTER

MAP
Sakamaki Hall & Campus Center





Social Sciences (C101-C102)

Engineering & Computer Sciences (B102-B103)

Arts & Humanities (B101)

Natural Sciences (A101-A104)

LOCATION

Sakamaki Hall

Oral Presentations Session One	9:15a - 10:05a
Oral Presentations Session Two	10:15a - 11:20a
Oral Presentations Session Three	11:30a – 12:20p

A101	Natural Sciences
A102	Natural Sciences
A103	Natural Sciences
A104	Natural Sciences
B101	Arts & Humanities – Creative and Research
B102	Engineering & Computer Sciences
B103	Engineering & Computer Sciences
C101	Social Sciences
C102	Social Sciences

Campus Center Ballroom

Lunch and Awards Ceremony	12:30 - 1:30p
Poster Presentations	1:30 - 2:30p

Oral Presentations Session One
9:15 - 10:05a

Sakamaki A101	**Natural Sciences**
Brent Wakuzawa	Reduction of Inhibitory Compounds Generated from High Pressure Treatment of *Gracilaria salicornia*
Casie Kubota, Marissa Kuwabara	Using X-ray Crystallography for Developing STAT3 Protein Structure
Eileen Chen, Nikki Rousslang	Screening Mutant Human Asparaginase-Producing *Escherichia coli* for the Production of Highly Active Human Asparaginases

Sakamaki A102	**Natural Sciences**
Mc Millan Nicol Ching*	Mimosine-Fe^{3+} Peptide Transporters in Leucaena and Common Bean
Sasha Canovali Anna Scheiner	Proteome Analysis of *Bacillus subtilis* with Expression of Ribosomal Protein Homologues
Janey Guo	Acetylation and Phosphorylation of Ribosomal Proteins in *Mycobacteria tuberculosis*

** next to name in schedule indicates student is also presenting a poster*

Oral Presentations Session One
9:15 - 10:05a

Sakamaki A103	**Natural Sciences**
Andrew S. Gerren	Effects of Varietal Diversity on Knowledge and Consumption of Kava (*Piper methysticum*) in the Pacific
Kristian McDonald, Alisha Summers	Beach Loss, Seawall Construction, and Land Use Patterns at Odds with Coastal Zone Policy - East Oʻahu, Hawaiʻi 1928-2015
Kenneth Choi*, Alexa Foster*	Creating a Lasting Community-Based Conservation Program for the Bahama Oriole (*Icterus northropi*), a Critically Endangered Species

Sakamaki B101	**Arts & Humanities - Creative**
Madisyn Uekawa*	*What I Chose*: Enhancing Suicide Prevention through Young Adult (YA) Fiction
Michelle Huynh	The Virtue in Propaganda

** next to name in schedule indicates student is also presenting a poster*

Oral Presentations Session One
9:15 - 10:05a

Sakamaki B102	**Engineering & Computer Sciences**
Chad Morrow*	Determine the Impact of Urban Storm Runoff from Chlordane and Dieldrin in the Manoa Stream
Curtis Frifeldt, Tamra Oyama, Jie Zhou	Stochastic Simulation of Nosocomial Disease Propagation

Sakamaki B103	**Engineering & Computer Sciences**
Noah Acosta, Kevin Kam	Flexible Graphene Transistors
Yosef Ben Gershom, Brialyn Onodera	Effects of Body Forces on Flow Boiling Heat Transfer in Micro-Channels through Dynamic Testing
Ricky Choi, Tayler Pave, Tien Tran, Taylor Viti	Ike-Wai Water-Monitoring Systems

** next to name in schedule indicates student is also presenting a poster*

Oral Presentations Session One
9:15 - 10:05a

Sakamaki C101	**Social Sciences**
Martine Leclerc*	The Effects of Gratitude on Cortisol Reactivity
Karolyn Lam*	Preventing Infant Deaths through Safe Sleep Education
Christopher D. Chow*	Promoting School-Based Hearing Screenings Among Hawai‘i’s Youth

Sakamaki C102	**Social Sciences**
Abundanzia Delavega	Importance of Sea Shell Data from Miloli‘i Valley on Kaua'i
Sarah Imanaka	Accounting for Climate Change
Christian Stegmann	Stone Soup: Plastiglomerate, The Anthropocene, and Recipes for Assembling the Geology of History on Kamilo Beach, Hawai'i 1805-2017

** next to name in schedule indicates student is also presenting a poster*

Oral Presentations Session Two
10:15 - 11:20a

Sakamaki A101	**Natural Sciences**
Shannon Kutscher	Effect of *Morinda citrifolia* (Noni) Juice on Hepatic Inflammation and Insulin Receptor Signaling in High-Fat Diet (HFD)-Fed Mice
Andrew Pham	The Role of Selenoprotein K on the Progression of Melanoma
Angelina Holcom	Extending Lifespan with Genetic Modification
Jenna Pak	Reduction of Tau Hyper-Phosphorylation via Selenoproteins

Sakamaki A102	**Natural Sciences**
Amy Chinen	Progress in Selective Hydrogenation: Reactivity Trends in PdAu Heterogeneous Catalysts & Developing Chiral Building Blocks for New Homogeneous Catalysts
Adora Klinestiver*	Exploration into Replacing the Salicylic Acid Portion of a STAT3 Inhibitor Molecule with Novel Heterocycles: Synthesis of a 5-fluoro-6-amino-*1H*-indazole Analog
Natalie Subia*	Searching Inhibitors of Mimosinase and Rhizomimosinase for Developing a Therapy for Iron Overload
Jason Dela Cruz	Analysis of Interleukin Protein, IL-37, for Anti-inflammatory Properties

** next to name in schedule indicates student is also presenting a poster*

Oral Presentations Session Two
10:15 - 11:20a

Sakamaki A103	**Natural Sciences**
Juliana Clark Leslie Hutchins	Mulching the Gardens of Lono
Micah Grumblis	Canoe Canes: Mutants and More
Katy Christensen	Mixing Variability of the Upper Layer in a Glacio-marine Fjord: Andvord Bay, Western Antarctica Peninsula
Elizabeth Dionne	Resolving Carbon Contributions in a Mangrove Estuary

Sakamaki A104	**Natural Sciences**
Justin Suitos	Genetic Comparison between Prince William Sound and Alaska Coastal Current Populations of a Zooplankton Species, the copepod *Neocalanus flemingeri*
Zachary Quinlan	Microbial Community Diversity of Coral in Kane'ohe Bay in Comparison to Organic Exudates
Andy Yu	*In silico* Identification of a Putative Circadian Clock in the Lobster *Homarus americanus* Cardiac Neuromuscular System
Jessica Sevilla	Disentangling the Species Abundance, Reproductive Mode(s), and Reproductive Timing of the Reef-Building Coral Species Complex *Pocillopora damicornis/acuta*

Oral Presentations Session Two
10:15 - 11:20a

Sakamaki B101	**Arts & Humanities – Creative & Research**
Angie Anderson	Grand Guignol: The Theatre of Horror, the Efficacy of Horrific Staging, and *When My Body Cried Out*
Brandy Dobson	A Murmur in the Weeds: A Memoir
Nicolette Smith	Spirituality in the Modern Woman
Jennifer Kakio	When the Biography Stops and the Fiction Begins: The Ethics Behind Charles J. Shields' And So It Goes: Kurt Vonnegut: A Life

Sakamaki B102	**Engineering & Computer Sciences**
Kazuo White*	Creating a Weakness Corpus to Support Proactive Cyber Security
Rodel Edra, Cherline Galacgac, Keanu Kim, Takato Mitsuda, Robert Ramos	Design and Development of Carbon Fiber Composite Reinforced Panels for Formula Racing Car
Ziad Alexander, Nikolai Herrera, Michael Howard, Gavin Nall, Daryl Patlingrao, Travis Scott, Naftali Tolibas	Design and Fabrication of an OSLS Electric All-Terrain Vehicle

** next to name in schedule indicates student is also presenting a poster*

Oral Presentations Session Two
10:15 - 11:20a

Sakamaki B103	**Engineering & Computer Sciences**
Noah Higa	Practical Enumeration of Task Clustering Options in Scientific Workflows
Kari Noe	3D Scanning in the Field: Developing a Visualization System for Archaeological Artifacts
Vanessa Banogon, Bryson Clemente, Eric Guyett, Raquel Kamalu, Nathaniel Lizama, Joshua Lui-Kwan, Kristen Monico, David Todd, David Yoshimoto	Design, Construction, and Implementation of an In-Water Coral Reef Nursery

Sakamaki C101	**Social Sciences**
Gerardo Ávila Jr.*	How Exposure Length to Faces Affects Facial Recognition
Dejah Fa'asoa*	Cultural Competency in Prenatal Care Among Pacific Island Women in Hawai'i
Lucia P. Amore*	Identifying Perceived Barriers and Enablers of Healthy Eating in College Students in Hawai'i: a Qualitative Study Using Focus Groups

** next to name in schedule indicates student is also presenting a poster*

Oral Presentations Session Two
10:15 - 11:20a

Sakamaki C102	**Social Sciences**
Ai Kitanosono	Ethnic Differences of Perceptions toward Psychopaths
Landon Kozai	Life Satisfaction of Undergraduate Students: Extrinsic and Intrinsic Motivators
Ivana Skye Matson	Accommodation in Instant Messaging

Oral Presentations Session Three
11:30a - 12:20p

Sakamaki A101	**Natural Sciences**
Mayumi Fernandez	Partial Feminization of Adult Testes from Males Lacking Y Chromosome Originate from Impairment in Sex Determination During Fetal Development
Kramer Ichimura	Early Biomarkers of Hyperlipidemia of Healthy Individuals
Kadee-Kalia Tamashiro	Examining Molecular Pathways of Urothelial Cell Differentiation Using a Novel Ex-vivo Ureter Explant Model

Sakamaki A102	**Natural Sciences**
Sai Furukawa	Influence of Chemosensory Perception on Male Fertility
Anthony Chen	Investigating Differences in Substrate Binding in *B. subtilis* BioA via Site Directed Mutagenesis
Diana Z. Holden	LRRK2 Kinase Inhibitors as a Potential Drug Therapy for Parkinson's Disease

Oral Presentations Session Three
11:30a - 12:20p

Sakamaki A103	**Natural Sciences**
Mark Anthony Pascua	Recovering the Genetics of Endangered Tree Snails with DNA from Old Ground Shells
Eric Welch	Groundwater Modeling in Pesticide Fluxes of the Faga`alu Stream, American Samoa
Kina Poulos	A Study of Immune Responses to Dengue Virus in a Naïve Population

Sakamaki A104	**Natural Sciences**
Tommy Lam	Design of Charge Focusing Lens for a Time Projection Chamber
Aleca Borsuk	Optical Properties of Marine Plant Tissues for the Chlorophyte, *Codium edule*
Marielle Dela Cruz	Analyzing Cometary Dust Tails Using Finson-Probstein Modeling

Oral Presentations Session Three
11:30a - 12:20p

Sakamaki B101	**Arts & Humanities - Research**
Emily Ko	Henry George and *Progress and Poverty's* Contribution to the Rise of Socialism in the United States, 1870-1900
Miranda Kam	Masters of la Mode: Representations of Women in the French Fashion Press, 1785-99
Sydney Blanke	Linguistic Relativity in Action: A Comparison of Motion Perception in English and Russian Speakers

Sakamaki C101	**Social Sciences**
Eleanor Stock	Exploring Salutogenesis as a Concept of Health and Wellbeing in Nurses who Thrive Professionally
Hide Yee Ching Wu	Sexual and Reproductive Health Services via Indicators of Urinary Tract Infection and Contraceptive Care
Lindsey Wilbur	PE Teacher Concussion Awareness in Hawai‘i

Poster Presentations

1:30 - 2:30p - Campus Center Ballroom

Arts & Humanities

Madisyn Uekawa	*What I Chose*: Enhancing Suicide Prevention through Young Adult (YA) Fiction

Engineering & Computer Sciences

Chad Morrow	Determine the Impact of Urban Storm Runoff from Chlordane and Dieldrin in the Manoa Stream
Kazuo White	Creating a Weakness Corpus to Support Proactive Cyber Security

Poster Presentations

1:30 - 2:30p - Campus Center Ballroom

Natural Sciences

Andrew Chang	Cellular Effects and Anti-Inflammatory Properties of ‘Uhaloa, a Native Hawaiian Medicinal Plant
Mc Millan Nicol Ching	Mimosine-Fe^{3+} Peptide Transporters in Leucaena and Common Bean
Kenneth Choi, Alexa Foster	Creating a Lasting Community-Based Conservation Program for the Bahama Oriole (*Icterus northropi*), a Critically Endangered Species
Adora Klinestiver	Exploration into Replacing the Salicylic Acid Portion of a STAT3 Inhibitor Molecule with Novel Heterocycles: Synthesis of a 5-fluoro-6-amino-*1H*-indazole Analog
Ernest Sam Puletasi	Speciation of Non-tuberculosis *Mycobacterium* Isolated from Clinical Specimens of Patients with Suspected Tuberculosis Disease in Cameroon
Natalie Subia	Searching Inhibitors of Mimosinase and Rhizomimosinase for Developing a Therapy for Iron Overload
Elizabeth Winnicki	Exploring the Genetic Diversity of Hawaiian Sweet Potato

Poster Presentations

1:30 - 2:30p - Campus Center Ballroom

Social Sciences

Lucia P. Amore	Identifying Perceived Barriers and Enablers of Healthy Eating in College Students in Hawai'i: a Qualitative Study Using Focus Groups
Gerardo Ávila Jr.	How Exposure Length to Faces Affects Facial Recognition
Christopher D. Chow	Promoting School-Based Hearing Screenings Among Hawai'i's Youth
Dejah Fa'asoa	Cultural Competency in Prenatal Care Among Pacific Island Women in Hawai'i
Karolyn Lam	Preventing Infant Deaths through Safe Sleep Education
Martine Leclerc	The Effects of Gratitude on Cortisol Reactivity

ABSTRACTS

Abstracts of oral and poster presentations are listed in alphabetical order of presenter's last name. Information below the name includes the student's major, the category of their presentation, and time/location of presentation. The faculty mentor, if appropriate, is listed below the abstract.

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

Noah Acosta, Kevin Kam
Ziad Alexander, Nikolai Herrera, Michael Howard, Gavin Nall, Daryl Patlingrao, Travis Scott, Naftali Tolibas
Vanessa Banogon, Bryson Clemente, Eric Guyett, Raquel Kamalu, Nathanial Lizama, Joshua Lui-Kwan, Kristen Monico, David Todd, David Yoshimoto
Sasha Canovali, Anna Scheiner
Yosef Ben Gershom, Brialyn Onodera
Eileen Chen, Nikki Rousslang
Kenneth Choi, Alexa Foster
Ricky Choi, Tayler Pave, Tien Tran, Taylor Viti
Rodel Edra, Cherline Galacgac, Keanu Kim, Takato Mitsuda, Robert Ramos
Curtis Frifeldt, Tamra Oyama, Jie Zhou
Casie Kubota, Marissa Kuwabara
Kristian McDonald, Alisha Summers

Abstracts are direct from presenters; wording and content are the author's responsibility.

Noah Acosta, Electrical Engineering
Kevin Kam, Electrical Engineering
Engineering & Computer Sciences
Participation for UROP
Oral Presentation: Session 1 (9:15-10:05a) in Sakamaki B103

Flexible Graphene Transistors

Due to graphene's recent rise in the field of two-dimensional (2D) solid-state devices, it has become a material of interest for high-performance sensors. Our project focuses on the implementation of graphene, a 2D carbon material, onto a flexible graphene field-effect transistor (FET). Due to its tunable energy band capabilities and remarkable carrier mobility, graphene has become a widely-researched material for low frequency devices. In conjunction with a liquid metal known as Gallium-Indium-Tin (Galinstan), ohmic contacts will be made and will serve as the gate, source, and drain electrodes for our FETs. In addition to graphene's electrical properties, its performance under strain makes it an excellent candidate for flexible transistor devices. To realize these transistors, extensive microelectronic device testing and fabrication methods are utilized. These devices will be made by carefully injecting liquid metal onto graphene to form electrodes. After the fabrication process, a semiconductor parameter analyzer will be utilized to characterize these devices. Current-Voltage curves, Capacitance-Voltage curves, and other various device parameter tests will be generated for our designed FETs. This data will be useful in showing the performance of our transistors relative to the currently fabricated devices. This research will provide novel methods for the design, fabrication, and testing of flexible graphene FETs. Our findings may have an impact on current transistors as well as on the future of sensor technology.

Mentor: Dr. David Garmire

Ziad Alexander, Mechanical Engineering
Nikolai Herrera, Mechanical Engineering
Michael Howard, Mechanical Engineering
Gavin Nall, Mechanical Engineering
Daryl Patlingrao, Mechanical Engineering
Travis Scott, Mechanical Engineering
Naftali Tolibas, Mechanical Engineering
Engineering & Computer Sciences
Participation for UROP
Oral Presentation: Session 2 (10:15-11:20a) in Sakamaki B102

Design and Fabrication of an OSLS Electric All-Terrain Vehicle

According to the Ocean Safety and Lifeguard Services Division (OSLS), lifeguards provide services for 198 miles of Oahu's coastline. The average lifetime of the current ATV being used by the lifeguards is about two years. This is due to high exposure to UV rays, pelting sand, salt water, and high humidity that corrode the frames. Emissions and noise from the engine pollute the air, and leaking oil causes harm to Hawaiian wildlife. To improve on this, an electric ATV will be designed and manufactured. This new type of ATV will address all of the problems above through exploration of non-corrosive materials, insulated materials to prevent object penetration, newly designed thermal cooling systems for the batteries and motor, as well as adapt charging with renewable energy.

Senior design team "eATV," department of mechanical engineering, has dedicated the year long class to research common problems experienced by the OSLS and C&C of Hawaii arising from ATVs. Over the course of the academic year, an electric ATV will be designed, optimized and fabricated; through unification of subsystems. Such systems include: 1. mainframe, supports, and mounting surfaces optimized to reduce and/or eliminate corrosion, the leading problem in "vehicle retirement." 2. Weatherproofing, in such ways to avoid damage to electrical components via corrosive marine environments, and obtain IP/IPx element rating of 55.
3. Cooling systems to ensure longevity of vehicle and its' components, by protection from thermal damage. 4. Renewable energy charging to refuel the batteries without contributing towards greenhouse gases.

Mentor: Dr. Lloyd Hihara

Lucia P. Amore
Food Science and Human Nutrition (Dietetics)
Minor in Filipino Language and Culture
Social Sciences
Participation for Honors, UROP
Oral Presentation: Session 2 (10:15-11:20a) in Sakamaki C101
Poster Presentation: 1:30-2:30p in Campus Center Ballroom

Identifying Perceived Barriers and Enablers of Healthy Eating in College Students in Hawai'i: a Qualitative Study Using Focus Groups

The purpose of this study was to identify and describe perceived barriers and enablers of healthy eating in college students ages 18-24 at the University of Hawai'i at Mānoa. A semi-structured interview guide was developed based on review of relevant literature and pilot tested in one focus group. Six focus groups of 4-6 students (n=30) were conducted by a trained moderator (LA). Discussions were audio recorded and subsequently transcribed. After each focus group, LA coded the transcript using NVivo 11, and additional codes were added to the codebook based on emergent ideas. Once all transcripts were coded, key themes were then determined by examining code counts and identifying overarching ideas based on the socio-ecological model of health. Key barriers identified were attitudes and beliefs toward healthy eating, the cost of healthy food options in Hawai'i, knowledge deficit of healthy foods or preparation, and institution-related food availability. Key enablers identified were knowledge of nutrition, attitudes or prioritization of healthy eating, and social support. Results revealed that social and educational factors play a role in promoting healthy eating in Hawai'i, but the cost of living and food availability at college serve as barriers even for motivated students. Incorporating nutrition education into the curriculum may be one way to help college students with the transition into independent living in the early years. Additional studies are still needed to determine how best to design and prioritize food environment interventions in colleges.

Mentor: Dr. Jinan Banna

Angie Anderson
English, Theatre
Arts & Humanities – Creative
Participation for Honors, UROP
Oral Presentation: Session 2 (10:15-11:20a) in Sakamaki B101

Grand Guignol: The Theatre of Horror, the Efficacy of Horrific Staging, and *When My Body Cried Out*

Grand Guignol is a genre of theatre that exploited the very strong and real human experience of intense fear in order to create impactful pieces of drama that, though fleeting, affected people deeply and sparked the flame of modern concepts of gore, shock, and thrill. The genre originated in *Le Théâtre du Grand-Guignol,* founded by Oscar Méténier in Paris during the late 19th century. The theatre staged gruesome naturalistic plays until its close in 1962, during which time audience members experienced shocking scenes of gore and violence. Today, because of the realistic nature of film and TV, theatrical horror can appear cheap and melodramatic.

When My Body Cried Out is an original one-act play written as an exploration of the Guignol genre in an effort to inspire a reinvigoration of its effective horror aesthetics. This play is an investigative endeavor towards applying surviving Guignol aesthetics in modern theatre and film to new, compelling, and believable theatrical horror. Richard Hand and Michael Wilson's book *Grand-Guignol: The French Theatre of Horror* was a key component to identifying these aesthetics; this text is one of the most comprehensive and widely-referenced pieces of literature on Grand Guignol and includes short, translated Grand Guignol plays. This new one-act play incorporates Guignol traditions of uninhibited, visceral shock and gore while also integrating modern horror aesthetics such as psychological terror and thrill. *When My Body Cried Out* is a story about the stigmas of mental illness and the monsters lurking in plain sight.

Mentors: Dr. Todd Sammons, Dr. Markus Wessendorf

Gerardo Ávila Jr.
Psychology, Certificate in Spanish
Social Sciences
Participation for Honors, UROP
Oral Presentation: Session 2 (10:15-11:20a) in Sakamaki C101
Poster Presentation: 1:30-2:30p in Campus Center Ballroom

How Exposure Length to Faces Affects Facial Recognition

One of the most important skills for humans and all primates is the ability to recognize faces (Parr, 2011). Longer exposure time to a face has been found to result in greater chances of face recognition (Laughery, Alexander, and Jane, 1971). The present research investigates a progression of exposure times to faces between 250 milliseconds and 2 seconds, and how that affects face recognition at different time points. Images of faces were presented for predetermined lengths of time, with the participants tasked to categorize each face by sex before performing a two-alternative-forced-choice surprise recognition test requiring them to decide which of two faces had been presented previously. Participants were then brought back to the laboratory two weeks later and re-tested. It was predicted that as exposure length to a face increased, so would the recognition rate. Also predicted was that as exposure length increased, reaction time on the recognition test would decrease. The results demonstrated that accuracy on the recognition test was significantly dependent on exposure time. Reaction time on the recognition test did decrease as exposure length increased, but only for the test administered during the first phase. Future studies of facial recognition might utilize these findings as a guideline for exposure length to faces in other experimental settings.

Mentor: Dr. Scott Sinnett

Vanessa Banogon, Mechanical Engineering
Bryson Clemente, Mechanical Engineering
Eric Guyett, Mechanical Engineering
Raquel Kamalu, Mechanical Engineering
Nathaniel Lizama, Mechanical Engineering
Joshua Lui-Kwan, Mechanical Engineering
Kristen Monico, Mechanical Engineering
David Todd, Mechanical Engineering
David Yoshimoto, Mechanical Engineering
Engineering & Computer Sciences
Participation for UROP
Oral Presentation: Session 2 (10:15-11:20a) in Sakamaki B103

Design, Construction, and Implementation of an In-Water Coral Reef Nursery

Coral reefs are a necessary resource for the vitality and success of both Hawai‘i’s economy and environmental protection. Providing interference with ocean waves, coral reefs act as a safety mechanism preventing significant coastal damage to shorelines and properties. Coral reefs also contribute to Hawai‘i’s local economy through various tourism activities including, but not limited to: diving tours, fishing trips, restaurant visits, and more.

Recognizing the importance of coral reefs as a resource, the National Oceanic and Atmospheric Administration (NOAA) commissioned students from the Department of Mechanical Engineering to design and construct an in-water coral reef nursery purposed for coral husbandry and out-planting of rehabilitated specimens. Considering the average ideal conditions for coral growth, multiple design iterations were completed to accommodate growth factors including: sunlight, wave action, and fouling. The designed structure was required to be no more than 20 feet in diameter, to rest 40 feet below the ocean surface, to carry coral at least 5 feet above the seabed, to withstand both static and dynamic loading events, to minimize its environmental impact, to carry coral specimens up to 24 inches in diameter, to be simple to deploy and assemble, to operate for a minimum of 5 years, to fail safely, and to be easy to access for researchers and maintenance crews. Considering these design parameters, modeling software was used to draft a 3D design of the structure, which was then analyzed using finite element analysis software.

Mentor: Dr. Bardia Konh

Yosef Ben Gershom, Mechanical Engineering
Brialyn Onodera, Mechanical Engineering
Engineering & Computer Sciences
Participation for UROP
Oral Presentation: Session 1 (9:15-10:05a) in Sakamaki B103

Effects of Body Forces on Flow Boiling Heat Transfer in Micro-Channels through Dynamic Testing

With current advances in space technology, the demand for smaller and more efficient electronic cooling systems also increases. In spacecraft, temperature sensitive electronics and computer system components generate immense amounts of waste heat. This requires dissipation of sizable amounts of heat flux. Two methods are the use of micro-channels and dual phase systems. Micro-channel designs allow for low conduction thermal resistance and higher heat transfer coefficients due to the micro scale of the channels. In dual phase heat transfer, or flow boiling, the dissipated heat is used to cause a phase change of the coolant from liquid to vapor. The latent heat of vaporization requires approximately 80 times more energy than raising the temperature of a liquid by 1 degree. By combining these two methods into a dual phase micro-channel heat sink system, it is possible to dissipate more heat flux than either method separately. Due to the unique microgravity environment of space, such a system would be subjected to varying degrees of body forces. To verify the use of this system in spacecraft, a dynamic testing apparatus is used to simulate those forces on Earth. This research will utilize this apparatus to determine how heat flux is affected by the simulated body forces.

Mentor: Dr. Weilin Qu

Sydney Blanke
Linguistics: Interpretation/Translation
Arts & Humanities – Research
Participation for Honors, UROP
Oral Presentation: Session 3 (11:30a-12:20p) in Sakamaki B101

Linguistic Relativity in Action: A Comparison of Motion Perception in English and Russian Speakers

Language is the medium through which people experience and communicate the world around them; it provides a habitual framework for thought and expression. However, each individual language has prominently created its own unique framework for such expression, which draws attention to, grammatically encodes, and prioritizes aspects of life in differing ways. The extent to which these differences are reflected in the minds of its speakers is unclear, and remains highly controversial to this day. This idea that one's native language influences cognition and perception—known as the linguistic relativity hypothesis—has fluctuated in popularity since its inception in the early twentieth century. This study takes a look at the differences in motion perception between English and Russian speakers that may arise due to the complex system of obligatory expression found in Russian verbs of motion. An open-response image description experiment was given to two groups: native English speakers, and native Russian speakers with varied degrees of English proficiency. Participants were scored based on the extent to which they remarked upon certain parameters that are mandatorily encoded in Russian verbs (with the exception of destination), but are not necessarily so in their English 'counterparts'. Results show significant differences between the groups in terms of double marking and output for certain parameters—particularly accompaniment, and guided motion under novel circumstances. It seems that there is indeed an argument to be made that the difference in native tongues can produce tangible changes in perception. Intended as an exploratory experiment, this study has raised some intriguing questions that warrant further investigation, and will hopefully inspire future research.

Mentor: Dr. Kamil Deen

Aleca Borsuk
Mechanical Engineering, Minor in Botany
Natural Sciences
Participation for UROP
Oral Presentation: Session 3 (11:30a-12:20p) in Sakamaki A104

Optical Properties of Marine Plant Tissues for the Chlorophyte, *Codium edule*

Beneath the ocean surface, light attenuation, absorption, and scatter by water forms an exponential gradient of intensity and radical spectral change with increasing depth. These conditions seemingly make photosynthesis a challenge for any plant. Yet, billions of years of ecological success suggest that traits have evolved to aid photosynthesis in light-limited environments. This work tests the hypothesis that, for the chlorophyte, *Codium edule,* light is trapped by refraction and scatter within lens-like utricle tips of siphons, guided to chloroplasts within cytoplasmic conduits, and re-distributed to chloroplast-dense sites by scatter within vacuoles. Confocal microscopy of *in vivo* tissue was used to build three-dimensional (3D) computer models of *C. edule* utricles. Ray tracing was then performed on the 3D models used to visualize and quantify the path length, scatter, and propagation of photosynthetically active radiation. Preliminary results indicate that *C. edule* utricles act as light guides, collecting and transporting light to chloroplast-dense sites. These findings suggest that marine plants such as *C. edule* are not passive in their utilization of the solar resource; rather, these organisms are well adapted for photosynthesis in low-light environments. Furthermore, this shows that variation in biochemical pigments are not the only means of enhancing photosynthesis—anatomical structure can also play a role.

Mentor: Celia Smith

Sasha Canovali, Molecular Cell Biology
Anna Scheiner, Microbiology
Natural Sciences
Participation for Honors, UROP
Oral Presentation: Session 1 (9:15-10:05a) in Sakamaki A102

Proteome Analysis of *Bacillus subtilis* with Expression of Ribosomal Protein Homologues

Ribosomes are highly conserved complexes responsible for the essential task of synthesizing proteins within the cell. These structures are composed of proteins (called ribosomal proteins) and ribosomal RNA. Recent research regarding bacterial ribosomes has identified a number of ribosomal protein homologues which have not previously been characterized. These homologous structures are hereafter referred to as primary ribosomal proteins (PrimRPs) and alternative ribosomal proteins (AltRPs). PrimRPs are characterized by a conserved zinc-binding motif, and are expressed under normal growth conditions (i.e. high zinc availability). AltRPs, conversely, do not possess this motif, and are expressed in response to zinc depletion. Three distinct pairs of such protein homologues have been described in *Bacillus subtilis*.

The objective of this study is to elucidate the consequence of AltRP expression in *B. subtilis* at the translational level. This will be done by performing whole proteome analyses using mass spectrometry on two strains of *B. subtilis*, each expressing either primary or alternative homologues of the three proteins in question. Translational regulation in terms of ribosomal protein homology has yet to be published and such evidence to be gained during this study may not only supplement understanding of translational regulation in *B. subtilis*, but provide a foundation for understanding the function of these newly-described proteins in all species that express them.

Mentor: Dr. Sladjana Prišić

Andrew Chang
Chemistry, Minor in Art
Natural Sciences
Poster Presentation: 1:30-2:30p in Campus Center Ballroom

Cellular Effects and Anti-Inflammatory Properties of ʻUhaloa, a Native Hawaiian Medicinal Plant

ʻUhaloa (*Waltheria indica*) is an endemic species in Hawaiʻi listed amongst the ten most recognized plants in traditional medicinal practices. A tea made from dried leaves, flowers and fresh tap root is used in Laʻau Lapaʻau by traditional Hawaiʻi health practitioners to treat disorders with inflammatory components including arthritis, tonsillitis, rheumatism, ulcers, various skin diseases, and respiratory problems. Published scientific reports and anecdotal evidence support the effectiveness of ʻuhaloa extracts (UE) in treating acute inflammation, and *in vivo* human *and* animal models, and *in vitro* cell studies further confirmed anti-inflammatory effects for an isolated ʻuhaloa flavonoid (quercetin), however systematic and in depth studies of the biological effects of crude UE, as used in traditional medicinal preparations, have not been undertaken. Our study aims to fill this knowledge gap by determining the cellular targets for the anti-inflammatory effects of UE.

Crude ethanol UE was prepared using aerial parts of the plant in 80% ethanol. Qualitative HPLC analysis aimed to verify potent anti-inflammatory compounds in aqueous and organic fractions of UE. Sequentially the crude UE and also the pure, ʻUhaloa-derived quercetin were assayed to compare how tissue resident cells and immune cells tolerate cytotoxicity of these phytochemicals at various concentration after 48 hour treatment using LDH assay on several human cell lines and finally UE and quercetin were also tested for 48 hours for their inflammatory-mediator effect on cytokine production utilizing ELISA assay on THP-1 monocyte derived, differentiated macrophage cultures.

Mentor: Dr. Katalin Csiszar

Anthony Chen
Biochemistry
Natural Sciences
Participation for Honors, UROP
Oral Presentation: Session 3 (11:30a-12:20p) in Sakamaki A102

Investigating Differences in Substrate Binding in *B. subtilis* BioA via Site Directed Mutagenesis

The enzyme cofactor and essential vitamin biotin is biosynthesized in bacteria, fungi, and plants through a series of enzyme catalyzed chemical transformations. One step in the pathway involves the substitution of the C7 ketone of 7-keto-8-aminopelargonic acid (KAPA) with an amine, and is catalyzed by the pyridoxal phosphate-dependent enzyme 7,8-diaminopelargonic acid synthase (BioA). Prior studies demonstrated that *Escherichia coli, Mycobacterium tuberculosis* and other bacteria use S-adenosylmethionine (SAM) as a source of the amino group, while recent findings indicate that *Bacillus subtilis* uses lysine as the source of this nitrogen. This study examined the BioA of *B. subtilis* and determined which residues would favor lysine binding. Based on protein crystal structures, the residues located at positions 17, 53, and 82 of the BioA enzyme are likely to participate in substrate binding. The residues of BioA in *E. coli* and *M. tuberculosis* at these positions are tyrosine, tryptophan, and glycine, while the residues of *B. subtilis* BioA are phenylalanine, valine, and leucine. These differences were used as a guide to introduce site-directed mutations to the *B. subtilis* bioA genes. The mutant enzymes were expressed and purified, and the activity was examined by monitoring the production of dethiobiotin (DTB) using liquid chromatography-mass spectrometry (LC-MS) analysis. Our findings reveal that all of the mutants were no longer able to produce DTB in the presence of SAM or lysine, highlighting the importance of the residues located at positions 17, 53, and 82 of the *B. subtilis* BioA enzyme.

Mentor: Dr. Joseph T. Jarrett

Eileen Chen, Chemistry
Nikki Rousslang, Biological Engineering
Natural Sciences
Participation for UROP
Oral Presentation: Session 1 (9:15-10:05a) in Sakamaki A101

Screening Mutant Human Asparaginase-Producing *Escherichia coli* for the Production of Highly Active Human Asparaginases

The current treatment for Acute Lymphoblastic Leukemia (ALL) includes the usage of drugs derived from bacterial asparaginase (ASNase). ASNase is an enzyme that breaks up asparagine, a nonessential amino acid for humans but essential amino acid for cancerous lymphoblasts. Unfortunately, some patients experience mild to fatal allergic reactions to the drug due to its derivation from bacteria. Human ASNase (hASNase) drugs may have the potential to displace the bacterial ASNase drugs. Because hASNases are not foreign to human bodies, they should not trigger allergic reactions like bacterial ASNases do. However, hASNase is significantly less active than the bacterial ASNase. Therefore, our goal was to obtain a more active hASNase by introducing mutations into the hASNase gene using ethyl methanesulfonate. We screened these mutants using a pH-sensitive assay and isolated mutants with increased activity. Then, we developed protocols for expression and purification to extract active hASNase. All our research took place in Dr. Ho Ng's protein structure laboratory.

Mentor: Dr. Ho Ng

Amy Chinen
Chemistry
Natural Sciences
Participation for Honors
Oral Presentation: Session 2 (10:15-11:20a) in Sakamaki A102

Progress in Selective Hydrogenation: Reactivity Trends in PdAu Heterogeneous Catalysts & Developing Chiral Building Blocks for New Homogeneous Catalysts

Selective hydrogenation is an essential method for converting cheap starting materials into more valuable chemical building blocks. Whether regioselectivity or diastereoselectivity is desired, catalysts are often employed to aid in this transformation. This work explores possibilities for fine-tuning both homogeneous and heterogeneous catalysts. Previously, bimetallic PdAu catalysts were used to enable the conversion of biologically produced 4-hydroxycoumarin (4HC) to pharmaceutically relevant coumarin and dihydroxycoumarin (DHC), but the subtleties of catalyst preparation and the effect of Pd loading were not known. Part I focuses on identifying reactivity trends resulting from variations in PdAu catalysts. Several PdAu catalysts with varying Pd:Au ratios were prepared by controlled surface reactions (CSR) or incipient wetness impregnation (IWI). Using high performance liquid chromatography (HPLC) and gas chromatography-mass spectrometry (GCMS), we determined the effects of the preparation method and Pd loading on reactivity, selectivity, and resistance to deactivation for the selective hydrogenation of 4HC to DHC. Part II aims to develop chiral building blocks for *C*1-symmetric, P-stereogenic ligands that will be used in the asymmetric hydrogenation of heavily functionalized substrates. To date, a new diastereoselective method of adding RO-H across a P=P double bond was identified and a new sterically dominating R group was generated. The results were analyzed by nuclear magnetic resonance (NMR) spectroscopy.

Mentor: Dr. Matthew Cain

Mc Millan Nicol Ching
Molecular Biosciences and Biotechnology, Philippine Language and Literature: Filipino
Natural Sciences
Participation for Honors, UROP
Oral Presentation: Session 1 (9:15-10:05a) in Sakamaki A102
Poster Presentation: 1:30-2:30p in Campus Center Ballroom

Mimosine-Fe^{3+} Peptide Transporters in Leucaena and Common Bean

Mimosine, a non-protein amino acid produced by the tree legume *Leucaena leucocephala* (leucaena), is considered a phytosiderophore for the uptake of Fe^{3+} by the plant. Under high pH conditions, essential micronutrients, such as iron (Fe), become chemically bound with other soil nutrients, rendering them insoluble and unavailable for plant use. This research tries to identify the mechanism of transport of the mimosine-iron complex into the leucaena root system. Kinetic studies in our lab have shown that three molecules of mimosine bind to one molecule of Fe^{3+} to produce a stable mimosine-iron complex, which may be taken up by the plant as a mechanism for iron acquisition. We hypothesize that a large complex made up of three mimosine and one Fe^{3+} will require a peptide transporter for transporting into the plant cell. Thirteen peptide transporter partial sequences were identified from the transcriptome sequences of leucaena on the basis of sequence homology with known peptide transporters, analyzed using Basic Local Alignment Search Tool (BLAST). Since leucaena secretes mimosine in the rhizosphere, we expect that the transporter(s) for the mimosine-iron complex will be expressed exclusively in the roots. Therefore, using Real-Time Quantitative Polymerase Chain Reaction (qRT-PCR), the expression level of these thirteen transporters will be determined in leaves, stems, and roots of leucaena, as well as in common beans, to verify mimosine-Fe^{3+} uptake. Discovering the mechanism of iron acquisition will be useful for developing plant varieties suitable for growing in alkaline soils. The UH UROP and USDA NIFA Hatch Grant support this research.

Mentor: Dr. Dulal Borthakur

Co-Authors: Michael Honda, Kazue Ishihara

Kenneth Choi, Natural Resources and Environmental Management
Alexa Foster, Natural Resources and Environmental Management
Natural Sciences
Participation for UROP
Oral Presentation: Session 1 (9:15-10:05a) in Sakamaki A103
Poster Presentation: 1:30-2:30p in Campus Center Ballroom

Creating a Lasting Community-Based Conservation Program for the Bahama Oriole (*Icterus* northropi), a Critically Endangered Species

In this project, we aimed to create a community-based conservation plan for the critically endangered Bahama Oriole (*Icterus northropi*) on Mangrove Cay, a district on Andros Island, The Bahamas. As a synanthropic, single-island endemic species, the Bahama Oriole benefits from human activities that increase breeding habitat and foraging opportunities in developed areas. This makes it an ideal candidate for community-based conservation, since people can see and appreciate oriole population growth that occurs because of their conservation actions. In this research program, we partnered with one classroom each at the high school and elementary school on Mangrove Cay, as an extension of an environmental education program run by the Bahamas National Trust, the primary natural resource management organization in the Bahamas. Students in each classroom collected data including, but not limited to, nest locations, date of courtship initiation, dates of nest-building activities, number of chicks fledged per nest, and occurrence of nest parasitism by brood parasites. Observations were entered by students into a website portal created as a citizen science website, as well as in a classroom-based Excel sheet.

We collaborated with the Bahamas National Trust to create a conservation plan and ongoing educational programs for the schools. Working with Bahamas National Trust, the data collected from the classroom programs as well as the nest cameras will inform the creation of a new National Park on Andros Island.

Mentor: Dr. Melissa Price

Ricky Choi, Electrical Engineering
Tayler Pave, Electrical Engineering
Tien Tran, Electrical Engineering
Taylor Viti, Electrical Engineering
Engineering & Computer Sciences
Participation for UROP
Oral Presentation: Session 1 (9:15-10:05a) in Sakamaki B103

Ike-Wai Water-Monitoring Systems

The Ike Wai project is a multidisciplinary project to study water issues that surround the Hawaiian Islands, such as overuse and pollution. Traditional methods of sensing water parameters have resulted in sensors which are either too expensive for arraying over many wells, or are subject to biofouling and other degradation effects of being out in the environment. The goal of Ike Wai is to optimize local use of resources by developing models of hydrological and geological attributes.

The College of Engineering will be involved in designing, fabricating, and testing water monitoring modules for down-well and ocean sensing. These modules will record several parameters which will include salinity, pressure, temperature, organics, turbidity, flow, and vibration. The monitoring system will include a DROP (Down-well Remote Operated Platform) module. The modules will be networked, maintain their own battery source and solar panels for powering, and carry innovative sensitive instrumentation.

The undergraduate students were able to successfully obtain measurements for salinity, pressure, and temperature. In addition, the DROP modules and self-sustaining power system were created and integrated with the sensors that completed a base system for the Ike Wai project. These sensors have typically been designed to operate under the assumption that an individual will walk the sensors around between wells. As a result, real-time information from wells is lacking or non-existent. Future work for this project would be to integrate other sensors that would complete the parameter readings of the ideal Ike Wai system, in addition to real-time telemetry for the sensor readings.

Mentor: Dr. David Garmire

Christopher D. Chow
Public Health
Social Sciences
Participation for Honors
Oral Presentation: Session 1 (9:15-10:05a) in Sakamaki C101
Poster Presentation: 1:30-2:30p in Campus Center Ballroom

Promoting School-Based Hearing Screenings Among Hawai'i's Youth

Hearing is not only important in day-to-day communication, but is vital in the overall development of infants and children. Although hearing loss is generally associated with aging, concerns for hearing conditions can start as early as birth. Considering the difficulty in recognizing hearing impairments among youth, it is vital to provide accessible hearing screenings to school-aged children. To address this need, the Hawai'i Lions Club created a statewide hearing screening program that is implemented in Hawai'i Department of Education schools.

The Hawai'i Lions' hearing screening initiative is designed to provide comprehensive hearing screenings to students in the Hawai'i Department of Education schools. By providing hearing screening for students primarily in kindergarten to the third grade, the goal is to achieve early identification of hearing loss or any ear-related concern. The hearing examination consists of four different components: audiometry, tympanometry, otoscopic examination, and otoacoustic emission testing. Students are given either the status of "pass" or "refer", where referred students are recommended to consult their primary care physician for follow-up.

The project was designed to increase awareness of the Hawai'i Lions' hearing initiative and to emphasize the importance of the services provided. In addition to promotion, the project actively participated in the screening process. Results from the 2015-2016 academic year was collected and analyzed to report descriptive statistics. A total of 5,937 students were screened. Conclusions found by the project include the need of expanding to more Hawai'i schools and the recruitment of volunteers to aid in the statewide screening process.

Mentor: Dr. Denise Nelson-Hurwitz

Katy Christensen
Global Environmental Science, Minor in Music, Certificate in Spanish
Natural Sciences
Participation for Honors
Oral Presentation: Session 2 (10:15-11:20a) in Sakamaki A103

Mixing Variability of the Upper Layer in a Glacio-marine Fjord: Andvord Bay, Western Antarctica Peninsula

The glacio-marine fjords on the Western Antarctic Peninsula (WAP) are rapidly changing systems of high biological productivity that are relatively unstudied. The goal of this research was to characterize the upper layer physical structure and variability of a representative study fjord, Andvord Bay, in order to determine how it changes with time, space, or other external forcing, such as wind. To analyze the upper layer of Andvord Bay, the Conductivity/Temperature/Depth (CTD) profiles and shipboard thermosalinograph data were used from two cruises in the National Science Foundation (NSF) supported project, Fjord Eco. First, the mixed layer depth (MLD) was numerically determined using two different methods, higher order weighting and threshold with different commonly used threshold values. Then, the variability of the upper layer salinity, temperature, density, and MLD was analyzed in relation to changes in space, time, and wind forcing. In finding the MLD, the best method was the threshold method using a threshold value of $\Delta\sigma = 0.03$ kg/m^3, but it still had inaccuracies due to the presence of weakly stratified layers. In the variability analysis, results show that seasonal heat flux is the largest factor impacting the changes in the upper layer of WAP fjords, although wind forcing does play an occasional role. Geographic influences are less prominent and are only relevant between the inside and outside of the fjord. Understanding the upper layer is an important part of understanding the water column dynamics, the chemical characteristics, and the biological diversity of glacio-marine fjords along the WAP.

Mentor: Dr. Mark Merrifield

Juliana Clark, Tropical Plant and Soil Sciences
Leslie Hutchins, Natural Resources & Environmental Management
Natural Sciences
Participation for UROP
Oral Presentation: Session 2 (10:15-11:20a) in Sakamaki A103

Mulching the Gardens of Lono

Nitrogen (N) is known to be the most essential nutrient for plant growth, and can greatly impact crop production. In Hawai'i, N is not readily available in soils, and therefore must be 'fixed' through either atmospheric or biological N fixation. Ancient Hawaiian agriculture is an example of a highly productive system that must have used biological N fixation to supplement N in soils through the addition of mulch. In this experiment, it was hypothesized that the addition of leaf litter in ancient Hawaiian dryland agriculture led to a direct increase in the productivity of that system. Part one of this experiment was set to determine the N fixation in the decomposition of 10 treatments of ulu, kukui, and sugarcane leaf litter. Part two of the experiment was to investigate how leaf litters decomposed when mixed together by analyzing the N and carbon (C) content of the mixtures. This research was conducted at Lyon Arboretum and at the University of Hawai'i at Manoa, over a 13-month timeline, emulating the growing season of Taro, a staple crop in ancient Hawaiian agriculture. N fixation was measured using an Acetylene Reduction Assay (ASA) and run through a gas chromatograph. Part two was measured using an Elemental Analyzer. Preliminary results indicate that different mulch mixtures altered decomposition and N fixation rates. This implies that knowledge of mulching practices would affect agricultural production.

Mentor: Dr. Noa K. Lincoln

Jason Dela Cruz
Molecular and Cell Biology, Philippine Language and Literature
Natural Sciences
Participation for UROP
Oral Presentation: Session 2 (10:15-11:20a) in Sakamaki A102

Analysis of Interleukin Protein, IL-37, for Anti-inflammatory Properties

The interleukin (IL) family of proteins consists of several cytokines that specifically control a complex network of pro-inflammatory signals, which regulate the human immune system in response to infections and autoimmune diseases. 10 out of the 11 proteins in this family have been well-characterized and identified as key players in innate immunity and pro-inflammatory signaling. The IL-37 protein is the only member of the IL family that has yet to be characterized or structurally analyzed. Recent literature suggests that IL-37 may act as an

inhibitor to the production of inflammatory cytokines in white blood cells.
The purpose of this study is to analyze IL-37 through protein denaturation experiments in order to identify residues involved in stabilizing IL-37's native structure. This information will help us determine folding domains, and understand how specific intramolecular forces contribute to IL-37's protein folding. The engineering of thermodynamically stable mutants can also prevent the denaturation of the protein at higher temperature levels. By understanding IL-37, we can use this information to better understand the pro- and anti-inflammatory pathways of the IL family. This information could be invaluable to the field of drug design, particularly in targeting autoimmune and inflammatory diseases.

Mentor: Dr. Ho Ng

Marielle Dela Cruz
Astrophysics
Natural Sciences
Participation for UROP
Oral Presentation: Session 3 (11:30a-12:20p) in Sakamaki A104

Analyzing Cometary Dust Tails Using Finson-Probstein Modeling

Comets are remnants from the processes of solar system formation, which preserve materials that existed during solar system formation and will help us understand more about the evolution of the solar system. This research focuses on analyzing cometary dust tails in order to predict volatiles contained in a comet using the Finson-Probstein (FP) dust-dynamical modeling method. FP modeling is used to calculate the trajectory of dust affected by radiation pressure and solar gravity. Using this method will help find estimates for dust grain sizes, emission times, and their velocities.

We selected two comets, 74P/Smirnova-Chernykh and 41P/Tuttle-Giacobini-Kresak, that had good observation geometries. Astronomical images were obtained from January 18-22, 2017 using the UH88 2.2m telescope on Maunakea. These images were processed using the Image Reduction and Analysis Facility (IRAF) software along with codes written in Python. Model images of comet tails were produced using an FP program that maps cometary activity as a function of time. These values will be used to compare the behavior of the two comets. One of the comets is known to be CO_2 rich, which can affect grain velocities and sizes. We will present the data reduction, modeling, and results.

Mentor: Dr. Karen J. Meech

Abundanzia Delavega
Anthropology
Social Sciences
Participation for Honors, UROP
Oral Presentation: Session 1 (9:15-10:05a) in Sakamaki C102

Importance of Sea Shell Data from Miloliʻi Valley on Kaua'i

Although, shellfish can be used by humans for the creation of tools, decoration, and jewelry, the consumption of shellfish can play a large role in determining the traits, diversity, and population of shellfish. In previous studies done in Nuʻalolo Kai, the neighboring valley of Miloliʻi, a decline in diversity and size of the valley's shoreline and reef shell species was observed. This implies that there could have been a resource depression in the area, due to the overfishing of shellfish. This project will conduct the same analyses on two shell assemblages that were excavated from Miloliʻi Valley to see if the valley's shellfish experienced a similar pattern. By measuring the sizes and weights of *Cellana sp.* and looking at the shell assemblages' total species diversity and weight counts, this project will document and discuss patterns and changes in shell population and diversity found over time.

Mentor: Dr. Seth Quintus

Elizabeth Dionne
Global Environmental Science
Natural Sciences
Participation for UROP
Oral Presentation: Session 2 (10:15-11:20a) in Sakamaki A103

Resolving Carbon Contributions in a Mangrove Estuary

Mangroves are carbon sinks that help capture sediments, which serve as further carbon storage in coastal waters and river banks. The mobilization and flushing of carbon from such sediments is not well understood. Tidal pumping, the process by which water is pushed through sediments by tides, flushes carbon into the surface waters. The goal of this project was to account for this movement of carbon through pore spaces in a mangrove estuary by determining the volume and rate at which water is flushed through the riverbank sediments.

The flushing rate was determined using short-lived radionuclides, radon and radium isotopes. Equilibrium concentrations of these radionuclides in the sediments were determined at various points along the river. These measurements were compared against in-situ radon and radium isotope concentrations in pore water. Differences between these values were used as a measure of time that river water spent in pore spaces. This approach allowed us to determine age and dissolved inorganic carbon concentration relationships, as well as estimate rates at which carbon is flushed into the river. We found that water ages ranged from a few hours to several days and that there was a clear relationship between water age and its dissolved carbon content.

The completion of this research will assist in creating a better understanding of global carbon budgets and nutrient circulation through mangrove estuaries. The methods outlined above will serve as a proof of concept in using geochemical tracers in this environment.

Mentor: Dr. Henrietta Dulai

Brandy Dobson
English
Arts & Humanities – Creative
Participation for Honors
Oral Presentation: Session 2 (10:15-11:20a) in Sakamaki B101

A Murmur in the Weeds: A Memoir

My mother ushered her three children into the living room to greet her new friend coming to dinner. I was nine and tired of new. I wanted the old, my old house, my old school, my old family. Like a caged tigress keen for the full expression of her power unleashed, my mother paced behind the screen door. "He's here!" she said. I anchored myself to the shag carpet, refusing to move for a man-friend, a man who was not my dad. I watched her wrap around him as he set his suitcase down, embracing her in an uplifted bear hug. My younger siblings jumped in curiosity, welcoming this stranger with open arms. In the pit of my stomach, my suspicions stirred an unsettled feeling awake – a feeling that would later grow into a reality of fear and sorrow that invaded and settled into my entire being.

This is a project in life-writing. The story of my youth is a source of pain for me. Even as I begin with this abstract, I am working through the complicated nature of shame and trauma from years of abuse as a child. I wrote my story as a way of coping and making meaning through writing. In addition, my work benefits from research on the specific issues within the genre of autobiography/creative non-fiction/memoir. My goals for this project are to engage in the therapeutic nature of writing, sharpen my narrative skills, and to perhaps inspire others with painful stories to undertake their own healing process on paper.

Mentor: Dr. Cynthia Franklin

Rodel Edra, Mechanical Engineering
Cherline Galacgac, Business Administration
Keanu Kim
Takato Mitsuda, Mathematics
Robert Ramos
Engineering & Computer Sciences
Participation for UROP
Oral Presentation: Session 2 (10:15-11:20a) in Sakamaki B102

Design and Development of Carbon Fiber Composite Reinforced Panels for Formula Racing Car

The team will develop an exoskeleton body structure and its respective ground effects for the University of Hawai'i at Mānoa's Rainbow Warrior Racing Team, taking into account several factors to construct an optimum body model as a final result. These factors include, but are not limited to, weight, cost, wind drag resistance, functionality, and aesthetics.

The project is divided into three significant phases, *design*/*modeling*, *analysis,* and *manufacturing*. During *design*, sketches are produced and mock-up of the vehicle body and diffuser will be modeled using SolidWorks, a computer-aided design program. This enables multiple subsequent design iterations to be performed quickly.

The final design iteration will be chosen based on analysis results after successful optimization has been achieved. Additional analyses are done on SolidWorks, including Finite Element Analysis (FEA) and Computational Fluid Dynamics (CFD) simulations to evaluate iteration.

During *manufacturing*, several molds are made with polyurethane pour foam. These are sanded and assembled in preparation for carbon fiber cloth. Preparation begins with a coat of epoxy resin to expose the molds imperfections. Problem areas on the molds are repaired and leveled with lightweight putty followed by coats of tooling gelcoat followed by 24 hour drying period. After removing striations, sealer, polishing compound, and other release agents will be applied to ensure a smooth mold. Carbon fiber and PVC foam core are laid onto molds and saturated with epoxy resin. After manufacturing, the body will be tested for drag resistance, functionality and ground effect to validate our design.

Mentor: Dr. Mehrdad N. Ghasemi Nejhad

Co-Author: Dr. A Zachary Trimble

Dejah Fa'asoa
Public Health
Social Sciences
Participation for Honors
Oral Presentation: Session 2 (10:15-11:20a) in Sakamaki C101
Poster Presentation: 1:30-2:30p in Campus Center Ballroom

Cultural Competency in Prenatal Care Among Pacific Island Women in Hawai'i

The objective of this paper was to synthesize the finding of studies evaluating interventions to improve cultural competence in prenatal care amongst Pacific Islanders in Hawaii. The title of this paper is “Cultural Competency in Prenatal Care Among Pacific Islander Women in Hawaii”. The design of this report is a systematic review and meta- analysis of the databases provided by the University of Hawaii at Manoa library systems. Which are CINAL (Cumulative Index to Nursing and Allied Health) and PubMed (Public/ Publisher Medline). The research question of this literature review is what are the important aspects of cultural competencies that are unique to Hawaii and how can it be used in a practical way that health care providers and patients are aware of the medical and cultural processes that must take place to receive prenatal care. In this literature review, there were no participants. The comparators of the Literature review are the total amount of articles after the inclusion and exclusion process. The method performed in this literature review were both electronic and hand searches from 1997 through 2017 and evaluate the articles the intervention designs to improve cultural competency amongst Pacific Islanders in Hawaii. There were no predetermined criteria that was created for the final total articles are were assessed as relevant after going through the inclusion and exclusion process. The main outcome of this study was to create an informational guide that was user friendly to a variety of audiences, that was specific and unique enough to the Pacific Island population in Hawaii.

Mentor: Dr. Denise Nelson-Hurwitz

Mayumi Fernandez
Molecular Cell Biology
Natural Sciences
Participation for Honors, UROP
Oral Presentation: Session 3 (11:30a-12:20p) in Sakamaki A101

Partial Feminization of Adult Testes from Males Lacking Y Chromosome Originate from Impairment in Sex Determination During Fetal Development

Disorders of sex determination (DSDs) are medical conditions in which chromosomal, gonadal, or anatomical sex is atypical. DSDs can be caused by mutations in the genes involved in sex determination but specific diagnoses of DSDs are rare due to limited research on these sex-determining genes. Previous studies aiming to define the function of genes on the Y chromosome led to the creation of male mice without any Y chromosome genes, XO*Sox9,Eif2s3x*. Many of the adult XO*Sox9,Eif2s3x* males had poorly developed testes and elevated expression of pro-ovary factors *FoxL2*, *Wnt4*, and *Rspo1*. These factors are typically expressed in female but not male gonads, and their presence in testes can be indicative of impairment in sex determination. These observations led to the hypothesis that partial feminization of adult XO*Sox9,Eif2s3x* testes result from incomplete antagonism between pro-testis and pro-ovary factors during sex determination. In mice sex determination takes place between 10.5 and 12.5 days post coitum (dpc), and involves complex molecular regulatory pathways directing developmental fate of the fetus. I quantified the expression of *FoxL2*, *Wnt4*, and *Rspo1* in 12.5 dpc genital ridges (gonadal precursors) using qRT-PCR and found that ovarian factor expression in XO*Sox9,Eif2s3x* males was intermediate to both XX and XY genotypes. I also demonstrated that genital ridges from XO*Sox9,Eif2s3x* varied in size, shape, and internal structure development from those from XX and XY fetuses. These findings add to the understanding of how the Y chromosome encoded genes and their homologues encoded elsewhere in the genome help to determine sexual development.

Mentor: Dr. Monika Ward

Curtis Frifeldt, Computer Engineering
Tamra Oyama, Electrical Engineering
Jie Zhou, Electrical Engineering
Engineering & Computer Sciences
Participation for UROP
Oral Presentation: Session 1 (9:15-10:05a) in Sakamaki B102

Stochastic Simulation of Nosocomial Disease Propagation

Hospital Acquired Infections (HAIs) are responsible for 99,000 deaths and 33 billion dollars in health care costs annually in the U.S. The project developed a computer simulation that models the propagation of HAIs in a medical care center. The purpose of the project is to develop a realistic model that captures the characteristics of HAI propagation.

Scripted movement simulations representing healthcare workers and patients were programmed in Netlogo. These scripts were based on real health care worker activity data. The simulation design mimicked the John A. Burn's School of Medicine's (JABSOM) SimTiki simulation center. An SIR (Susceptible, Infected, Recovered) model was implemented into the simulation. The purpose of that is so we can compare and analyze our simulated data to the physical data we will collect at JABSOM in the future. All the data generated from the simulation is stored in a MySQL database. A Monte Carlo simulation will be conducted soon. This entails running the scripted simulation numerous times back to back to generate a substantial amount of data.

The SIR model and database is finished and functioning properly. The Monte Carlo simulation shall be conducted in March. A preliminary test was done at JABSOM's SimTiki center. This preliminary test was preparation for the real trial in April.

A full contact list of the simulation movement has been recorded, and it should match the contact list that will be generated in the SimTiki simulation center. The conclusion will be drawn from the Monte Carlo simulation.

Mentor: Dr. David Garmire

Sai Furukawa
Biochemistry
Natural Sciences
Participation for Honors
Oral Presentation: Session 3 (11:30a-12:20p) in Sakamaki A102

Influence of Chemosensory Perception on Male Fertility

Male fertility is essential for their productive success of a species and is the result of normal sperm production (spermatogenesis). Many hormonal and genetic factors are involved in spermatogenesis. However, little is known about how spermatogenesis-related genes are controlled. Prior results show a surprising role for taste and smell signals in controlling fertility. In this study, the fertility of male *Drosophila melanogaster (*vinegar fly*)* was altered depending on exposure to other male pheromones (chemical communication signals). In this experiment, we determined if pheromone detection changed male fertility by altering the expression of previously-identified spermatogenesis-related genes, *Orb2, dj, and djl*. Quantitative Polymerase Chain Reaction (qPCR) was used to determine if gene expression changes in the presence of pheromonal stimulation.

Mentors: Dr. Joanne Yew, Dr. Megan Porter

Andrew S. Gerren
Ethnomedicine & Plant Conservation, Minor in Tropical Plant & Soil Science
Natural Sciences
Participation for Honors
Oral Presentation: Session 1 (9:15-10:05a) in Sakamaki A103

Effects of Varietal Diversity on Knowledge and Consumption of Kava (*Piper methysticum*) in the Pacific

This study investigated ethnobotanical knowledge variation in Hawai'i and Vanuatu, two regions located in opposite ends of the Oceanic archipelago known for their distinctive yet interrelated cosmologies that have shaped kava culture and epistemology. The theory of perceptual salience suggests that the more exposure one has to a certain environment, the more one will know about that environment. In this study, the aim was to understand the drivers of kava consumption and how exposure to an environment where diverse varieties of kava are grown influences knowledge of kava and selection of varieties for consumption. Data were obtained by free-listing of kava cultivars and through semi-structured surveys. This study also explored how the dynamics of age and gender affect how much a person knows about kava. The results show that there is no significant relationship between varietal diversity and varietal knowledge. This lack of significant influence of exposure on individual knowledge is due to the high variation in varietal knowledge in Hawai'i. However, there was a significant relationship between the predictors of knowledge, age and region. Specifically, varietal knowledge has more to do with exposure over time and the type of opportunity for which an individual I engaged with kava, rather than how much exposure one has had to varieties of kava. This study provides insight into how varietal diversity alone is not enough to influence people's knowledge. It also shows how the length of exposure to a given environment better defines how environmental structures affect people's knowledge. Moreover, it provides further insight into future pathways as kava enters the global market and how exposure to kava varieties over time influences consumption patterns.

Mentors: Dr. Orou G. Gaoue, Dr. Noa Kekuewa Lincoln, and Dr. Michael Thomas

Micah Grumblis
Tropical Plant & Soil Sciences
Natural Sciences
Participation for UROP
Oral Presentation: Session 2 (10:15-11:20a) in Sakamaki A103

Canoe Canes: Mutants and More

Sugarcane has indeed played a large role in Hawaiian history but very little research has been conducted on the varieties of canes originally brought to the islands by seafaring Polynesian colonizers. The current void in the ethnography regarding heirloom canes includes: understanding the differences in varieties of Hawaiian sugarcanes and their relationships to one another, the inter-variety somatic mutations between specific varieties, the impact of diseases and pests that afflict these types of sugarcanes, and a relational tree based on both genetic analysis and morphology. In order to further understanding in regards to these issues, this project established a sugarcane plot at the Waimanalo Research Station featuring over 80 varieties of known Hawaiian sugarcanes. Based on the analysis of cane types collected prior to plot establishment, it became apparent that certain varieties are more vigorous in growth habit as well as less susceptible to current diseases that are typical of sugarcane including eye spot fungus, red rot fungus, and sugarcane mosaic virus as well as insect pests such as mealy bug, and aphids. Variety specific somatic mutations were recorded as well as severity of disease affliction and a genetic analysis survey is to be completed in the near future.

Mentor: Dr. Noa Kekuewa Lincoln

Janey Guo
Biochemistry
Natural Sciences
Participation for UROP
Oral Presentation: Session 1 (9:15-10:05a) in Sakamaki A102

Acetylation and Phosphorylation of Ribosomal Proteins in *Mycobacteria tuberculosis*

Protein acetylation is a type of protein post-translational modification that involves the addition of an acetyl group to the amino-group of a polypeptide. Phosphorylation involves the addition of a phosphoryl group instead. These modifications play a critical regulatory role in eukaryotes, but its role in prokaryotes remains uncertain. RimI is a type of N-α-acetyltransferase (NAT) enzyme that has been found to acetylate ribosomal proteins in *Escherichia coli*. Based on this finding, the goal of this study is to determine if RimI will acetylate the two paralog ribosomal S18 proteins, S18-1 and S18-2 found in *Mycobacterium smegmatis* (*Msm*), a non-pathogenic organism related to *Mycobacterium tuberculosis* (*Mtb*), the causing agent of tuberculosis. The process to determine if acetylation occurs first involved expressing RimI in *Msm* and purifying RimI and S18-1 and S18-2 proteins. However, RimI did not express in *Msm* so acetylation of the substrates cannot be determined. Moving forward, instead of focusing on one enzyme and one pair of ribosomal proteins, I will identify post-translational modifications that occur on ribosomal proteins when *Mtb* is exposed to oxidative stress. I will be identifying these modifications on the vaccine strain of *Mtb* instead of *Msm* because *Mtb* serve a better model of the tuberculosis pathogenesis. The results I obtain from studying modifications in *Mtb* on ribosomal proteins could potentially expand our knowledge about the physiology of *Mtb* (e.g., how acetylation and/or phosphorylation affects protein translation) and could eventually lead to new or improved treatments for tuberculosis.

Mentor: Dr. Sladjana Prisic

Noah Higa
Computer Science
Engineering & Computer Sciences
Participation for Honors, UROP
Oral Presentation: Session 2 (10:15-11:20a) in Sakamaki B103

Practical Enumeration of Task Clustering Options in Scientific Workflows

Today, most high-performance computing (HPC) is done on systems that are used by multiple users with many different computational tasks that are continuously submitted for execution. This computational demand typically outweighs computational capacity, so most tasks are placed in a waitlist. The wait time of a task is often significantly longer than its execution time. Most HPC applications comprise large numbers of individual tasks. To reduce overall wait time, smaller tasks in these applications can be grouped together to form larger, composite tasks. A particularly critical class of such HPC applications are “scientific workflows,” which are structured sets of tasks. Many heuristics have been proposed for clustering tasks in scientific workflows. In this thesis, we consider these previously proposed heuristics and also implement new ones. We also design an exhaustive enumeration of all possible task clustering options, which determines the best task clustering option, thus providing an absolute bound on the goodness of the aforementioned heuristics. We realize a software implementation of all the above and evaluate this implementation for several real-world scientific workflow configurations. The software tool resulting from this work forms a sound basis for conducting and furthering research on task clustering strategies for scientific workflows in the HPC context.

Mentor: Henri Casanova

Angelina Holcom
Biology, Certificate in German
Natural Sciences
Participation for Honors
Oral Presentation: Session 2 (10:15-11:20a) in Sakamaki A101

Extending Lifespan with Genetic Modification

Aging is a complex biological process that is characterized by different factors. One major factor are telomeres, which cause cell death and results in aging when they shorten. Telomeres are the end caps of the chromosome and are made of a repeated section of DNA. Their purpose is to maintain genomic and cellular stability, which involves protecting the genome from breaking down or mutating. The goal of this experiment is to learn how telomeres function in *Drosophila melanogaster* in order to better understand their aging process. In the experiment the expression of two genes that produce telomere complex proteins, *spindle*-E and *cav,* will be reduced to determine their effect on the life cycle and lifespan. I will measure the life cycle by recording the time it takes for an adult to eclose. The lifespan will be measured by counting how many fruit flies are alive and dead each day.

I found that there is an increase in life cycle compared to control and there's a mutation in eye phenotype of the UAS.Cav.RNAi. x ey-GAL4 population. There is a significant increase in lifespan of the crosses: UAS.Spn-E.RNAi. x Act5C-GAL4, UAS.Spn-E.RNAi. x ey-GAL4, UAS.Cav.RNAi. x Act5C-GAL4, and UAS.Cav.RNAi. x nos-GAL4. The reduction of *spindle-E* and *cav* in *D. melanogaster* appears to affect the ability to develop into adults. There are other telomere genes that can assist in telomere maintenance in the absence of another gene and that these genes have only an effect in specific tissues, which limits their effects in other regions of the organism.

Mentor: Dr. Floyd Reed

Diana Z. Holden
Biochemistry
Natural Sciences
Participation for Honors
Oral Presentation: Session 3 (11:30a-12:20p) in Sakamaki A102

LRRK2 Kinase Inhibitors as a Potential Drug Therapy for Parkinson's Disease

Parkinson's disease (PD) is a neurodegenerative disorder that is characterized by motor and cognitive dysfunction including resting tremor, rigidity, bradykinesia, and depression. Current treatment options including L-DOPA, MAO-B inhibitors, and dopamine agonists only affect PD symptoms and do not modify disease progression. PD is sporadic in nature but recent studies have targeted mutations in the *leucine-rich repeat kinase 2 (LRRK2)* gene as a genetic cause of PD. The most common mutation is G2019S which is associated with increased kinase activity and disruption of phosphorylation mechanisms. This mutation site is a potential therapeutic drug target via LRRK2 kinase inhibitors (LRRK2-In-1, MLi-2, GNE-7915, and GNE-0877). Recent studies have shown adverse side effects in peripheral tissues as well as decreases in protein concentration in brain lysates. To expand on this finding, this project sought to determine the effect of kinase inhibition in a living dopaminergic-like cell line transfected with LRRK2(WT)-EGFP or LRRK2(G2019S)-EGFP. Alterations in protein dynamics after treatment were measured using advanced fluorescence microscopy with total internal reflection fluorescence microscopy (TIRF) and 2 photon confocal microscopy. Our data show alterations in both protein concentration and oligomerization state of WT LRRK2 which are more indicative of G2019S rather than WT function suggesting higher activation of WT LRRK2 after treatment. This finding was further exaggerated in G2019S expressing cells. This project uncovered novel changes in LRRK2 function after treatment suggesting that additional characterization of kinase inhibitor function is needed before drug approval.

Mentor: Dr. Nicholas G. James

Michelle Huynh
Theatre, English
Arts & Humanities – Creative
Participation for Honors, UROP
Oral Presentation: Session 1 (9:15-10:05a) in Sakamaki B101

The Virtue in Propaganda

We have all learned about the controversies, brutalities, and legalities of the Vietnam War. However, an aspect we never learn about is of the Vietnamese. One may immediately think of the Việt Cộng or Bác Hồ, but there are thousands who are looked over and forgotten — "war babies." This directly translated word from the Vietnamese language describes a small group of minorities who were born of American soldiers and Vietnamese mothers. Being born during the war, many babies were either abandoned or killed because of the prejudice towards the American military. Similarly enough, my mother is a Caucasian woman born in Vietnam during the heat of the war in poor countryside Vietnam. She was luckily found on the streets but faced racism, abuse, and unequality as she lived. Her story and the story of other "war babies" are one of my inspirations behind the play I have written.

Another issue that strikes me is the amount of literature written that showcases the Vietnamese's perspective. Perspective is an important issue to me because society lacks the attempt to solve lingering biases. My play is written to feature the emotions and sentiments of the Vietnamese nationals with the lens focused on these people who consider themselves Vietnamese, but "not Vietnamese enough." As culture and nationalism are hot topics today in many countries, it is essential for us to discuss this in a safe place — the theatre. The goal is to display the emotional story of the conflicted Vietnamese identity.

Mentors: Dr. Glenn Man, Dr. Markus Wessendorf

Kramer Ichimura
Molecular Biosciences and Biotechnology
Natural Sciences
Participation for UROP
Oral Presentation: Session 3 (11:30a-12:20p) in Sakamaki A101

Early Biomarkers of Hyperlipidemia of Healthy Individuals

In Hawaii, cardiovascular disease (CVD) is the second leading cause of death. Besides obesity, inflammation is strongly associated with hyperlipidemia, a risk factor for CVD. MicroRNA (miRNA) are short (18-24 bp) nucleotide molecules that regulate gene expression related to cellular metabolism including lipid metabolism. The goal of our project is to identify early biomarkers of hyperlipidemia. We will therefore investigate the correlation of inflammation and circulating miRNA with lipid profiles among healthy individuals. Fasting blood was collected from healthy individuals and plasma chemistry was analyzed at Clinical Laboratory Services (CLS). Circulating miRNA will be isolated using commercial kits. miRNA profiles will be analyzed using RT^2 Profiler PCR Array Data Analysis version 3.5 (SABiosciences) [10]. Studies investigating early biomarkers of hyperlipidemia are expected to reduce CVD among individuals at risk by initiating early therapeutic intervention or lifestyle changes. Supported in parts by Undergraduate Research Opportunities Program (UROP) and NIFA, USDA (HAW05023-R, HAW00598-H, W3122, HAW00526-H, 2004-34135-15182).

Mentor: Dr. Pratibha Nerurkar

Sarah Imanaka
Accounting, Economics
Social Sciences
Participation for Honors
Oral Presentation: Session 1 (9:15-10:05a) in Sakamaki C102

Accounting for Climate Change

The Securities and Exchange Commission (SEC) Staff Accounting Bulletin: No. 99 regarding materiality states that public companies in the US, are required to disclose operating risks and opportunities material to the decision-making process. As rising temperatures cause severe changes in the environment, companies should adapt their financial disclosures to accurately reflect its effects on business operations. Reporting climate change is not mandatory, but recommended non-financial disclosures are described by the SEC in the 2010 Commission Guidance Regarding Disclosure Related to Climate Change. Companies that make climate change commitments acknowledge its importance and relevant disclosures should be made if it is determined that profitability is threatened or opportunities for future revenues exist. Thus, participants in the American Business Act on Climate Change Pledge were used to analyze the reporting behavior of companies that made mitigation commitments. This study seeks to answer the following questions:

1. Do companies who make public commitments in support of climate change mitigation report its material effects?
2. How are these companies reporting relevant impacts?
3. Are companies reporting in accordance with the 2010 SEC Guidance?

This study found that out of the participating public companies just over half include “climate change” disclosures in their annual reports from 2015 data.

Mentors: Dr. David Yang, Dr. PingSun Leung

Jennifer Kakio
English
Arts & Humanities – Research
Participation for Honors, UROP
Oral Presentation: Session 2 (10:15-11:20a) in Sakamaki B101

When the Biography Stops and the Fiction Begins: The Ethics Behind Charles J. Shields' And So It Goes: Kurt Vonnegut: A Life

(No abstract submitted)

Mentor: Craig Howes

Miranda Kam
History, French
Arts & Humanities – Research
Participation for Honors
Oral Presentation: Session 3 (11:30a-12:20p) in Sakamaki B101

Masters of la Mode: Representations of Women in the French Fashion Press, 1785-99

This project examines representations of women in the French fashion press from its beginning in 1785 to Napoleon's coup d'état in 1799. During the French Revolution, certain women wore 'masculine' Revolutionary symbols to facilitate their participation in Revolutionary processes. Many saw the actions of these women as threats to masculine citizenship and in 1793, the increased controversy surrounding dress forced the National Convention to declare freedom of dress for all citizens and citizenesses. Some historians have contended that Revolutionary legislators granted women freedom in fashion largely as a substitute for genuine political power in the emerging public sphere. This project argues that although revolutionary processes may have granted women freedom of fashion, the male-dominated fashion press attempted to undermine women's authority and assert men's control in an area in which it claimed women possessed legitimate power.

Through the close analysis of 18th-century fashion periodicals, this project determines that while fashion periodicals claimed to venerate women and their talents in the realm of fashion, they employed concepts like the relationship between dress and behaviors to dictate women's dress. Although the fashion press initially celebrated women as the creators and masters of fashion, the fashion press editors later used their professed adoration of women to persuade them to surrender their freedom of dress. By regulating women's consumptive and sartorial habits, the fashion press helped to alleviate contemporaries' concerns regarding women's participation in the public sphere.

Mentor: Dr. Matthew Lauzon

Ai Kitanosono
Psychology
Social Sciences
Participation for Honors, UROP
Oral Presentation: Session 2 (10:15-11:20a) in Sakamaki C102

Ethnic Differences in Perceptions towards Psychopaths

A number of studies have been done to investigate the relationship between psychopathic personality and criminal behavior. However, relatively few studies have been done regarding the perception towards psychopathy. Investigating the belief and attitude towards psychopathy is important because these factors could affect how people label certain individual as psychopathy and how they treat the person who regarded as psychopathy. In addition, examining the influence of ethnicity on the perception towards psychopath is crucial considering the ethnical diversity in current United States. To investigate the ethnic differences in how people perceive psychopaths, the survey using CAPP prototype-rating scales will be conducted over 254 undergraduates at UH manoa. From the previous researches, we hypothesized that East Asians would have higher rate of misconceptions toward psychopaths compared to European Americans, but the results was exactly the opposite. European Americans actually had higher rate of choosing psychotic symptoms as typical of psychopaths, which means that higher rate of misconceptions toward psychopaths. Also, the lack of difference in perceptions toward psychopathy was found across ethnicity. Further researches might be necessary to investigate both similarity and difference in perceptions toward psychopathy across ethnicities.

Mentor: Dr. David C. Cicero

Adora Klinestiver
Chemistry, Minor in Spanish
Natural Sciences
Participation for Honors
Oral Presentation: Session 2 (10:15-11:20a) in Sakamaki A102
Poster Presentation: 1:30-2:30p in Campus Center Ballroom

Exploration into Replacing the Salicylic Acid Portion of a STAT3 Inhibitor Molecule with Novel Heterocycles: Synthesis of a 5-fluoro-6-amino-*1H*-indazole Analog

Signal Transductor and Activator of Transcription three (STAT3) is a protein that regulates the transcription rate from DNA to mRNA of specific genes that control cell death and survival. The abnormal regulation of the STAT3 pathway has been associated with malignant cell growth in many cancers. Finding inhibitors that block the STAT3 pathway could be useful for the treatment of cancer and has been an ongoing collaborative effort between scientists at the UH Cancer Center including Dr. James Turkson and at the University of Hawai‘i at Mānoa and Dr. Marc Tius, Dr. Christine Brotherton-Pleiss and Dr. Francisco Lopez-Tapia. To this end, a 6-amino-*1H*-indazole building block will be replaced by a 5-fluoro-6-amino-*1H*-indazole building block for incorporation into the inhibitor molecule. This 6-amino-*1H*-indazole was designed as an alternative for the benzoic acid portion of the molecule. Earlier research showed that incorporation of a fluorine atom *ortho* to the 5-amino group of the benzoic acid residue improved the potency. By incorporating a new indazole portion with a fluorine substituent in the same position as that of the benzoic acid residue, the hope is that the potency of the inhibitor will increase. The new indazole starting material will be prepared by adapting a method similar to that used previously for an earlier indazole analog. Experiments will be performed to determine the best protecting group strategy to obtain the target compound in good overall yield. The final compound will be submitted to the UH Cancer Center for bioassay to determine whether there is improved potency.

Mentors: Dr. Marcus Tius, Dr. Christine Brotherton-Pleiss

Emily Ko
History, Economics, Certificate in Spanish
Arts & Humanities – Research
Participation for Honors
Oral Presentation: Session 3 (11:30a-12:20p) in Sakamaki B101

Henry George and *Progress and Poverty*'s Contribution to the Rise of Socialism in the United States, 1870-1900

Henry George was a writer, journalist, lecturer, and social leader in the United States. In the last three decades of the nineteenth century, which is commonly referred to as the Gilded Age, he rose to prominence from his most famous work *Progress and Poverty*. This work observed the inequality and injustice of the period in which he lived, when wealth and want coexisted. George's solution to this problem was a single tax on land that would essentially eliminate private ownership of land and in George's eyes, allow for a more productive and equal-opportunity economy. George's works were best sellers in his day and were read by the most prominent and influential reformers, writers, and political leaders. With his arguably socialist tendencies, some criticized George for being too radical, while others, particularly many notable socialist leaders, denounced George for being too moderate. Despite the controversy, it is clear from the various reactions to George and his works from those against and in favor of socialism that he had an immutable impact on the course of this economic ideology in America.

The analysis of primary sources, like *Progress and Poverty* and George's other writings and pamphlets, diaries, and periodicals from socialist thinkers during the period, has illustrated George's impact. Many socialist thinkers, even if they did not completely agree with his theories, cited George as an imperative stepping stone in the spread of socialism. This evidence changes the history of socialism and aids in the understanding of its implications in American society.

Mentors: Dr. Peter Hoffenberg, Dr. Sumner La Croix, Dr. James Kraft

Landon Kozai
Economics
Social Sciences
Participation for Honors, UROP
Oral Presentation: Session 2 (10:15-11:20a) in Sakamaki C102

Life Satisfaction of Undergraduate Students: Extrinsic and Intrinsic Motivators

In college, choosing a major involves thinking about its extrinsic and intrinsic attributes, for instance its pecuniary benefits versus the degree to which it is internally rewarding. Some students may choose lucrative majors over those which they believe are internally rewarding and vice versa. Previous research has shown that those who pursue intrinsic goals are happier relative to those who pursue extrinsic ones. However, people tend to overestimate the life satisfaction gained by extrinsic needs while underestimating the satisfaction gained by intrinsic needs. Students are motivated for varying extrinsic and intrinsic reasons. It is possible that students choosing a major for reasons conflicting with their personal goals may suffer from lowered life satisfaction. Nonetheless, the temporary circumstances of college students may create a unique dynamic from what has previously been studied. 270 University of Hawai'i at Mānoa college students were surveyed at random. Constructs such as optimism and feelings of community, among others, were found to be indicators of increased life satisfaction. This research may suggest that factors such as the possibility of employment and financial prospects, in addition to other known correlates are key determinants of life satisfaction in college students.

Mentor: Inessa Love

Casie Kubota, Biochemistry
Marissa Kuwabara, Bioengineering
Natural Sciences
Participation for UROP
Oral Presentation: Session 1 (9:15-10:05a) in Sakamaki A101

Using X-ray Crystallography for Developing STAT3 Protein Structure

Abnormal function and activation of STAT3, a protein in humans that assists in cell proliferation and survival, is manifested in many human diseases such as cancer. We are interested in producing high resolution visualizations of crystallized STAT3 proteins that are bound to an inhibitor. Currently, there are a surplus of inhibitors that bind to STAT3, but none bind strongly enough to make that inhibitor a viable option for medical treatment. Due to the fact that the crystal structure of a STAT3 protein binding to a ligand is not known, scientists are unable to move forward in cancer therapy research. This project was a continuation of a previous project to crystallize two different variants of the STAT3 protein that is bound to various ligands in hopes to give researchers powerful data that could possibly lead to a breakthrough in cancer treatment. STAT3 crystals were successfully grown in crystallization trays containing different reagents. Then, using findings from these crystallization trays, various parameters were modified to grow crystals of higher resolution. These crystals were sent to an X-ray crystallography lab to obtain diffraction data on the crystals. The data was then analyzed in order to develop a protein structure for STAT3.

Mentor: Dr. Ho Leung Ng

Shannon Kutscher
Microbiology
Natural Sciences
Participation for UROP
Oral Presentation: Session 2 (10:15-11:20a) in Sakamaki A101

Effect of *Morinda citrifolia* (Noni) Juice on Hepatic Inflammation and Insulin Receptor Signaling in High-Fat Diet (HFD)-Fed Mice.

Chronic inflammation plays an important role in pathogenesis of several metabolic disorders including insulin resistance and type 2 diabetes (T2D). Besides adipose tissue, high-fat diet (HFD)-induced hepatic inflammation play a critical role in insulin resistance and T2D. *Morinda citrifolia* (noni) has been used for centuries by the Pacific islanders to treat various diseases including T2D. Recent studies indicated that noni juice protected mice against chronic alcohol-consumption-induced hepatic inflammation. Effects of noni juice on diet-induced hepatic and intestinal inflammation remain unknown. Our preliminary data indicates that laboratory-based fermented noni juice (fNJ) improved fasting plasma glucose, and insulin tolerance in HFD-fed mice. Since insulin sensitivity is associated with insulin receptor signaling, ***we will test the hypothesis*** that fNJ improves insulin receptor phosphorylation. Furthermore, inflammation is considered as one of the early triggers of T2D. We will also test a ***second hypothesis*** that fNJ improves inflammation in HFD-fed mice. C57BL/6 male mice were fed either a) control diet (4% fat), b) fNJ + con diet, c) HFD (58% fat) or d) HFD + fNJ for four weeks. A panel of 62 tissue-specific inflammatory chemokines and cytokines were analyzed by using commercial dot bot array kits as standardized in our laboratory. We will determine insulin receptor phosphorylation, using commercial ELISA kits. Identifying anti-inflammatory properties of noni, may lead to identifying low-cost alternative treatment strategies for chronic inflammatory diseases. Supported in parts by Undergraduate Research Opportunities Program (UROP), NIFA, USDA (HAW05023-R, HAW00598-H, W3122, HAW00526-H, 2004-34135-15182) and NIH (R21AT003719, G12RR003061, P20MD000173) grants.

Mentor: Dr. Pratibha Nerurkar

Karolyn Lam
Public Health
Social Sciences
Participation for Honors
Oral Presentation: Session 1 (9:15-10:05a) in Sakamaki C101
Poster Presentation: 1:30-2:30p in Campus Center Ballroom

Preventing Infant Deaths through Safe Sleep Education

Sudden unexpected infant death (SUID) is the death of an infant less than 1 year of age and can be reported as sudden infant death syndrome (SIDS), unknown cause, or accidental strangulation and suffocation. These reports are determined upon completion of a thorough investigation. SIDS is the leading cause of death in infants in the United States. Healthy Mothers Healthy Babies (HMHB) Coalition of Hawai‘i is a local nonprofit that provides mothers with proper education and prenatal programs. This project focuses primarily on the Hawaii Cribs for Kids Program facilitated by HMHB. The purpose of this study was to identify the demographics of mothers who attend the Cribs for Kids classes in Hawaii and identify common misconceptions about safe sleep practices. By having this information readily available, HMHB can improve class material to be more culturally appropriate and to teach recommendations and prioritize mothers at high risk when doing outreach. Results indicated that mothers learned most about pacifier use for safe sleep and how bumper pads and wedges or positioners can be hazardous when placed in an infant’s sleep environment.

Mentor: Lisa Kimura , Dr. Denise Nelson-Hurwitz

Tommy Lam
Physics, Mathematics
Natural Sciences
Participation for UROP
Oral Presentation: Session 3 (11:30a-12:20p) in Sakamaki A104

Design of a Charge Focusing Lens for a Time Projection Chamber

The Time Project Chamber (TPC) is a detector of subatomic particles that images ionization in 3D. As a general purpose detector of ionization, the TPC is widely used in particle physics experiments and dark matter searches. However, with dark matter searches and large particle experiments, costs increase significantly due to the number of pixel chips needed in order to convert ionization charge into pixels. Hence, the ability to focus the ionization tracks onto a smaller region comparable to the size of a pixel chip would greatly reduce costs, allowing for the potential to increase the number of detectors in production or increase their size of the TPC at a fixed costs. Therefore, the goal of the project is to design an electrostatic lens that will focus ionization drifting in a TPC while minimizing the effects of charge diffusion in order to preserve the performance of the TPC.

A spherical voltage potential distribution was used as a model for the lens' voltage distribution. In order to evaluate the effectiveness of the model, Garfield, a CERN computer program, is used to simulate different lens voltage configurations. The criteria for effectiveness is a near uniform and steady focusing factor across the length of lens. The first stage of simulations, which is complete, validates the spherical voltage potential model. The next stage of simulations, that is currently in progress, is refining the lens meet the specifications stated above.

Mentor: Dr. Sven Vahsen

Martine Leclerc
Psychology
Social Sciences
Participation for Honors, UROP
Oral Presentation: Session 1 (9:15-10:05a) in Sakamaki C101
Poster Presentation: 1:30-2:30p in Campus Center Ballroom

The Effects of Gratitude on Cortisol Reactivity

Cortisol, a hormone released during periods of psychological or physiological stress, has been linked to many of the harmful effects of stress. If cortisol levels are not managed, individuals may be at higher risk of developing certain mental disorders, high blood pressure, heart disease, and more. Research examining the effects of gratitude shows promising results in reducing psychological stress, but it is not known if this translates into the physiological effect of reduced cortisol production. This study tests the effect of a gratitude intervention on stress and cortisol levels in college students. The experiment was done in two parts: a pilot study and a main experiment. The pilot study used 42 student participants to determine if the gratitude intervention reduced stress, improved life satisfaction, and increased gratitude. The intervention was not effective, so it was modified by making it less quantity and more qualitatively oriented. In the main experiment, a different set of 38 participants listed three things they were grateful for and wrote a weekly paragraph about gratitude, to test if the intervention could improve cortisol reactivity, stress, satisfaction with life, and gratitude. Cortisol reactivity was measured by salivary cortisol samples taken before and after a stressful social computer game. The hypothesis was not supported. Limitations and future research are discussed as to how gratitude interventions may be effective in only certain conditions.

Mentor: Dr. Loriena Yancura

Ivana Skye Matson
Linguistics
Social Sciences
Participation for Honors
Oral Presentation: Session 2 (10:15-11:20a) in Sakamaki C102

Accommodation in Instant Messaging

Differing levels of formality are salient to linguists and laypeople alike (Coupland 2014) - including in computer-mediated communication (CMC), which has not been extensively researched. As formality is so salient, it would not be surprising if users of CMC react differently to conversation partners who use different levels of formality, for instance by accommodating to their conversation partner's formality level (Beebe & Giles 1984). In this study, sociolinguistic interviews were carried out over instant messaging - a synchronous, one-on-one form of CMC. To investigate accommodation, these interviews were carried out in two conditions: one where formal features were used, and one where informal features were used. During the last part of the interviews in both conditions, the conditions were switched. Standard capitalization is a common marker of formality in CMC (Lahti & Laippala 2014, also shown to be perceived as true by frequent CMC users in a pre-study); due to this, one of the main differences between these conditions was that the interviewer used standard capitalization in the formal condition, but no capitalization at all in the informal condition. The results indicate trends in the expected direction, as well as substantial variation across participants.

Mentors: Dr. Amy Schafer, Dr. Katie Drager

Kristian McDonald, Natural Resources and Environmental Management, Minor in Geology and Geophysics
Alisha Summers, Global Environmental Science
Natural Sciences
Participation for UROP
Oral Presentation: Session 1 (9:15-10:05a) in Sakamaki A103

Beach Loss, Seawall Construction, and Land-Use Patterns at Odds with Coastal Zone Policy - East Oʻahu, Hawaiʻi 1928-2015

Protecting and preserving Hawaiʻi's beaches is important to the economy, ecosystem, Hawaiian culture, and local island lifestyle. However, within the last century, beaches on Oʻahu have narrowed and are increasingly vanishing altogether. As part of the policy framework created under the U.S. Congress' Coastal Zone Management Act of 1972, the State of Hawaiʻi enacted a statewide Coastal Zone Management (CZM) program in 1977 in response to federal incentives and locally significant erosion problems. Under the program, counties were given authority to regulate shorelines independently. Since then, the four counties have adopted different types of construction setback laws: Maui and Kauaʻi have adopted rate-based setbacks, and Hawaiʻi and the City & County of Honolulu use a fixed distance of 20-60 feet depending on specific parcel conditions. Despite the establishment of these setbacks, shorelines continue to recede and beach to disappear. We present data from the east-facing shores of Oʻahu, that document changing shoreline positions and beach widths concurrent with coastal development. Over the period of the study, seawall and revetment construction increased by 54%, which resulted in 74% of the beach eroding at an average rate of -0.058 ± 0.048 m/yr. Before the CZM (1928-1975) was enforced the shoreline accreted at an average rate of 0.027 ± 0.07 m/yr. Despite the enforcement of the CZM program, from 1975 to 2015 the shoreline eroded at an average rate of -0.14 ± 0.063 m/yr. We reveal that historical seawall and revetment construction to protect eroding lands has caused a narrowing and loss of beach from 1928 to 2015 even while the CZM program has been in force with laws at State and County levels specifically designed to protect the coastline.

Mentor: Dr. Charles Fletcher

Chad Morrow
Civil Engineering
Engineering & Computer Sciences
Participation for UROP
Oral Presentation: Session 1 (9:15-10:05a) in Sakamaki B102
Poster Presentation: 1:30-2:30p in Campus Center Ballroom

Determine the Impact of Urban Stormwater Runoff from Chlordane and Dieldrin in the Manoa Stream

Chlordane and dieldrin are chlorine-containing pesticides that are very toxic and difficult to remove from the environment. Both chlordane and dieldrin have been detected in recent studies in sediment samples from the Ala Wai Canal and the tributary Mānoa, Pālolo, and Makiki streams.

The objective of this study is to quantify the amount of chlordane and dieldrin in stormwater runoff due to heavy rainfall events, which flow into Mānoa stream and into the Ala Wai Canal. The research approach is to collect the Total Suspended Solids (TSS) via hourly water samples within Mānoa stream and separate the TSS from the water samples. After a series of standard laboratory methods, the samples are analyzed via gas chromatography and concentrations are then compared to the United States Geological Survey (USGS) streamflow data for correlation.

The research results are indicative of high levels of both chlordane and dieldrin within the filtered TSS samples. The streamflow ranges varied from 8 cubic feet per second (cfs) to 550 cfs. Chlordane ranged from 18.80 parts per billion (ppb) to 46.65 ppb. Dieldrin ranged from 0.31 ppb to 3.93 ppb.

The conclusion is that chlordane and dieldrin are found in stormwater runoff in Mānoa stream and increasingly prevalent during heavy rainfall events. The pesticides likely originate from upstream urban areas, which are carried downstream as sediment runoff, deposited along the streambed and eventually into the Ala Wai Canal. As the streamwater flow increases during a stormwater event, there is a correlation between flow intensity and pesticide concentration.

Mentor: Dr. Tao Yan

Kari Noe
Information and Computer Science
Engineering & Computer Sciences
Participation for UROP
Oral Presentation: Session 2 (10:15-11:20a) in Sakamaki B103

3D Scanning in the Field: Developing a Visualization System for Archaeological Artifacts

This project aims to develop a design of an interactive visualization system for at-risk archaeological artifacts. The analysis of artifacts is integral to archaeology, but due to problems such as the artifacts own fragility, ethical disputes over ownership of artifacts, and natural and anthropogenic factors, many artifacts are considered to be at risk of being damaged, destroyed, or inaccessible to researchers. Currently, there are techniques to preserve these at--risk artifacts, however, degradation is unavoidable at every stage of the archaeological process. However, with the increase of cost-effective 3D scanning technologies, the ability to create 3D data products has become available to archaeologists. Here I aim to describe the process of designing a program that will visualize 3D structural data of at--risk artifacts. I will produce a design that will create an intuitive user experience for archaeologists through lessons learned through archaeological experience and research. Through this approach, I will investigate the benefits of a developer experiencing authentic user activities when undergoing the design process to solve problems for fields that require unique design qualities or constraints. I will also touch upon the use of virtual reality in the visualization system and discuss the benefits it could have for cultural preservation.

Mentor: Jason Leigh

Jenna Pak
Biology
Natural Sciences
Participation for UROP
Oral Presentation: Session 2 (10:15-11:20a) in Sakamaki A101

Reduction of Tau Hyper-Phosphorylation via Selenoproteins

Alzheimer's disease (AD) is a neurodegenerative disease that causes loss of memory and other brain functions. One of the hallmarks of AD is the neurofibrillary tangles (NFT), caused by hyper-phosphorylated tau that aggregates to form paired helical filaments. Patients with AD have elevated brain zinc levels and zinc deposits that are localized to NFT-bearing neurons. Selenium is another element required for proper brain function and is incorporated into selenoproteins, such as the glutathione peroxidases (GPx), that prevent the buildup of harmful free radicals. Recent AD studies have shown that selenium supplementation can reduce tau phosphorylation, potentially through antioxidant activities. Oxidative stress can induce the release of zinc from intracellular stores. Zinc is capable of inhibiting protein phosphatase 2A (PP2A), the primary protein responsible for de-phosphorylating tau. The objective of this project is to determine if selenoproteins reduce tau phosphorylation by preventing oxidative-stress induced zinc release. In the study, cells were treated with various selenium concentrations to measure its effects on intracellular free zinc levels. *FluoZin-3*, a zinc selective fluorescent indicator, was used to measure zinc levels. Selenium-deficient cells displayed higher levels of zinc than controls, suggesting that selenium supplementation in the brain may prevent accumulation of intracellular zinc. Selenium-sufficient cells treated with the GPx4 inhibitor RSL-3 also had higher levels of zinc indicating that the protective effect of selenium may be mediated through GPx4 activity. These findings suggest that selenium, by reducing oxidative stress, can prevent release of zinc from storage and subsequently reduce tau phosphorylation.

Mentor: Dr. Frederick Bellinger

Mark Anthony Pascua
Biology
Natural Sciences
Participation for UROP
Oral Presentation: Session 3 (11:30a-12:20p) in Sakamaki A103

Recovering the Genetics of Endangered Tree Snails with DNA from Old Ground Shells

On the island of Molokai a population of Hawaiian tree snails, *Partulina redfieldi,* was divided into subpopulations in the 1900s through cattle damage to the native forest. Research from 1982 to 2000 noted that after several generations of separation snails on four semi-isolated trees differed in size, color, and fecundity, even though they were once part of the same larger breeding population. In the 1980s to 1990s demographic measurements were taken on snails living on these trees, separated by distances of less than 100 meters, and shells from snails that died were collected from under each tree and labeled with the tree identification number. Soon after, rats decimated the populations.

Genetic work was never done on the living populations, but we now have the ability to extract DNA from old shells. Can genetic differences be detected among tree-snail populations in trees separated by distances of less than 100 meters? We will utilize a set of achatinelline microsatellite primers to evaluate relationships among four subpopulations of *Partulina redfieldi*.

In this study, we will: 1) identify shell characters of color and size for these subpopulations of *Partulina redfieldi;* 2) recover DNA from these old shells; and 3) utilize ten achatinelline microsatellite primers to evaluate the genetic relationships among the four isolated subpopulations of *Partulina redfieldi.*

Mentor: Dr. Michael G. Hadfield

Andrew Pham
Biology
Natural Sciences
Participation for Honors
Oral Presentation: Session 2 (10:15-11:20a) in Sakamaki A101

The Role of Selenoprotein K on the Progression of Melanoma

Store-operated Ca2+ entry (SOCE) in the endoplasmic reticulum (ER) has been found to be vital for effective proliferation of melanoma cells. With Selenoprotein K (SELENOK) understood to influence calcium flux during activation and migration of immune cells, it was hypothesized that SELENOK may play a role in the development of primary and secondary melanoma tumors. To test this hypothesis, we utilized a mouse model susceptible to spontaneous melanoma by involving the overexpression of the glutamate receptor 1 (GRM1) in melanocytes. This model was established to drive melanoma in the tails and ears of mice, progressing it to metastatic melanoma that may appear in the draining lymph nodes by 4 months of age. Using these mice, we bred for the deletion of the SELENOK gene while retaining GRM1. This generated littermate controlled experiments consisting of GRM1/SELENOK+/+, GRM1/SELENOK+/-, and GRM1/SELENOK-/- mice that could be compared for the development of primary and secondary tumors. Male and female cohorts from these littermates were analyzed separately (N>8 per sex per genotype) for tumor on the tails and ears at 4 months of age. Results showed both male and femalesGRM1/SELENOK-/- genotypes had significantly lower tumor progression compared to GRM1/SELENOK+/+ and GRM1/SELENOK+/- genotypes, both of which were similar to each other. These data suggest that SELENOK is involved in promotion of melanoma at the primary sites. These results indicate the possibility of targeting SELENOK as a possible treatment to control melanoma progression.

Mentor: Dr. Peter Hoffmann

Kina Poulos
Biology
Natural Sciences
Participation for Honors, UROP
Oral Presentation: Session 3 (11:30a-12:20p) in Sakamaki A103

A Study of Immune Responses to Dengue Virus in a Naïve Population

The four serotypes of dengue virus (DENV) are the world's leading cause of mosquito-transmitted viral disease and infect around 390 million individuals annually, leading to an estimated 25 thousand deaths. Decades of research have been devoted to developing a dengue vaccine, but only recently has a vaccine become available. Last year, Sanofi-Pasteur released a chimeric yellow fever dengue vaccine (CYD) that has since been licensed in several Asian and South American countries. The CYD vaccine demonstrates 60% efficacy despite the presence of neutralizing antibodies. It performs poorly in subjects who have never been exposed to DENV, the population that would benefit the most. This dilemma highlights the need for more information about immune responses following DENV infection. Complete protection against infecting serotypes has been shown to correlate with neutralizing antibodies. In this study, we investigate the titers of antibodies in 11 serum samples, collected 75-263 days post-illness, from confirmed cases and 2 of their household members in the Big Island during the 2015-2016 DENV1 outbreak. Using enzyme-linked immunosorbent assays (ELISA) and focus reduction neutralization assays (FRNT), we determined the IgM/IgG antibodies and neutralizing antibody titers, respectively. IgG was positive for all 11 confirmed dengue cases and for one of the two household members; IgM was positive in 9 dengue cases. The neutralizing antibodies to DENV1 were detected in all 11 dengue cases and one household member.

Mentors: Dr. Wei-Kung Wang, Dr.Saguna Verma

Ernest Sam Puletasi
Biochemistry
Natural Sciences
Participation for MHIRT Fellow
Poster Presentation: 1:30-2:30p in Campus Center Ballroom

Speciation of Non-*Tuberculosis Mycobacterium* Isolated from Clinical Specimens of Patients with Suspected Tuberculosis Disease in Cameroon

Non-*Tuberculosis mycobacterium* (NTM) refers to all the species in the family mycobacterium except *M. leprae* and *M. tuberculosis.* NTMs are environmental pathogens that can be isolated from the soil and water, and there are over 140 different NTM species. About 40% of NTM species cause an array of diseases affecting the lungs, lymph nodes, skin, bone, and extra pulmonary regions. NTMs have been neglected in medical settings because of the virulence of other infectious diseases like tuberculosis (TB) making it of lower priority. However, NTM are becoming an increasing concern due to prevalence of infections within HIV patients, immunocompetent patients, as well as in children leading to diseases. In this retrospective study, the main goal was to identify and characterize NTM species recovered from cultured-clinical specimens submitted to Centre Pasteur du Cameroon by TB-suspect patients for the isolation of *Mycobacterium tuber*culosis between January 2015 and April 2016. The *GenoType Mycobacterium CM/AS* system was utilized for the identification of NTM species. Of the 60 samples tested, 33 had NTM single infection and 11 had two NTM infections. Within this study, the age group affected the most by NTM infections ranged from 0-10 years old. There were 12 different species identified with the most common species identified being *M. intracellular* and *M. smegmatis*. This study showed that TB-suspected patients acquired a variety of NTM infections. Future studies will investigate clinical and radiological records of patients to identify signs and symptoms that could be associated with NTM disease.

Mentor: Abanda Ngu

Co-Authors: Dr. Sara Eyangoh, Dr. Valerie Donkeng

Zachary Quinlan
Marine Biology
Natural Sciences
Participation for UROP
Oral Presentation: Session 2 (10:15-11:20a) in Sakamaki A104

Microbial Community Diversity of Coral in Kane'ohe Bay in Comparison to Organic Exudates

Coral reef communities are in a state of constant change especially with the risk of global climate change and rising sea levels. This is changing the interactions between reef community constituents and having an impact on the microbial community. Understanding the changes in microbial community with differential dissolved organic exudation from coral or algal reef constituents is extremely important in understanding the shifting reef make-up. We examined the effect of model component inoculation on sea water microbial communities, coral and algae through two different experiments. We characterized the shifts in DOM composition with fluorescent dissolved organic matter (fDOM) using scanning fluorescence spectroscopy. Microbial community growth was assessed through flow cytometry and compared against the fDOM production variation. During the initial remineralization experiment we determined the growth rates of microbial communities with inoculations of Fucose, Tyrosine, and humic acid. Following this remineralization experiment, a chemostat incubation experiment was designed to determine coral fDOM production under these chemical enrichments and the shift in fDOM composition when algae and coral were associated.

Mentor: Dr. Craig E. Nelson

Jessica Sevilla
Marine Biology
Mathematics
Natural Sciences
Participation for UROP
Oral Presentation: Session 2 (10:15-11:20a) in Sakamaki A104

Disentangling the Species Abundance, Reproductive Mode(s), and Reproductive Timing of the Reef-Building Coral Species Complex *Pocillopora damicornis/acuta*

Reef biodiversity is maintained by reproduction, recruitment, and larval dispersal; Therefore, knowledge of species reproduction is critical in understanding how reefs will be impacted by mounting stressors. Knowledge of coral reproduction is complicated by multiple reproductive modes within a single species and uncertainty of species identification due to extreme morphological plasticity. One coral that displays these complex characteristics is the genus *Pocillopora*, a dominant scleractinian coral in Kāne'ohe Bay which is frequently the subject of studies. However, its' reproductive modes are yet to be characterized and new data suggest that genetically distinct clades exist within what was previously known as *P. damicornis*. This uncertainty affects the validity of decades of work and needs to be resolved in order to clarify these data. Twenty colonies of *Pocillopora damicornis/acuta* collected from across Kāne'ohe Bay were observed to characterize spawning and planulation timing. Microsatellite analysis of planulae collected from these colonies were used to determine sexual/asexual production ratio. Another 200 colonies were sequenced at the mitochondrial ORF and compared to previuos work by Schmidt-Roach *et al.* 2012 to determine ratio of *P. damicornis* vs*. P. acuta* in Kāne'ohe Bay. Our results will clarify species and reproductive complexity in an attempt to understand species on the reef and the capacity they have for maintaining diversity — a critical driver of reef resilience in a time of anthropogenic climate change.

Mentor: Dr. Ruth Gates

Co-Authors: Jen Davidson, Katie Barott, Ruth Gates

Nicolette Smith
English
Arts & Humanities – Research
Participation for Honors
Oral Presentation: Session 2 (10:15-11:20a) in Sakamaki B101

Spirituality in the Modern Woman

This project is a critical analysis of the life writing of young, contemporary women focusing on the spiritual aspect of their writing aiming to study the spiritual beliefs and purpose behind including this aspect of their life in an autobiography. of these young women through their published autobiographical works.

This paper focuses on studying the autobiographies of three women- Lena Dunham, Malala, and Katie Davis. Lena Dunham is a controversial feminist, while Malala and Katie Davis are conservative, religious women, although Malala is Muslim and Davis is Christian. Based on their writings about their life, cultural studies is done to compare and contrast their spiritual and/or religious beliefs and the way they act on them, according to their work. In addition, theoretical framework on autobiography and life writing is studied in order to situate the autobiographies in both history and modern critics in order to determine the intent of each writer and the purpose of their spirituality (or lack thereof) within their respective autobiography.

In each of the autobiographies studies, it was determined that each author is both writing in response to their own spiritual community as well as to their critics.

By studying contemporary women, this project sheds light on the different ways religion and spirituality are acted out in modern times in a largely secular world. This research contributes to the analysis of women's life writing by focusing on the religious and/or spiritual part of each writer's life not often discussed in secular literature.

Mentor: Dr. Craig Howes

Christian Stegmann
Anthropology, Minor in Asian Studies
Social Sciences
Participation for UROP
Oral Presentation: Session 1 (9:15-10:05a) in Sakamaki C102

Stone Soup: Plastiglomerate, The Anthropocene, and Recipes for Assembling the Geology of History on Kamilo Beach, Hawai'i 1805-2017

(No abstract submitted)

Mentor: Dr. Jonathan Padwe

Eleanor Stock
Nursing
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Participation for Honors, UROP
Oral Presentation: Session 3 (11:30a-12:20p) in Sakamaki C101

Exploring Salutogenesis as a Concept of Health and Wellbeing in Nurses who Thrive Professionally

Purpose: To determine whether salutogenesis, a concept of health and wellbeing, can be identified in nurses who self-describe themselves as thriving professionally.
Background: Nurse burnout can potentially impact clinical performance, patient safety, and increase the turnover of nurses, which all contribute to additional health care costs (Rushton, Batcheller, Schroeder & Donohue, 2015). The ability to not only avoid burnout, but to thrive in stressful environments is an important factor worth exploring. The salutogenic theory is related to this. Currently no published data exists that specifically explores the concept of salutogenesis in nurses who self-describe themselves as thriving professionally.
Methods: This was a mixed method, exploratory, descriptive study which was undertaken to describe elements of the salutogenic theory. Survey data was collected from twelve nurses who describe themselves as "thriving" professionally. Qualitative data was analyzed for themes. Quantitative data was statistically analyzed.
Results: Qualitative data analysis revealed the importance of the following main themes: other people, passion, coping mechanisms, personal characteristics, and time. Quantitative data revealed the average Sense of Coherence (SOC) score, which measures a persons perceived health, was 73.58 out of a possible 91 points.
Conclusion: Nurses who self-described themselves as thriving reported a value in passion, support from others, the possession of innate personal characteristics, and education as critical to thriving.

Mentor: Dr. Estelle Codier

Natalie Subia
Molecular Cell Biology
Natural Sciences
Participation for UROP
Oral Presentation: Session 2 (10:15-11:20a) in Sakamaki A102
Poster Presentation: 1:30-2:30p in Campus Center Ballroom

Searching Inhibitors of Mimosinase and Rhizomimosinase for Developing a Therapy for Iron Overload

Iron overload is a medical condition that affects many children as well as adults. Mimosine is a plant-derived non-protein amino acid, which has a potential for using as a drug for iron chelation therapy. However, mimosine may also have toxic side effects, as it is known to inhibit mitotic cell division. Therefore, excess mimosine should be removed following the iron chelation treatment. Mimosinase and rhizomimosinase are two enzymes that effectively degrade mimosine, and therefore they may be used for removal of mimosine following the iron chelation treatment. However, there may be natural inhibitors of these enzymes in the human plasma that may inhibit their activity. Therefore, it is important to determine the effects of potential inhibitors of these enzymes that may be present in human plasma. The objective of this research is to determine the activities of these enzymes in the presence of varying concentrations of four potential inhibitors that have some structural similarities with mimosine. Three of these compounds, L-DOPA, dopamine, and DOPA-methyl-ester were found to inhibit activities of both enzymes while deferiprone did not show any inhibitory effects on these enzymes. The results obtained from this study may help to develop a novel treatment regime for treatment of iron overload.

This research is supported by UH UROP Program, UH INBRE program, and a USDA NIFA Hatch Grant.

Mentors: Dr. Dulal Borthakur, Michael Honda

Justin Suitos
Marine Biology
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Participation for UROP
Oral Presentation: Session 2 (10:15-11:20a) in Sakamaki A104

Genetic Comparison between Prince William Sound and Alaska Coastal Current Populations of a Zooplankton Species, the copepod *Neocalanus flemingeri*

Microscopic plants and animals, collectively called plankton, are at the base of pelagic food webs making them the foundation of marine ecosystems. *Neocalanus flemingeri* is a species of zooplankton commonly found all along the Alaskan continental shelf and offshore in the Gulf of Alaska (GOA) and in Prince William Sound (PWS). Within the PWS, there is a fjord acting as a physical barrier between *N. flemingeri* populations raising the question of connectivity between GOA and PWS populations. It is hypothesized that there is limited gene flow between the western PWS and the GOA populations of *N. flemingeri*, leading to differences in the proportion of haplotypes between the two regions. In addition, individuals of *N. flemingeri* collected at station PWS2 in May and September were hypothesized to be genetically similar. DNA was extracted from 30 individuals per station from five different stations. A target region of the mitochondrial cytochrome oxidase subunit 1 (MTCOI) gene was then amplified for each sample using specific primers followed by sequencing of the amplicon. Using the program Mega 7, the gene region was aligned with both forward and reverse templates to make a single consensus strand. Each consensus strand was blasted in NCBI to confirm the *N. flemingeri* species identify. The sequences were put in the program Arlequin to calculate the haplotype diversity (h), haplotype frequencies for each station, and fixation index (Fst) to measure the genetic diversity and genetic distance [Fst/(1-Fst)] between samples.

Mentor: Dr. Petra Lenz

Co-Author: Vittoria Roncalli

Kadee-Kalia Tamashiro
Biology
Natural Sciences
Participation for Honors
Oral Presentation: Session 3 (11:30a-12:20p) in Sakamaki A101

Examining Molecular Pathways of Urothelial Cell Differentiation Using a Novel Ex-vivo Ureter Explant Model

Congenital obstructive nephropathy is the most common cause of kidney disease in children, and is caused by obstructions of the urinary tract during fetal development. The blockage most commonly occurs at the *Ureteropelvic Junction* (UPJ) in the upper ureter where it connects to the kidney. There is a poor understanding of the environmental and genetic causes of UPJ obstructions, partly due to the lack of non-surgical genetic models. My faculty mentor, Dr. Fogelgren, has recently generated a transgenic mouse with prenatal congenital UPJ obstructions. This transgenic mouse has a conditional knockout of the Sec10 gene (Sec10-CKO) in urothelial cells, which are specialized epithelial cells that line the urinary tract. My project aims to establish an "ex-vivo" tissue explant model that will allow us to better analyze the genetic control and timing of urothelial differentiation. To accomplish this, ureters were dissected out at mouse gestational day 15.5, before urothelial differentiation begins, and were cultured under various cell culture conditions to assess consistency and optimize the model. Physical growth of the explant, urothelial cell differentiation, and occurrence of peristalsis were used as criteria to evaluate the validity of the model. Following the establishment of a reliable model, we compared ureters from Sec10-CKO and control mice in order to determine how Sec10 is critical for differentiation. Real time PCR and immunostaining were used to examine genetic pathways previously shown to be important in ureter development. Preliminary results suggest that ureters can be grown *ex-vivo* to reliably study cell differentiation and ureter development.

Mentor: Dr. Benjamin Fogelgren

Madisyn Uekawa
English & Public Health
Arts & Humanities – Creative
Participation for Honors
Oral Presentation: Session 1 (9:15-10:05a) in Sakamaki B101
Poster Presentation: 1:30-2:30p in Campus Center Ballroom

What I Chose: Enhancing Suicide Prevention through Young Adult (YA) Fiction

What I Chose is a Young Adult (YA) fictional novella that emerged from my desire to use popular literature as a tool to promote good health. I read and evaluated a series of six popular YA fiction books that contain themes of suicide, and I attempt to emulate the effective literary techniques of these best-selling authors alongside safe messaging into my work. I use my protagonist, Kiara, and Emma, her deceased twin who died by suicide, to exemplify individuals at risk for suicide. I also include supporting characters that show readers a way to reach out to those that display suicidal signs. I form my novella around Kiara's journey as a transfer freshman at UH who is looking for a restart in life but finds herself uncovering the death and story of her twin that she had no prior knowledge of. Kiara is looked at by those who knew Emma as if she had returned from the dead, and she finds herself given a second chance at life. Similar to most of the YA novels I read in my research, *What I Chose* aims to hopefully illuminate the meaning in finding purpose, hope, and embracing the choices we are given in this life. Since popular culture and ideology can be influenced by successful YA literature (due to its large readership), it is essential to appropriately expand upon a YA "health promoting" subgenre that can be didactic and that can potentially improve holistic well-being and possibly reduce detrimental behavior.

Mentors: Dr. Susan Schultz, Dr. Jeanelle Sugimoto-Matsuda

Brent Wakuzawa
Bioengineering
Natural Sciences
Participation for Honors, UROP
Oral Presentation: Session 1 (9:15-10:05a) in Sakamaki A101

Reduction of Inhibitory Compounds Generated from High Pressure Treatment of *Gracilaria salicornia*

In 2015, the U.S. Energy Information Administration (EIA) reported that nearly 81% of the country's total energy consumption was derived from non-renewable energy sources. Hawaii's reliance on petroleum is due to the state's isolated location and declining natural resources. Studies have investigated lignocellulosic biomass as a potential replacement for petroleum as a sustainable and cost-effective energy source. Lignocellulosic biomass is composed of cellulose, hemicellulose, and lignin. Lignin acts as a natural barrier to external stresses and prevents the hydrolysis of cellulose and hemicellulose into fermentable sugars which can be converted into biofuels. Therefore, pretreatment methods are utilized in order to separate the three components prior to further processing.

Steam explosion is one of the most cost-effective methods for generating a high product yield. Biomass is exposed to high pressure and temperature steam and a sudden decompression results in the physical and chemical breakdown of the biomass material. However, severe conditions result in the hydrolysis of monomeric sugars into inhibitory compounds which lowers potential biofuel yields.

In this study, an invasive red macroalgae species, *Gracilaria salicornia*, was evaluated as a possible biomass source for biofuel production. Sugar and inhibitor concentration in the pretreated biomass was measured using high pressure liquid chromatography (HPLC), a method to quantitatively determine the concentration of compounds in a mixture. The effectiveness of a physical filtration treatment on the inhibitory compounds was determined by passing the pretreated slurry through a biochar column. This project's aim is to maximize monomeric sugar yield by reducing generated inhibitor compounds.

Mentor: Dr. Samir K. Khanal

Eric Welch
Global Environmental Science
Natural Sciences
Participation for UROP
Oral Presentation: Session 3 (11:30a-12:20p) in Sakamaki A103

Groundwater Modeling in Pesticide Fluxes of the Faga`alu Stream, American Samoa

Pesticide use is a growing concern in today's society. Pesticides in natural waters may present problems not only to terrestrial and marine flora and fauna, but also to humans. We investigated groundwater flow as a vector of pesticide dispersion in the watershed. Although contaminant transport through aquifers may take several decades, problems may persist for extended periods and eventually reach drinking water supplies, streams, and the marine environment. Our study focused on surface water-groundwater interactions in streams and the coastal ocean, focusing on pesticide fluxes. Groundwater and base flow samples were taken across the island of Tutuila in American Samoa to analyze for the herbicide glyphosate ("Roundup"). In addition, a more detailed stream-study, involving samples along the mountain to ocean gradient was conducted in the developed Faga`alu watershed on the outer Pago Harbor region of the island. Samples were collected at base flow and high stream flow conditions, at coastal springs, and from groundwater wells run by the American Samoa Power Authority (ASPA). Glyphosate concentrations were determined using an ELISA method at the University of Hawai`i. Concentrations were low in general, with the highest being 0.301 ppb. The trace amounts recorded do not indicate a threat to aquatic habitats, as the EPA's set MCL value for glyphosate is 700.0 ppb. Although the observed concentrations indicate minimal toxicity, the results show presence of pesticide in the groundwater that likely contributes to the stream's base flow as well as to submarine groundwater discharge (SGD) in the coastal region of the studied watershed.

Mentor: Dr. Henrietta Dulai

Kazuo White
Management Information Systems
Engineering & Computer Sciences
Participation for For ITM 399 Independent Research
Oral Presentation: Session 2 (10:15-11:20a) in Sakamaki B102
Poster Presentation: 1:30-2:30p in Campus Center Ballroom

Creating a Weakness Corpus to Support Proactive Cyber Security

The number and severity of cyber-attacks has been increasing at an alarming rate. Currently software security reacts to attacks, trying to minimize damage after it has already occurred. The inherit delay in a reactive approach will inevitably result in larger-than-necessary losses. To prevent or minimize such losses, a proactive approach to security is needed. This proactive approach is the basis of PERCEIVE. By being able to identify potential attacks before they can cause harm, we will be able to finally turn the tide and stop being on the defensive.

Many weaknesses in software are known, and are publicly indexed, but this information is not reaching decision makers. MITRE's databases—CVE for vulnerabilities, CWE for weaknesses, and CAPEC for attack patterns—hold these past concepts.

While the data in these databases was rich, it was loosely structured and high in volume. My portion of this project was to understand the structure and contents of the CWE database so that we could create a more easily understood and analyzable corpus. This corpus, through machine learning, will be used to compare known concepts (CWEs) to emerging concepts in hacker discussion groups. To aid in determining similarity between our indexed concepts and emerging concepts, we need to understand the specificity, subject, time and purpose of each concept that we index. By analyzing emerging concepts in this manner, we can direct the attention of software developers, managers, and decision-makers so that they can proactively fix the security weaknesses in an economic and time efficient way.

Mentors: Dr. Kazman, Carlos Paradis

Lindsey Wilbur
Political Science
Social Sciences
Participation for UROP
Oral Presentation: Session 3 (11:30a-12:20p) in Sakamaki C101

PE Teacher Concussion Awareness in Hawai‘i

(No abstract submitted)

Mentor: Dr. Nathan Murata

Elizabeth Winnicki
Biology
Natural Sciences
Poster Presentation: 1:30-2:30p in Campus Center Ballroom

Exploring the Genetic Diversity of Hawaiian Sweet Potato

Sweet potato, *Ipomoea batatas*, is native to Central and South America and is one of the most important food crops in the world. First introduced to Hawaii by the original Polynesian settlers between 1100 and 1200 AD they developed many diverse, high quality, and high yielding types. Many of these 'Hawaiian Heritage' varieties of sweet potatoes that were common before statehood are conserved at the University of Hawai`i at Mānoa and many botanical gardens across the state. After European contact, new varieties of sweet potatoes were introduced to the islands. These two gene pools, the native and the imported, contributed to the exceptional genetic diversity of sweet potato grown in Hawaii. Much of the introduced diversity is currently grown in the Southeastern United States, and is housed in the United States Department of Agriculture (USDA) National Genetic Resource Program, which is available to researchers and includes geographic origin data. Additionally, historic material is preserved in Herbarium samples providing information as to what was being grown at different time points in history. Our objective is to compare genetic information of 'Hawaiian Heritage', USDA, and historic Herbarium sweet potato to explore the change in cultivar preference and the origin of different types of sweet potato. Two chloroplast genes and four nuclear genes were utilized for the purpose of determining the introductions of sweet potato and analyzing Hawaiian and USDA cultivar genotypes. The genotypes and phenotypes of the sweet potato varieties were compared to better understand the relationship between potentially genetically distinct clades.

Mentor: Dr. Michael Kantar

Hide Yee Ching Wu
Public Health
Social Sciences
Participation for Honors
Oral Presentation: Session 3 (11:30a-12:20p) in Sakamaki C101

Sexual and Reproductive Health Services via Indicators of Urinary Tract Infection and Contraceptive Care

The maintenance of Sexual Reproductive Health (SRH) is important to one's wellbeing. This is essential to those who may fall into categories of social economic disparities. The target population of this research paper is those categorized in these disparities. This may include low income families, the homeless population, run away teenagers, children, and young adults. This paper analyzes the importance of SRH services and its correlation to increased quality of health, examining SRH in two categories: urinary tract infections and reproductive contraceptives.

This project focuses on the importance of diagnosis and treatment of urinary tract infections, as well as increasing accessibility to contraceptive care within SRH services. The purpose is to evaluate the two categories within SRH services, assure that that the needs of underrepresented populations are being met, and correlate a relation between SRH services and an increase of quality of life and health. An applied learning experience will be employed at Waikiki Health Youth Outreach, a drop in center for homeless to at-risk kids. Deliverables included increasing the awareness of knowledge within the target population of various sexual and reproductive health topics.

Current programs are effective in increasing knowledge within community members. Services provided were dedicated to improving the wellbeing of the target population. Conclusions include that additional research needs to be conducted specific to the community to assure that health needs are being met. Policy and funding towards SRH services need to be assessed to assure that there are no barriers to accessibility.

Mentor: Dr. Denise Nelson-Hurwitz

Andy Yu
Cell and Molecular Biology
Natural Sciences
Participation for UROP
Oral Presentation: Session 2 (10:15-11:20a) in Sakamaki A104

In silico Identification of a Putative Circadian Clock in the Lobster *Homarus americanus* Cardiac Neuromuscular System

Nearly all organisms exhibit characteristic physiological and behavioral rhythms that operate on time scales ranging from sub-second to daily, annual, and even longer-timed patterns. Decades of research has been dedicated to studying behavioral rhythms that operate on relatively short time courses, for example the rhythmic beating of the lobster heart. The patterned timing of this behavior includes a rhythmic beating of the heart, as well as a circadian oscillation in heat beat frequency, the latter presumably driven by a complement of genes that together arrange a transcriptional autoregulating feedback loop, i.e. a molecular circadian clock. The daily pattern of heart beat frequency in the lobster is believe to be controlled by a central circadian clock (likely in the brain and/or eyestalk ganglia) that acts as a master timer for circadian behavior in this species. However, peripheral clocks that control circadian rhythmicity in individual organ systems have been documented. In this project we conducted homology-based BLAST searches to mine a lobster cardiac ganglion (CG)-specific transcriptome for proteins responsible for the generation of rhythmic behaviors in *Drosophila.* From these searches, we have identified all components necessary for the establishment of a peripheral circadian pacemaker in the CG. Studies to further determine the location of the clock in the lobster CG are ongoing, i.e., is it located in the pacemaker or motor neurons present in the ganglion.

Mentor: Dr. Andrew E. Christie

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