



## **Undergraduate Research and Creative Work**

6 May 2016 – 7:30am to 3:00pm  
Sakamaki Hall  
Campus Center Ballroom  
Honolulu, Hawai'i

# SCHEDULE

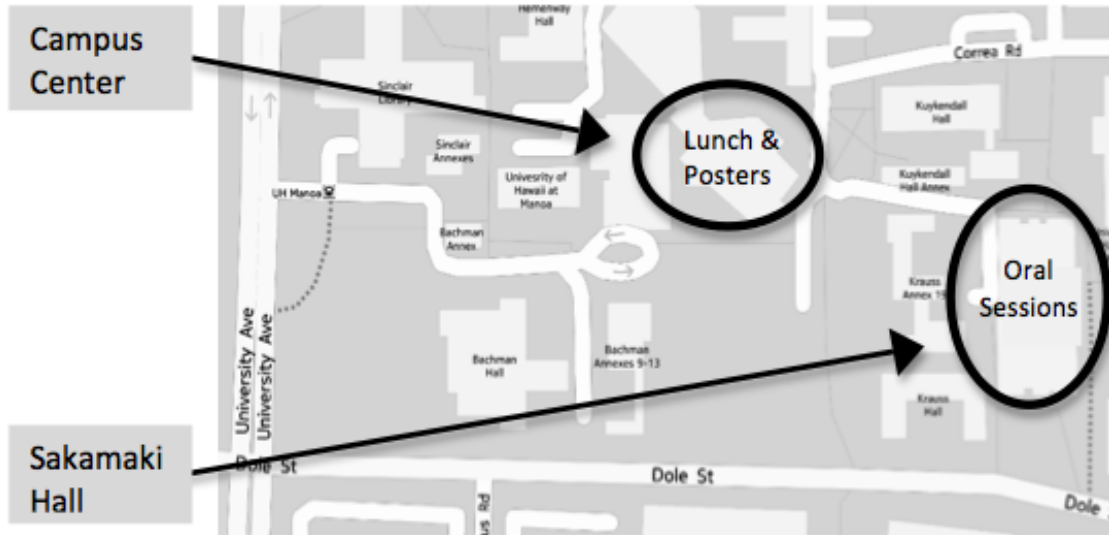
TIME	ACTIVITY	LOCATION
<b>7:30-8:15a</b>	Registration and Breakfast	Sakamaki First Floor
<b>8:15-8:20a</b>	Opening Ceremony	Sakamaki First Floor
<b>8:30-9:45a</b>	Oral Presentations Session One	Breakout Rooms
<b>9:45-9:55a</b>	Break	Courtyard
<b>9:55-11:10a</b>	Oral Presentations Session Two	Breakout Rooms
<b>11:10-11:20a</b>	Break	Courtyard
<b>11:20a-12:20p</b>	Oral Presentations Session Three	Breakout Rooms
<b>12:30-1:30p</b>	Lunch and Awards Ceremony	Campus Center Ballroom
<b>1:30-3:00p</b>	Poster Presentations Session	Campus Center Ballroom

SAKAMAKI HALL

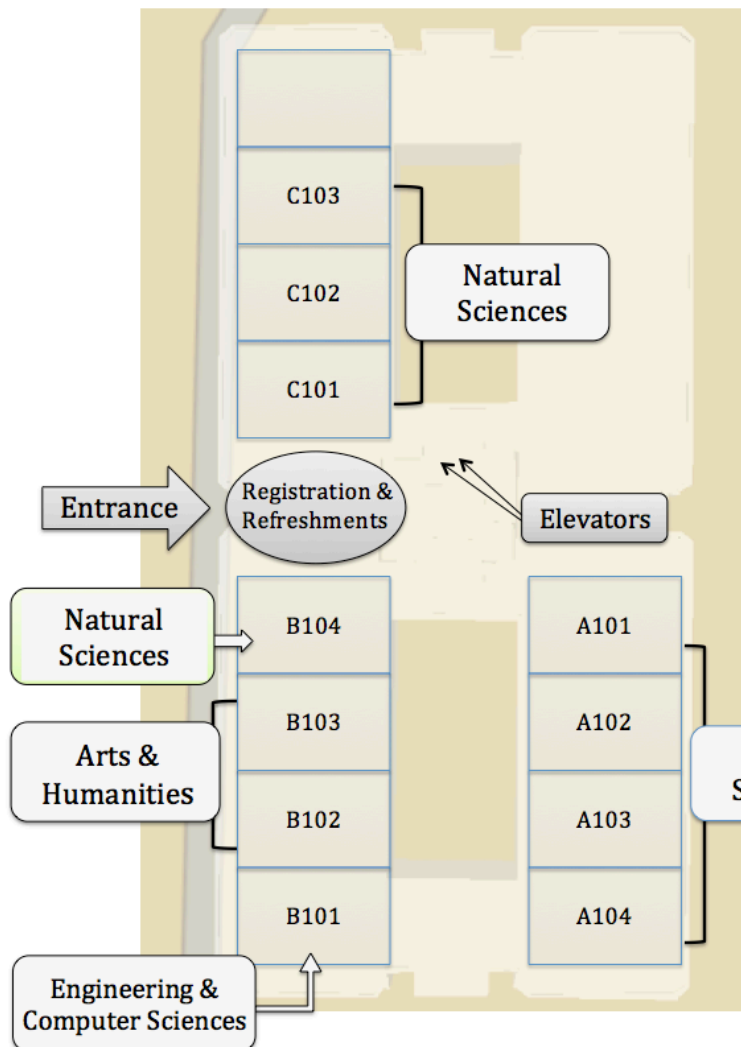
CAMPUS CENTER

# MAP

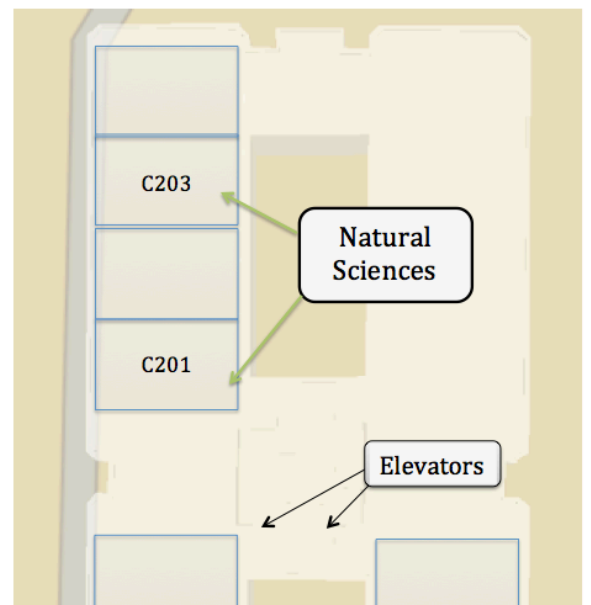
## Sakamaki Hall & Campus Center



Sakamaki Hall First Floor



Sakamaki Hall Second Floor



## LOCATION

### **Sakamaki Hall**

Oral Presentations Session One	8:30a - 9:45a
Oral Presentations Session Two	9:55a - 11:10a
Oral Presentations Session Three	11:20a - 12:20p

<b>A101</b>	Social Sciences
<b>A102</b>	Social Sciences
<b>A103</b>	Social Sciences
<b>A104</b>	Social Sciences
<b>B101</b>	Engineering & Computer Sciences
<b>B102</b>	Arts & Humanities – Creative
<b>B103</b>	Arts & Humanities – Research
<b>B104</b>	Natural Sciences
<b>C101</b>	Natural Sciences
<b>C102</b>	Natural Sciences
<b>C103</b>	Natural Sciences
<b>C201</b>	Natural Sciences
<b>C203</b>	Natural Sciences

### **Campus Center Ballroom**

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

## Oral Presentations Session One

8:30 - 9:45a

### **Sakamaki A101**

### **Social Sciences Finished Projects**

Carolyn Burk\*

Assessing Prenatal Health Care Provider Knowledge & Practices: An Approach to Improve Prenatal Health Outcomes in the Hawaiian Islands

Chevelle Davis\*

Key Factors in Obstetric Delivery Decision-Making Among Women with Limited English Proficiency

Danielle M Lazarus\*

Implementing a Preschool Curriculum to Promote Health Behaviors & Creating a Healthy Foundation

Sasha Madan\*

Combating Obesity through Implementation of a Sugar Sweetened Beverage Tax

### **Sakamaki A102**

### **Social Sciences Finished Projects**

Michael L Sanes\*

Changing Social Norms on Nutritional Behavior

Alissa Harada\*

Factors Associated with Leadership Behaviors in Nursing Students

Xuefang Chen\*

Psychotic-Like Symptoms and Attitude toward Seeking Professional Psychological Help in Asian-American College Students

Sakaria "Sai"  
Auelua-Toomey\*

Autism Spectrum Disorder: Testing Perception of Reality Through the Monty Hall Problem

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

## Oral Presentations Session One

8:30 - 9:45a

### Sakamaki A103

### Social Sciences Finished Projects

Aprilei TT Ramirez\*

Insalubrious (Unhealthy) Snapshots of Kalihi:  
Adolescent Empowerment through  
PhotoVoice

Robert L Fread

Limitations of White Privilege: Examining the  
Intersection of State Power and Race

Alexander Bitter

Turkish Membership in the European Union:  
Will it Ever Happen?

Jason Liang

The Last Queen of Korea: The Fall of the  
Korean Kingdom and Western Response to  
the Assassination of the Korean Queen at the  
Hands of the Japanese

### Sakamaki A104

### Social Sciences Finished Projects

Lisa Yu\*

Weeding Out Crime: CPTED in Oahu's Weed  
& Seed Neighborhoods

Caitlin Kelly

Preventing Suicide in Hawai'i Through Youth  
Empowerment

Kaile Luga

Mai Ka Ho'oku'i A Ka Hālāwai: From Kahiki to  
Hawai'i – Pōhaku Ku'i 'Ai of East Polynesia

Laura Ramirez\*

Concrete & Paradise: A Biography of Land in  
Hawai'i Kai

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

## Oral Presentations Session One

8:30 - 9:45a

### **Sakamaki B101**

### **Engineering & Computer Sciences Works in Progress & Finished Projects**

Daylan K Siemann

Pulsating Stability of Burner Stabilized  
Premixed Flames

Noah Higa

Practical Enumeration of Task Clustering  
Options in Scientific Workflows

Evan Kawamura

Managing Renewable Generation  
Fluctuations

Joshua Faumuina,  
Liem Nguyen,  
Tayler Pave,  
Bryson Racoma

Deployable Autonomous Glider for the 2016  
CanSat Competition

### **Sakamaki B102**

### **Arts & Humanities Creative Finished Projects**

Joanna Gordon

Stretch, Sag, and Sing: Songs of Womanhood

Shannon Quan Iriarte

Storytelling in the Shadows: Sharing Cultural  
Values through Puppetry

Robert LGL Sassone

*Doughnut*: The Creation of the Animated  
Short, and Observations on Independent  
Hand-Drawn Animated Filmmaking

## Oral Presentations Session One

8:30 - 9:45a

### Sakamaki B103

### Arts & Humanities Research Finished Projects

Taryn Alisna,  
Ai Okuno

Aloha Vegas: The Relationship of the  
California Hotel in Las Vegas and the  
Japanese Americans from Hawai'i

Kaitlyn Iwashita

One False Note: the Case of Billy Tipton and  
America's Reactions to Transgender Individuals  
in the 1980s and 1990s

Veronica Freeman

Panic, It's Organic!  
The Most Desensitized Food Term in the  
United States

Von Dickens Ulsa

The Captor and the Legist: The Forgotten  
Histories of the Andrade Brothers

### Sakamaki B104

### Natural Sciences Works in Progress & Finished Projects

Michael A Wallstrom

Family Affairs of Horny Sponges: A  
Phylogenetic and Morphological Description of  
a New Invasive-Algae-Associated Pacific  
Species, *Igernella hawaiiensis* (Porifera,  
Demospongiae) with Implications for the  
*Igernella* and *Dendrilla* Genera

Eric Wadnal

Calibration and Analysis of Coastal Oahu pH  
Data

Debbi Yoshimoto

Analyzing Algal Parameters as a Function of  
Submarine Groundwater Discharge, on Two  
Shores of O'ahu

Melissa Walker

Uncovering Aquatic Mysteries: Algal Diversity  
in Hawaiian Streams



## Oral Presentations Session One

8:30 - 9:45a

### Sakamaki C101

#### Natural Sciences Works in Progress & Finished Projects

Marshall Clark	Environmental Changes at Station ALOHA from Earth System Simulations
Dalton Muchow	Raman and Fluorescence Spectroscopy for Categorizing Coral Health in Hawai'i
Ashley Nakaoka*	The Comparison of the Performance of the SNAP ELISA and Zinc Sulfate Centrifugation Tests in Detecting <i>Giardia duodenalis</i> in Recently Imported Dogs to Hawai'i
Caroline Greenwood	Sub-canopy Nutrient Accumulation within <i>Acanthophora spicifera</i>

### Sakamaki C102

#### Natural Sciences Works in Progress & Finished Projects

Coral R Bielecki	Hybrid Populations of <i>Bidens sandvicensis</i> and <i>Bidens asymmetrica</i>
Nozomi Shimizu	Identification of Cryptic Siphonous Green Algae through Molecular Analysis and Observation of Developmental Strategies
Stephanie A Matthews	Metagenetic Sequencing of Zooplankton Communities in the High-Diversity Central North Pacific
Trista McKenzie*	Quantifying Atmospheric Fallout of Fukushima-derived Radioactive Isotopes in the Hawaiian Islands

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

## Oral Presentations Session One

8:30 - 9:45a

### Sakamaki C103

### Natural Sciences Finished Projects

Jarin Loristo

Mechanistic Studies of Organometallic  
Anticancer Complexes

Kendrick Villanueva Go\*

Assessing the Clinical Significance of HPV  
Quantitation by Quantitative PCR (qPCR) in  
HIV-associated Anal Dysplasia

Jae Yun Lee

Acetylation of S18 Ribosomal Proteins in  
*Mycobacterium smegmatis*

Shalin Zhang

Expression of Aromatase in *Escherichia coli*

### Sakamaki C201

### Natural Sciences Finished Projects

Derek Sasaki

Co-immobilized Microalgae/Fungi Cell Pellets  
as a New Biotech Production Platform

Jasmine M Tyson

Expression of Dengue Virus-Like Particles in  
*Drosophila* Cells as Vaccine Candidates

Andrea  
Unzueta Martinez

*Montipora* White Syndrome: the Good, the  
Bad, and the Coral

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

## Oral Presentations Session One

8:30 - 9:45a

### Sakamaki C203

### Natural Sciences Finished Projects

Carissa Nakao

Characterization of the Triggering Receptor Expressed on Myeloid cells (TREM) Family Receptors Induced by West Nile Virus (WNV) Immunity

Audrey Bearden

Interaction between the Nicotinic Receptor-Dependent Sensitization of A $\beta$  Toxicity and the Common Cellular Toxicity Pathway

Cheyenne Barela\*

Characterization of the Expression of Protein Disulfide Isomerase-M Subfamily Members, PDI9 and PDI10, during Development of Arabidopsis Plants

Nikki Rousslang

Developing an Optimal Medium and Screening Method to Detect Human Asparaginase Production in *Escherichia coli*

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

## Oral Presentations Session Two

9:55 - 11:10a

### **Sakamaki A101**

#### **Social Sciences Works in Progress & Finished Projects**

Kyung Moo Kim\*

Price Determinants of Tuberculosis Drugs:  
An Analysis of The Global Fund Price Quality  
Report

Hye Won (Judy) Chung\*

Mental Health Stigma Perceived by Rural  
Health Professionals

Joan Lanzaderas

Out-of-School Time Programs for Low-  
Income, Minority High School Students

### **Sakamaki A102**

#### **Social Sciences Finished Projects**

Mark Lee\*

Ethno-Cultural Differences in Later-Life  
Caregiving Expectations, Caregiver Burden,  
Family Dynamics, and Healthcare Decision  
Making Factors

Jeanna Chi\*

Attachment and Romantic Relationships:  
Differences Between First and Second  
Generation Attachment Style in Honolulu,  
Hawai'i

Michelle Ho-Gi Tong\*

Association of Health Literacy with  
Cardiovascular Disease in Chinese Americans

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

## Oral Presentations Session Two

9:55 - 11:10a

### **Sakamaki A103**

### **Social Sciences Proposals**

Emily Ko

Capitalism in the Gilded Age

Chelsea Hicks

Interviews of Micronesian Women's  
Experiences in Seeking Healthcare in Hawai'i  
for Themselves and Their Children

Owen Sandstrom

Pregnancy Healthcare Services

Sydney Blanke

Searching for Linguistic Relativity: A  
Grammatical and Cultural Comparison of  
English and Russian

### **Sakamaki A104**

### **Social Sciences Works in Progress & Finished Projects**

Kalina LR Calantoc

Developing and Implementing an Elementary  
School Garden Program in Honolulu

Raquel Reinagel

Study Abroad Students' View of Their L1  
Community

Ivana Matson

Accommodation in Instant Messaging

Michelle Herr

Influence of the 1215 Fourth Lateran Council  
in Late Medieval Iberia

## Oral Presentations Session Two

9:55 - 11:10a

### Sakamaki B101

#### Engineering & Computer Sciences Works in Progress & Finished Projects

Tina Li

Finite Element Study of the Self Deflections  
in Large Mirrors Subject to Kinematic Mounts

Jaclyn Guenther

Numerical Modeling for Undergraduates

Bryce Adams,  
Mitch McLean,  
Holm Smidt,  
Zack Yuen

Developing a Demand Response Platform  
and Client Network for Residential Smart  
Grid Solutions

Derek Chan\*,  
Christopher Delp\*,  
Jarrod Lofy\*,  
Shonelle Swarens\*

Step-by-Step Mathematics

### Sakamaki B102

#### Arts & Humanities Creative Works in Progress & Finished Projects

Cindy Huynh

*Remember Me*

Jeremy Francisco  
Divinagracia\*

Development of a Men's Fashion Made in  
U.S.A.

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

## Oral Presentations Session Two

9:55 - 11:10a

### **Sakamaki B103**

### **Arts & Humanities Research Finished Projects**

Kapeka Forges

Research of Indigenous Art Programs in Aotearoa

Angela Soto Balmores

Mama Don't Let Your Daughters Grow Up To Be Housewives

Tierra Mendez

Observing War Through Literature: The Effects of the Iraq and Afghanistan Wars on the Family Unit

Sarah Imanaka,  
Alyssa Lassiter,  
Sarah Champayn-Look,  
Eric Sorensen

Mixed Plate: Diversifying a National Stage

### **Sakamaki B104**

### **Natural Sciences Works in Progress**

Corey Mutnik

Spex Young Star Atlas

Makana Silva\*

Mathematics and Applications of Solitons

Carl L Thompson

Carbon Isotope Analysis of Hawaiian Land Snail Shells for Paleo-Climate Reconstruction

James Green

Establishment of a CRISPR-Mediated Transformation System for Development of Virus Resistant Transgenic Plants

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

## Oral Presentations Session Two

9:55 - 11:10a

### Sakamaki C101

### Natural Sciences Finished Projects

Jessica Sevilla\*

Nutrient Effects on Growth and Biomass of Dominant Reef Constituents

Margaret Moeller

Development of Larval Rearing Techniques for the Hawaiian Slipper Lobster *Scyllarides squammosus*

Kristen Bennett,  
Clara Schlieman

What does it Take to Count an Eel?: A Comparison of Moray Eel Survey Methods Across Varying Levels of Habitat Complexity

Corinna SY Hong

Comparison of Normal and Abnormal Coral Tissue using Microskeletal Traits in Massive *Porites*

### Sakamaki C102

### Natural Sciences Finished Projects

Tiffany-Heather Ulep

The Analysis and Comparison of Individual *Conus striatus* Milked Venom Profiles

Dustin Vuong

Expression of Recombinant Human Apoferritin in *Escherichia coli*

Ashley Heikkila

Vertical Distributions and Seasonal Fluctuations from CALIOP: A Regional Aerosol-Cloud Interaction Analysis

Brandon Makana  
McMurtry\*

On the Formation of Pyridine Carboxylic Acids in Interstellar Model Ice Grains

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



## Oral Presentations Session Two

9:55 - 11:10a

### Sakamaki C103

### Natural Sciences Finished Projects

Brysa Kato

Hemoglobin A1c test in an Ad Libitum Low Glycemic High Carbohydrate Diet

Sidra Jabbar

Evaluation of Fibroblast Gene Expression Differences in Internal Organs

Marissa Kuo

The Liver Support System: The Potential Roles of PDGF Receptors in Liver Fibroblasts

### Sakamaki C201

### Natural Sciences Finished Projects

Blake Pinell

Hypoxic Regulation of Variant Splicing in the Heart

Kadee-Kalia Tamashiro

Studying Urothelial Cell Differentiation Using a Novel Ex-vivo Ureter Explant Model

Lauren Yumol

Species-Specific Response to Regional Warming of the Antarctic Peninsula

Zhaotong Xu

Overexpression of PRAF2 in *Drosophila melanogaster*

## Oral Presentations Session Two

9:55 - 11:10a

### **Sakamaki C203**

### **Natural Sciences Works in Progress**

Torbjoern Nielsen

Quantitative Analysis of Cell Populations in the Testes from Mice with Limited Y Chromosome Gene Content

Sadie M  
Karratti-Abordo

METH and HIV-Tat Induced Changes in Calcium Channel Expression in Dopaminergic Neurons

Michellei Fisher

Modeling the Effect of STAT-3 on ROR-1 Production in Relation to B-cell Chronic Lymphocytic Leukemia

## Oral Presentations Session Three

11:20a - 12:20p

### **Sakamaki A101**

### **Social Sciences Proposals**

Karolyn Lam

Preventing Sudden Infant Death Syndrome (SIDS) in Hawai'i

Kennethjay Buccat

Assessing the Factors that Affect the Usage of the Warrior Recreational Center at the University of Hawai'i at Mānoa

### **Sakamaki A102**

### **Social Sciences Proposals**

Ana Liza Capulong

Increasing Awareness and Folic Acid Intake Among Pregnant Women

Jeremy Dontez McClam

Mosquito Vector Control and The Prevention of Dengue and Zika Spread

Ami Wong

Tobacco Compliance Research on the Increased Smoking Age Law

## Oral Presentations Session Three

11:20a - 12:20p

### **Sakamaki A103**

### **Social Sciences Proposals**

John Matthew A  
Pagaragan

Prevention Means Business: Implementing a  
Standardized Workplace Wellness Initiative  
Among Student Employees at the University  
of Hawaii – Mānoa

Henderson Huihui

Human Rights Law and International  
Intervention: What Can the International  
Community do?

Ai Kitanosono

Ethnic Differences in Perceptions toward  
Psychopaths

### **Sakamaki A104**

### **Social Sciences Proposals**

Abundanzia Delavega

Importance of Sea Shell Data from Miloli`i  
Valley, Kauai

Martine Leclerc

The Affects of Gratefulness on Cortisol  
Reactivity

Landon Kozai

Measuring Well-Being Across Different  
College Majors

## Oral Presentations Session Three

11:20a - 12:20p

### **Sakamaki B101**

### **Engineering & Computer Sciences Proposals**

Kari Noe

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

Brent Wakuzawa

Reduction of Inhibitory Compounds  
Generated from High Pressure Treatment of  
Macroalgae

Pooja Nuti

Modeling Radio Propagation in Urban  
Environments for Advanced Wireless  
Communication Systems

### **Sakamaki B102**

### **Arts & Humanities Creative Proposals**

Michelle Huynh

*The Virtue in Propaganda*

Devon Ahuna

Highlighting the Growing Trend of Cross  
Generational Lessons and Appeal of Modern  
Animated Cartoons

Brandy Dobson

Letters to Lydia

Angie Anderson

Grand Guignol: The Theatre of Horror and  
the Efficacy of Horrific Staging

## Oral Presentations Session Three

11:20a - 12:20p

### **Sakamaki B103**

### **Arts & Humanities Research Proposals**

Miranda Kam

Women and Fashion in the French Revolution

Nicolette Smith

Spirituality in the Modern Woman

### **Sakamaki B104**

### **Natural Sciences Proposals**

Andrew S Gerren

Effects of Varietal Diversity on the Selection of Kava in the Pacific

Lucia Amore

Let's Talk Food: Identifying Attitudes Toward Healthy Eating in College Students

Sarah Albright

A Study of Growing Patterns of *Avrainvillea amadelpha* in Soft Sediment Communities

### **Sakamaki C101**

### **Natural Sciences Proposals**

Alaina Smith

Maintenance of Diversity through Multiple Time Scales of Variation

Laurence Lea Lacar

Combatting Drug Resistance of Cancer Cells through Combination of STAT3 Inhibitors with Molecular-Targeted Agents

Angelina Holcom

The Biology of Aging: A Study of Telomeres

## Oral Presentations Session Three

11:20a - 12:20p

### Sakamaki C102

### Natural Sciences Proposals

Andrew Pham

Effect of SELK Knockout on Metastasis of Melanoma

Kina Poulos

The Spectrum and Duration of Neutralizing Antibodies Produced after Natural Primary Infection by Dengue 1

Bowen Ressler

Beta Methyl Amino L Alanine Incorporation into Cyanobacteria

Sai Furukawa

Zika Virus Effects in Various Stages of Gestation: Treatment Development for Microcephaly

### Sakamaki C103

### Natural Sciences Proposals

Ted Jacoby

The Chemical Modification of L-Asparaginase

Adora Klinestiver

Synthesis of a Substituted Indazole Compound, 5-fluoro-6-nitro-1H-indazole, to Obtain a More Potent STAT3 Inhibitor

Sasha Canovali,  
Anna Scheiner

Differences in Protein Production by *Bacillus subtilis* in the Presence and Absence of Alternative Ribosomal Proteins

## **Poster Presentations**

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

### **Arts & Humanities - Creative**

Jeremy Francisco  
Divinagracia

Development of a Men's Fashion Made in  
U.S.A.

### **Engineering & Computer Sciences**

Derek Chan,  
Christopher Delp,  
Jarrod Lofy,  
Shonelle Swarens

Step-by-Step Mathematics



## Poster Presentations

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

### Natural Sciences

Cheyenne Barela	Characterization of the Expression of Protein Disulfide Isomerase-M Subfamily Members, PDI9 and PDI10, during Development of Arabidopsis Plants
Kendrick Villanueva Go	Assessing the Clinical Significance of HPV Quantitation by Quantitative PCR (qPCR) in HIV-associated Anal Dysplasia
Trista McKenzie	Quantifying Atmospheric Fallout of Fukushima-derived Radioactive Isotopes in the Hawaiian Islands
Brandon Makana McMurtry	On the Formation of Pyridine Carboxylic Acids in Interstellar Model Ice Grains
Ashley Nakaoka	The Comparison of the Performance of the SNAP ELISA and Zinc Sulfate Centrifugation Tests in Detecting <i>Giardia duodenalis</i> in Recently Imported Dogs to Hawai'i
Jessica Sevilla	Nutrient Effects on Growth and Biomass of Dominant Reef Constituents
Makana Silva	Mathematics and Applications of Solitons

## Poster Presentations

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

### Social Sciences

Sakaria "Sai" Auelua-Toomey	Autism Spectrum Disorder: Testing Perception of Reality Through the Monty Hall Problem
Carolyn Burk	Assessing Prenatal Health Care Provider Knowledge & Practices: An Approach to Improve Prenatal Health Outcomes in the Hawaiian Islands
Xuefang Chen	Psychotic-Like Symptoms and Attitude toward Seeking Professional Psychological Help in Asian-American College Students
Jeanna Chi	Attachment and Romantic Relationships: Differences Between First and Second Generation Attachment Style in Honolulu, Hawai'i
Hye Won (Judy) Chung	Mental Health Stigma Perceived by Rural Health Professionals
Chevelle Davis	Key Factors in Obstetric Delivery Decision- Making Among Women with Limited English Proficiency
Alissa Harada	Factors Associated with Leadership Behaviors in Nursing Students
Kyung Moo Kim	Price Determinants of Tuberculosis Drugs: An Analysis of The Global Fund Price Quality Report

## Poster Presentations

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

### Social Sciences (continued)

Danielle M Lazarus	Implementing a Preschool Curriculum to Promote Health Behaviors & Creating a Healthy Foundation
Mark Lee	Ethno-Cultural Differences in Later-Life Caregiving Expectations, Caregiver Burden, Family Dynamics, and Healthcare Decision Making Factors
Sasha Madan	Combating Obesity through Implementation of a Sugar Sweetened Beverage Tax
Aprilei TT Ramirez	Insalubrious (Unhealthy) Snapshots of Kalihi: Adolescent Empowerment through PhotoVoice
Laura Ramirez	Concrete & Paradise: A Biography of Land in Hawai'i Kai
Michael L Sanes	Changing Social Norms on Nutritional Behavior
Michelle Ho-Gi Tong	Association of Health Literacy with Cardiovascular Disease in Chinese Americans
Lisa Yu	Weeding Out Crime: CPTED in Oahu's Weed & Seed Neighborhoods

## 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:

**Bryce Adams**, Mitch McLean, Holm Smidt, Zack Yuen

**Taryn Alisna**, Ai Okuno

**Kristen Bennett**, Clara Schlieman

**Sasha Canovali**, Anna Scheiner

**Derek Chan**, Christopher Delp, Jarrod Lofy, Shonelle Swarens

**Joshua Faumuina**, Liem Nguyen, Tayler Pave, Bryson Racoma

**Sarah Imanaka**, Alyssa Lassiter, Sarah Champayn-Look, Eric Sorensen

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

Bryce Adams, Mechanical Engineering  
Mitch McLean, Mechanical Engineering  
Holm Smidt, Mechanical Engineering  
Zack Yuen, Mechanical Engineering  
Finished Project in Engineering & Computer Sciences  
Participation for UROP  
Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki B101

### Developing a Demand Response Platform and Client Network for Residential Smart Grid Solutions

With the increase of renewable energy generation in the state of Hawai`i, the stability of our electric grid is prognosed to decrease. This is due to intermittent energy sources, such as solar and wind, having unpredictable power production profiles. Utility companies compensate for the variability in renewable power and consumer demand by increasing or decreasing their generator output. This in turn results in considerable wear and tear on the power plants and overall energy inefficiencies.

Grid modernization with the integration of demand response (DR) strategies -- strategies where consumers can play an active role in reducing peak load by allowing the utility to have control over their appliances -- presents a key tool to maintaining a sustainable and reliable electricity grid.

This project integrates software, electrical, and mechanical designs into a DR management system for residential applications. The platform provides necessary and customizable tools to connect home appliances to a smart grid network, thus balancing demand and supply when needed, and contributing to a more sustainable, energy-efficient, and stable electricity grid in Hawai`i.

Our software as a service platform pairs with our home kit devices to automatically adjust energy usage to correct frequency problems. When installed in residential homes, our devices monitor overall household energy consumption and automatically control appliance loads. Our user interface displays real time energy data, as well as offers various analytics and services to the end user and the utility.

Mentor: Dr. Reza Ghorbani

Devon Ahuna  
Academy for Creative Media  
Proposal in Arts & Humanities – Creative  
Participation for Honors  
Oral Presentation: Session 3 (11:20a-12:20p) in Sakamaki B102

### Highlighting the Growing Trend of Cross Generational Lessons and Appeal of Modern Animated Cartoons

This Project is one that resonates with me more on a personal level. I am sure all or the majority of us have grown up watching animated cartoons and remember them, for the most part, quite fondly. For those of us that watched them we cannot deny that cartoons have had an impact on our lives and our perceptions of the world. While they entertained us in our animated youths most did only that, gave us something to laugh at without giving us much in the way of life lessons. As of recent however, there has been a growing trend in some animated cartoons to present more meaningful stories that prepare younger generations for some of the questions and conflicts of modern life. As it stands I think this growing trend is doing a great service to both young and old, as quite a few of these shows have a fairly large adult following as well, and I would like to contribute to this trend. I intend to write an original screenplay for a pilot episode of a cartoon that will strive to present meaningful life lessons to generations both young and old.

This Project will focus on taking into consideration the target audience as screenwriter crafts their story, with the goal of trying to make a show with a broad appeal. Overall I hope this project can be an opportunity for me to improve my skills as a screenwriter, while also promoting a trend for better and more meaningful story telling in modern animated cartoons.

Sarah Albright  
Marine Biology  
Proposal in Natural Sciences  
Participation for Honors  
Oral Presentation: Session 3 (11:20a-12:20p) in Sakamaki B104

A Study of Growing Patterns of *Avrainvillea amadelpha*  
in Soft Sediment Communities

Invasive species often plague Hawaiian habitats, both terrestrial and aquatic. One invasive species, *Avrainvillea amadelpha*, is a siphonous macro green algae of the Order Bryopsidales. As a non-native algae to the Hawaiian Islands, it is considered to be an invasive species in all locations surrounding the shallow coastal shores and deeper, off-shore waters. There are no natural grazers of *A. amadelpha* located in Hawaii; therefore the natural removal of this invasive species from the environment is limited. Current restoration projects of areas that are affected by *A. amadelpha* are done by sending volunteers out to hand pick the algae from the reefs in designated areas and pathways. Consequently, this effort requires many people stepping on reefs to remove the algae. This study will examine the reproduction via fragmentation of *A. amadelpha* and learn what size fragment *A. amadelpha* requires to continue to be a viable adult specimen. To do this, *A. amadelpha* will be grown at different fragment sizes in a controlled environment over the course of several months to see the growth rates of each specimen. The resulting data will be applicable to restoration efforts, which would allow for the reduction of habitat destruction during attempts to restore the original locations where *Avrainvillea* has spread. By knowing what minimum size fragments can be left behind, we can ensure that *A. amadelpha* stops spreading and ceases to be an ecological problem in the future, whilst maintaining the integrity of the reefs.

Mentor: Dr. Celia Smith

Taryn Alisna, Academy for Creative Media  
Ai Okuno, Academy for Creative Media  
Finished Project in Arts & Humanities – Research  
Participation for UROP  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki B103

Aloha Vegas: The Relationship of the California Hotel in Las Vegas  
and the Japanese Americans from Hawai'i

The California Hotel and Casino in Downtown Las Vegas attracts over 300,000 people from Hawai'i every year, many of them Japanese Americans. The goal of this project is to create a short narrative film that looks at the cultural impact these visitors have on the hotel.

As a filmmaker, our objectives are not only to gain skills to translate the conclusion of this research into a strong visual story telling and a medium of art, but to also analyze how Japanese Americans from Hawai'i are impacted by the hotel. There are documentaries about Japanese Americans that are specifically about internment camps, however, there are not many narrative films about what they have done to construct their cultural identities in their post-war lives.

Thus, this research will focus on what attracts regular visitors from Hawai'i to the hotel, and will explore the difference of perspectives about Japanese Americans and how they are portrayed in films by filmmakers with and without being rooted within the context of the Asian American experience. The opening sequence of the short film will include a compilation of interviews with Japanese American descendants who regularly visit the California Hotel and a narrative film that depicts the culture of Japanese Americans from Hawai'i.

Mentor: Lisette Flanary



Lucia Amore  
Food Science & Human Nutrition – Dietetics  
Proposal in Natural Sciences  
Participation for Honors  
Oral Presentation: Session 3 (11:20a-12:20p) in Sakamaki B104

### Let's Talk Food: Identifying Attitudes Toward Healthy Eating in College Students

In addressing undesirable eating habits contributing to the obesity epidemic in the U.S., college students represent an important target. Previous studies have demonstrated that undergraduate students are not meeting recommendations with regards to fruit and vegetable intake and consume diets high in low-nutrient energy-dense foods. Interventions promoting healthy habits in diverse student populations are needed. The objective of this study is to identify the perceived motivators and barriers for engaging in healthy eating in college students to inform interventions focused on preventing excess weight gain in the college years.

A trained moderator will conduct a series of audio-recorded focus groups in a diverse group of students in the 18-24 year old range from different majors, ethnic backgrounds, and academic standing. An interview guide focused on perceptions, motivators and barriers to healthy eating will be developed based on a review of the literature. Motivators to be addressed will include appearance, social factors, and health benefits of healthy eating. Barriers to be addressed will include food access, time and cost constraints, and lack of nutritional knowledge. Participants will receive a gift card as compensation for their time. Content analysis using qualitative data analysis software will be used to identify themes in interview transcripts. Data collection will be ongoing until new ideas no longer emerge from the focus groups.

Identifying perceived motivators and barriers for engaging in healthy eating in college students will help tailor interventions to address the specific concerns of the college population, resulting in more impactful long-term obesity prevention.

Mentor: Dr. Jinan Banna

Angie Anderson  
English and Theatre  
Proposal in Arts & Humanities – Creative  
Participation for Honors  
Oral Presentation: Session 3 (11:20a-12:20p) in Sakamaki B102

### Grand Guignol: The Theatre of Horror and the Efficacy of Horrific Staging

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 inspired modern concepts of gore, shock, and horror. The genre originated in *Le Théâtre du Grand-Guignol*, founded by Oscar Méténier in Paris during the late 19<sup>th</sup> century. The theatre staged gruesome illusionistic plays until its close in 1962, during which time audience members experienced shocking scenes of thrilling, macabre violence. Today, because of the realistic nature of film and TV, theatrical horror can appear cheap and melodramatic. This project seeks to examine how this form of storytelling was used to impact an audience and how those aesthetics survive in more believable cinematic forms. The primary document being used to explore Grand Guignol is Richard Hand and Michael Wilson's book *Grand-Guignol: The French Theatre of Horror*. This text is the most comprehensive and widely referenced piece of literature on Grand Guignol and includes short, translated Grand Guignol plays. This project will also study modern pieces of horror, particularly in film, and identify Guignol aesthetics that pervade today. Ultimately, this research process will provide new insight into the basic aesthetics of theatrical horror and gore originating in the Grand Guignol tradition, will reevaluate the effectiveness of fear in modern drama, and will provide new avenues for creating believable, impactful, theatrical horror.

Mentor: Dr. Todd Sammons

Sakaria "Sai" Auelua-Toomey  
Psychology and Communicology  
Finished Project in Social Sciences  
Participation for Honors  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki A102  
Poster Presentation: 1:30-3:00pm in Campus Center Ballroom

### Autism Spectrum Disorder: Testing Perception of Reality Through the Monty Hall Problem

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

Mentor: Dr. James Campbell

Cheyenne Barela  
Molecular Biosciences & Biotechnology  
Finished Project in Natural Sciences  
Participation for UROP  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki C203  
Poster Presentation: 1:30-3:00pm in Campus Center Ballroom

Characterization of the Expression of Protein Disulfide  
Isomerase-M Subfamily Members, PDI9 and PDI10,  
during Development of Arabidopsis Plants

Protein disulfide isomerase (PDI) catalyzes the folding of newly synthesized proteins in the endoplasmic reticulum. This study focused on the non-classical PDI9 and PDI10 of the model plant, *Arabidopsis thaliana*. These proteins are distinct from the classical PDIs in that their catalytic domains are closely spaced and not separated by thioredoxin-like fold domains. A previous study using the PDI9 and PDI10 promoters fused to the  $\beta$ -glucuronidase (GUS) reporter gene revealed that the genes are expressed in the anthers of flowers, suggesting they play an important role in the development of the male gametophyte. The presence of GUS enzyme activity is not a direct observation of PDI mRNA and protein. Therefore, the goal of this investigation was to verify the expression and tissue localization of these PDIs at the mRNA and protein levels. To determine and analyze the protein and mRNA levels of PDI9 and PDI10 in diverse Arabidopsis plant tissues, Western blot and RT-PCR and qPCR analyses were used. Preliminary Western blot analysis with a PDI9-antiserum indicated a high level of PDI9 protein in the flower and root tissues compared to the leaf, stem and silique tissues. A second trial is underway as are experiments to examine mRNA levels in the same tissues to clarify existing data. Identification of PDI9 in reproductive tissues is important in determining its function and the protein substrates it folds, and will lead to a better understanding of the floral development in plants.

Mentor: Dr. David Christopher

Audrey Bearden  
Molecular Cell Biology  
Finished Project in Natural Sciences  
Participation for Honors, UROP  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki C203

### Interaction between the Nicotinic Receptor-Dependent Sensitization of A $\beta$ Toxicity and the Common Cellular Toxicity Pathway

Alzheimer's disease (AD) is a progressive, neurodegenerative disease that is characterized by loss of memory, thinking, language, and other cognitive skills. One of the primary physical features of AD is the presence of senile plaques composed of beta amyloid (A $\beta$ ). A $\beta$  is a series of peptides, 36-43 amino acids in length, with the most common, toxic form being A $\beta$ <sub>1-42</sub>. Early in the progression of the disease, freely diffusible A $\beta$  levels rise and it appears that the soluble peptide triggers AD. We have postulated that there is a common pathway whereby elevated levels of A $\beta$  exert the peptide's toxic action on nerve cells. The components of this putative common pathway are unknown. One possible component is cellular prion protein (PrP<sup>c</sup>), as it is activated by A $\beta$ . The PrP<sup>c</sup> interacts, in turn, with Fyn kinase, possibly triggering an apoptotic cascade. A putative second pathway has been identified wherein the presence of nicotinic acetylcholine receptors (nAChRs) sensitizes neurons to the toxic action of A $\beta$ . The objective of this proposal is to address the role of the common pathway in the sensitization to cell toxicity arising from the interaction of A $\beta$  and nAChRs. The approach consists of reducing or eliminating the expression of potential components of the pathway, such as PrP<sup>c</sup>, and examining the impact on oxidative stress and cellular viability in the absence or presence nAChRs. Elucidating the interaction between these two pathways will provide a richer understanding of the early events in Alzheimer's disease.

Mentor: Dr. Robert Nichols

Kristen Bennett, Marine Biology  
Clara Schlieman, Marine Biology  
Finished Project in Natural Sciences  
Participation for UROP  
Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki C101

### What does it Take to Count an Eel?: A Comparison of Moray Eel Survey Methods Across Varying Levels of Habitat Complexity

Hole-dwelling species such as moray eels are notoriously underestimated during visual fish surveys due to the cryptic nature of their lifestyles. The purpose of this study was to address this issue and identify a methodology yielding the most accurate population density estimate for moray eels in varying habitat complexities. In order to accomplish this, we compared three survey methods consecutively on defined cylindrical transects 15 meters in diameter. The first method was the stationary point count (SPC), a visual fish survey used by many agencies to assess reef fish biomass in general. The SPC involves a stationary observer recording fish sighted. The second method was an eel-specific search, in which observers inspected potential hiding places with flashlights and recorded observed eels. The last method was a baited transect technique, which used bait to draw eels out of their crevices by utilizing their highly developed olfactory senses. An observer watched and recorded the eels present during the pre-established duration of each survey method. We hypothesized that the baited transect would be the most effective at detecting the highest average proportion of eels, and the SPC method the least effective. The methods were also compared across different levels of habitat complexity. A rugosity measurement was used to characterize each survey site's complexity. We hypothesized that the less complex habitats would not have as much variance between methods while the main hypothesis would hold true for the most complex habitat sites.

Mentor: Dr. Megan Donahue

Coral R Bielecki  
Ethnobotany  
Finished Project in Natural Sciences  
Participation for Honors, UROP  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki C102

### Hybrid Populations of *Bidens sandvicensis* and *Bidens asymmetrica*

The *Bidens* genus in Hawai'i is an excellent example of adaptive radiation, an important process by which diversity emerges. Molecular work to date has demonstrated that genetic diversity of the terrestrial plant genus in Hawai'i is similar to that within a single continental species. Even the rapidly evolving nuclear and plastid loci studied thus far show little genetic divergence among the Hawaiian species despite over 1.3 million years of ecological specialization. I present a comparative study of *Bidens sandvicensis* subsp. *sandvicensis* and *Bidens asymmetrica* populations that show morphological evidence of intergradation in the Ko'olau mountains on Oahu island. The intent of this project is to assess genetic diversity and population structure, and to compare the utility of different approaches in the taxonomy of Hawaiian endemic *Bidens* spp. I utilized two different molecular techniques: sequence related amplified polymorphism (SRAP) population markers and restriction-site associated DNA (ezRAD) genotyping with next generation sequencing (NGS) technology. The approaches for both are different, yet they have been used to answer the same kinds of questions in different model systems. I demonstrate genetic delineation between *B. sandvicensis* subsp. *sandvicensis* and *B. asymmetrica* is possible and that the morphological intermediate individuals may be of hybrid origin. Furthermore, SRAP markers sufficient to answer questions about genetic variation between these species without higher throughput sequencing methods.

Mentor: Dr. Clifford Morden

Alexander Bitter  
Political Science and Journalism  
Finished Project in Social Sciences  
Participation for Honors  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki A103

### Turkish Membership in the European Union: Will it Ever Happen?

The European Union (EU) has expanded its membership significantly in the post-Cold War era, welcoming many countries that have made rapid political transitions. The Republic of Turkey, meanwhile, has been at the EU's doorstep for over half a century without success despite efforts to align domestic policies with the EU's standards. What's more, for the last eleven years, Turkey has been in membership talks with the EU but remains far from meeting all of the membership criteria. Now, with refugees streaming into Europe through Turkey, the EU has indicated it wants to jumpstart the stalled talks. The new interest comes amid fresh dynamics in the relationship between the EU and Turkey, including destabilizing conflicts in nearby Iraq and Syria, a challenge to the secular authority in the country, and uncertainty about the role of Muslim immigrants in Western Europe.

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

Mentor: Dr. Carolyn Stephenson



Sydney Blanke  
Linguistics via Interdisciplinary Studies  
Proposal in Social Sciences  
Participation for Honors  
Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki A103

## Searching for Linguistic Relativity: A Grammatical and Cultural Comparison of English and Russian

Language is the medium through which people experience and communicate the world around them; it provides a framework for thought and expression. However, each individual language has prominently created its own unique framework for such expression, which draws attention to and grammatically encodes 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. The idea that one's native language has a significant impact on cognition and perception—known as the linguistic relativity hypothesis—has fluctuated in popularity since its inception in the early twentieth century. Much of the conversation regarding this issue has been speculative, with not nearly enough scientific data being accumulated to strengthen the argument on either side. I propose an experiment to contribute to this important discussion, using English and Russian as comparative mediums. Native English and Russian speakers will be given verbal tasks relating to grammatical subject matter that is significantly different in each language—such as verbs of motion or possessive constructions. Relevant variables will be measured in their responses, potentially highlighting a consistent difference in perception based purely on grammatical differences. Affirmation of linguistic relativity would spark a huge paradigm shift, resulting in greater self-awareness regarding world views and cognition biases. It would be a great tool for historical analysis, international conflict resolution, and understanding of humankind in general. The hope is that this study will help find an answer to this critical and universally relevant issue.

Mentor: Dr. Kamil Deen

Kennethjay Buccat  
Public Health  
Proposal in Social Sciences  
Participation for Honors  
Oral Presentation: Session 3 (11:20a-12:20p) in Sakamaki A101

Assessing the Factors that Affect the Usage of the Warrior Recreational  
Center at the University of Hawai'i at Mānoa

College campuses are an important setting where promotion of healthy lifestyle habits can occur. However, studies and research suggests that approximately 35% of all college students are overweight or obese, with many at risk for weight gain during the college years. Poor nutrition and physical inactivity contribute to the increased risk of weight gain and prevalence of overweight and obese individuals in this population.

The purpose of this research is to investigate the factors that influence why students attend or do not attend the Warrior Recreational Center (WRC) at the University of Hawaii at Mānoa (UHM). This study will analyze specific demographics and the reasoning behind their pattern of usage. With the obesity epidemic growing substantially over the past several decades, it has consequentially affected a vast majority of the nation, including the college-age population. The study will consist of a sample population of UHM students. A modified paper and online questionnaire from a previous study that assessed fitness and recreation center usage within the college population will be given. The study will also conduct key-informant interviews to obtain qualitative data. Both quantitative and qualitative data will be analyzed to assess the variety of reasons that may affect a student's usage of the WRC. The goal for this project would be for the WRC to gear its facility and programs to the barriers or factors that will potentially be found through this study. The data may also be used for other universities/campuses that are planning to construct/renovate new recreational centers.

Mentor: Dr. Claudio Nigg

Carolyn Burk  
Public Health  
Finished Project in Social Sciences  
Participation for Honors  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki A101  
Poster Presentation: 1:30-3:00pm in Campus Center Ballroom

Assessing Prenatal Healthcare Provider Knowledge and Practices: An  
Approach to Improve Prenatal Health Outcomes in the Hawaiian Islands

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

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

Mentor: Dr. Denise Nelson-Hurwitz

Kalina LR Calantoc  
Elementary Education  
Finished Project in Social Sciences  
Participation for Honors, UROP  
Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki A104

## Developing and Implementing an Elementary School Garden Program in Honolulu

The literature reveals that school garden programs are beneficial to our children's education and have great potential, but can be difficult to implement and maintain. While there are local resources in Hawai'i that provide general guidelines on developing a school garden program, these guidelines lack the detailed instructions necessary to address the challenges of building a garden specifically designed for elementary school use in Hawai'i. This study focused on developing and implementing a school garden program at a public charter school in Honolulu during the school year 2015-2016.

The primary objective of this study was to develop the professional knowledge, skills and experience necessary to implement a school garden program that is integral to the elementary curriculum. This project provided insight on the perceptions of faculty and students related to developing and implementing a school garden program, as well as first-hand experience in overcoming challenges related to organizing a school garden program. The research methodology included analyzing qualitative data collected from student surveys and garden notebooks, the researcher's observations, and interviews with faculty at the study site. Quantitative data analyzed includes information related to program costs, time devoted to the project, student time in the garden, and program volunteers.

The research findings identify many of the school garden challenges faced by the researcher, as well as recommendations to overcome some of those challenges. The research findings and recommendations may also help the classroom teacher to better understand the impact school gardens may have on the school community and student learning.

Mentor: Dr. Jennifer Herring

Sasha Canovali, Molecular Cell Biology  
Anna Scheiner, Microbiology  
Proposal in Natural Sciences  
Participation for Honors  
Oral Presentation: Session 3 (11:20a-12:20p) in Sakamaki C103

### Differences in Protein Production by *Bacillus subtilis* in the Presence and Absence of Alternative Ribosomal Proteins

Ribosomes are intracellular structures which translate mRNA to synthesize proteins required for an organism's survival. Bacterial ribosomes are composed of a set of primary ribosomal proteins (PrimRPs), and some bacterial cells contain at least one paralog which we call an alternative ribosomal protein (AltRP). Prior research has shown that these AltRPs are incorporated into the ribosome in place of the PrimRPs under certain conditions. We hypothesize that these "alternative ribosomes" synthesize a different set of proteins than the primary ribosome, which may change how the bacterial cell functions and maintains its structure. Thus, understanding the functional significance of AltRPs in bacteria will allow researchers to better understand the process by which bacterial cells regulate translation and synthesize proteins. The objective of this study is to demonstrate the function of AltRPs in the bacterium *Bacillus subtilis*. In order to do this, we will construct a  $\Delta altRP$  triple mutant of the bacterium and compare its proteome to that of the wild type. Proteins produced by each strain will be quantified by mass spectrometry, and differences observed in protein production may indicate an effect on translation by AltRPs. This kind of translational regulation has not been described before and knowledge gained about the mechanism will greatly improve our understanding of protein synthesis in bacteria. In addition, results from this study can be applied to the development of a standard model for the function of AltRPs in species of bacteria that contain them.

Mentor: Dr. Sladjana Prišić

Ana Liza Capulong  
Public Health  
Proposal in Social Sciences  
Participation for Honors  
Oral Presentation: Session 3 (11:20a-12:20p) in Sakamaki A102

### Increasing Awareness and Folic Acid Intake Among Pregnant Women

Folic acid also known as Vitamin B12, is an essential nutrient found in many fruits and vegetables that helps nourish and replenish the cells in the body for growth. Folic acid is also important for a healthy pregnancy as proper levels of this nutrient needs to be maintained before conception and during pregnancy; to reduce the risk of any birth defects such as neural tube defects (spina bifida, ancephaly, and encephalcole). In a U.S. survey of women of childbearing, only seven percent knew that folic acid should be taken before pregnancy to prevent any birth defects (Ben-Joseph, 2014). According to Centers for Disease Control and Prevention (CDC), each year in the U.S there are 3,000 pregnancies that are affected by neural tube defects (CDC, 2014). This problem should be recognized and addressed to the public to increase the awareness of folic acid. Woman of childbearing age should know the required prenatal intake of folic acid is 400 micrograms daily, to effectively prevent neural tube defects. With such a high risk of kids affected by this health condition, this study is aimed to investigate woman's awareness of folic acid and understand the barriers that the families encounter. Partnering up with Dr. Randal Wada at a local children's hospital (Kapiolani Medical Center) it would help gain insight on the maternal population to better understand the issues being addressed. This will help promote healthy pregnancies, prevent death and abnormalities associated with neural tube defects.

Derek Chan, Information & Computer Sciences  
Christopher Delp, Information & Computer Sciences  
Jarrod Lofy, Information & Computer Sciences  
Shonelle Swarens, Information & Computer Sciences  
Work in Progress in Engineering & Computer Sciences  
Participation for UROP  
Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki B101  
Poster Presentation: 1:30-3:00pm in Campus Center Ballroom

### Step-by-Step Mathematics

Step-by-Step Mathematics (SBSM) is an application for both mobile and desktop devices that aims to teach mathematics with two main focuses. Firstly, the application aims to show all of the steps of the problem solving process. We believe that the understanding of these steps is one of the greatest keys to learning mathematics. SBSM aims to help students gain a better understanding of each individual step by visualizing the steps needed to solve a problem. Secondly, we believe part of understanding the lessons is knowing how lessons relate to each other. Mathematics doesn't exist in a vacuum; each problem is related and built upon previous problems. Therefore the application takes steps to ensure that each lesson is connected to previous lessons. For example, the application works to show the connections between counting and addition in hopes that students can use their knowledge of counting to aid in their solving of addition problems. In that way we hope that each lesson builds on previous ones.

The entire project will consist of two parts: designing the application using the Hawai'i Common Core Standards to ensure that what we are teaching is relevant to Hawai'i's classrooms and sitting down with students to evaluate what works and what doesn't work within the application. During the evaluation phase not only are we looking to evaluate the application's effectiveness in teaching, we are evaluating the application's design as well. We will then use the student feedback to redesign and improve the application.

Mentor: Ravi Narayan

Xuefang Chen  
Psychology  
Finished Project in Social Sciences  
Participation for Honors  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki A102  
Poster Presentation: 1:30-3:00pm in Campus Center Ballroom

### Psychotic-Like Symptoms and Attitude toward Seeking Professional Psychological Help in Asian-American College Students

Studies have found that Asian Americans have more negative attitudes toward seeking professional psychological help compared to other ethnic groups. Cultural-related barriers, demographic, and personal factors are correlated with Asian American mental health and underutilization of treatment services. Additionally, Asian Americans have been shown to have higher scores on both disorganization and interpersonal schizotypal subscales of a commonly used schizotypal personality disorder measure compared to White Americans. The current study recruited 241 Asian-American college students include 70 males and 171 females from the University of Hawaii at Manoa. The age range of participants was from 16 years old to 62 years old with a mean of 19.82. Asian-American students' collective self-esteem was significantly correlated with the Social Anhedonia ( $r=-0.36$ ,  $P=0.00$ ) and Social Anxiety Subscales ( $r=-0.189$ ,  $p=0.006$ ) of the Schizotypal Personality Questionnaire (SPQ). First generation Asian-American students had significantly higher scores on the Magical Ideation subscale of the SPQ ( $F=3.8$ ,  $df=2$ ,  $P=0.02$ ) than second generation. However, the current study did not find Asian Americans' attitude toward seeking professional psychological help to be significantly correlated with generational status, multi-ethnic identity, or collective self-esteem. These results suggest that cultural factors may influence the manifestation of schizotypal personality symptoms. Clinicians need to be aware of such cultural implications in order to provide culturally appropriate mental health services for Asian ethnic minorities in the United States.

Mentor: Dr. David Cicero



Jeanna Chi  
Psychology  
Finished Project in Social Sciences  
Participation for Honors  
Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki A102  
Poster Presentation: 1:30-3:00pm in Campus Center Ballroom

### Attachment and Romantic Relationships: Differences Between First and Second Generation Attachment Style in Honolulu, Hawai'i

Rooted in Western culture, attachment theory is derived from observations between maternal and infant behavior. Though attachment behavior is overt in infants and children, such behaviors are present throughout an individual's lifecycle. Three attachment styles developed during infancy: avoidant, secure, and anxious-ambivalent attachment are present in adult romantic relationships. Cultural tendencies and beliefs about children and interpersonal relationships shape attachment in each culture. Empirical studies on both Western and Eastern cultures show support for the attachment theory. However, research has yet to be done within the Chinese-American culture, comparing different generations. There is a fundamental change in attachment theory when applied to non-western cultures. The goal of my research is to cultivate a better understanding of culturally specific characteristics that attribute to attachment style. Furthermore, I hope to extend previous research on culture and attachment to add the component of intergenerational experiences and address how clashes in cultural beliefs influence attachment bonds.

Mentor: Dr. Elaine Hatfield

Hye Won (Judy) Chung

Psychology

Work in Progress in Social Sciences

Participation for Honors, UROP

Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki A101

Poster Presentation: 1:30-3:00pm in Campus Center Ballroom

### Mental Health Stigma Perceived by Rural Health Professionals

**Research Goal:** To investigate mental health stigma (MHS), this study focuses on rural and Native Hawaiian (R/NH) communities across the State of Hawai'i.

**Background:** Confronting MHS is vital to improving health services. Research has identified MHS is a barrier to accessing health services and a higher prevalence of MHS in rural communities. Finally, the majority of Native Hawaiians live in rural communities, where health resources tend to be limited.

**Methods:** An online survey has been designed to assess the extent to which health professionals living and/or working in R/NH communities participate in the Department of Psychiatry continuing education activities. Current project will enhance the survey by adding MHS items in effort to identify MHS as perceived by rural health professionals and MHS experienced by association. The focus of this honors project during spring 2016 is to develop the MHS stigma items, seek IRB approval for the modification, and coordinate data collection to be conducted in later semesters.

**Expected Results:** Data will be analyzed based on professional context (working in rural, Native Hawaiian community; professional affiliation) using SPSS software, with reports of descriptive statistics. It is expected that professionals living and/or working in R/NH communities will report MHS experienced by them through association and by clients seeking mental health services.

**Conclusion:** Continuing education may be provided by the Department of Psychiatry to enhance rural health access through professional development. Future research should seek to assess the efficacy of the Department of Psychiatry continuing education activities in reducing MHS among health professionals.

Mentor: Dr. Susana Helm

Marshall Clark  
Global Environmental Science  
Finished Project in Natural Sciences  
Participation for UROP  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki C101

### Environmental Changes at Station ALOHA from Earth System Simulations

Observations from the Hawai'i Ocean Time-series (HOT) station show long term changes in the biogeochemical conditions in the North Pacific Subtropical Gyre (NPSG). Whether these multi-decadal trends are in response to human activities or naturally occurring changes due to internal climate variability is unclear. Exploration of this issue will be comparing the trends in several biogeochemical parameters observed from HOT with changes simulated by an ensemble of climate change simulations. Statistical analysis of the trends from HOT will be observed. The ensemble consist of 33 simulations of changes in climate change and ocean biogeochemistry performed with the Community Earth System Model Version 1 (CESM1). The simulations only differ on their internal variability, while the anthropogenic forcing are the same, making this ensemble ideal to explore the interaction of natural and human causes in the observed changes. Statistical analysis will be performed to determine if the observed trends are outside or within the range of natural variability simulated by the ensemble. While the observed trends of partial pressure carbon dioxide ( $p\text{CO}_2$ ) follow the anthropogenic increase of carbon dioxide ( $\text{CO}_2$ ) in the atmosphere, the drivers of the changes in chlorophyll and primary productivity are not clear. Conversely, I will also explore whether CESM1 simulates trends in ocean biogeochemistry realistically. Implications for projecting future natural and man-made changes in the NPSG will also be explored.

Mentor: Dr. Pedro DiNezio

Chevelle Davis  
Public Health  
Finished Project in Social Sciences  
Participation for Honors  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki A101  
Poster Presentation: 1:30-3:00pm in Campus Center Ballroom

### Key Factors in Obstetric Delivery Decision-Making Among Women with Limited English Proficiency

Asian American and Pacific Islanders (AA/PI) who are often classified under “other”, can be misrepresented as well as have hidden health disparities. Limited English Proficiency is understudied too, especially in AA/PI populations. This is important because some adverse perinatal outcomes, including obstetric trauma, are worse for women with limited English proficiency (LEP), compared to those who are versed in English. This study focused on how women of different levels of English proficiency obtained their health information regarding where to give birth, and who was important in making those decisions in Hawai‘i among diverse racial/ethnic groups, including those with LEP. Understanding this topic is important because (1) we need to understand who they are, (2) it will help design interventions, and (3) it provides knowledge and understanding of the background in which health disparities are made and resolved.

This study focused on questions from a larger survey, specifically regarding ways in which women of different levels of English proficiency obtained their health information, what influenced their decision of where to give birth, who was important in making those decisions, as well as what factors they considered salient when final decisions were made. This study compared these findings to factors proficient English-speaking women found important when choosing a place to deliver and the ways in which English-speaking women obtain their health information. The goal of this research is to determine which factors women in different linguistic groups value in making health care decisions, and if they have access to this health information.

Mentor: Dr. Denise Nelson-Hurwitz

Abundanzia Delavega  
Anthropology  
Proposal in Social Sciences  
Participation for Honors  
Oral Presentation: Session 3 (11:20a-12:20p) in Sakamaki A104

### Importance of Sea Shell Data from Miloli'i Valley, Kauai

I will be studying shells that will be excavated from the Miloli'i Valley on the Na Pali coast of Kaua'i. The site is in an isolated area where, until the 20th century, Native Hawaiians lived. It was then made into a state park. Through the study of shells in the area, I hope to understand what purpose the shells had for the community that once lived there, and to judge if overfishing was ever an issue for them. I will be able to see this through the size and condition of the shells we find during the excavation. There is also the possibility of finding a shell practice that is unique to that area. A unique shell practice can imply that there may have been foreign contact within that community.

Mentor: Dr. James M Bayman

Jeremy Francisco Divinagracia  
Fashion Design & Merchandising  
Work in Progress in Arts & Humanities – Creative  
Participation for UROP  
Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki B102  
Poster Presentation: 1:30-3:00pm in Campus Center Ballroom

### Development of a Men's Fashion Made in U.S.A.

Fashion is a never-ending update of previous designs. For the menswear market, tailoring was lost over time after the 1960s and is currently regaining momentum in this modern generation. The exponential growth of interest in men's fashion within the industry is recognized nationally. This involves challenging the accepted aesthetics of masculinity and breaking gender-fixed clothing silhouettes.

Street style is an eccentric expression of contemporary culture in fashion. It has become a resource that inspires designers' collections. Hawai'i is one of the most recognizable travel destinations globally, which brings different cultures into one location. The combination of cultures in one place allows an array of diversity that can be seen on the streets of Honolulu. These are documented in "Honolulu Street Style" by Maile Moran, Attila Pohlmann, and Andy Reilly.

This creative project focuses on developing a fashion line for the contemporary menswear market by combining the aesthetics of classic gentlemen's wear with the diversity found in street style in Hawai'i.

Mentor: Dr. Andy Reilly

Brandy Dobson  
English  
Proposal in Arts & Humanities – Creative  
Participation for Honors  
Oral Presentation: Session 3 (11:20a-12:20p) in Sakamaki B102

### Letters to Lydia

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, bowling down the door. I anchored myself to the shag carpet refusing to move for a man-friend, a man that 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 pure curiosity welcoming this stranger with innocence and trust. 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 across 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 will write my story with an emphasis on the healing nature of writing. In addition, my work will benefit from research into some of the specific issues involved with the narrative form of autobiography. My goals for this project are to employ writing as a therapeutic tool, sharpen my skills as a writer, and to perhaps inspire others with painful stories to engage in their own healing process on paper.

Mentor: Dr. Cynthia Franklin

Joshua Faumuina, Mechanical Engineering  
Liem Nguyen, Mechanical Engineering  
Tayler Pave, Electrical Engineering  
Bryson Racoma, Electrical Engineering  
Finished Project in Engineering & Computer Sciences  
Participation for UROP  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki B101

### Deployable Autonomous Glider for the 2016 CanSat Competition

When considering Mars as the next habitat for humanity, further investigations of Martian landing zones are of utmost importance. NASA scientists depend on orbiting satellites for overhead images of the Martian surface. While these images provide scientists with a broad view of Mars' various terrains, highly detailed images of landing zone candidates taken at lower altitudes will become necessary when planning future robotics and manned missions to Mars. To address this issue, NASA intends to deploy an autonomous glider mission into the Martian atmosphere during future Mars rover explorations in order to capture high resolution images of proposed landing sites. The CanSat Competition is an international engineering design competition for undergraduate and graduate students to develop and fabricate small rocket payloads that resemble current space-related projects, specifically the NASA Mars glider mission. The 2016 University of Hawai'i at Mānoa (UHM) CanSat team, consisting of undergraduates in their junior and senior year in mechanical and electrical engineering, designed and fabricated a deployable, autonomous glider science payload that is restricted to fit inside a cylinder the approximate size of a two-liter soda bottle. The mechanical engineering team designed, built, and tested a lightweight, 3D printed glider with collapsible wings. The electrical engineering and controls team designed and fabricated an Arduino based sensor package as well as a ground control station for receiving glider telemetry. If the 2016 UHM team is successful at the CanSat competition, the technologies developed by the team could aid NASA in their future Mars glider designs and missions.

Mentor: Dr. Trevor Sorensen



Michellei Fisher  
Biochemistry  
Work in Progress in Natural Sciences  
Participation for Mathematical Biology Certificate  
Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki C203

### Modeling the Effect of STAT3 on ROR1 Production in Relation to B-cell Chronic Lymphocytic Leukemia

B-cell chronic lymphocytic leukemia (B-cell CLL) is the most common adult leukemia in the Western hemisphere and is characterized by B lymphocytes co-expressing CD5 and CD19 antigens. Unlike in other hematologic malignancies, in B-cell CLL the signal transducer and activator of transcription 3 (STAT3) is constitutively phosphorylated on serine 727 (serine pSTAT3) and activates the transcription of the receptor tyrosine kinase like orphan protein type-I (ROR1). ROR1 protein is strongly expressed on the surface of B-cell CLL cells, while absent on healthy peripheral blood mononuclear cells. Because ROR1 is expressed only on cancerous cells, the objective of this project is to model the regulation of ROR1 by STAT3. We are developing a differential equations model describing a simplified dynamics of the regulation process and will employ techniques from dynamical systems theory to determine the factors potentially related to the onset of B-cell CLL.

Mentor: Dr. Yuriy Mileyko

Kapeka Forges  
Hawaiian Studies  
Finished Project in Arts & Humanities – Research  
Participation for UROP  
Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki B103

### Research of Indigenous Art Programs in Aotearoa

Maoli art is beginning to thrive and there is a growing opportunity for us to use art as one form in which to teach Hawaiian culture to the youth of Hawai'i. There are not many art programs taught through a Hawaiian worldview that are accessible to the youth of Hawai'i available, and more so any research being done to kickstart these programs. I believe it is important for this type of creative education to begin now, in order for it to make a positive difference tomorrow. My goal is to find alternative ways to help our younger generations connect themselves to our rich history, stories, and language. I believe that by creating art programs to help foster identity building in our keiki, we can create a stronger and more conscious generation of Hawaiians to help move our lāhui forward.

I chose to do research in New Zealand because they are strong example in cultural revitalization efforts. As our cousins across the Pacific we have used them to model other programs, such as the Hawaiian language preschools, 'Aha Pūnana Leo. I traveled to Aotearoa in July alongside my mentor Maile Andrade, her 'ohana, and two other maoli art students. We visited multiple schools across the North Island where art programs are taught through a Maori perspective. We participated in art activities, spoke with students, and assessed their cultural values and how they weaved them into the curriculum. I also conducted interviews with prominent Maori artists who are educators.

Mentor: Maile Andrade

Robert L Fread  
Political Science  
Finished Project in Social Sciences  
Participation for Honors  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki A103

### Limitations of White Privilege: Examining the Intersection of State Power and Race

The history of race relations in the United States is an unquestionably troubling aspect of a nation claiming to be founded on enlightened principles of liberty and justice. Ranging from the genocide of the First Nation peoples to the horrors of the Trans-Atlantic Slave Trade, countless generations have faced unspeakable acts of terror and suffering as European colonialism moved into the Americas. Even in contemporary society, remnants of this racial bias leave many people facing a systemic corruption which fails to recognize the inherent value of human life. Thus, it is no surprise that the argument for a pervasive and often invisible white privilege has become relatively dogmatic in both academia and the public sphere.

But do these historical facts automatically exclude whites from facing similarly brutal effects of state mechanisms, and if not, to what extent? This paper will focus on the death of Kelly Thomas in 2011; a homeless white man diagnosed with schizophrenia who died shortly after a severe beating by police officers in Fullerton, California. Through an examination of persistent conditions found in the criminal justice system that sanctioned his murder, both the limitations and absence of white privilege can be revealed. It is at this curious intersection of the social contract wherein claims for equal protection, domestic policing, state agency, and individual autonomy collide—perpetuating an ‘Other’ worthy of killing without recourse whose status is not necessarily predicated on race.

Mentor: Dr. Jonathan Goldberg-Hiller

Veronica Freeman  
English  
Finished Project in Arts & Humanities – Research  
Participation for Honors  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki B103

Panic! It's Organic!  
The Most Desensitized Food Term in The United States

In order to give a more transparent view of a complex and ambiguous term, throughout this essay, I decode the word organic as it is used in the popular culture of the United States. I begin with a personal viewpoint of how organic informs the perspective of an American consumer. In addition, I evaluate consumer bias and values. I highlight a brief review of successful organic labels and marketing strategies, such as that of Cascadian Farms and Whole Foods Market. In this paper, I reveal how the term organic changes meaning from individual to individual. While the average consumer may believe organic is only about the food on the shelf, others view organic as an ever changing and evolving phenomenon that moves beyond the grocery store. Researchers and food writers have begun addressing a more important and immediate question: *why* is organic obscure to consumers. Marketers utilize consumer guilt and temptation as a ploy. Marketing a product as organic pulls in an audience, appealing to notions of health and wellness.

Though now heavily desensitized within American culture, notions of organic still hold a synonymous connotation to most Americans: organic means healthy. While not accurate, corporations have caught on to the organic trend and have expanded business in order to exploit an audience that desires health. The purpose of this paper is to inform the general public of why the term organic has risen in popularity and how to determine potentially better food options without falling into marketing traps.

Mentor: Dr. Kristin McAndrews

Sai Furukawa  
Biochemistry  
Proposal in Natural Sciences  
Participation for Honors  
Oral Presentation: Session 3 (11:20a-12:20p) in Sakamaki C102

Zika Virus Effects in Various Stages of Gestation:  
Treatment Development for Microcephaly

The Zika Virus (ZIKV) is transmitted via various *Aedes* species (mosquitos), although primarily by *Aedes Aegypti*, and is becoming more prevalent as a major endemic due to the increased number of reported cases of Microcephaly, which contributes to seizures and other related brain problems, in newborn babies. In Brazil, physicians have noticed a relationship between ZIKV-affected areas and Microcephaly. Although some cases have found the presence of ZIKV in amniotic fluid of pregnant women, more research needs to be done. No research has found how the ZIKV affects the various stages of gestation (germinal, embryonic, fetal), which may help scientists to better understand the timeline of Microcephaly development in newborn babies. Therefore, the ZIKV will be studied in each stage of gestation to understand what specifically occurs to help with the development of treatments.

In this project, we will use *in vitro* techniques for viral propagation, imaging techniques, and diagnostic Flavivirus antibody assays that will help with the detection of the virus in the hosts. Treatments/cures can be further developed to protect prenatal organisms from the ZIKV, thus preventing microcephaly using the knowledge gained from this experiment.

Andrew S Gerren  
Ethnomedicine & Plant Conservation  
Proposal in Natural Sciences  
Participation for Honors  
Oral Presentation: Session 3 (11:20a-12:20p) in Sakamaki B104

### Effects of Varietal Diversity on the Selection of Kava in the Pacific

This study will investigate patterns of different kava varieties grown and consumed in Hawai'i and Vanuatu, to identify factors contributing to their production and consumption, and to identify major knowledge gaps. The presence of *Piper methysticum* within the Oceania archipelago has been well documented; however, the botanical variations of kava cultivars and their influence on selection need further investigation. The objective of this study is to develop consumer awareness of kava consumption, understand the role that local producers play in applying their knowledge to the kava growth process, and to catalog what varieties of locally grown kava would be open to the global market. Preliminary data will be compiled from photos, literature, and plant specimens found in Hawai'i and Vanuatu. Surveys, semi-structured interviews and focus groups with farmers, producers, consumers, and retailers will be conducted, as well as visits to farms, production sites, and other facilities, where participant observation and field walks will be used to assess factors influencing varietal diversity. Data will be analyzed using indices to determine varietal importance to help map out the complex nature and number of varieties. Identifying and describing the mechanisms of varietal selection will provide insight into future pathways as kava enters the global market. This study will also provide information on cultivar abundance, allowing us to see which varieties require more attention to ensure their survival. Information obtained on kava growth and consumption will be used to analyze the multidimensional concept of "importance" into standardized and comparable numerical scales or values.

Mentor: Dr. Noa Kekuewa Lincoln, Dr. Orou Gaoue, Dr. Michael B Thomas

Kendrick Villanueva Go  
Molecular Cell Biology  
Finished Project in Natural Sciences  
Participation for Honors, UROP  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki C103  
Poster Presentation: 1:30-3:00pm in Campus Center Ballroom

### Assessing the Clinical Significance of HPV Quantitation by Quantitative PCR (qPCR) in HIV-associated Anal Dysplasia

Nearly all-cervical cancers and approximately 90% of anal cancers are associated with human papillomavirus (HPV) infection of epithelial cells. Although most sexually transmitted HPV infections are asymptomatic and are cleared by the immune system within 1-2 years, unresolved infections can present themselves as genital warts or precursors of anal cancer as low-grade squamous cell intraepithelial lesions (LSILs) or high-grade squamous cell intraepithelial lesions (HSILs). HIV-positive men and women have a 52 times and 14 times higher risk of increased risk of invasive anal cancer and should therefore receive annual anal cytology screening tests as part of their routine health maintenance.

The objective of this study is to assess the clinical significance of HPV quantitation in HIV-associated anal dysplasia, which could possibly be incorporated into the current anal cancer diagnostic algorithm. Anal cytology samples were used in this study to detect and quantitate high-risk HPV subtypes 16 and 18, which are associated with roughly 70% of anal dysplasia and anal cancer cases in the United States. Preliminary results indicate that HPV 16 is significantly associated with atypical cytology ( $p=0.0181$ ) but HPV 18 is not significantly associated with atypical cytology ( $P=0.2043$ ). Unfortunately, the current sample size is insufficient to determine association between HPV 16 copy number and anal cytology grades. However, our results are consistent with literature reporting the presence of HPV 16 DNA as having a significant association with anal dysplasia. The parent study (RMATRIX) is continuing specimen collection to increase the sample size and determine the significance of HPV 16 and 18 copy number according to cytology grades.

Mentor: Dr. Bruce Shiramizu

Joanna Gordon  
English  
Finished Project in Arts & Humanities – Creative  
Participation for Honors  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki B102

### Stretch, Sag, and Sing: Songs of Womanhood

This chapbook is a series of poems that explores the systematic and internalized ideals of the middle class in the attempt to understand the sociocultural aspects within eating disorders. My chapbook reflects the storylines of suburban middle class narrative, and critical theories that influence the suburban family dynamic. The chapbook uses the body as a physical landscape to characterize my transition from girlhood to womanhood. It will include theoretical fields from 2<sup>nd</sup> and 3<sup>rd</sup> wave feminism, food studies, and affect studies. My chapbook, acts as a mosaic of the eating disorder from pre-diagnosis to recovery to reflect some of the systemic issues within the 21<sup>st</sup> century woman. I will be tracing my experiences back to the beginnings, the first time I saw what womanhood looked like, to the first time I felt the desire to be “perfect” and reexamine what exactly that means in relation to my own perception of my body. My thesis will be an observation of a world obsessed with perfection, as well as a recounting of how I have worked to rise above it.

Mentor: Craig Santos Perez



James Green  
Tropical Plant & Soil Sciences  
Work in Progress in Natural Sciences  
Participation for Honors, UROP  
Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki B104

## Establishment of a CRISPR-Mediated Transformation System for Development of Virus Resistant Transgenic Plants

CRISPR-Cas genome editing heralds the dawn of facile genome editing, enabling and simplifying the engineering of transgenic resistance to plant pathogens. Engineering a CRISPR-Cas system *in plantae* is the initial step in a multiple step research project to develop a CRISPR-Cas transformation system for virus resistant transgenic plants.

We designed small guide RNA (sgRNA) *in silico*, and reassembled via overlapping PCR a 20-nucleotide (nt) site of a sgRNA in the pUC119-gRNA vector. We confirmed the reassembly of a 20-nt target site via Sanger sequencing. We introduce our reassembled CRISPR-Cas system in *E. coli* strain DH5 $\alpha$  into *Agrobacterium tumefaciens* strain EHA105 through triparental mating. The CRISPR-Cas system is introduced from *A. tumefaciens* strain EHA105 into transgenic *Nicotiana benthamiana* line 16c for transient expression via agroinfiltration. Line 16c was previously transformed for constitutive expression of the green fluorescent protein (GFP) originally found in *Aequorea victoria*.

The sgRNA targeting the GFP locus direct the Cas endonuclease to the integrated GFP locus. Cas bind to the DNA duplex and generate a double strand break (DSB) resulting in 'knockout' of expression of the GFP transgene via frameshift mutation. Initiation of a DSB at the GFP allele completes the first step of the project. The next step of the project introduces the engineered CRISPR-Cas system to generate a DSB to precipitate the conditions necessary for homology directed repair (HDR). HDR of the cleaved locus enables the insertion of a gene of interest (e.g., a gene conferring resistance to a particular virus) at the targeted GFP locus.

Mentor: Dr. John Hu

Caroline Greenwood  
Marine Biology  
Finished Project in Natural Sciences  
Participation for UROP  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki C101

### Sub-canopy Nutrient Accumulation within *Acanthophora spicifera*

*Acanthophora spicifera* has become one of the most prolific invasive species in the Hawaiian marine coastal environment. Its rigid thalli intertwine to form dense mats, which have been shown to retard water flow. *A. spicifera*'s heartiness has enabled it to exploit brackish, nutrient-rich waters and thrive on shallow reef flats, where it outcompetes native macroalgae and corals.

This study sought to examine the extent to which *A. spicifera* alters the biogeochemistry within its own sub-canopy microhabitat. Water samples were drawn from the top and bottom of an *A. spicifera* canopy. These samples were analyzed for nutrient ( $\text{NO}_3^-$ ,  $\text{NO}_2^-$ ,  $\text{NH}_4^+$ ,  $\text{PO}_4^{3-}$ ,  $\text{H}_4\text{SiO}_4$ ) concentrations and compared to analogous samples taken outside of the canopy. Tissue samples were analyzed to determine the elemental (C, N, P) composition and the C:N:P ratios, as well as nitrogen reductase and alkaline phosphatase activities as metrics of nutritional status. *In-situ* profiles of pH, dissolved oxygen, and photosynthetically available radiation beneath and exterior to the canopy were determined using various probes.

Higher dissolved nutrients concentrations (particularly  $\text{NH}_4^+$ ) are anticipated in the water column beneath an *A. spicifera* canopy than in the water column exterior to the canopy. The elevated sub-canopy nutrient concentration would in turn be reflected in the elemental composition of algal tissue. These findings would suggest that the characteristically rigid structure provides a competitive advantage through the maintenance of an optimal microhabitat. The rigid mat-like morphology could be an evolutionary adaptation designed to reduce water velocity and accumulate nutrients for individual benefit.

Mentor: Dr. Kathleen Ruttenberg

Jaclyn Guenther  
Geology & Geophysics  
Finished Project in Engineering & Computer Sciences  
Participation for Honors  
Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki B101

### Numerical Modeling for Undergraduates

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

Mentor: Dr. Stephen Martel

Alissa Harada

Nursing

Finished Project in Social Sciences

Participation for Honors

Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki A102

Poster Presentation: 1:30-3:00pm in Campus Center Ballroom

### Factors Associated with Leadership Behaviors in Nursing Students

Over the next twenty years it is anticipated that novice nurses will begin to fill vacant nurse leadership positions as “the Baby Boomer” generation nurses retire. The Hawai’i Academic Progression in Nursing Leadership and Mentorship (L&M) program developed and implemented a pilot program using modules from the *New Careers in Nursing Leadership Development Toolkit (4<sup>th</sup> edition)* and the *New Careers in Nursing Mentoring Program Toolkit and Handbook* published by the Robert Wood Johnson Foundation. The purpose of the study was to identify and describe factors associated with nursing student leadership behaviors.

Three cohorts of students participated in completing a survey developed for the purposes of this study. The first cohort was used to pilot the L&M program. The other two cohorts had components of the L&M program integrated into their nursing undergraduate curriculum.

The results revealed a number of observable differences amongst the three cohorts. For example, the findings showed students self-report of *preparedness to take on a leadership position upon completion of the program* differed by cohort. In the Executive RN to BSN cohort (100%) responded they felt prepared to take on a leadership position, while 57.1% of the KCC nursing cohort and 38.6% of the UHM nursing cohort felt prepared to take on a leadership position. The finding of this study will contribute to our understanding of nursing L&M education. However, future studies are required to continue improving our knowledge of leadership development in undergraduate education to ensure sustainability of leadership as Baby Boomers leave the nursing workforce.

Mentor: Associate Professor Sandra LeVasseur, PhD, RN

Ashley Heikkila  
Atmospheric Sciences  
Finished Project in Natural Sciences  
Participation for Honors  
Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki C102

## Vertical Distributions and Seasonal Fluctuations from CALIOP: A Regional Aerosol-Cloud Interaction Analysis

There are still many unknowns in regards to aerosols and clouds and their overall effect on the climate. By knowing the location and vertical distribution of aerosols in the atmosphere in relation to nearby clouds along with their seasonality, it will allow for a better understanding of aerosol-cloud-climate interactions. In order to study the intricate relationships between absorbing aerosols and clouds, an analysis is conducted using fourteen different regions that were chosen for observation based on fire count data from Aqua's MODIS satellite. This study uses CALIOP Level 2 Lidar Vertical Feature Mask (VFM) data for the years 2006-2015. The VFM data provides aerosol types in categories based on their optical properties, including those that are reflective, such as sulfur containing continental pollution, and those considered absorbing, such as dust and smoke. The CALIOP aerosol types under investigation in this study are clean marine, dust, polluted dust, clean continental, polluted continental, and smoke. In addition to aerosols, cloud types and their heights in the atmosphere will also be determined using the VFM data. The cloud types are low overcast (transparent), low overcast (opaque), transition stratocumulus, low, broken cumulus, altocumulus (transparent), altostratus (opaque), and cirrus (transparent). Gridded profiles were created based on the latitude and longitude of the regions. Each satellite pass through these regions was extracted and averaged over a nine year time period to create a climatological average of the dominant aerosol and cloud type, their maximum and average heights, and their seasonal fluctuations in the atmosphere.

Mentor: Dr. Jennifer D. S. Griswold

Michelle Herr  
Political Science and Religion  
Work in Progress in Social Sciences  
Participation for Honors  
Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki A104

### Influence of the 1215 Fourth Lateran Council in Late Medieval Iberia

Religions have unified communities for hundreds of centuries, but in Medieval Iberia Jews, Christians, and Muslims experienced social and political disorder as kingdoms and territories shifted. When Pope Innocent III convened the 1215 Fourth Lateran Council, its mission was to reaffirm the orthodoxy of the Catholic Church. Following the Council, expulsion of Jews and Muslims began in Iberia. In my research, I will find connections between the proceedings of the Fourth Lateran Council and subsequent policies put in place by the Kingdoms of Castile and Aragon. To do this, I will study and analyze historical documents, laws, and personal writings in order to find connections from the canons of the Council and subsequent policies in Iberia from the Iberian participants in the Council and onwards. Next, I will analyze any social and political influences that contributed to the expulsion of Jews and Muslims from Medieval Iberia. Lastly, I will synthesize my sources in order to explain how much influence the Fourth Lateran Council had on the Kingdoms of Castile and Aragon. This research will serve as an explanation for the upheaval of Jews and Muslims experienced during the late medieval period in Iberia.

Mentor: Dr. Nevzat Soguk

Chelsea Hicks  
Anthropology  
Proposal in Social Sciences  
Participation for Honors  
Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki A103

### Interviews of Micronesian Women's Experiences in Seeking Healthcare in Hawai'i for Themselves and Their Children

Micronesian immigrants to Hawai'i have faced discrimination, poor access to quality government assisted healthcare and added health issues as a result of the United States doing nuclear testing during World War II in Micronesia. The choice to focus on women and children specifically is because they are at an even greater risk. This also comes at a time when the COFA (Compact of Free Association) is in the process of being dissolved by the Micronesians with the United States. Which would mean that Micronesians living in the United States would lose their immigration status and possible loss of federal benefits.

This project aims to address the problems Micronesian women and their children face when trying to obtain access to healthcare in Hawai'i. By interviewing these women we can gain insight on issues they face with state and federal funded healthcare, medical facilities and staff, travel to and from health facilities, medications and health issues that are related to the effects of the United States doing nuclear testing during World War II in Micronesia. By being able to see the issues they face from their point of view we will be better able to understand their perceived hardships, needs and wants.

Mentor: Dr. Jan Brunson

Noah Higa  
Information & Computer Science  
Work in Progress in Engineering & Computer Sciences  
Participation for Honors  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki B101

### Practical Enumeration of Task Clustering Options in Scientific Workflows

Currently, task scheduling for a supercomputer is done through a batch scheduling system. Multiple users submit their jobs to the scheduler, which will, when there are enough resources available on the supercomputer, put the job to work. Most jobs to be submitted to a supercomputer are multiple, separate program tasks that work together through a series of dependencies to produce a desired set of data. However, this scheduling often comes with significant overhead for each task waiting in the scheduler's queue. This wait time could be longer than the actual runtime of the tasks.

One way to avoid this overhead is to cluster tasks into larger meta-tasks that are submitted as a single task to be done sequentially. This avoids the overhead, but increases the runtime, because the tasks cannot be run in parallel as if they were submitted separately. The goal of this field is to find an efficient compromise between clustering and not clustering tasks. My part of the project creates code that will generate clustering options for a given set of tasks, represented as a directed acyclic graph. For a single set of tasks, my code will output, based on user preferences, all possible cluster options, randomized samples of cluster options, or cluster options that had been proposed previously in academic journals. These will be used to evaluate the usefulness of current clustering practices, or to find a pattern of useful clustering.

Mentor: Dr. Henri Casanova



Angelina Holcom  
Biology  
Proposal in Natural Sciences  
Participation for Honors  
Oral Presentation: Session 3 (11:20a-12:20p) in Sakamaki C101

### The Biology of Aging: A Study of Telomeres

Aging is a complex biological process that is characterized by different factors. One of the major theories of aging is the cell death or telomere theory. This theory focuses on the shortening of telomeres, which causes cell death and results in aging. Telomeres are the end caps of the chromosome and are made of a repeated section of DNA that do not code for anything. Their purpose is to maintain genomic and cellular stability, which involves protecting the genome from breaking down or mutating. Telomere loss can result from a problem in DNA replication or when chromosome ends are processed after replication. The loss of telomeres can possibly cause age-related diseases including cardiovascular disease, type 2 diabetes mellitus, cancer or chronic obstructive pulmonary disease.

The goal for my experiment is to learn how to prevent the shortening of telomeres so that I can better understand how to slow down the aging process. In my experiment I will introduce various nutrients, such as minerals, to the tested organism's food source to observe if the telomere length changes. I will measure the length of telomeres by using one of the following methods: Telomere Restriction Fragment (TRF) analysis by Southern blot, Quantitative fluorescence in situ hybridization (Q-FISH) or quantitative polymerase chain reaction (qPCR).

This experiment is significant because it will increase our understanding of the aging process, so that we can improve the aging process for a better quality of life when we age.

Mentor: Dr. Floyd Reed

Corinna SY Hong  
Marine Biology  
Finished Project in Natural Sciences  
Participation for Honors  
Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki C101

### Comparison of Normal and Abnormal Coral Tissue using Microskeletal Traits in Massive *Porites*

Massive *Porites evermanni* and *Porites lobata* colonies in Hawai'i have historically been observed with demarcated and raised growth anomalies (GAs). Following Hawai'i's mass coral bleaching event in September 2014, growth anomalies on *Porites evermanni* and *Porites lobata* colonies in Lanikai became more pronounced. Growth anomalies appear as noticeable masses of enlarged skeleton and tissue with larger and fewer polyps compared to the adjacent normal tissue. Some corallites in the growth anomaly region even contain additional septa. The purpose of this study is to quantitatively determine if there is a significant difference in corallite size between normal tissue and growth anomaly tissue. *Porites evermanni* and *Porites lobata* skeletons collected in Lanikai were photographed at 18x using a Nikon Coolpix 4500 attached to a stereo microscope. Ten corallites were measured from each sample using 24 X-Y coordinates mapped on landmark skeletal structures relating to septal length and overall corallite size. The ten sets of 24 coordinates were then averaged to obtain the best representation of corallite size for the sample. The morphometrics of the normal skeletons and the GA skeletons will be compared using ANOVA to determine if there is a significant difference in size. By mapping out points and measuring distances, a quantitative measure of variance between the two skeletal types can be determined. Based on collected background information, I expect a significant corallite size difference between normal and GA tissue.

Mentor: Dr. Cynthia L Hunter

Henderson Huihui  
Political Science  
Proposal in Social Sciences  
Participation for Honors  
Oral Presentation: Session 3 (11:20a-12:20p) in Sakamaki A103

## Human Rights Law and International Intervention: What Can the International Community do?

After the atrocities of World War II, the Universal Declaration of Human Rights was declared by the United Nations (UN) in 1948. In international law there are two main sources of law: Customary International Law and treaties. Both of these sources of law are binding on nations. The Human Rights declaration does not directly fall under either category of international law but its contents have been included in two treaties: The International Covenant on Civil and Political Rights (ICCPR) and the International Covenant on Economic, Social and Cultural Rights (ICESCR). This project will focus on the rights in the ICCPR because those rights are negative rights and do not require money to be implemented.

This research project will examine the implementation of human rights law and the enforcement mechanisms utilized by the international community and their effectiveness. There are a number of ways that the international community can intervene. This includes military intervention, sanctions, criminal prosecutions and periodic review. This project will attempt to answer the question of what form of intervention is the most effective in remedying human rights violations. This will be accomplished by analyzing documents such as treaties, UN Security Council resolutions, General Assembly resolutions, Human Rights Council, Commission and Committee reports as well as other various UN reports and recommendations. Reports from Non-Governmental Organizations will also be examined. Human Rights abuses are still very prevalent today in many different nations, partly due to human rights law being a relatively new concept that is constantly evolving.

Mentor: Dr. Carolyn Stephenson

Cindy Huynh

English

Finished Project in Arts & Humanities – Creative

Participation for Honors

Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki B102

### *Remember Me*

*Remember Me* is a novella that focuses on generational conflicts in Vietnamese-American families. The creative work deals with the conflicts between Western and Eastern culture, but also aims to address the similarities by using death as a universal concept. The novella's main character, Emily Lang, is a first generation American who has just been told that her mother is terminally ill. Due to a lack of communication from her father and unable to receive the emotional support she needs from the tragic news, she eventually lashes out at her aunt, unable to stand her insults any longer. She runs away from home and meets Henry, who is revealed to be one half of Heibai Wuchang, a deity from Chinese folklore who is in escorts the spirits of the dead to the underworld. He makes a deal with Emily. If she can assist him in helping the ghosts of the dead move on, he'll bring her mother back to life. To do this, Emily must witness one memory from every person that dies. These memories and her experiences with Henry, she begins to change her outlook on the world. The work is divided into three narratives, all done entirely in first person point of view. The first narrative presented is that of a diary narrative of the protagonist. The second narrative is linear, providing a plot for readers to follow. The third narrative consists of multiple characters' single experiences, or the 'memory' that is received by the main character as a form of catharsis following their deaths. This work also explores familial dynamics, relationships, suicide, and other social issues that plague us as human beings.

Mentor: Dr. Katharine Beutner

Michelle Huynh  
English  
Proposal in Arts & Humanities – Creative  
Participation for Honors  
Oral Presentation: Session 3 (11:20a-12:20p) in Sakamaki B102

*The Virtue in Propaganda*

From the age of four, I would overhear both of my parents speak about the time they grew up in Vietnam, especially their individual experiences with the Vietnam War. Only until I was older nearing my mid-teens did I realize that my parents lived through extraordinary circumstances to get to where they are today. My mother, a Caucasian woman who was adopted in poor countryside Vietnam, faced racism, abuse, and unequal education as compared to others who were of direct Vietnamese decent. My father, a Vietnamese man who was born into one of the most elite Catholic families in Vietnam, grew up in the heart of Saigon and was later drafted in the infantry to fight for the South. That, of course, is one of my inspirations behind the dramatized play I have planned where the audience follows the life of Trinh, a half-Vietnamese, half-Caucasian teenager living in the outskirts of Saigon when the war is nearly its end. At the same time, I am incredibly fascinated by the amount of literature written on the Vietnam War and how many of these pieces only show one perspective — the Western perspective. Perspective is an 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 as well as shining a light on racial inequalities, sexuality, and biases that are not explored in Asian literature. I want my audience to feel the humanity that exists behind Vietnam and other countries that have been socially affected through Western appropriation. I want my audience members to feel the wrath and agony of war as they walk out of the theatre.

Mentor: Dr. Glenn Man

Sarah Imanaka, Accounting  
Alyssa Lassiter, Music Performance  
Sarah Champayn-Look, Music Education  
Eric Sorensen, Music Performance  
Finished Project in Arts & Humanities  
Participation for UROP  
Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki B103

### Mixed Plate: Diversifying a National Stage

Compared to their Western counterparts, Pacific and Asian concert band composers and their music are underrepresented on the national performance stage. “Mixed-Plate: Diversifying a National Stage” is a student-led project by University of Hawai’i Wind Ensemble members aiming to encourage ethnic diversity in concert programming on a national level. The purpose of this project is to expose western audiences to music from underrepresented cultures. The University of Hawai’i Wind Ensemble was invited to perform in Reno, Nevada at the College Band Directors National Association (CBDNA) Conference, and performed public concerts in the Bay area of California. Through this project were able to collect data on other ensembles performing at the CBDNA conference, as well as other semi-professional groups on the mainland, to demonstrate the lack of (and the need for) diversity in programming in the wind band community.

Mentor: Dr. Jeffery Boeckman

Shannon Quan Iriarte  
Theatre  
Finished Project in Arts & Humanities – Creative  
Participation for UROP  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki B102

### Storytelling in the Shadows: Sharing Cultural Values through Puppetry

The primary objective of this research was to reinforce Chamorro cultural values among Guam's youth. On 27 May 2015, I traveled from O'ahu to Guam and began the process of script writing, interviewing, and creating shadow puppet characters and scenery. For several weeks, I collaborated and interviewed a local, elder storyteller named Rosa "Tan Chai" M. Quidachay. Together, along with my grandmother who is fluent in the language, we spent several weeks creating an English and Chamorro script for three stories: *I Fuetsan Gadao*, *Encantao na Aniyu*, and *Si Sirena*. We also worked together to create various shadow puppet characters and sceneries to fit the script. On 16 July 2015, I performed at Astumbo Middle School with an English script. Then on 20 July 2015, both Tan Chai and I performed at the Hurao Academy, a Chamorro immersion school. Tan Chai told the story in Chamorro and elaborated also on background information of Chamorro culture, the importance of materials and tools used in the past, and Chamorro words and phrases for particular sea animals like dolphins and sea turtles. After the performance, I carried out an activity for the school children ages four through twelve, whereby I provided them with materials to create their own shadow puppets and colorful backgrounds and later shared their own stories on the shadow screen.

Mentor: Mark Branner

Kaitlyn Iwashita  
History and English, certificate in Women's Studies  
Finished Project in Arts & Humanities – Research  
Participation for UROP  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki B103

One False Note: the Case of Billy Tipton and America's Reactions to  
Transgender Individuals in the 1980s and 1990s

This paper examines media representation of transgender individuals during the 1980s and 1990s by way of Billy Tipton, a jazz musician who was discovered to be transgender following his death in 1989. By examining Tipton's career, personal life, and death, I will elucidate the media's coverage of Tipton's death during the 1980s and 1990s, which exemplifies the popular American interpretations and misconceptions of transgender people during the 1980s and 1990s. Following his death, Tipton was portrayed in the media as a "woman" who had been masquerading as a man, rather than a man who was assigned female at birth. Furthermore, I contend that, despite the rise in awareness of LGBTQ+ people during the 1980s and 1990s, the portrayal of Tipton in the media perpetuated false representations of Tipton's gender identity and highlights the transphobia that is prevalent in American culture.

I use two major research strategies: (1) analysis of newspaper articles, obituaries, interviews, and legal documents concerning LGBTQ+ people that were published in the 1980s in America and (2) analysis of follow-up newspaper articles, interviews, legal documents, and reports on Tipton's life and death that were published during the 1990s. Data have been collected from obituaries, newspapers, interviews, published reports, legal documents, court cases, and biographies of Tipton's life.

Mentor: Dr. Karen Jolly



Sidra Jabbar

Biology

Finished Project in Natural Sciences

Participation for Honors, UROP

Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki C103

### Evaluation of Fibroblast Gene Expression Differences in Internal Organs

Cystic fibrosis and cardiac fibrosis after myocardial infarction are diseases that originate from the same root cause: malfunction of the fibroblast cells. Health organizations like the Cystic Fibrosis Foundation and the American Heart Association work towards their missions to cure and control these ailments, however research on this specific cell population can aid in their pursuits.

Fibroblasts are spindle-shaped cells found in the connective tissue and play an important part in wound healing by migrating to the site of injury and replacing damaged tissue with new collagen. Problems arise, however, when fibroblasts secrete and deposit excessive amounts of extra-cellular matrix (ECM). In the case of cardiac fibroblasts after a heart attack, these cells deposit too much ECM which restricts heart movement, eventually leading to organ failure.

A lot of research already done on fibroblasts focuses on genes present in specific organs. However, there is still a gap in knowledge as to which genes are expressed in organs relative to each other. Broader implications of this project include developing therapeutics for fibrosis. By knowing the relative gene levels in organs, medications can be developed later to target specific organ fibroblasts to reduce the level of fibrosis in affected tissue without destroying fibroblasts in other organ systems.

Using mouse models, the project compared the relative gene expression of fibroblast cells from the heart and lung through qPCR. Identification of several overlapping genes as well as potential targets for fibroblast/organ specificity is anticipated. This project was conducted at the John A. Burns School of Medicine Center for Cardiovascular Medicine.

Mentor: Dr. Michelle Tallquist

Ted Jacoby  
Biochemistry  
Proposal in Natural Sciences  
Participation for Honors  
Oral Presentation: Session 3 (11:20a-12:20p) in Sakamaki C103

### The Chemical Modification of L-Asparaginase

Bacterial L-asparaginase is the main enzymatic chemotherapy used for Acute Lymphoblastic Leukemia (ALL) due to its' high activity in converting asparagine into aspartic acid, starving the cancerous cell of this essential amino acid and preventing cell growth. Unfortunately, because a foreign protein is used as treatment, the body has a natural tendency to produce anti-bodies against it and elicit an immune reaction. This leads to many undesirable side effects to the treatment and eventual denaturation of the protein by the immune system; however, if human L-asparaginase were used as a replacement for the current chemotherapy, then this immune response would not occur and patients diagnosed with ALL will have access to an extremely efficient chemotherapy without the complications associated with consuming a foreign protein.

In order to successfully use human L-asparaginase as a chemotherapy, a mutant variant that mimics its' bacterial counterpart in activity must be used. Mutant genes will be inserted into plasmids in order to replace amino acids in the active site of human L-asparaginase. Then the experimental success will be determined through PCR and SDS-PAGE gel electrophoresis. Variants will be tested for relative activity using a fluorescent plate reader and compared to the bacterial enzyme. If this is successfully implemented, and a human variant with high activity is discovered, the efficacy of L-asparaginase as a chemotherapy would be improved.

Mentor: Dr. Ho Leung Ng

Miranda Kam

History

Proposal in Arts & Humanities – Research

Participation for Honors

Oral Presentation: Session 3 (11:20a-12:20p) in Sakamaki B103

### Women and Fashion in the French Revolution

Fashion frequently reflects and reinforces broader political and social trends. This was as true, if not more so, during the political upheaval of the French Revolution as it is today. Popular fashions shifted along with the series of changes in controlling governments and the constitutions they produced. The rise of consumerism in France during the Old Regime created a fashion culture and by the late 18<sup>th</sup> century, a focus on fashion was no longer a privilege of elites. Some historians, such as Aileen Ribeiro and Jennifer M. Jones, who have written about fashion in the French Revolution, have argued that Revolutionary legislators granted women freedom in fashion largely as a substitute for genuine political power in the emerging public sphere. Through the examination of a variety of sources, including Revolutionary legislation, fashion plates, and publications that address clothing and convey ideal methods of dress, this project will explore how authorities regulated dress in an attempt to control citizens and viewed deviations from their established norms as problematic to the Revolution; in particular, how dress reflected and influenced attitudes toward women's roles and their participation in the public sphere. For example, when the National Convention declared freedom of dress a fundamental human right, men nonetheless perceived women who wore masculine clothing as a threat to their authority and worried that women would demand political rights.

Mentor: Dr. Matthew Lauzon

Sadie M Karratti-Abordo  
Biochemistry  
Work in Progress in Natural Sciences  
Participation for Honors, UROP  
Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki C203

### METH and HIV-Tat Induced Changes in Calcium Channel Expression in Dopaminergic Neurons

METH increases dopamine (DA) neurotransmission in the ventral tegmental area (VTA) and the nucleus accumbens (NAc). DA contributes to the pathogenesis of HIV resulting in damage to nearby neurons and leading to neurodegeneration. METH increases extracellular DA by targeting dopamine transporters (DAT), blocking DA reuptake and prolonging DA's actions in the synapse. Similarly, the HIV-Tat protein, a major pathogenic factor for HIV plays a critical role in the HIV virus replication, and modulates DA transmission by altering the function of DAT. The combination of HIV and METH exposures can cause greater neurological impairments than each agent alone.

Previous reports have shown that HIV-Tat and METH independently affect  $\text{Ca}^{2+}$  levels inside the cell. In vitro, METH increases intracellular  $\text{Ca}^{2+}$  concentrations and enhances  $\text{Ca}^{2+}$  oscillations in the VTA dopamine neurons of METH-treated rats. Similarly, the HIV-Tat protein amplifies  $\text{Ca}^{2+}$  levels in hippocampal neurons in response to glutamate. The mechanisms by which neurons mediate  $\text{Ca}^{2+}$  responses are poorly understood. The preliminary data in our laboratory shows that in SH-SY5Y cells, our in-vitro model of dopaminergic neurons, HIV-Tat and METH influence the expression of the L-type and N-type  $\text{Ca}^{2+}$  channel genes. The main goal of this project is to determine and identify which  $\text{Ca}^{2+}$  channel subtypes on the plasma membrane HIV and METH target and also to determine the combined effects of chronic Tat and METH exposures on  $\text{Ca}^{2+}$  channel expression levels. To achieve this goal, we will employ molecular biology approaches (real time PCR or qPCR), immunohistochemistry and fura-2 ratiometric imaging techniques.

Mentor: Dr. Marilou Andres

Brysa Kato  
Biology  
Finished Project in Natural Sciences  
Participation for Honors  
Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki C103

#### Hemoglobin A1c test in an Ad Libitum Low Glycemic High Carbohydrate Diet

In America, nearly 50% of our population has diabetes or pre-diabetes. A detrimental complication that stems from excess glucose in the blood is organ and tissue damage that often results in kidney failure, blindness, and decreased wound-healing ability in diabetics. This study describes changes in hemoglobin a1c (HbA1c) in people from a general population that underwent a dietary lifestyle change with unprocessed foods in a high carbohydrate diet. HbA1c results from participants before starting the diet program were compared to HbA1c results taken three months after. This study also measured and analyzed blood test measurements such as cholesterol, triglycerides, and fasting glucose over the 10-day diet program period. HbA1c levels decreased significantly through changes from this diet which implies that nutrition with a high carbohydrate diet is an effective treatment in managing and lowering hyperglycemia.

Mentor: Dr. Terry Shintani

Evan Kawamura  
Mechanical Engineering  
Finished Project in Engineering & Computer Sciences  
Participation for Honors  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki B101

### Managing Renewable Generation Fluctuations

Energy and power production are essential to daily life. By the year 2030, HECO desires to increase renewable energy production up to 65%. Increasing renewable energy production will help reduce fuel burning to hopefully minimum. However, power produced from solar panels and wind turbines may be insufficient to meet the load conditions. Therefore, spinning reserves, which are back-up power fuel-burning devices, or energy storage systems such as batteries are used to make up for that power deficiency. These main two back-up plans must be very efficient and cost effective to quickly make up for power deficiency when renewable energy production decreases. The first step is to obtain aggregate power data from household appliances. Then, typical load and PV curves can be constructed to help determine the best-fit daily model of power demand and production in areas in Hawaii. The next step inputs this data into a complex valued neural network that considers several variables such as solar irradiation, relative humidity, daily air temperature, and sunshine duration. This complex valued neural network will learn patterns from this data to make predictions for short-term load forecasting. The aim of this study is to create a short-term load forecasting model to demonstrate how much renewable energy is needed on a daily basis to power a home. Excess power is stored in batteries and used when there is insufficient power from renewable energy sources. If there is sufficient power, then the user can live independently off the power grid.

Mentor: Dr. Reza Ghorbani

Caitlin Kelly  
Psychology and Sociology  
Finished Project in Social Sciences  
Participation for UROP  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki A104

### Preventing Suicide in Hawai'i Through Youth Empowerment

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

Mentor: Dr. Deborah Goebert

Kyung Moo Kim

Economics

Finished Project in Social Sciences

Participation for Honors

Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki A101

Poster Presentation: 1:30-3:00pm in Campus Center Ballroom

Price Determinants of Tuberculosis Drugs:  
An Analysis of The Global Fund Price Quality Report

Though drugs for tuberculosis has existed since the 1940s, over 9.6 million people fell ill with TB and 1.5 million died from disease in 2014. Developing countries carry much of the burden: over 95% of TB deaths occur in low- and middle-income countries, accounting for more than 80% of new tuberculosis cases globally every year. It is therefore important that tuberculosis drugs are available and affordable to countries that are not adept at negotiation and/or procurement. The Price and Quality Reporting (PQR) system is a web-based system that collects procurement data for select commodities under The Global Fund to Fight AIDS, Tuberculosis and Malaria. Little empirical work has been done on factors that affect global tuberculosis drug pricing and affordability. A data set containing PQR information from 2006 to 2014 was obtained from the Global Fund. We isolated procurement data related to tuberculosis and its treatment. All data unrelated to tuberculosis and its treatment was excluded. We converted product amount by the equivalent treatment months, and identified drugs in fixed-dose combinations. There were 6372 transactions and the products purchased amount to more than US\$400 million (current terms). We analyze using regression analysis the relationship between prices and factors including time intervals between purchase order date and delivery date, FDCs, GDP per capita (Atlas method), public and private health expenditure as % of GDP, population density, education rates, government corruption, incidence of tuberculosis, suppliers, geography, and infrastructure (% roads paved).

Mentor: Dr. Victoria Fan



Ai Kitanosono  
Psychology  
Proposal in Social Sciences  
Participation for Honors  
Oral Presentation: Session 3 (11:20a-12:20p) in Sakamaki A103

### Ethnic Differences in Perceptions toward 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 ethnic diversity in current United States. To investigate the ethnic differences in how people perceive psychopath, the survey using CAPP prototype-rating scales will be conducted over 500 undergraduates at UH manoa. The survey includes: questions concerning the belief and attitude towards psychopathy, questions about their ethnicity, gender, and age. The study will hope to reveal the ethnic differences in attitude and belief towards psychopath.

Mentor: Dr. David C. Cicero

Adora Klinestiver  
Chemistry and Spanish  
Proposal in Natural Sciences  
Participation for Honors  
Oral Presentation: Session 3 (11:20a-12:20p) in Sakamaki C103

### Synthesis of a Substituted Indazole Compound, 5-fluoro-6-nitro-1H-indazole, to Obtain a More Potent STAT3 Inhibitor

Signal Transducer and Activator of Transcription three (STAT3) is a protein actively occurring in the human body. Its most important function is regulating gene expression, and these genes are very important for many cellular processes, including survival, rapid growth and movement, new blood vessel formation, invasion, and development into many other cells. However, mutations involving STAT3 can lead to abnormal processes in cells, like tumor formation. Fortunately, there are inhibitors that stop the continuous binding of STAT3 protein complexes. Some common inhibitors are heterocycles, and they have a direct effect on the deactivation of STAT3 protein kinases. The indazole compound, 5-fluoro-6-nitro-1H-indazole is a good alternative base structure to increase the potency of a STAT3 inhibitor by adding the electronegative element, fluorine to the heterocycle and substituting different protecting groups to the indazole compound. This indazole will be synthesized by following a similar patent used for synthesizing other indazole compounds. The reagents 4-fluoro-2-methyl-5-nitroaniline, potassium acetate, acetic anhydride in chloroform, and isoamyl nitrite will be reacted together, extracted with ethyl acetate, and purified with column chromatography. A similar synthesis experiment previously performed will be used to track the best yield when putting on and taking off different protecting groups on the indazole to determine which one is more potent. With this research, it will lead to the synthesis of commercial drugs that will reduce cancer pathogenesis in breast, ovarian, prostatic, and pancreatic cancers.

Mentor: Dr. Marcus Tius with aid of Dr. Christine Brotherton-Pleiss

Emily Ko  
History and Economics  
Proposal in Arts & Humanities  
Participation for Honors  
Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki A103

### Capitalism in the Gilded Age

The Gilded Age in the United States of America was a paradoxical time. It was a time of great economic growth and development, but it was also a time of great poverty and divisions of wealth. During this period and thereafter, scholars have discussed the representation of capitalism in the Gilded Age, some saying that it was capitalism at its fullest potential and others condemning it for straying off the path of capitalism that was to bring growth to everyone. My project will discuss why these disparities in perspectives and such divisions of wealth during the period existed, particularly focusing on the Panic of 1873 and the “great depression” that followed.

The world today is experiencing similar debates as occurred in the Gilded Age. How should capitalism work? Why are some extremely rich and millions of others extremely poor? Is capitalism the best and most free economic system? The study of capitalism in the Gilded Age has an answer to all of these questions; therefore, it provides a way to study the lives of the past and to solve the problems of today.

Mentor: Dr. Peter Hoffenberg

Landon Kozai  
Economics  
Proposal in Social Sciences  
Participation for Honors  
Oral Presentation: Session 3 (11:20a-12:20p) in Sakamaki A104

### Measuring Well-Being Across Different College Majors

Happiness is important for optimal functioning. It is a significant goal and one of the most salient needs of human life. The subjective nature of the word “happiness” has led to the increased use of “well-being” to describe the extent of one’s overall satisfaction with life. Previous research has shown that people have a tendency to overestimate the satisfaction gained by extrinsic needs while underestimating the satisfaction gained by intrinsic needs. On the college campus, choosing a major has a variety of extrinsic implications, including future income and status of having a particular job. For instance, science, technology, engineering, and math-related degrees are expected to yield higher financial gains on average when compared to a literary arts degree. However, it is suggested that such students spend more time doing unfavorable activities such as studying and extracurricular academic work. Particularly students in the natural sciences experience delayed gratification in comparison to others, expecting large salaries that require years of sacrifice. With respect to predicted income, students involved in different fields of study may experience varying workloads and amounts of leisure time. This study attempts to investigate students’ levels of satisfaction associated with intrinsic characteristics such as leisure and extrinsic characteristics such as expected income after graduation with respect to their majors. The Satisfaction with Life Scale will be used to measure happiness.

Mentor: Dr. Inessa Love

Marissa Kuo  
Biology  
Finished Project in Natural Sciences  
Participation for UROP  
Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki C103

### The Liver Support System: The Potential Roles of PDGF Receptors in Liver Fibroblasts

Liver fibrosis, in particular cirrhosis, is a medical problem that results in more than 300,000 deaths annually. Currently, there are no treatments to reduce fibrosis. Identification of signaling pathways required for fibroblast function could lead to new avenues of treatment. PDGFR $\alpha$  is a receptor tyrosine kinase that is required for fibroblast formation in the developing heart, and it is also required for maintenance of mature cardiac fibroblasts. The purpose of this study was to investigate the role of PDGFR $\alpha$  and PDGFR $\beta$  in liver fibroblasts. Using antibodies and transgenic mouse lines to identify fibroblasts, we found that PDGFR $\alpha$  and PDGFR $\beta$  were co-expressed in liver fibroblasts, also known as hepatic stellate cells. This expression combined with the known role of the receptors in other organ fibroblasts led us to hypothesize that PDGF receptor signaling is required for hepatic stellate cell maintenance. To test this we will use transgenic mice to delete PDGFR $\alpha$  and PDGFR $\beta$  in hepatic stellate cells and identify cellular functions attributed to PDGF receptor signal transduction. Results will provide a deeper understanding of the role of the PDGF receptors in the liver and potentially lead to therapeutics targeting fibrosis.

Mentor: Dr. Michelle Tallquist

Laurence Lea Lacar  
Biochemistry  
Proposal in Natural Sciences  
Participation for Honors  
Oral Presentation: Session 3 (11:20a-12:20p) in Sakamaki C101

### Combating Drug Resistance of Cancer Cells through Combination of STAT3 Inhibitors with Molecular-Targeted Agents

Chemotherapy remains as the main line of treatment for most cancers but molecular-targeted agents (MATs) are rising as an option for various cancers due to the selectivity and implicit design of the agents based on genetic and protein information. Looking into how cells grow into malignant tumors and attempting to block these processes is a novel approach to cancer treatment. STAT3 protein is one such target as a master regulator responsible for cell division and apoptosis prevention. Developing small molecule inhibitors as a novel drug for this protein, and others like it, is a research priority. However, sometimes, treatment with a single MAT is followed by resistance development. Combining STAT3 inhibitors with other MATs may produce greater antitumor efficacy and be a viable cancer treatment option. The goal of this research is to investigate these MATs and rationally combine STAT3 inhibitors with preexisting drugs for breast, pancreatic, and ovarian cancer in order to develop a combination therapeutic technique to decrease cancer cell viability and combat resistance. This is done through cell cultures, treatment with the MATs, and proliferation assays. One cell line for each cancer type will be treated with the compounds of interest, STAT3 inhibitor, and both—all in varying concentrations.  $IC_{50}$  numbers to demonstrate drug efficacy will be generated and protein presence analyzed via western blot. Through these studies, we can gain better insight on drug resistance development in cancer cells and develop a viable treatment option for those suffering from the aforementioned types of cancer.

Mentor: Dr. James Turkson

Karolyn Lam  
Public Health  
Proposal in Social Sciences  
Participation for Honors  
Oral Presentation: Session 3 (11:20a-12:20p) in Sakamaki A101

### Preventing Sudden Infant Death Syndrome (SIDS) in Hawai'i

Hawai'i has one of the highest costs of living in the country and this becomes an issue when trying to afford the basic needs of a child. Without proper knowledge and supplies, babies may potentially die from preventable causes or Sudden Infant Death Syndrome (SIDS). With this in mind, The Healthy Mothers Healthy Babies (HMHB) Coalition of Hawai'i provides programs for these mothers in need.

The Hawai'i Cribs for Kids Program has been designed to educate mothers about how to properly put their babies down to sleep. At the end of this program, cribs are distributed. Unfortunately, mothers are not enrolled early enough or are unaware that this program exists. If mothers are unable to purchase a crib, the infant will sleep with the mother in the adult bed, increasing the chance of suffocation and SIDS tremendously.

This study is designed to promote earlier enrollment in the Hawai'i Cribs for Kids program as well as other programs that are already available. Investigating the challenges that HMHB faces when reaching out to the community will be one focal point. Additionally, analyzing and improving the other programs HMHB offers will be done to ensure that mothers are receiving the support and information that they need. No child in Hawai'i should be deprived of basic needs to promote healthy development and likewise, no mother should be deprived of the education that they need to raise their child.

Mentor: Lisa Kimura

Joan Lanzaderas  
Social Work  
Work in Progress in Social Sciences  
Participation for Honors, UROP  
Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki A101

### Out-of-School Time Programs for Low-Income, Minority High School Students

Existing research shows there is an achievement gap for students that are minorities and are from low-income families. There are many theories explaining why this is. Professionals in education and related fields acknowledge that barriers in education do not only include in-school factors but outside factors as well. Such as a student's home environment, their peer groups, or the risk factors within their neighborhood. More and more school reforms include the implementation of school community services or out-of-school time (OST) programs to counter the effects of outside risk factors. There are now multiple OST programs implemented throughout the nation. Topics of interest that now arises are the availability and quality of OST programs. Are there enough OST programs available for all students? Do they reduce the likelihood of students engaging in risky behavior? Lastly, do they really help as protective barriers to risk factors in communities? This study is focused on out-of-school time (OST) programs for low-income, minority high school students. The objective is to evaluate the association between OST programs and positive youth development, evaluate the availability of OST programs, and identify the challenges in the coordination and service delivery of OST programs for low-income, minority high school students.

Mentor: Dr. Bum Jung Kim



Danielle M Lazarus  
Public Health  
Finished Project in Social Sciences  
Participation for Honors  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki A101  
Poster Presentation: 1:30-3:00pm in Campus Center Ballroom

### Implementing a Preschool Curriculum to Promote Health Behaviors & Creating a Healthy Foundation

The prevalence of childhood obesity has more than doubled in the past thirty years. Children and adolescents who are obese are likely to be obese as adults and are therefore at increased risk for developing immediate and long-term health effects. The most effective approach to reducing obesity in children is through modification of nutritional and physical activity. These behaviors are influenced by many sectors of society- including families, communities, and schools. Preschool learning environments offer significant opportunities for building healthy attitudes and awareness about food and nutrition. Local wellness policies are also an important tool for parents and school districts to promote student wellness, prevent, and reduce childhood obesity. This project focused on 1) a review of the Preschool Wellness Policy assessment data, 2) improvements to wellness policy training for school personnel and parents, 3) assisting educators with implementing related activities within a classroom setting, and 4) engaging the community to participate in program development. This project will be conducted in Waimanalo and Nānākuli Head Start Programs and promote the six behavior strategies of the Children's Healthy Living (CHL) Program. A long-term goal for this project would be to achieve a healthy weight in young children by maximizing the potential for effective implementation of this project and engaging the community in this process. Associations can improve health outcomes for children and improve the quality of life for all. This project highlights influential ways that schools, local advocates, parents, and communities can work together to help families modify their style of living into a healthier one.

Mentor: Dr. Denise Nelson-Hurwitz

Martine Leclerc  
Psychology  
Proposal in Social Sciences  
Participation for Honors  
Oral Presentation: Session 3 (11:20a-12:20p) in Sakamaki A104

### The Affects of Gratefulness on Cortisol Reactivity

The purpose of this experiment is to determine if gratefulness exercises done daily for an extended period of time can decrease cortisol reactivity levels. Although there is a large amount of longitudinal research related to gratefulness and stress, there is very little experimental evidence to back up these claims. By adding experimental evidence to this body of research, these results can hopefully be applied to the general population in more concrete terms. The participants will be split into an experimental group and control group. The control group will list neutral events that happened throughout the day while the experimental group will list things they are grateful for every day. Before the experiment begins, individuals will have their cortisol reactivity tested by putting participants through a stressful event and measuring how high their cortisol levels increase during that stressful event. I expect my results to show that participants' cortisol reactivity will decrease in the experimental group after the month of doing the exercises. This research can be applied to daily life for any who feels their stress life is too high, for people suffering from anxiety and depression, or preventing them since high stress/cortisol levels are associated with the development of some mental illnesses. Those trying to decrease blood pressure to prevent heart disease and other health problems associated with stress and/or high cortisol levels can also benefit from these exercises.

Mentor: Dr. Loriena Yancura

Jae Yun Lee  
Microbiology  
Finished Project in Natural Sciences  
Participation for UROP  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki C103

### Acetylation of S18 Ribosomal Proteins in *Mycobacterium smegmatis*

The main focus of this study is the post-translational modification, specifically acetylation, of the ribosomal proteins S18-1 and its homolog S18-2 from *Mycobacterium smegmatis*. This organism was chosen because it is a nonpathogenic and fast-growing bacterium related to the causative agent of tuberculosis, *Mycobacterium tuberculosis*. Considering that they are a closely related species and thus share some common mechanisms, we will be able to understand more about *M. tuberculosis* and potentially identify new drug targets. Ribosomal proteins undergo several types of post-translational modifications, which may allow the cell to respond to environmental changes. Our hypothesis is that RimI from *M. smegmatis* (MSMEG\_1579) acetylates both S18 proteins as demonstrated in other bacteria like *Escherichia coli*. First, plasmids were constructed for overexpression of the enzyme RimI and its supposed substrates S18-1 and S18-2 in *E. coli*. The overexpressed 6-histidine tagged proteins were purified using cobalt columns under denaturing conditions and refolded using dialysis. We obtained all three proteins at high purity. An *in vitro* acetylation assay was used to determine if acetylation of either S18-1 or S18-2 is catalyzed by RimI. In short, the CoA group released after acetylation of the substrates reacts with Aldrithiol<sup>TM</sup>-4, which is measured using absorbance at 324nm. The results of our assay suggested that RimI is not active when expressed in *E. coli* and refolded (only insoluble enzyme could be obtained), therefore we will attempt to express the enzyme in the endogenous strain *M. smegmatis* instead of *E. coli*.

Mentor: Dr. Sladjana Prišić

Mark Lee

Molecular Cell Biology and Mathematics

Finished Project in Social Sciences

Participation for Honors, UROP

Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki A102

Poster Presentation: 1:30-3:00pm in Campus Center Ballroom

### Ethno-Cultural Differences in Later-Life Caregiving Expectations, Caregiver Burden, Family Dynamics, and Healthcare Decision Making Factors

**Background:** In the qualitative literature, Asians and Pacific Islanders (APIs) were generalized to highly value collectivism, suggesting that APIs may have more caregiving responsibilities and obligations, caregiver burden, and group decision making compared to the general population. **Methods:** A stratified random sample of Euro-American, Japanese, Chinese, and Native Hawaiian children-generation participants (n=106) from the 1970s Hawai'i Family Study of Cognition was surveyed on measures of family dynamics, caregiver burden, caregiving expectations, actual caregiving responsibilities, importance of healthcare decision-making factors, proximity to parents, communication with parents, and demographics. A subset of participants (n=10) was interviewed by phone to provide further context on their families' caregiving and healthcare decision-making. **Results:** APIs were significantly more likely to perceive an expectation to be a family caregiver compared to Euro-Americans. Also, there was a trend for Native Hawaiians being more likely to have actual caregiving and/or decision-making responsibilities compared to Euro-Americans. Qualitative findings, such as a theme for reluctance to use nursing services among APIs, supported these quantitative results. Qualitative analyses provided additional insights into family caregiving and decision-making, including a theme for caregiving duties to be delegated based on circumstantial considerations and only when caregiving needs arose. **Discussion:** Since some API ethnic groups are more likely to have caregiving expectations and/or caregiving duties, culturally competent support services for API caregivers may be needed. Qualitative findings also suggest that prevention/intervention strategies for caregiver burden may be helpful for all families, including outreach programs that facilitate long-term planning for later-life healthcare services and caregiving.

Mentor: Dr. Jane Onoye

Tina Li  
Mechanical Engineering  
Finished Project in Engineering & Computer Sciences  
Participation for UROP  
Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki B101

## Finite Element Study of Self-Deflections in Large Mirrors Subject to Kinematic Mounts

Due to the size and weight of large mirrors, gravity causes deflections onto the mirror surface that distort the output images. The design of a mount must be considered in order to support the mirror and limit self-weight deflection. This research compares various analytical models of self-deflection to calculations of mirror surface deflections using finite element analysis (FEA) softwares (COMSOL, SolidWorks, ANSYS, and PLOP) for various mounting designs. Assuming a Borofloat33 glass mirror with a 400-mm diameter and 50-mm thickness, the findings show a 3% difference between the FEA and analytical solutions (taking into account bending and shear stresses) for a ring mount, both simply-supported and fixed. As the aspect ratio (diameter/thickness) of the mirror increases, bending stress dominates the deflection and shear stress becomes negligible. Differences in the deflection predicted by the analytical and FEA approaches diverge at small aspect ratios below 8-10 due to localized stress. Analytical and FEA deflections will be compared to experimental results for various aspect ratios to examine the accuracy of analytical and FEA results. Verification and understanding of FEA will facilitate the design and analysis of more complex mounts under varying gravity vectors. Findings can help establish a foundation in designing mirror mounts for large mirrors for any given specifications. This knowledge is useful to attain as the improvement on the quality of our telescopes can further investigate the future and study the past.

Mentor: Dr. A Zachary Trimble

Jason Liang  
Secondary Education in Social Studies  
Finished Project in Social Sciences  
Participation for UROP  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki A103

The Last Queen of Korea: The Fall of the Korean Kingdom and Western  
Response to the Assassination of the Korean Queen at the Hands of the  
Japanese

This paper explores the events which lead to the death of the Korean Queen in 1895 and the repercussions which followed her death. After Japan's Meiji Restoration, they were poised to enter East Asia through the Korean Kingdom. While many countries were apprehensive about Japan's presence in the Eastern theatre, at first Japan met little resistance from Great Britain, America, Russia, and or China.

Meanwhile Korea was plagued with internal strife as the King Regent and Queen fought for control over the King. The King and Queen, faced with internal enemies, could not sufficiently defend themselves against Japan and were subsequently forced to rely on China for assistance. After the Sino-Japanese War, China was forced to release Korea as a tributary and thus assured that China would not intervene in Korea affairs.

Korea's Queen met her end when Japan sent an emissary who conspired with the King Regent to assassinate the Queen under the condition that the Regent be placed back into power. After completing the assassination the King and crown prince escaped to Russia which brought the Russians into conflict with Japan.

Japan defeated Russia in the Russo-Japanese War, but despite the resistance put up by Great Britain in the years prior to the war they did not step in on Korea's behalf. Further research shows that the passive response from Great Britain and America was due to the economic benefits of Russia losing the Russo-Japanese War and preferring to remain allied to the Japanese.

Mentor: Dr. Karen Jolly

Jarin Loristo  
Chemistry  
Finished Project in Natural Sciences  
Participation for Honors  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki C103

### Mechanistic Studies of Organometallic Anticancer Complexes

Many prominent anticancer drug candidates (NAMI-A, KP1019, Au(phen) and Au(bpy)) are organometallics in nature. Their mechanisms of action are far ranging and often not fully understood. The design of new anticancer organometallics should be based on a modular and tunable ligand framework to establish trends in anticancer activity. 6-substituted-2-pyridinecarboxaldehydes are commercially available and feature a sterically and electronically diverse set of substitution patterns. Using Phospha-Wittig methodology, a new set of pyridine-phosphaalkene ligands were constructed from 6-substituted-2-pyridinecarboxaldehydes and characterized by NMR spectroscopy. Efforts to bind these ligands to metals and create new anticancer organometallic targets are under investigation.

Mentor: Dr. Matthew Cain

Kaile Luga  
Anthropology  
Finished Project in Social Sciences  
Participation for UROP  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki A104

Mai Ka Ho'oku'i A Ka Hālāwai:  
From Kahiki to Hawai'i – Pōhaku Ku'i 'Ai of East Polynesia

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

Mentor: Dr. James Bayman



Sasha Madan  
Public Health and Psychology  
Finished Project in Social Sciences  
Participation for Honors  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki A101  
Poster Presentation: 1:30-3:00pm in Campus Center Ballroom

### Combating Obesity through Implementation of a Sugar Sweetened Beverage Tax

Obesity is a pressing issue in the lives of many Americans throughout the U.S. In Hawai'i, obesity rates have more than doubled in the last ten years. Coinciding with this increase is an increase in sugar consumption, which has been linked to the rapidly growing obesity epidemic. The objective in combating this issue is to work with the Hawai'i Public Health Institute (HIPHI) on advocacy for a penny-per-ounce sugar-sweetened beverage (SSB) tax. The main focus of this project is to analyze the effectiveness of SSB taxes implemented in other states and countries by looking at the direct impacts on reducing sugar consumption, and the indirect economic and health impacts. To address this, a literature review on SSB taxation was conducted, and from this a policy analysis on the tax was created.

The results from the analysis show that SSB taxation is effective at reducing sugar consumption rates through basic price elasticity. Furthermore, the indirect health and economic benefits were found to be significant. Due to the lack of support for the tax in Hawai'i, this policy analysis will serve as an effective means for promotion of the law. Increased awareness of the possible benefits of the tax is expected to result in increased public and legislative support for the policy and higher regulations on food options in community settings. The long-term objective is implementation of the policy leading to declines in obesity rates, which can be obtained through stricter regulations and community support.

Mentor: Dr. Denise Nelson-Hurwitz

Ivana Matson  
Linguistics  
Work in Progress in Social Sciences  
Participation for Honors  
Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki A104

### Accommodation in Instant Messaging

Differing levels of formality are salient to linguists and laypeople alike, in any medium - including 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. In this ongoing study, sociolinguistic interviews are being carried out over instant messaging - a synchronous, one-on-one form of CMC. To investigate accommodation, these interviews are carried out in two conditions: one where formal features are used, and one where informal features are used. 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 is that the interviewer uses standard capitalization in the formal condition, but no capitalization at all in the informal condition. The other primary difference is the use of message-final periods in the formal condition, but not in the informal condition. Preliminary data showing the degree to which interviewees do or do not accommodate to these features will be presented.

Mentor: Dr. Amy Schafer

Stephanie A Matthews  
Biology  
Finished Project in Natural Sciences  
Participation for Honors, UROP  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki C102

### Metagenetic Sequencing of Zooplankton Communities in the High-Diversity Central North Pacific

Marine zooplankton are important intermediate trophic level consumers in the ocean, and the subtropical North Pacific holds global maxima in species diversity for these communities. Zooplankton assemblages in this region include several species complexes, with many understudied and morphologically cryptic species. We used metagenetic sequencing to characterize zooplankton community composition across depth (0-1500m) at an open ocean time series site in the central North Pacific (Station ALOHA), using depth-stratified 1m<sup>2</sup>MOCNESS samples that were size fractionated into 5 size classes (0.2-0.5 mm, 0.5-1 mm, 1-2 mm, 2-5 mm, >5 mm). Our goals were to quantify the fraction of the community that is currently undescribed, identify taxonomic groups that contain large numbers of undescribed species and may be important to biogeochemical cycling in the ocean, and establish a metagenetic method that can be used to effectively characterize the species richness of epipelagic and mesopelagic communities in this region. Amplicons from several DNA loci, including mitochondrial cytochrome *c* oxidase subunit I and 12S rRNA, and nuclear 18S and 28S rRNA genes were sequenced on the MiSeq Illumina platform to characterize community composition. We evaluate species composition across metagenetic marker regions, pelagic depth zones, day and night-time MOCNESS tows, and compare our findings with prior species lists from the region. Our results are an important contribution to establishing standardized metagenetic methods for marine zooplankton communities.

Mentor: Dr. Erica Goetze

Jeremy Dontez McClam  
Public Health  
Proposal in Social Sciences  
Participation for Honors  
Oral Presentation: Session 3 (11:20a-12:20p) in Sakamaki A102

### Mosquito Vector Control and The Prevention of Dengue and Zika Spread

Our tropical paradise is becoming the home of nightmares. Dengue fever and Zika virus are the new threats that challenges the health and happiness of Hawaii. There have been hundreds of cases in the state of Hawaii and that number continues to grow. There are different types of dengue which is why it is so hard to find a cure. The cure could take years to find. Dengue fever and Zika virus are two diseases that have very similar symptoms. Zika also effects babies. There are birth defects linked to Zika, which increases the threat to women. Millions of people have contracted or dealt with dengue fever and Zika virus and that number grows by the day. Gaining control will take the efforts of scientists from all over the world. In order to stop the spread of the diseases I feel that we should attack the source first.

Because the diseases are transmitted by the *Aedes Egypti* and *Aedes Albopictus* mosquito species, the focus should be on vector control and eradication. Reducing the population of the *Aedes Egypti* has been accomplished in many countries around the world. Some places have successfully eradicated the species and maintained it for decades. Hawaii can learn from others successes by implementing their practices into policies. Educating the public and taking the proper actions will allow Hawaii to continue to be the tropical paradise for the people of Hawaii and tourist to enjoy.

Mentor: Dr. Denise Nelson-Hurwitz

Trista McKenzie  
Geology & Geophysics  
Finished Project in Natural Sciences  
Participation for UROP  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki C102  
Poster Presentation: 1:30-3:00pm in Campus Center Ballroom

### Quantifying Atmospheric Fallout of Fukushima-derived Radioactive Isotopes in the Hawaiian Islands

On March 11, 2011, several reactors at the Fukushima Dai-ichi Nuclear Power Plant suffered damage and released the radioisotopes iodine-131, cesium-134, and cesium-137 into the atmosphere. A week later, these isotopes were detected in aerosols over the state of Hawai'i and in milk samples analyzed from the Big Island. Because the detected levels were significantly below levels of health concern, the state did not attempt to quantify the deposition of these nuclides on the islands. This study estimated the magnitude of atmospheric fallout of cesium and iodine, and examined the patterns of cesium wet deposition with precipitation observed in March 2011. Mushroom and soil samples were collected along precipitation gradients on O'ahu and the island of Hawai'i and analyzed for cesium isotopes using gamma spectrometry. Fukushima-derived fallout was differentiated from historic nuclear weapons testing fallout by the presence of Cs-134, which has a shorter half-life of 2.06 years and the fact that Cs-134 and 137 were released from the severed power plant nearly in parity. We found that Fukushima-derived cesium was present in both mushrooms and soil and the soil inventories ranged 2.2-1155.8 Bq/m<sup>2</sup> for Cs-137 and 16.1-8460.5 Bq/m<sup>2</sup> for I-131. Additionally, we found that Fukushima-derived cesium inventories in soils were correlated with precipitation gradients. This research confirmed and quantified the presence of Fukushima-derived fallout in Hawai'i, however the activities detected were orders of magnitude lower than fallout associated with the nuclear weapons testing in the Pacific.

Mentor: Dr. Henrietta Dulai

Brandon Makana McMurtry  
Chemistry  
Finished Project in Natural Sciences  
Participation for Honors  
Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki C102  
Poster Presentation: 1:30-3:00pm in Campus Center Ballroom

### On the Formation of Pyridine Carboxylic Acids in Interstellar Model Ice Grains

The formation of pyridine carboxylic acids in interstellar ice grains was modeled by the electron irradiation of a binary pyridine ( $C_5H_5N$ )–carbon dioxide ( $CO_2$ ) ice mixture at 10 K under contamination-free ultrahigh vacuum conditions through the utilization of a surface scattering machine. Chemical processing of the pristine ice and subsequent warm-up phase was monitored on line and in situ via Fourier transform infrared spectroscopy (FT-IR) and quadrupole mass spectroscopy (QMS) to probe for the formation of new irradiation induced species. In the infrared spectra of the irradiated ice, bands assigned to nicotinic acid (niacin; vitamin B3;  $m$ - $C_5H_4NCOOH$ ) along with 2,3-, 2,5-, 3,4-, and 3,5-pyridine dicarboxylic acid ( $C_5H_3N(COOH)_2$ ) were unambiguously identified along with the hydroxycarbonyl (HOCO) radical, a proposed reactive intermediate in the formation of generic carboxylic acids in ice grains. The observed suite of pyridine carboxylic acids formed mimics the results of a recent study on a series of CM-2 type carbonaceous chondrites as well as older studies on the Murchison and Tagish Lake meteorites.

Mentor: Dr. Ralf Kaiser

Tierra Mendez

English

Finished Project in Arts & Humanities – Research

Participation for Honors

Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki B103

### Observing War Through Literature: The Effects of the Iraq and Afghanistan Wars on the Family Unit

This project discusses the effects of the ongoing U.S involvement in Iraq and Afghanistan on the family unit, with emphasis on children. The aim of my research is to create awareness of the psychological trauma and hindrance inflicted on children when they are exposed to a disturbance in the family unit due to war. I discuss works of literature, articles, medical journals, and documentaries, as well as ongoing research being conducted on the psychological trauma of children affected by war. The studies referenced in this honors project suggest that children with a parent absent due to war, or parent suffering from PTSD or depression may be at risk for developing some form of psychological disturbance. By analyzing literature (addressing the effects of war on the family) the goal of my research is to stimulate an increase in works being produced for children and families that discuss the hardships of war.

Mentor: Dr. Mark Heberle

Margaret Moeller  
Marine Biology  
Finished Project in Natural Sciences  
Participation for UROP  
Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki C101

Development of Larval Rearing Techniques for the Hawaiian Slipper  
Lobster *Scyllarides squammosus*

The long term goal of this project is to add to the development of a co-cultured open ocean cage system in Hawaii for both fish and slipper lobsters. Lobsters are detritivores, and the addition of lobster culturing under the fish cages would limit both the economic loss of fish feed and the nutrient influx to the surrounding environment. Although no gravid female slipper lobsters were found, copepod cultures intended for use as feeds for slipper lobster phyllosoma have been isolated from around O'ahu using 180 micron plankton nets. They have been cultured in monoculture and fed mixed diets of live phytoplankton to optimize growth. For each culture, a 710 base pair fragment of the mtCOI gene was amplified to determine species by DNA barcoding. Species identification was supported by morphological identification.

Mentor: Dr. Spencer Malecha



Dalton Muchow  
Global Environmental Science  
Work in Progress in Natural Sciences  
Participation for UROP  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki C101

### Raman and Fluorescence Spectroscopy for Categorizing Coral Health in Hawai'i

The majority of the world's reef ecosystems are at risk due to changes in the local and global environments. Many common current techniques that determine coral health over large areas require scientists to SCUBA dive on a coral reef to make observations and collect samples, requiring an enormous amount of planning and funding. Remote Raman spectroscopy is a powerful technique capable of quickly identifying a large variety of chemicals, including pure elements, simple molecules, inorganic chemicals, organic compounds, biogenic compounds, and rock forming minerals (calcite, aragonite) from any state of aggregation (solid, liquid, and gas phase). Another powerful remote sensing technique is "Time Resolved Laser Induced Native Fluorescence" (TR-LINF) and has been used as a standoff biofinder capable of differentiating between mineral and biological fluorescence. Both of these techniques are fast (detection time  $<0.1s$ ) and can quickly and accurately measure large areas of interest. Remote Raman and TR-LINF's proven use in categorizing biological markers at remote distance provides potential for application in measuring and categorizing large areas of coral reef health from a distance. Currently, nobody in Hawai'i has the capability to remotely measure coral and assess its health using remote spectroscopy under daylight conditions.

Mentor: Dr. Anupam Misra

Corey Mutnik  
Physics  
Work in Progress in Natural Sciences  
Participation for UROP  
Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki B104

### Spex Young Star Atlas

Studies of young stars give insight into how stars are born. Spectra (brightness vs. wavelength) can be used to find and characterize new young stars, if we have a good spectral library of both old and young stars to compare too. Surprisingly, a spectral atlas of young stars does not exist at infrared wavelengths, even though infrared observations are necessary to see through the gas and dust in star forming regions. We construct a new spectral atlas of 51 young stars using a medium-resolution ( $R \sim 2000$ ) infrared spectrograph, SpeX, at the NASA Infrared Telescope Facility (IRTF) on Mauna Kea, Hawai'i. All atlas stars were selected from the star-forming region Upper Scorpius, which has a well-established age of  $\sim 11$  Myr. Clear variations between old and young stars are observed, which will help constrain models of stellar evolution and atmospheres, at infrared wavelengths. Our new spectral atlas will allow for more accurate classification of young stars.

Mentor: Dr. Jessica Lu

Carissa Nakao  
Food Science & Human Nutrition - Pre-professional  
Finished Project in Natural Sciences  
Participation for Honors, UROP  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki C203

### Characterization of the Triggering Receptor Expressed on Myeloid cells (TREM) Family Receptors Induced by West Nile Virus (WNV) Immunity

Since its introduction in the US in 1999, West Nile Virus (WNV), a single-stranded mosquito-borne Flavivirus is responsible for 5,675 cases with 286 deaths. WNV is first detected by antigen presenting dendritic cells of the skin, which initiate the innate immune system through pattern recognition receptors such as Toll like receptors (TLRs) pathways. These cells produce inflammatory cytokines and type I IFN to clear infection in peripheral organs and prevent virus from entering the brain. However the mechanisms that fine-tune the inflammatory response to WNV are not well understood. The triggering receptor expressed on myeloid cells (TREM) family of receptors is being described as important modulators of innate immune regulation. TREM-1 plays an important function in amplification of inflammation, while in contrast TREM-2 exhibits anti-inflammatory functions through tissue debris clearance and dampening inflammation. In the past TREM-1 and -2 functions were characterized via bacterial infection, but have not characterized through viruses, such as WNV. The goal of this study was to first characterize if WNV infection can alter the expression of TREM-1 and -2 and then understand their roles in WNV-associated innate immunity. We were able to characterize the cell-specific expression of TREM-1 and -2 induced by WNV in different human and primary mouse immune cells. We also looked at the role of TREM-1 during a WNV infection by looking at its ability to up-regulate the production of pro-inflammatory cytokines. Characterizing the role of TREM virus-host interactions is the first step towards understanding fine-tuning of antiviral immunity and designing novel therapies.

Mentor: Dr. Saguna Verma

Ashley Nakaoka  
Biology and Japanese  
Finished Project in Natural Sciences  
Participation for Honors  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki C101  
Poster Presentation: 1:30-3:00pm in Campus Center Ballroom

The Comparison of the Performance of the SNAP ELISA and Zinc Sulfate  
Centrifugation Tests in Detecting *Giardia duodenalis* in Recently Imported  
Dogs to Hawai'i

INTRODUCTION: *Giardia duodenalis* is an internal protozoan parasite that can infect a variety of mammals, including humans, domestic animals and wildlife. There are eight known genetic assemblages (A-H) of *G. duodenalis* with assemblages A and B found in both humans and dogs, and C and D specifically in dogs. Giardiasis is the clinical disease caused by infection with *G. duodenalis* and is typically, but not always, accompanied by diarrhea. Approximately 1,000 dogs arrive annually into the State of Hawai'i through the Animal Quarantine Station (AQS) and a zinc sulfate centrifugation test is performed to screen for intestinal parasites, including *G. duodenalis*. The genetic types of the *Giardia* strains entering Hawai'i have not been previously determined.

METHODS: The zinc sulfate centrifugation test and the IDEXX *Giardia* SNAP ELISA test were performed on fecal samples collected within three days of the dogs' arrival at the Hālawā AQS.

RESULTS: This study found that 11/97 of the dogs used in this study arrived at AQS with *Giardia duodenalis* (assemblages C or D). Discordance between the SNAP ELISA test and zinc sulfate centrifugation test was 0.545. Overall, there was a concordance rate of 0.938 between the two tests.

DISCUSSION: *Giardia duodenalis* assemblages C and D are not zoonotic, so the zoonotic potential of *Giardia* carried by dogs in Hawai'i is low. The high concordance rate of the zinc sulfate centrifugation test indicates that there is a satisfactory detection of *Giardia* cysts by the Hawai'i Department of Agriculture Veterinary Laboratory microbiologists.

Mentor: Dr. Jeneé Odani

Torbjoern Nielsen  
Cell Molecular Biology  
Work in Progress in Natural Sciences  
Participation for INBRE  
Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki C203

## Quantitative Analysis of Cell Populations in the Testes from Mice with Limited Y Chromosome Gene Content

Mammalian Y chromosome encodes a battery of genes playing important roles in male reproduction. Among these genes, two are of key importance: *Sry*, which initiates testis formation and *Eif2s3y*, which initiates the process during which male gametes are formed (spermatogenesis). *Sry* and *Eif2s3y* have close relatives encoded on other chromosomes, *Sox9* and *Eif2s3x*, respectively, and when expression of these relatives is transgenically increased, they can functionally substitute for the Y genes.

The lab where I am working investigates spermatogenesis in mice lacking Y chromosome but carrying a variable combination of four transgenes (*Sry*, *Eif2s3y*, *Sox9*, *Eif2s3x*). To assess the efficiency of spermatogenesis testicular sections were prepared, stained with Period Acid Schiff and Hematoxylin to identify cells by morphology, and Sertoli cells (somatic testicular cells), spermatogonia (germ cells capable to enter spermatogenesis) and round spermatids (first haploid germ cells resulting from spermatogenesis) were counted. Although testicular cell counts based on conventionally stained tissue yield reliable results, it is advisable to verify such counts using an alternative method.

I will test the hypothesis that Sertoli, spermatogonia and round spermatids numbers quantified after immunostaining of testis sections with antibodies against markers of these cells (SOX9, PLZF and GATA4, respectively) will yield results similar to those obtained after conventional staining. I will perform immunohistochemistry on the same testis sections for which conventional staining data were gathered, count immunostained cells, and correlate two data sets. This analysis will strengthen previously obtained results and enable detailed characterization of spermatogenesis in males with limited Y chromosome contribution.

Mentor: Dr. Monika A. Ward

Kari Noe  
Information & Computer Science  
Proposal in Engineering & Computer Sciences  
Participation for Honors  
Oral Presentation: Session 3 (11:20a-12:20p) in Sakamaki B101

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

This research aims to develop a design of an interactive visualization system for archaeological artifacts that are considered at risk. 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 can be considered 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 is more accessible. Here I aim to describe the process of designing an application that will visualize 3D structural data of at-risk artifacts through an empathetic design approach. Through the participation of an archaeological excavation in the Miloli'i Valley of Kaua'i, I will be able to produce a design that will create an intuitive user experience for archaeologists through lessons learned through in-situ experience. 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.

Mentor: Dr. Jason Leigh

Pooja Nuti  
Electrical Engineering  
Proposal in Engineering & Computer Sciences  
Participation for Honors  
Oral Presentation: Session 3 (11:20a-12:20p) in Sakamaki B101

### Modeling Radio Propagation in Urban Environments for Advanced Wireless Communication Systems

The transmission and reception of radio signals comprise a communication system. In order to match the demand for advanced communication systems, advanced methods of modeling radio propagation are required. The modeling stage associated with designing advanced communication systems is a vital step. In this step, it can be observed how obstructions such as terrain and buildings in urban environments can affect the transmitted signal. Urban environments are of particular interest because demand for communication systems in these regions is growing rapidly and more complex. Modeling methods should not only be accurate but also efficient. To meet the requirements of modeling radio propagation, machine learning in conjunction with ray-tracing tools will be implemented to yield efficient and accurate models. The general approach of this study will involve generation of a three-dimensional (3D) environment through Google Earth, 3D ray-tracing to simulate radio propagation, and application of machine learning classification methods to learn and approximate important characteristics of radio propagation in a given environment. Propagation modeling allows innovation in communication systems to be realized, providing faster and more reliable services in wireless systems which are used to extensively today.

Mentor: Dr. Magdy Iskander

John Matthew A Pagaragan  
Public Health  
Proposal in Social Sciences  
Participation for Honors  
Oral Presentation: Session 3 (11:20a-12:20p) in Sakamaki A103

Prevention Means Business: Implementing a Standardized Workplace  
Wellness Initiative Among Student Employees at the  
University of Hawai'i - Mānoa

A rising commonality seen among many corporate businesses and organizations across the country involves the corporate wellness initiative that is offered to employees. A healthy, thriving workforce makes for a healthier business. United States employers face complex challenges ranging from billions of dollars spent on economic burden of worker injuries as well as work-related stress and chronic disease management. Productivity losses linked to absenteeism costs United States employers billions of dollars annually. With the workforce average age range increasing, combined with detrimental factors such as stress, fatigue, and neglect, they all cumulatively impact the spending and budget of a company. Thus, when employers focus on protecting and promoting health and safety at the workplace, they gain productive and satisfied employees. This can reduce the truant behavior, less money spent on healthcare treatment, and a decrease in illness and workplace injury rates. Wellness initiatives in the workplace range from providing exercise facilities and equipment to expanding employee benefits to include possible gym membership discounts and other privileges.

My project will look into analyzing current workplace wellness initiatives that have been successfully implemented in corporate businesses and identifying components that are viable for implementation here at on campus. My goal is to develop a proposal in collaboration with the Mānoa Career Center and University Health Services with aims to educate the student employee population about readily available resources they have around them. The proposal's goal is to provide student employees with a healthy work environment and to practice small healthy lifestyle changes.

Mentor: Dr. Denise Nelson-Hurwitz



Andrew Pham  
Biology  
Proposal in Natural Sciences  
Participation for Honors  
Oral Presentation: Session 3 (11:20a-12:20p) in Sakamaki C102

### Effect of SELK Knockout on Metastasis of Melanoma

Melanoma's development is found in melanocytes, cells producing the skin color pigment melanin. Metabotropic glutamate receptor 1 (GRM1) expression was discovered to drive melanocytic neoplasia. Increased expression of GRM1 in melanocytes triggers carcinogenesis and intensifies the migration of tumor cells and their spread to other organs (i.e. metastasis). Store-operated calcium entry (SOCE) is found to influence the propagation and migration of melanoma. One protein demonstrated to regulate this calcium flux is selenoprotein K (Selk). Selk promotes palmitoylation and stable expression of a calcium channel, promoting efficient calcium flux. We hypothesize that Selk may influence the increasing onset of melanoma, particularly metastasis due to the importance of calcium flux in the latter. With calcium flux connecting melanoma and Selk, it may be possible to control melanoma metastasis through Selk regulation. To generate mouse models both with the loss of Selk and overexpression of GRM1, we are crossing mice lacking the SELK gene with the GRM1 transgenic mice. This generates mice lacking Selk expression and littermate controls. These mice will be evaluated for tumor progression and metastasis. These outcomes will be quantified by collecting formalin fixed tissue samples from primary sites of melanoma (tail and ears) and secondary sites (lung, liver, etc.), embedding tissues in paraffin, and performing both H&E staining and immunohistochemistry analyses for levels of cancer cells in these tissues. Examining the resulting metastasis will provide a greater understanding of the effects of lower Selk levels on melanoma metastasis, paving way for possible treatments involving the control of Selk.

Mentor: Dr. Peter Hoffman

Blake Pinell  
Molecular Cell Biology  
Finished Project in Natural Sciences  
Participation for Honors, UROP  
Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki C201

### Hypoxic Regulation of Variant Splicing in the Heart

Hypoxia-inducible factor 1 (HIF-1) is an oxygen-labile transcription factor that plays a crucial role in the regulation of cellular processes associated with hypoxia in the heart. In this study, we evaluated the effects of HIF-1 on variant RNA splicing of calcium/calmodulin-dependent protein kinase II gamma (CaMKII $\gamma$ ). CaMKII $\gamma$  is known to play an important role in calcium signaling and heart function. Previously collected data indicated that HIF-1 expression affected alternative splicing of three CaMKII $\gamma$  variants in the hearts of transgenic mice. RNA transcript levels of the full-length variant appeared to be down regulated whereas variants 2 and 3 increased in abundance following HIF-1 induction. Based on this preliminary data, we developed an *in vitro* cell culture system in order to pursue the mechanism of HIF-related splice-regulation. We used a mouse cardiac myocyte cell line (HL-1) to try and recapitulate the *in vivo* observation. My hypothesis was that the RNA transcript levels of the full length transcript variant 1 would decrease, and variants 2 and 3 would increase when cells were exposed to hypoxia, which stimulates HIF-1 activity. I used real-time polymerase chain reaction on lysates from cells exposed to low-oxygen conditions in a hypoxia chamber. We have found that expression levels of all three transcript variants decreased when exposed to hypoxia and expression levels of variant 3 recovered to normoxic levels by 24 hours. By examining how CaMKII $\gamma$  responds to HIF-1 and hypoxia, we are able to more accurately understand the cardiac stress response.

Mentor: Dr. Ralph Shohet

Kina Poulos  
Biology  
Proposal in Natural Sciences  
Participation for Honors  
Oral Presentation: Session 3 (11:20a-12:20p) in Sakamaki C102

### The Spectrum and Duration of Neutralizing Antibodies Produced after Natural Primary Infection by Dengue 1

The four serotypes of dengue virus (DENV) put 2.5 billion people at risk of infection annually. No FDA-approved vaccine is currently available, partly due to the lack of detailed understanding of protective immune responses after natural DENV infection. Primary DENV infection with one serotype is known to provide long-lived protection against that serotype. Human challenge study has reported short-term complete protection followed by partial and then no protection against other serotype. However, the mechanism is poorly understood. The objective of this study is to understand neutralizing antibody responses after natural primary DENV infection. We hypothesize that neutralizing antibodies cross-reactive to multiple DENV serotypes are present early after primary infection and become more type-specific several months later. Beginning in the fall of 2015, the Big Island of Hawaii experienced an outbreak of primary DENV1 infection. The sera antibodies will be analyzed to determine their level of neutralization against the four serotypes over the course of a year. Blood will be drawn from 20 symptomatic dengue cases at the time of study enrollment and at subsequent periods of three, six, and twelve months; sera will be applied to a virus neutralization assay of four DENV serotypes, in which different dilutions of serum will be incubated with DENV to determine the neutralization titer. The study of the effectiveness and duration of cross-reactive neutralizing antibodies in primary infections will provide new insights into protective immune responses after natural DENV infection and facilitate dengue vaccine development.

Mentor: Dr. Wei-Kung Wang

Aprilei TT Ramirez

Public Health

Finished Project in Social Sciences

Participation for Honors

Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki A103

Poster Presentation: 1:30-3:00pm in Campus Center Ballroom

### Insalubrious (Unhealthy) Snapshots of Kalihi: Youth Empowerment through Photovoice

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

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

Mentor: Dr. Denise Nelson-Hurwitz

Laura Ramirez

Economics

Finished Project in Social Sciences

Participation for Honors

Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki A104

Poster Presentation: 1:30-3:00pm in Campus Center Ballroom

### Concrete & Paradise: A Biography of Land in Hawai'i Kai

Hawai'i Kai, a suburb of Honolulu, has a seemingly innocuous name, meaning "sea Hawai'i." The name Hawai'i Kai, however, is emblematic of the area's dramatic transformation over the past sixty years. The "Kai" is derived from the last name of Henry J. Kaiser, American industrialist and developer of much of what constitutes Hawai'i Kai. Kaiser's influence can still be felt throughout O'ahu by his lasting post-WWII suburban aesthetic, his "Hawaiian Village" in Waikiki (now the Hilton Hawaiian Village), and the ubiquity of his name on buildings such as Kaiser High School and Kaiser Permanente Medical offices. Hawai'i Kai continued to transform after Kaiser's initial development through law. The controversial Land Reform Act (LRA) of 1967 utilized the "public use clause" of the Fifth Amendment to justify eminent domain, arguing through economic reasoning that was not fully substantiated. Through a combination of historical research and an examination of current implications, the history of land in Hawai'i Kai can be read as a biography of individuals instigating changes of landscape and ideology.

Mentor: Dr. La Croix

Raquel Reinagel  
Second Language Studies  
Finished Project in Social Sciences  
Participation for UROP  
Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki A104

### Study Abroad Students' View of Their L1 Community

The purpose of this study is to investigate the relationship between study abroad students' language development and their view of their L1 community, which is a community consisting of people who speak one's native language and/or are from one's native country. Previous research has addressed the involvement of one's L1 community in a student's life when living abroad and has shown that participants tend to view themselves as becoming more proficient L2 speakers when they distanced themselves from their L1 community (Dewey, Bown, & Eggett, 2012). However other research has shown that despite students choosing to be distanced from their L1 community, the students felt that their language skills did not improve. (Wilkinson, 1998). In contrast to previous studies that used self-report measures of L2 proficiency, this study uses a direct measure of listening language ability (at two time points) to evaluate the English language ability of study abroad students attending the University of Hawai'i at Mānoa (UHM). Additionally, a questionnaire about language use and study abroad communities is used to obtain information about time spent with different communities, attitudes toward first and English language communities, and with whom each language was used. Correlation analysis will be used to measure the relationship between the study abroad students' language ability gains and their views/associations with their language communities while studying abroad at UHM.

Mentor: Dr. Theres Gruter

Bowen Ressler  
Biochemistry  
Proposal in Natural Sciences  
Participation for Honors  
Oral Presentation: Session 3 (11:20a-12:20p) in Sakamaki C102

### Beta Methyl Amino L Alanine Incorporation into Cyanobacteria

Around 20,000 people in the US are diagnosed with ALS each year. This disease and other neurological diseases like it have a strong connection to Beta-Methylamino-L-Alanine (BMAA). Methods for its uptake could be important in helping people affected by ALS. If rates of uptake through misincorporation are high, it could show more about prevention of the disease. This experiment proposes that cells cannot take in enough BMAA through misincorporation to account for these disorders. The experiment will use 5 different strands of cyanobacteria, grown in a BMAA rich environment. The different metabolites will be analyzed for traces of the BMAA. The results of this analysis will give insight to the possible mechanisms BMAA takes in the human body. If BMAA is found incorporated into high weight proteins, then it would show us that this same mechanism could be found in the human body.

Mentor: Dr. Thomas Hemscheidt

Nikki Rousslang  
Biological Engineering  
Finished Project in Natural Sciences  
Participation for UROP  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki C203

Developing an Optimal Medium and Screening Method to Detect Human  
Asparaginase Production in *Escherichia coli*

Nutrient rich agar plates' ingredients were varied to develop an optimal medium for screening human asparaginase-producing *E. coli* for asparaginase production. Asparaginase production was gauged visually because the asparaginase catalyzed a reaction that formed basic products on the agar plates, which made the plates change color since a pH indicator was added to them. The pH indicator that yielded the clearest color contrast between *E. coli* colonies and the plates was Bromothymol blue (BTB). An optimal BTB concentration has not yet been determined. Gauging color change was easier when citric acid was added to the plates to lower their initial pH because then the plates' color changed from yellow to blue instead of from greenish yellow to blue. The preferred initial pH for the agar plates was about 5. Adding an inducer (IPTG) to the medium stimulated higher levels of asparaginase production, which expedited the screening process. A preferred method for inducing the *E. coli* has not yet been determined. The *E. coli* grew best on the agar plates at 37°C. An optimal cell density has not yet been found, but is necessary to find so that the agar plates can contain as many *E. coli* colonies as possible for screening, but not so many that the color change is not localized to individual colonies.

Mentor: Dr. Ho Leung Ng



Owen Sandstrom  
Anthropology  
Proposal in Social Sciences  
Participation for Honors  
Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki A103

### Pregnancy Healthcare Services

This project will show that neoliberal standpoints in regards to medicine are allowing pregnancy resource centers to proselytize religious beliefs due to limitations in care availability in the private sector for those who have low incomes. This project will also show that religious beliefs and medical definitions influence the understanding of pregnancy and what are viewed as appropriate treatment options at pregnancy resource centers.

Michael L Sanes  
Public Health  
Finished Project in Social Sciences  
Participation for Honors  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki A102  
Poster Presentation: 1:30-3:00pm in Campus Center Ballroom

### Changing Social Norms on Eating Behavior

The purpose for this research project was to evaluate a community based program (808 Junior Chef Cook-off) to promote healthy eating. Specifically, examine participants' response to a social-cognitive-theory-based nutrition education program for adolescents. The target population was aimed at families living in Hawai'i within the Kalihi community and surrounding areas. The study assessed documentation of any nutrition or cooking activities that had been initiated as a result of program participation. In addition, observations of change in social norms, attitudes, and behavior among 808 Junior Chef Youth participants, perceived barriers to acting on the lessons or messages learned in the program; and areas where participants and staff feel that the program could be strengthened or improved.

The study conducted a series of 5 key informant interviews with adult employees of youth organizations serving low-income adolescents, who participated in the 808 Junior Chef programs. Qualitative analysis was used to determine the programs perceived strengths and weaknesses. Moreover, how the outcomes impacted the students. Results then were used to develop recommendations for program improvement.

The ultimate goals were to assess their perspectives of the strengths and challenges of the program. In addition, determine the perception of the adolescents' nutrition knowledge and food-related attitudes and behaviors. After assessing the nutritional behaviors, the access to healthy foods (fruit & vegetables), and evaluating the level of education on nutrition, the project will determine the best choice for future intervention.

Mentor: Dr.Denise Nelson-Hurwitz

Derek Sasaki  
Biological Engineering  
Finished Project in Natural Sciences  
Participation for UROP  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki C201

### Co-immobilized Microalgae/Fungi Cell Pellets as a New Biotech Production Platform

With the current dependence on a finite supply of fossil fuels the desire for alternative energy has become an area of interest in the scientific community. The goal of this project is to create an artificial symbiotic relationship between microalgae, fungi, and yeast. These three organisms will form pellets through flocculation where yeast will be at the core surrounded by fungi and then a layer of microalgae. The yeast will have starch at the core which will be broken down by the fungi utilizing enzymes it naturally produces. The fungi will also act to cut off the supply of oxygen to the yeast core which will allow the yeast to undergo anaerobic fermentation in order to produce ethanol. The microalgae will then absorb the carbon dioxide produced through fermentation and produce oxygen for the fungi to utilize. This relationship will keep all organisms alive with the added benefit of ethanol production. This theory will be tested by inoculating the three species in Vogel media with starch. Ratios of cell concentration for each organism will then be optimized for ethanol production, which will be tracked using an ethanol sensor.

Mentor: Dr. Winston Su

Robert LGL Sassone  
Academy for Creative Media  
Finished Project in Arts & Humanities – Creative  
Participation for Honors  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki B102

*Doughnut*: The Creation of the Animated Short, and Observations on  
Independent Hand-Drawn Animated Filmmaking

In recent years American-produced hand-drawn animated films have become increasingly rare in animation studios and movie theaters, having largely been replaced by more profitable computer animated features. Thanks to the rise of the Internet, hand-drawn animation has become more and more the domain of independent filmmakers who largely rely on the web to be their platform from which they gain exposure and financial compensation for artistic efforts. Producing hand-drawn animation as an independent creator without the resources of a studio is challenging, and any animator attempting to become an independent creator of hand-drawn animation must be aware of the complexities involved if they wish to maximize their chances of success in the modern animation industry.

My creative project is divided into two parts: a 3-minute Flash-animated short film entitled *Doughnut* which was made over the course of the Fall 2015 Semester, and a paper detailing the current state of the animation industry, the process of the *Doughnut's* creation, and the information I gathered from the experience pertaining to independent animation production. Ultimately, it is my conclusion that while creating hand-drawn animated films as an independent artist is doable, the time investment necessary for a single artist to regularly produce hand-drawn animated content prevents the art form from truly thriving on an independent level. However, there is still potential for growth through independent cooperative productions that allow for division of labor.

Mentor: Lisette Flanary

Jessica Sevilla  
Marine Biology  
Finished Project in Natural Sciences  
Participation for UROP  
Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki C101  
Poster Presentation: 1:30-3:00pm in Campus Center Ballroom

### Nutrient Effects on Growth and Biomass of Dominant Reef Constituents

Degradation of coral reefs has been accelerating at an alarming rate worldwide. Introduction of nitrates and phosphates stimulates algal growth allowing them to outcompete calcifying organisms such as corals in eutrophic environments. Additionally, there is evidence to suggest nutrient availability can inhibit calcification and promote bioerosion even in the absence of algal competition, further shifting the reef community towards net erosion. The complexity of assessing the effects of nutrients on coral reefs is further exacerbated by the diversity of the benthic community. While much information is available on primary production, calcification, and dissolution on reefs at a variety of nutrient conditions, the individual responses of the reef inhabitants are not widely available for multiple reef constituents. In this study, we examined the biological responses of dominant coral reef components of Kāneʻohe Bay under increased nutrient availability. Three replicates of four coral reef substrates, coral (*Montipora capitata* and *Porites compressa*), macroalgae (*Gracilaria salicornia*), coral rubble (naturally conditioned *Porites* skeletons), and sediment were exposed to three nutrient levels in a press experiment for a period of six weeks. Growth rates were calculated using changes in buoyant weight (coral, coral rubble), wet weight (algae), and % organic content (sediment) to determine the biological response of each substrate to nutrient addition. These results will provide the capacity to parse reef response to individual constituents and compare this to reef assemblage response.

Mentor: Dr. Ruth Gates

Nozomi Shimizu  
Marine Biology  
Work in Progress in Natural Sciences  
Participation for UROP  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki C102

### Identification of Cryptic Siphonous Green Algae through Molecular Analysis and Observation of Developmental Strategies

Siphonous green algae –the order Bryopsidales– are a diverse and sometimes dominant plant group in many coastal reefs and benthic communities. These algae often serve as primary producers and several genera produce carbonate, which supplement reef structure and sand deposition. Despite their importance, reproductive strategies and structures as well as complete life histories have not been fully described for about a third of the known genera. For example, reproductive structures of the invasive leather mud-weed *Avrainvillea amadelpha* remain unknown. When *Rhipidosiphon javensis* was put in culture, plants attained larger sizes, formed gametangia and released gametes allowing this development to be described for the first time. This study aims to identify diminutive siphonous green algae that remain undescribed through a molecular analysis and examination of developmental strategies. Small rubble pieces (n=36) will be randomly collected along the south shore of O‘ahu over the period from February to May, 2016. Collected substrates will be cultured in mesocosms, and the diminutive algae will be allowed to grow in size, leading to possible identification. The development of these newly emerged algae will be documented by photo analysis and will be subsequently processed through molecular analyses for ultimate identification, if sufficient tissues are available. Discovery of new taxa and/or reproductive structures of siphonous green algae should allow us to gain a better understanding of their life histories, the diversity in our marine flora, as well as the evolutionary relationships within and between species.

Mentor: Dr. Celia Smith

Daylan K Siemann  
Mechanical Engineering  
Finished Project in Engineering & Computer Sciences  
Participation for Honors  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki B101

### Pulsating Stability of Burner Stabilized Premixed Flames

The topics of renewable energy and energy conservation are quickly gaining interest in the world of engineering. Carbon dioxide, one of the causations to this rising interest, is a main product of combustion processes. This research aims to use theory to formulate the specific combustion phenomenon of premixed reactants flowing through a porous burner. Specifically, a stability analysis involving a perturbation of the flame location is used to assess the overall stability of the flame. The stability of a flame can be physically represented by the wrinkling and distortion of the flame. A stable flame burns efficiently which reduces the amount of fuel required and the amount of pollutants released when compared to an unstable flame. The neutrally stable boundary which separates the classification of a stable and unstable flame was observed and characterized.

Mentor: Dr. Beei-Huan Chao

Makana Silva

Physics

Work in Progress in Natural Sciences

Participation for UROP

Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki B104

Poster Presentation: 1:30-3:00pm in Campus Center Ballroom

### Mathematics and Applications of Solitons

The purpose of this project is to study the methods behind finding solitary wave solutions and from these solutions build topological soliton solutions from integrable systems and find new applications for describing different physical models. Solitons are special because they are the solutions of a balance between the nonlinear and dispersive terms in a partial differential equations (PDE).

Systems described by PDE such as the Korteweg – de Vries Equation (KdV) and the Sine Gordon Equation are classified as integrable and have topological soliton solutions. The Inverse Scattering Transform (IST) can be applied to integrable systems in order to derive topological solitons.

This was the most interesting aspect of the research because these solitons have topologically distinct behavior at infinity from the vacuum solution. Topological solitons can be used to described particles in high energy physics because of their unique properties. Some PDE such as the  $\phi^4$  model are considered non-integrable and therefore (IST) cannot be used as a method for finding topological solitons. These solitons have conserved quantities that mimic conserved properties such as baryon number, charge, etc.

The future of this project is to now apply these methods of finding soliton solutions to more quantum mechanical fields and expanding the (IST) to multi-dimensional scattering systems.

Mentor: Dr. Sarah Post



Alaina Smith  
Global Environmental Science  
Proposal in Natural Sciences  
Participation for Honors  
Oral Presentation: Session 3 (11:20a-12:20p) in Sakamaki C101

### Maintenance of Diversity through Multiple Time Scales of Variation

The goal of this project is to understand how diversity is maintained in nature. Diversity can be maintained through resource fluctuation because species can evolve different strategies to thrive under different conditions. These strategies include being able to grow the fastest when resources become available, being able to store the most resources and continue growing over a long period of time, or being able to use resources more efficiently, thus being the best competitor under limited resources. Nutrient supply in the ocean likely varies over multiple time scales (e.g., seasonal variation vs. storms); however, we do not understand how multiple frequencies of variation affects phytoplankton communities. To test the role of multiple frequencies of variation, I am using a model describing how phytoplankton respond to varying nutrient supply. I hypothesize that different time scales operating in the same ecosystem will allow for more species to coexist because multiple time scales will support a larger variety of strategies. Understanding the maintenance of diversity in phytoplankton is important because they are the base of the food web and they play a major part in biogeochemical cycles including the carbon cycle, which affects how the biosphere reacts to climate change. I am going to use a model of phytoplankton competition to look at how multiple co-occurring time scales of variation effect the diversity of communities.

Mentor: Dr. Kyle Edwards

Nicolette Smith

English

Proposal in Arts & Humanities – Research

Participation for Honors

Oral Presentation: Session 3 (11:20a-12:20p) in Sakamaki B103

### 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. Often in literature, the critique of women writers stems from a feminist point of view that focuses on the development and sexuality of the woman. This project aims to study what is often neglected in literary critique, and study the spiritual beliefs, growth, and development of these young women through their published autobiographical works. 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 which is not often discussed in secular literature.

The three women this project focuses on are very different- 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, there will be a cultural studies done to compare and contrast their spiritual and/or religious beliefs and the way they act on them, according to their work. By studying contemporary women, this project will shed light on the different ways religion and spirituality are acted out in modern times in a largely secular world.

Mentor: Dr. Craig Howes

Angela Soto Balmores  
History and Political Science  
Finished Project in Arts & Humanities – Research  
Participation for UROP  
Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki B103

### Mama Don't Let Your Daughters Grow Up To Be Housewives

In 1959, during a visit to Moscow, Vice-President Richard Nixon engaged in a debate with Nikita Khrushchev, the leader of the Soviet Union. Even though, the argument between the two representatives of the most powerful countries during the Era of the Cold War took place in the kitchen, there was very little mention of culinary arts. However, both of them used the kitchen's connection to prosperity and technology, to state their opinions concerning capitalism and communism. Nixon's argument that "what we want to do, is make life easy for our housewives" will be the primary focus of this paper. Was the American woman really empowered as a housewife by the modern kitchen?

Advertisements prior to World War II focused on the housewife in the kitchen preparing meals for their family. With the economic boom of the 1950s and American capitalism as an embodiment of the democratic freedom America wanted to show the world, advertisement agencies took an interesting turn. Women still maintained their typified role in the kitchen, but the advertisements focused on the idea of ease. The woman was beautifully put together while being a cook, a maid, and a mother. Some advertisements focused on technology liberating the housewife from her matriarchal duties. To keep a woman happy in her new home, she would need the possessions to ensure that the American family would keep up with the latest trends and technology.

Mentor: Dr. Suzanna Reiss

Kadee-Kalia Tamashiro

Biology

Finished Project in Natural Sciences

Participation for Honors, UROP

Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki C201

### Studying 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

Carl L Thompson  
Geography - Earth Science of the Pacific Islands  
Work in Progress in Natural Sciences  
Participation for Honors, UROP  
Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki B104

### Carbon Isotope Analysis of Hawaiian Land Snail Shells for Paleo-Climate Reconstruction

Transformative action will be required in dealing with the environmental and societal global climate change. Over the last century attests to the fact that the Hawaiian Islands have undergone episodic transformation during its geological history. The study of community of extinct Hawaiian snail's assemblages and individual snail shells may hold crucial signals evidence concerning past environmental, ecological and evolutionary profiles locally and globally.

Mentor: Dr. Brenden Holland

Michelle Ho-Gi Tong  
Biology and Public Health  
Finished Project in Social Sciences  
Participation for Honors  
Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki A102  
Poster Presentation: 1:30-3:00pm in Campus Center Ballroom

### Association of Health Literacy with Cardiovascular Disease in Chinese Americans

As a leading cause of death in Americans, cardiovascular disease (CVD) is further augmented by health disparities among ethnic minority sub-populations. In Hawaii and California, the Chinese American population is considered a minority population. Thus, members of this group may lack adequate health literacy required for protection against developing CVD or effective management of CVD after diagnosis. Having diminished understanding of disease prevention and health maintenance, such as through low health literacy, can exacerbate risk factors for developing CVD. Known factors that can lead to CVD progression range from genetics to lifestyle components. Preventative measures against CVD include implementing a series of lifestyle changes, such as eating a nutritious diet, exercising daily, and reducing stress.

This project was a collaborative effort between the Office of Public Health Studies at The University of Hawai'i at Mānoa as well as the Hawai'i State Department of Health. The aim was to provide researchers with a better understanding of the relationship between health literacy and its effects on CVD in the Chinese American sub-populations of California and Hawaii. Data was taken from three health surveys across these states, respectively. The results were analyzed using descriptive statistics and multivariate logistic models. The data collected across the surveys were compared for evidence of association between health literacy and CVD in the sample populations. Findings from this study did not support any link between health literacy and CVD in Chinese Americans. However, other associations were found, including the relationship among health literacy and age, which sets the foundation for future research.

Mentor: Dr. Tetine Sentell

Jasmine M Tyson  
Microbiology  
Finished Project in Natural Sciences  
Participation for Honors, UROP  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki C201

### Expression of Dengue Virus-Like Particles in *Drosophila* Cells as Vaccine Candidates

Dengue virus (DENV) belongs to the *Flaviviridae* family and its four serotypes cause the most important arthropod-borne diseases in the tropics. It is estimated that over 390 million people are newly infected with DENV each year with 25% apparent infections including dengue fever and potentially-fatal dengue hemorrhagic fever/dengue shock syndrome. There are currently no FDA-approved vaccines despite several live-attenuated tetravalent vaccine candidates undergoing clinical trials. One of the biggest challenges is the difficulty eliciting a balanced immune responses against all serotypes due to interserotype viral interference. Co-expression of the DENV precursor membrane (prM) and envelope (E) proteins can form virus-like particles (VLPs), which are antigenically similar to DENV and have potential as vaccine candidates. The objective of this project was to express DENV VLPs in *Drosophila* S2 cells and study them as vaccine candidates. The first aim was to express VLPs of four serotypes in S2 cells; the second was to test their immunogenicity. To accomplish this, the prM and E genes of the four serotypes were cloned into the pMT vector in the absence or presence of the furin gene (to increase maturation of VLPs), and then amplified in *E. coli* cells. The S2 cells were transfected with each construct to establish S2 clones stably expressing VLPs, and this would have been used to immunize mice to determine immunogenicity. However, probably due to the complex nature of VLP secretion in *Drosophila* cells, the S2 stable clones did not secrete VLPs well. Several hypotheses are discussed to offer possible explanations.

Mentor: Dr. Wei-Kung Wang

Tiffany-Heather Ulep  
Biological Engineering  
Finished Project in Natural Sciences  
Participation for UROP  
Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki C102

### The Analysis and Comparison of Individual *Conus striatus* Milked Venom Profiles

Conotoxins have been useful research tools in biotechnology, oncology, neurology, and psychology. These peptides have led to numerous advancements in molecular biotechnology techniques as well as pharmacological success as a biologic analgesics. Venom composition is essential in the investigation and discovery of novel peptides, as these peptides are highly specific and differentiate between closely related receptor subtypes. Quantitative analyses of the venom profiles were conducted by means of High Pressure/Performance Liquid Chromatography (HPLC) and Matrix-Assisted Laser Desorption/Ionization (MALDI). The venoms analyzed were milked from *Conus Striatus*' kept on highly regulated diets. The goal of this project is to determine if there are any differences in venom composition between organisms with assigned diet restrictions and those on native-like diets and to determine the diet's effect on the novelty of peptides produced within the venom profiles.

Mentor: Dr. Jon-Paul Bingham



Von Dickens Ulsa  
American Studies, English, and History  
Finished Project in Arts & Humanities – Research  
Participation for Honors, UROP  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki B103

The Captor and the Legist:  
The Forgotten Histories of the Andrade Brothers

Spanish brothers Jose and Luis Taviel de Andrade played important yet often overlooked roles in the history of the Philippines in the late nineteenth century. Jose, the older brother, led various Spanish commands across the then-colony prior to arresting Jose Rizal, the decorated national hero of the Philippines, in the summer of 1892. His younger brother, Luis, represented Rizal as his counsel against charges of treason – an effort that failed dramatically, leading to Rizal's execution in 1896. This research takes us through an investigation of the Andrade brothers' ambiguous relationship with Rizal during his final years. My investigation took me all the way to Seville, Spain, the hometown of the Andrades. Having access to the General Archives of the Indies as well as local libraries, I was able to get a sense of the colonial period through Spanish resources and historians. What my research reveals about the Andrades' relationship with Rizal is a relationship far from the anti-Spanish interpretation of current historians. The line between oppressive Spaniards and the subdued Filipinos becomes more blurred as new information about the Andrades and their relationship with Rizal were rediscovered. Their histories led me to a novel approach in understanding the history and historiography of Colonial Philippines and Imperial Spain – as well as potentially ground-breaking discoveries of the Andrades' encounter with Rizal prior to their supposed first interaction in the Philippines.

Mentor: Dr Vina Lanzona

Andrea Unzueta Martinez  
Marine Biology  
Finished Project in Natural Sciences  
Participation for Honors, UROP  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki C201

### *Montipora* White Syndrome: the Good, the Bad, and the Coral

Coral reefs are among the most diverse and productive ecosystems on earth, however they are threatened by bacterial infections. *Vibrio coralliilyticus* strain OCN008, a marine bacterium, induces the tissue loss disease acute *Montipora* White Syndrome (aMWS) in *Montipora capitata*, a major reef-building coral in Kāneʻohe Bay, Oʻahu, Hawaiʻi. Two bacteria, *Pseudoalteromonas rubra* and *Pseudoalteromonas luteoviolacea*, were isolated from healthy fragments of *M. capitata* and can protect coral fragments from OCN008 infection under controlled conditions. These two bacteria produce unidentified antibiotic compounds that inhibit the growth of OCN008, which are believed to be involved with protecting coral from infection. Procedures were developed to investigate both the pathogenic and protective bacteria. To identify the genes responsible for antibiotic production in the protective strains, tools were developed to randomly mutagenize genes in their genomes with marked mutations. In the pathogen, tools were developed to remove or express a specific gene believed to regulate hemolysin activity, an enzyme hypothesized to be involved with disease. These genetic approaches will help in understanding the bacteria that influence the health of our coral reefs.

Mentor: Dr. Sean Callahan

Dustin Vuong  
Molecular Cell Biology and Psychology  
Finished Project in Natural Sciences  
Participation for Honors, UROP  
Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki C102

### Expression of Recombinant Human Apoferritin in *Escherichia coli*

Ferritin is a globular protein consisting of 24 subunits (heavy and light chains) and is the major iron storage protein in most living organisms. Ferritin has the potential to be developed into a magnetic resonance imaging (MRI) contrast agent to noninvasively detect deterioration in the glomerular basement membrane, a symptom of human kidney diseases. A cost-effective means of obtaining human apoferritin rather than animal apoferritin is necessary to lessen incompatibility issues with the human immune system when used as an MRI contrast agent. This project proposed to develop a protocol for the expression and production of human apoferritin in *Escherichia coli* by recombinant DNA techniques for diagnostic purposes. Systematic analytical tests for growth variables such as cell lines, temperature, and media composition were conducted to determine the best method for the expression of human apoferritin. We found that the highest yield was obtained when the protein was expressed from *E. coli* BL21 at 23°C after 24 hours induction in M9 minimal media. We also determined that a two-step purification method, affinity chromatography followed by size exclusion chromatography, was best to greatly improve the protein purity. Importantly, purified recombinant human apoferritin had expected structural characteristics, as measured by electron microscopy, indicating that the protein could be used *in vivo* to test its efficacy as an MRI contrast agent.

Mentor: Dr. Heinz Gert de Couet

Eric Wadnal  
Global Environmental Science  
Work in Progress in Natural Sciences  
Participation for UROP  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki B104

### Calibration and Analysis of Coastal Oahu pH Data

Recently ocean acidification (OA) has received increased attention from scientists due to its potentially adverse effects on marine ecosystems, so obtaining an accurate and precise pH measurement in the coastal ocean is critical. This project aims to obtain the most precise pH measurements possible using a pH spectrophotometer, and will use these measurements to correct time series data collected by three PMEL MAPCO<sub>2</sub> buoys around Oahu and determine the data's reliability. Two of the buoys are located on fringing reefs of the south shore and one on the barrier reef in Kaneohe Bay. Other parameters with time series data are then used to analyze influences to coastal pH of Oahu. For each buoy location, bottle samples were collected in situ at times corresponding to when the SeaFET, a pH instrument attached to the buoy, is programmed to measure pH in order to calibrate the time series data collected by the SeaFET. I expect the spectrophotometrically measured pH differed from the SeaFET measurements by a small, yet significant value. Analysis of the pH data indicates different variability patterns and pH ranges among the three locations. The pH data also show a very strong relationship between Dissolved Oxygen at all three buoys, indicating photosynthesis and respiration as the main driver for pH changes. However each of the three locations have slightly different factors influencing the daily and seasonal variability of the data, as well as the magnitude of their pH ranges.

Mentor: Dr. Eric DeCarlo

Brent Wakuzawa  
Bioengineering  
Proposal in Engineering & Computer Sciences  
Participation for Honors  
Oral Presentation: Session 3 (11:20a-12:20p) in Sakamaki B101

## Reduction of Inhibitory Compounds Generated from High Pressure Treatment of Macroalgae

The U.S. Energy Information Administration (EIA) reported that petroleum accounted for 84% of Hawaii's total energy consumption in 2013; the highest in the U.S., a fact largely due to both the state's isolated location and declining natural resources. Research studies have investigated lignocellulosic biomass as a prospective replacement for petroleum as an inexpensive, sustainable energy source. Lignocellulosic materials are 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, certain pretreatments are utilized to separate the three biomass structural components.

Steam explosion is one of the most cost-effective means for generating a high product yield. The biomass is exposed to high pressure and temperature steam prior to sudden decompression resulting in the physical and chemical breakdown of the lignocellulosic material. Exposure to severe conditions will hydrolyze the sugars into inhibitory compounds that will inhibit the fermentation of sugars into biofuels. Furfural and 5-hydroxymethyl furfural (HMF) are inhibitory compounds generated from the degradation of hexose and pentose sugars, respectively.

A physical treatment using biochar filters will be utilized to lower inhibitor concentration in the pretreated slurry. The inhibitor concentration in the pre-physical treated effluent will be compared to the inhibitor concentration in the post-physical treated effluent using high performance liquid chromatography (HPLC), a method to quantitatively determine the concentration of compounds in a mixture. This project's aim is to maximize monomeric sugar yield by minimizing generated inhibitor concentration.

Mentor: Dr. Samir K Khanal

Melissa Walker  
Botany  
Finished Project in Natural Sciences  
Participation for Honors, UROP  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki B104

### Uncovering Aquatic Mysteries: Algal Diversity in Hawaiian Streams

Algae, photosynthetic organisms exclusive of plants, are important members of benthic communities in aquatic environments. Benthic communities are composed of organisms, which live in and on the stream bottom. Communities of microscopic algae form the foundation of food webs for fish, mollusks and crustaceans. They also cycle nutrients, increasing the bioavailability of inorganic compounds, and directly impact biodiversity found within stream habitats. These communities are influenced by factors such as competition, seasonality, leaf litter and debris inputs from the surrounding habitat. Additionally, Hawaiian stream habitats may be largely impacted by anthropogenic activity including industrialization and agriculture. All of these factors need to be studied to understand the natural and human-induced change of Hawaiian benthic communities. This research study focused on three stream sites monitored by the Division of Aquatic Resources and includes benthic sampling from both the dry and wet Hawaiian seasons. The purpose of this study was to establish baseline measurements of benthic algal diversity and document possible changes to these communities in response to anthropogenic land use and seasonality. Environmental DNA (from all members of the microbial community) was extracted for each sample and submitted for high-throughput sequencing. Analysis of the results will allow for characterization of diversity present in Hawaiian streams, including species potentially unknown to science. These results will also allow for the evolutionary relationship of the species to be deduced in conjunction with species from Oahu, the Hawaiian Islands, and other regions of the world.

Mentor: Dr. Alison Sherwood

Michael A Wallstrom  
Marine Biology  
Finished Project in Natural Sciences  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki B104

Family Affairs of Horny Sponges: A Phylogenetic and Morphological  
Description of a New Invasive-Algae-Associated Pacific Species, *Igernella*  
*hawaiiensis* (Porifera, Demospongiae) with Implications for the *Igernella* and  
*Dendrilla* Genera

A previously undescribed species of keratose sponge closely associated with, and commonly found in, invasive algal mats on O'ahu is identified. This new species, *Igernella hawaiiensis*, constitutes a second Indo-Pacific species of *Igernella*. We place this species into the larger phylogenetic context of the *Dendrilla* and *Igernella* genera which are divided between the families of Darwinellidae and Dictyodendrillidae respectively. The relative phylogenetic positions of these species underscore the currently inconsistent taxonomy of this species group. An updated key for the *Igernella* genus is provided and a call is made for future work to develop a general revision of the taxonomy of the Dendroceratida order of keratose sponges, as well as the need for follow-up work to understand the role of *I. hawaiiensis* in invasive species ecology and coral reef conservation in the Central Pacific.

Mentor: Dr. Floyd A. Reed

Ami Wong  
Public Health  
Proposal in Social Sciences  
Participation for Honors  
Oral Presentation: Session 3 (11:20a-12:20p) in Sakamaki A102

## Tobacco Compliance Research on the Increased Smoking Age Law

### **Objective:**

Starting January 1, 2016 Hawaii raised the smoking purchasing age from 18 years old to 21 for both traditional and electronic cigarettes. The purpose of this law is to decrease and prevent the amount of young smokers around the state. Due to the recent change of law, this study will be significant to test how effective and enforced the new law is on cigarette distributors around the state.

### **Method:**

Working with the Public Health Department's Doctor Rebecca Schweitzer, we will be conducting a study during Summer 2016 that involves inspecting how many cigarette vendors are cooperating with the new law. If vendors are still distributing cigarettes to people less than 21 years of age, then the law will be flawed.

A tobacco compliance experiment has already been conducted to test the effectiveness of the previous smoking age of 18 years old. There will be training sessions for the high school and college students under 21 years old. Additionally, there will be a schedule of which tobacco distributors to purchase tobacco products at specific locations in the State of Hawaii. Variables such as: Gender, method of payment, distributor type, and education will be examined to see if illegal sales increase or decrease for specific situations.

### **Implications:**

By enforcing the new smoking age law, tobacco products will be harder to obtain for younger generations. With the enforcement of the law, there is more potential for positive results.

Mentor: Dr. Denise Nelson-Hurwitz



Zhaotong Xu  
Molecular Cell Biology and Psychology  
Finished Project in Natural Sciences  
Participation for Honors, UROP  
Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki C201

### Overexpression of PRAF2 in *Drosophila melanogaster*

PRAF (prenylated Rab acceptor family) proteins are highly conserved among multicellular organisms and several paralogous genes of PRAF exist. PRAF proteins are expressed in a variety of tissues and are associated with cellular transport and endo/exocytic vesicle trafficking. Currently, the function of a newly described PRAF protein, PRA1 domain family, member 2 (PRAF2) is still not understood. However, PRAF2 is upregulated in cancerous cells of the breast, colon, lung, and ovaries and serves as a candidate prognostic marker for neuroblastoma. This study investigates the effects of the overexpression of PRAF2 in *Drosophila melanogaster* by using a tubulin-GAL4 driver to express UAS-PRAF2::GFP ubiquitously. Since *Drosophila* ommatidia are especially sensitive to abnormal levels of gene expression, we will use transmission and scanning electron microscopy to investigate any ultrastructural changes in *Drosophila* compound eyes that may have resulted from the ubiquitous overexpression of PRAF2.

Mentor: Dr. Heinz Gert de Couet and Dr. Floyd Reed

Debbi Yoshimoto  
Marine Biology  
Finished Project in Natural Sciences  
Participation for UROP  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki B104

Analyzing Algal Parameters as a Function of Submarine Groundwater  
Discharge, on Two Shores of O'ahu

Land-based sources of pollution impact the health of reefs leading to habitat changes and overall shifts in the biotic composition of coastal ecosystems. Increasingly groundwater flows in urban regions contains elevated nutrients released into coastal waters when submarine groundwater discharge (SGD) occurs. An elevated level of nutrients can enhance algae growth and cause an overabundance over weedy species in the benthic community and a loss in coral abundance. In this study, SGD has been evaluated singly and in combination with other factors that are known to influence the composition of a community. Benthic surveys were taken by spanning two transect lines for 50 meters and a quadrat photographed every five meters, near SGD sources and at control sites, along with collection of benthic algal tissues to test for nitrogen composition. This work was done at four study sites, two on the northeast shore: He'eia Kea Pier, Laenani Beach Park and two on the south shore: Kawaiku'i, Wailupe, regions known to be dominated by invasive *Gracilaria salicornia* and abundant SGD. Through testing nitrogen isotopes, quantifying percent benthic cover and evaluation of biological impacts of these already well characterized sites impacted by SGD, we will test the influence of SGD on algal growth and community composition. Comparisons among sites on O'ahu will begin to provide a more comprehensive view of these interactions and allow resource managers to gain more understanding of the effects of SGD in coastal settings.

Mentor: Dr. Celia Smith

Lisa Yu  
Architecture  
Finished Project in Social Sciences  
Participation for UROP  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki A104  
Poster Presentation: 1:30-3:00pm in Campus Center Ballroom

### Weeding Out Crime: CPTED in Oahu's Weed & Seed Neighborhoods

Crime Prevention Through Environmental Design (CPTED) is a multidisciplinary community policing approach to deter criminal behavior through environmental design. Its goal is to create built and social environments that promote safety by reducing fear and the incidence of crime through the use of specific building design elements. Weed & Seed is a U.S. Department of Justice (DOJ) community-based initiative that aims to restore stability and prosperity to crime afflicted urban neighborhoods.

This research aims to analyze the influence of defensible space and CPTED principles on crime perception and safety, and determine if and how CPTED can contribute to Weed & Seed programs and help catalyze neighborhood revitalization. Through an examination of existing peer-reviewed literature, interviews with community members, and direct observations via site visits, this research concludes that there is no *communis opinio* about the effectiveness of CPTED, and different people can interpret the physical design of space differently. Socio-economic factors heavily influence perceptions of design. While CPTED cannot be considered a panacea for crime and violence in urban neighborhoods, it has the potential to contribute as a crime prevention strategy and guide the design of safe neighborhoods together with social interventions.

Mentor: Dr. Priyam Das

Lauren Yumol  
Global Environmental Science  
Finished Project in Natural Sciences  
Participation for UROP  
Oral Presentation: Session 2 (9:55-11:10a) in Sakamaki C201

### Species-Specific Plant Response to Regional Warming of the Antarctic Peninsula

Ecosystems of the western Antarctic Peninsula (wAP) are currently experiencing one of the fastest rates of regional warming in the world. Aerobic moss-dominated peatbanks, which have the most flourishing vegetation in this ice-dominated region, were studied along the wAP to investigate plant growth conditions over space and time. Living plants of the dominant moss bank species, *Polytrichum strictum*, were collected from 13 sites between 64°09' and 67°35'S and a core was raised from a *P. strictum* moss bank at 65°14'S. Stable isotope ratios of carbon ( $^{13}\text{C}$ ) and nitrogen ( $^{15}\text{N}$ ) were measured in modern and fossil plant tissue. The  $\delta^{13}\text{C}$  values of modern plants varied from -31.7 to -27.0‰ and were influenced as much by tissue type as geographic location. Modern plant  $\delta^{15}\text{N}$  values ranged from -1.4 to +14.7‰ showing little tissue effect. In the core, radiocarbon-dated fossil leaf tissue showed plant growth beginning 2300 years ago, one of the oldest sites on the wAP, variable accumulation rates, and evidence for a hiatus between ~1600 and 800 years ago. Recent decade's leaf tissue had  $\delta^{13}\text{C}$  values between -30.3 to -27.2‰ that were at least 2.0‰ more depleted than any time during the last 2300 years. Enriched  $\delta^{15}\text{N}$  values of +11.5 to +13.2‰ in leaf tissue deposited between ~200 and 700 years BP suggest a period of more trophically-enriched animal inputs. Our results suggest *P. strictum* plants have experienced unprecedented growth conditions with recent rapid warming and a history of changing nutrient sources.

Mentor: Dr. David Beilman

Shalin Zhang  
Molecular Cell Biology  
Finished Project in Natural Sciences  
Participation for Honors, UROP  
Oral Presentation: Session 1 (8:30-9:45a) in Sakamaki C103

### Expression of Aromatase in *Escherichia coli*

Human aromatase is an enzyme necessary for estrogen biosynthesis from androgen precursors, and is often the target of chemotherapy drugs that fight against breast cancers with estrogen receptor positive breast cancer cells. Tamoxifen, a drug that acts as an estrogen receptor antagonist, was the primary method of treatment for women with hormone receptor positive breast cancer cells in the twentieth century and is still widely used today. More recent forms of chemotherapy drugs for breast cancer include aromatase inhibitors, which directly act on aromatase to inhibit the enzyme. Aromatase inhibitors are effective and highly selective for aromatase, but are limited by resistance issues, and therefore motivate researchers to produce drugs that will overcome those resistance mechanisms.

Recent studies have shown that tamoxifen metabolites may be working to block estrogen synthesis through a second pathway; tamoxifen metabolites inhibit aromatase through noncompetitive inhibition. Although aromatase has been crystallized, there are no crystal structures that have elucidated the presence of these allosteric sites. To perform protein crystallization, an abundant amount of enzyme must be readily available. *Escherichia coli* is the most utilized host for the production of cytochrome P450's, a class of enzymes consisting of heme proteins such as aromatase, but the yield of functionally active enzymes remain problematic. The objective of this project was to express aromatase in *E. coli*, purify the expressed aromatase, and test for functionality.

Mentor: Dr. Ho Leung Ng

## NOTES

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