



**RIVERSIDE**

Undergraduate Education

**UNDERGRADUATE  
RESEARCH &  
CREATIVE ACTIVITY  
SYMPOSIUM**

**May 12-13, 2021**

## Schedule of Events:

All presentations will be oral presentations.

### Wednesday - May 12, 2021

#### Emerging Research

**Emerging Research presentations represent projects that are not fully completed, perhaps due to pandemic impacts.**

10:00 - 11:00am	Oral & Creative Arts Presentations
11:15 - 12:15pm	Oral & Creative Arts Presentations
1:00 - 2:00pm	Oral & Creative Arts Presentations
1:00 - 2:00pm	Oral & Creative Arts Presentations
2:15 - 3:15pm	Oral & Creative Arts Presentations
3:30 - 4:30pm	Oral & Creative Arts Presentations
4:40-5:40pm	Oral & Creative Arts Presentations

### Thursday - May 13, 2021

#### Completed Research

**Completed Research presentations represent projects that are not fully completed, perhaps due to pandemic impacts.**

10:00 - 11:00am	Oral & Creative Arts Presentations
11:15 - 12:15pm	Oral & Creative Arts Presentations
1:00 - 2:00pm	Oral & Creative Arts Presentations
1:00 - 2:00pm	Oral & Creative Arts Presentations
2:15 - 3:15pm	Oral & Creative Arts Presentations
3:30 - 4:30pm	Oral & Creative Arts Presentations

## STUDENT PRESENTERS

In order of sessions

### **JULIANA CHEN, PSYCHOLOGY**

FACULTY MENTOR: KALINA J. MICHALSKA, PhD

#### **DOES FEAR RESPONDING DURING THREAT CONDITIONING PROSPECTIVELY PREDICT ANXIETY SYMPTOMS IN LATINA CHILDREN?**

ANXIOUS YOUTH EXHIBIT ALTERATIONS IN THREAT LEARNING DURING PAVLOVIAN CONDITIONING PARADIGMS. THOUGH SUCH PARADIGMS ARE A VALUABLE TOOL FOR CONCURRENTLY ASSESSING ANXIETY, WE KNOW LESS ABOUT THEIR UTILITY IN PREDICTING THE DEVELOPMENT OF ANXIETY OVER TIME. THE CURRENT STUDY ADDRESSES THESE GAPS THROUGH EXAMINATION OF FEAR RESPONDING DURING THREAT CONDITIONING AS A PROSPECTIVE PREDICTOR OF ANXIETY SYMPTOMS IN A SAMPLE OF PREADOLESCENT LATINA GIRLS. PARTICIPANTS INCLUDED 54 PARENT-DAUGHTER DYADS. AT WAVE 1, PARENTS REPORTED ON THEIR DAUGHTERS' ANXIETY VIA THE CHILD BEHAVIOR CHECKLIST (CBCL), AND DAUGHTERS (MAGE=9.90,  $\pm$  1.25 YEARS) COMPLETED A DIFFERENTIAL THREAT CONDITIONING PARADIGM VALIDATED IN PEDIATRIC POPULATIONS. SKIN CONDUCTANCE RESPONSE AND SELF-REPORTED FEAR RATINGS INDEXED BOTH PSYCHOPHYSIOLOGICAL AND SUBJECTIVE FEAR RESPONDING TO CONDITIONED (CS+, CS-) AND UNCONDITIONED THREAT STIMULI. ONE YEAR LATER AT WAVE 2, 14 PARENTS TO DATE PROVIDED INFORMATION ABOUT THEIR CHILDREN'S ANXIETY SYMPTOMS VIA PARENTAL REPORTS ON THE CBCL. WAVE 2 DATA COLLECTION IS ONGOING. WAVE 1 ANXIETY SIGNIFICANTLY PREDICTED WAVE 2 ANXIETY, AFTER CONTROLLING FOR PUBERTAL STATUS ( $DR2=0.76$ ,  $p<.001$ ). FURTHER, SELF-REPORTED FEAR RATINGS IN RESPONSE TO THE CS+ SIGNIFICANTLY PREDICTED WAVE 2 ANXIETY, OVER AND ABOVE WAVE 1 ANXIETY ( $DR2=0.09$ ,  $p<.05$ ). THESE EFFECTS WERE NOT OBSERVED FOR PSYCHOPHYSIOLOGICAL FEAR RESPONDING. THOUGH PSYCHOPHYSIOLOGICAL MEASURES OF THREAT LEARNING ARE UNDOUBTEDLY VALUABLE FOR UNDERSTANDING VARIOUS FACETS OF ANXIETY IN CHILDREN, THE CURRENT FINDINGS SUGGEST THAT SUBJECTIVE EXPERIENCES OF FEAR SHOULD NOT BE OVERLOOKED AND MAY IN FACT BE A UNIQUELY INFORMATIVE RISK FACTOR FOR THE DEVELOPMENT AND MAINTENANCE OF ANXIETY OVER TIME.

10:00 AM-11:00AM

### **AZALEA CORRAL, ANTHROPOLOGY**

FACULTY MENTOR: JENNIFER HUGHES, HISTORY DEPARTMENT

#### **DIVERSITY, EQUITY, AND INCLUSION IN HIGHER EDUCATION**

MUCH OF THE RESEARCH THAT HAS BEEN DONE ON EDUCATION FROM AN ANTHROPOLOGICAL PERSPECTIVE THUS FAR HAS FOCUSED ON CHILDREN IN THE STAGES OF PRIMARY AND SECONDARY EDUCATION. RECENTLY, THERE HAVE BEEN A FEW MORE STUDIES THAT FOCUS ON THOSE WHO ARE ENROLLED IN HIGHER EDUCATION. ALTHOUGH SOME RESEARCH HAS BEEN DONE ON COLLEGE-AGED STUDENTS, MY PROJECT IS CENTERED ON THE EXPERIENCES OF UNDERREPRESENTED MINORITY STUDENTS. THE GOAL OF THIS PROJECT IS TO GATHER AND ANALYZE DATA ON THE EFFECTS OF HAVING ACCESS TO DIVERSITY, EQUITY, OR INCLUSION CENTERS AND RESOURCES ON OR NEAR COLLEGE CAMPUSES. USING DATA ON GRADUATION AND RETENTION RATES OBTAINED BY VARIOUS COLLEGE CAMPUSES ALONG WITH EXPERIENCES FROM INTERVIEWS WITH AND QUESTIONNAIRES FROM UNDERREPRESENTED MINORITY COLLEGE STUDENTS, I TRANSCRIBE THIS INFORMATION ONTO A MAP REPRESENTATION USING THE GEOGRAPHIC INFORMATION SYSTEM ARCGIS. THIS INTERACTIVE MAP REPRESENTS THE EXPERIENCES OF



THE INDIVIDUALS INTERVIEWED, ALONG WITH THE DATA GATHERED ABOUT GRADUATION AND RETENTION RATES THROUGHOUT VARIOUS COLLEGE CAMPUSES. THE PURPOSE OF THIS IS TO BRING AWARENESS TO THIS DATA AND EXPERIENCES FROM AN ANTHROPOLOGICAL PERSPECTIVE.

10:00 AM-11:00AM

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### **NIVA MANCHANDA, PSYCHOLOGY**

FACULTY MENTOR: TUPPETT YATES, DEPARTMENT OF PSYCHOLOGY

RELIGIOSITY AND SCHOOL CONNECTEDNESS: THE MEDIATING ROLE OF FAMILY COHESION

ALTHOUGH EXTANT RESEARCH SUGGESTS THAT STUDENT PERCEPTIONS OF SCHOOL CONNECTEDNESS ARE ASSOCIATED WITH THEIR OVERALL ADJUSTMENT AND WELL-BEING (E.G., SELF-ESTEEM, REDUCED STRESS; AZAGBA ET AL., 2014; BOND ET AL., 2007), LITTLE IS KNOWN ABOUT THE ROLE OF RELIGIOSITY IN SCHOOL CONNECTEDNESS.

RELIGIOSITY PROVIDES A POSITIVE SPILLOVER EFFECT OF 'LEARNED COMPETENCIES' (I.E., RELIGIOUS PARTICIPATION MAY ALLOW YOUTH TO ACQUIRE ELEMENTS OF CULTURAL CAPITAL THAT MAY BE USEFUL IN NAVIGATING THE SCHOOL ENVIRONMENTS) THAT MAY ENHANCE SCHOOL CONNECTEDNESS (SMITH, 2003). LIKEWISE, A SENSE OF FAMILY CONNECTEDNESS MAY INFLUENCE CONNECTEDNESS TO OTHER IMPORTANT SOCIAL SPHERES (LAW ET AL., 2013). THUS, THE CURRENT STUDY AIMED TO INVESTIGATE THE POTENTIAL MEDIATING ROLE OF FAMILY COHESION IN THE LINK BETWEEN COLLEGE STUDENTS' RELIGIOSITY AND SCHOOL CONNECTEDNESS. WE EXPECTED THAT RELIGIOSITY WOULD ENHANCE FAMILY CONNECTEDNESS AND, AS A RESULT, SCHOOL CONNECTEDNESS.

IN FALL 2020, 510 UNDERGRADUATES (58% FEMALES, 67.3% LATINX) COMPLETED SELF-REPORTED MEASURES TAPPING THEIR SENSE OF SCHOOL CONNECTEDNESS (I.E., PSYCHOLOGICAL SENSE OF COMMUNITY SCALE; JASON ET AL., 2015), RELIGIOSITY (I.E., SPIRITUAL AND RELIGIOUS ATTITUDES/PRACTICES QUESTIONNAIRE; BÜSSING ET AL., 2021) AND FAMILY COHESION (I.E., FAMILY ADAPTABILITY AND COHESION EVALUATION SCALE IV QUESTIONNAIRE; OLSON, 2011).

MULTIPLE REGRESSION ANALYSES REVEALED A SURPRISING NEGATIVE ASSOCIATION BETWEEN RELIGIOSITY AND SCHOOL CONNECTEDNESS MEDIATED BY HIGHER FAMILY COHESION. INDIVIDUALS WITH HIGH RELIGIOSITY AND STRONG FAMILY COHESION MAY FIND CONNECTIONS WITHIN THOSE SPHERES; THUS, LIMITING THEIR NEED OR DESIRE TO CONNECT AT SCHOOL. LIKEWISE, THEY MAY HAVE FAMILY OBLIGATIONS LIMITING THEIR ACCESS TO SCHOOL CONNECTEDNESS (E.G., WATCHING YOUNGER SIBLINGS RATHER THAN CONNECTING WITH FRIENDS AT SCHOOL). THESE ANALYSES INDICATE THAT HIGHLY RELIGIOUS STUDENTS MAY FEEL LESS CONNECTED TO THEIR COLLEGE COMMUNITY; THEREFORE, POINTING TO THE POTENTIAL IMPORTANCE OF TARGETED INTERVENTIONS TO PROMOTE SCHOOL CONNECTEDNESS AMONG RELIGIOUS STUDENTS.

10:00 AM-11:00AM

**FENG YU LIU, PSYCHOLOGY**

FACULTY MENTOR: AARON SEITZ, DEPARTMENT OF PSYCHOLOGY

**RHYTHM GAME'S EFFECTS ON FIELD OF VIEW AND SPATIAL PROCESSING**

MUCH RESEARCH HAS BEEN CONDUCTED ON THE PROPERTIES OF ACTION VIDEO GAMES THAT BENEFIT INDIVIDUALS IN WAYS THAT IMPROVE INFORMATION PROCESSING, DEVELOPMENTS OF ATTENTION SKILLS, AND EFFECTS ON SPATIAL RESOLUTION OF VISION. THERE EXISTS LITTLE RESEARCH, HOWEVER, ON HOW RHYTHM GAMES MAY BE ABLE TO ACHIEVE THE SAME BENEFITS WITHOUT ALL THE COMPLICATED RULES AND MECHANICS PRESENTED IN ACTION VIDEO GAMES. THIS EXPERIMENT AIMS TO COMPARE THE USEFUL FIELD OF VIEW AND SPATIAL PROCESSING IMPROVEMENTS BETWEEN STANDARD PUZZLE GAME, TETRIS, WITH A POPULAR RHYTHM GAME, CYTUS II. NORMALLY, THE TESTS AND TRAINING WOULD BE CONDUCTED IN PERSON TO ENSURE CLEAR UNDERSTANDING OF THE INSTRUCTIONS. UNDER THE CIRCUMSTANCES OF COVID-19, THE EXPERIMENT PROCESS HAS BEEN CHANGED TO BECOME SOLELY RELIANT ON PARTICIPANTS' INDIVIDUAL DOCUMENTATION OF THEIR EXPERIENCE IN THEIR JOURNAL. THE PARTICIPANTS WOULD HAVE TO DOWNLOAD THE SOFTWARE NECESSARY TO CONDUCT THE EXPERIMENT ON THEIR PERSONAL DEVICES. ALTHOUGH THERE WILL BE COMMUNICATIONS THROUGH EMAILS AND ZOOM MEETINGS, THE PROCESS MAY NOT REACH THE SAME EFFICIENCY AND STABILITY AS CONDUCTING THIS EXPERIMENT IN PERSON. IN THIS PRESENTATION, I WILL PRESENT THE STUDY DESIGN PROCESS TO COMPLETE THE STUDY, AND, HOPEFULLY, PRELIMINARY DATA.

10:00 AM-11:00AM

**MARTHA ANGUIANO, CHEMICAL ENGINEERING**

FACULTY MENTOR: DAVID LO, SCHOOL OF MEDICINE

**CHARACTERIZING ULTRAFINE FLUORESCENT BEAD DEPOSITION AND DISTRIBUTION: IMAGEJ ANALYSIS**

QUANTITATIVE AND CHARACTERIZATION ANALYSIS OF PARTICLE DISTRIBUTION IN LUNGS HAS NOT YET BEEN RESEARCHED. IDENTIFYING THE OVERALL DISTRIBUTION AND DEPOSITION OF ULTRAFINE PARTICLES IN MOUSE LUNGS CAN PROVIDE SUPPORTING CAUSES FOR IMMUNE RESPONSES AND GENE REGULATIONS OBSERVED IN MOUSE MODELS. 1-MICRON BEAD SUSPENSIONS IN CHAMBER EXPOSURE EXPERIMENTS ARE USED TO MODEL HOW ULTRAFINE AEROSOL PARTICLES DEPOSIT IN THE LUNGS. THROUGH THE USE OF IMAGEJ, MEASURING THE BEAD DENSITY PROVIDES US WITH AN IDEA ON HOW THE BEAD DEPOSITION AND DISTRIBUTION LOOKS LIKE FOR THE MOUSE MODELS. FREQUENCY GRAPHS PROVIDE US WITH WHETHER OUR BEAD DENSITY DATA IS NORMALLY DISTRIBUTED OR NOT. INITIAL ANALYSIS SHOWS THAT OUR DATA IS NORMALLY DISTRIBUTED, WHICH IMPLIES THAT THERE IS A UNIFORM DISTRIBUTION OF BEADS IN THE MOUSE MODELS. SINCE THE BEADS ARE SUCCESSFULLY DEPOSITING IN THE ALVEOLI THIS ALSO IMPLIES THAT THERE IS A UNIFORM DISTRIBUTION ACROSS ALL SECTIONS. FURTHER EXPERIMENTS ARE NEEDED IN ORDER TO VERIFY THE ASSAY FOR THIS ANALYSIS. VARYING TIME, INDUCING RESPIRATORY DISEASES, AND BEAD CONCENTRATIONS IN BEAD EXPOSURE EXPERIMENTS WOULD HELP US DETERMINE THIS AS WELL AS GIVE US AN IDEA ON HOW THE DISTRIBUTION WOULD CHANGE WITH THESE VARYING CONDITIONS.

10:00 AM-11:00AM

## **SAMREET ATWAL, NEUROSCIENCE**

FACULTY MENTOR: SACHIKO HAGA-YAMANAKA, DEPARTMENT OF MOLECULAR, CELL AND SYSTEMS BIOLOGY

### **A POTENTIAL MECHANISM FOR SENSORY PERCEPTION OF UNPLEASANT FLORAL SCENT OF PEAR BLOSSOMS**

THE FLOWERS OF PEAR BLOSSOMS (*PYRUS CALLERYANA* AND *PYRUS KAWAKAMII*) EMIT A DISTINCTIVE UNPLEASANT SCENT, OFTEN DESCRIBED AS A SEMEN-LIKE SMELL. HOWEVER, THE CHEMICAL ORIGIN OF THE SMELL REMAINS UNCHARACTERIZED. THE KNOWLEDGE IS CRUCIAL TO EXPLAINING THE NEGATIVE RESPONSE ON HUMANS AND COULD POTENTIALLY EXPLAIN AN EVOLUTIONARY MECHANISM. WE FIRST CONDUCTED AN EXTENSIVE LITERATURE SEARCH OF FLORAL VOLATILE ORGANIC COMPOUNDS (VOCs) IN THIS GENUS. DURING THIS SEARCH, OTHER SPECIES SUCH AS *CASTANEA MOLLISSIMA*, *PHOTINIA SERRULATA*, *CASTANOPSIS SCLEROPHYLLA*, *XYSMALOBIMUM PARVIFLORUM*, AND *STEMONA JAPONICA* WERE NOTED TO HAVE A SIMILAR UNPLEASANT SMELL. THE FLORAL VOCs WERE IDENTIFIED USING MASS SPECTROSCOPY AND GAS CHROMATOGRAPHY. AMONG THE VOCs IDENTIFIED FROM THOSE PLANTS, 1-PYRROLINE IS KNOWN TO BE PERCEIVED AS A SEMEN-LIKE SMELL IN HUMANS AND, THEREFORE, COULD BE RESPONSIBLE FOR THE PEAR BLOSSOMS' FLORAL SCENT. WE ALSO EXPLORED THE LITERATURE ABOUT SEMEN VOCs AND IDENTIFIED PUTRESCINE, SPERMIDINE, AND SPERMINE, WHICH CONTRIBUTE TO THE SMELL OF SEMEN. INTERESTINGLY, INCLUDING 1-PYRROLINE, ALL THESE COMPOUNDS ARE NITROGENOUS AMINES. THEREFORE, WE EXPANDED TO EXAMINE HOW WE PERCEIVE THESE AMINES. AS IT TURNS OUT, TRACE AMINE-ASSOCIATED RECEPTORS (TAARs) WERE IDENTIFIED AS POLYAMINE RECEPTORS. TAARs ARE EXPRESSED IN THE OLFACTORY EPITHELIUM IN VERTEBRATE SPECIES, AND THEIR ACTIVATION LEADS TO EITHER ATTRACTIVE OR ADVERSE BEHAVIOR IN MICE. TAKEN TOGETHER, OUR LITERATURE SEARCH SUGGESTS THAT 1-PYRROLINE TO BE THE SOURCE OF THE SMELL OF PEAR BLOSSOMS AND THAT TAARs ARE RESPONSIBLE FOR ITS PERCEPTION WHICH MEDIATES ADVERSE BEHAVIOR. THE MECHANISM BEHIND THIS SCENT ILLUSTRATES THE INTRICATE YET SPECIALIZED FEATURE OF OLFACTORY PERCEPTION.

10:00 AM-11:00AM

## **BETER ZAKI, NEUROSCIENCE; YASEEN HAMIM**

FACULTY MENTOR: KEVIN KOU, DEPARTMENT: CHEMISTRY

### **BIOSYNTHESIS, SYNTHESIS AND ANTICANCER ACTIVITY OF BISBENZYLISOQUINOLINE ALKALOID**

BISBENZYLISOQUINOLINE (BBI) ALKALOIDS ARE NATURALLY-OCCURRING, NITROGENOUS COMPOUNDS FOUND IN A RANGE OF PLANT FAMILIES ORIGINATING IN TROPICAL AND SUBTROPICAL REGIONS. CONSISTING OF A DIMERIC SCAFFOLD LINKING TWO ISOQUINOLINE MOETIES BY STERICALLY ENCUMBERED, ELECTRON-RICH DIARYL ETHER BONDS, BBI ALKALOIDS ARE A SUBJECT OF GREAT INTRIGUE FOR SYNTHETIC CHEMISTS. THE FORMATION OF THE DIARYL ETHER LINKAGE IS NONTRIVIAL AND CURRENTLY, AND ONLY ONE METHOD EXISTS TO SYNTHESIZE THESE BONDS, ALBEIT IMPRACTICAL. BIOSYNTHESIS IS ABLE TO CIRCUMVENT THE BARRIER ASSOCIATED WITH THE ASSEMBLY OF THE DIARYL ETHER BOND USING CYP80A1 TO EXECUTE AN ENZYMATIC OXIDATIVE DIARYL ETHER BOND FORMATION REACTION.

CANONICAL ANTI-CANCER THERAPEUTICS SUCH AS CISPLATIN AND PACLITAXEL SUFFER FROM OFF-TARGET CYTOTOXICITY, AND IMPORTANTLY, CELLS OFTEN DEVELOP RESISTANCE. BBI ALKALOIDS TETRANDRINE (TET) AND BERBAMINE (BBM) HAVE EXHIBITED POTENT ANTICANCER ACTIVITY AGAINST SEVERAL CANCER CELL LINES, MAKING THEM VALUABLE MOLECULES FOR FURTHER EXPLORATION. TET AND BBM DEMONSTRATE INTERACTIONS WITH MULTIPLE PATHWAYS IMPLICATED IN ONCOGENESIS AND METASTASIS INCLUDING NF- $\kappa$ B, AKT, RAS, AND WNT, AND MAY SERVE AS INDIVIDUAL OR ADJUNCT THERAPEUTIC AGENTS. COMBINED THERAPY WITH CANONICAL DRUGS SUCH AS CISPLATIN

AND PACLITAXEL OVERCOMES THE BARRIER OF CHEMOTHERAPY RESISTANCE BY INTERACTIONS WITH P-GLYCOPROTEIN, A KEY PROTEIN INVOLVED IN DRUG EFFLUX. UNDERSTANDING THE STRUCTURE-ACTIVITY RELATIONSHIPS OF BBI ALKALOIDS AND AFFECTED CELLULAR COMPONENTS IS KEY TO ELUCIDATING THE UNDERLYING MECHANISMS OF THERAPY FOR FURTHER DEVELOPMENT FOR THE TREATMENT OF VARIOUS CANCERS. HEREIN, WE OUTLINE IMPORTANT SYNTHETIC, BIOSYNTHETIC AND MOLECULAR NUANCES THAT DESIGNATE BBI ALKALOIDS AS HIGH-VALUE TARGETS FOR THE FIELD OF CANCER BIOLOGY.

10:00 AM-11:00AM

### **CLARISSA CARRETTA, GEOLOGY**

FACULTY MENTOR: DANIEL HIRMAS, ENVIRONMENTAL SCIENCES

#### **A RAPID METHOD FOR ESTIMATING SOIL CHEMICAL INFORMATION USING SOIL COLOR**

SOIL MANAGEMENT OFTEN REQUIRES DECISION-MAKING THAT IS BASED ON LIMITED OBSERVATIONAL DATA OBTAINED FROM THE FIELD. VISUAL FEATURES SUCH AS COLOR CAN BE ESTIMATED SUBJECTIVELY USING COLOR CHARTS IN THE FIELD WHEREAS SOIL PROPERTIES SUCH AS SOIL ORGANIC CARBON (SOC) CONCENTRATION USUALLY REQUIRE SAMPLING AND FURTHER ANALYSIS IN THE LABORATORY. HOWEVER, IF CERTAIN CHEMICAL CONCENTRATIONS CAN BE QUANTITATIVELY LINKED TO COLOR ESTIMATES, THIS WOULD OPEN THE DOOR TO RAPID, FIELD-BASED DETERMINATION OF THOSE CONCENTRATIONS. THEREFORE, THE OBJECTIVE OF THIS STUDY WAS TO ANALYZE AND QUANTIFY RELATIONSHIPS BETWEEN SOIL MATRIX COLOR AND THE CONCENTRATION OF SOC, SOIL CARBONATE ( $\text{CaCO}_3$ ), IRON (Fe), AND MANGANESE (Mn) TO DETERMINE IF THESE CONCENTRATIONS CAN BE DETERMINED IN THE FIELD BASED ON OBSERVED SOIL COLOR. THESE CHEMICAL CONSTITUENTS WERE CHOSEN SINCE THEY ARE KNOWN TO GENERALLY HAVE STRONG INFLUENCES ON SOIL COLOR. SOILS WERE SAMPLED FROM THE NATIONAL SCIENCE FOUNDATION-FUNDED NATIONAL ECOLOGICAL OBSERVATORY NETWORK (NEON) MEGAPIT SITES NATIONWIDE BY THE US DEPARTMENT OF AGRICULTURE-NATURAL RESOURCES CONSERVATION SERVICE (USDA-NRCS), DESCRIBED IN THE FIELD, AND ANALYZED IN THE LABORATORY FOR STANDARD SOIL PHYSICAL, CHEMICAL, AND MINERALOGICAL ANALYSIS. SOIL MATRIX COLOR WAS RECORDED IN MUNSELL NOTATION. SOIL LAB DATA AND FIELD PEDON DESCRIPTIONS WERE PAINSTAKINGLY MERGED BY HAND INTO ONE DATASET. MUNSELL COLOR DATA WERE CONVERTED TO RGB VALUES AND REGRESSED AGAINST CHEMICAL CONSTITUENT INFORMATION IN R. THE FINDINGS AND IMPLICATIONS FROM THIS STUDY WILL BE PRESENTED.

10:00 AM-11:00AM

### **MARK NGUYEN, PHYSICS**

FACULTY MENTOR: ROYA ZANDI, DEPARTMENT OF PHYSICS AND ASTRONOMY

#### **EXAMINATION OF THE ASSEMBLY AND DISASSEMBLY OF THE COWPEA CHLOROTIC MOTTLE VIRUS (CCMV)**

MODERN MEDICAL SCIENCE POSSESSES A LIMITED ARRAY OF MOLECULAR TECHNIQUES TO DELIVER THERAPEUTIC AGENTS INTO THE BODY. BY UNDERSTANDING THE PHYSICAL PHENOMENA BEHIND THE ASSEMBLY AND DISASSEMBLY OF VIRAL SHELLS, WE WILL NOT ONLY REVOLUTIONIZE THE WAY PHARMACEUTICALS ARE EFFECTIVELY DISTRIBUTED INTO THE BODY, BUT ALSO BROADEN THE FIELD OF ARTIFICIAL ORGANELLES. IN A SERIES OF EXPERIMENTS, VAN HEST AND COLLABORATORS AT RADBOD UNIVERSITY IN THE NETHERLANDS CONSTRUCTED EMPTY CCMV CAPSIDS UNDER VARIOUS TEMPERATURES AND PH LEVELS. THESE CCMV CAPSIDS WERE CONSTRUCTED WITH THE DEVELOPMENT OF A



VARIANT OF THE CCMV CAPSID PROTEIN (CP), WHICH INVOLVED THE SUBSTITUTION OF THE POSITIVELY CHARGED NUCLEIC ACID BINDING DOMAIN AT THE N-TERMINUS OF CAPSID PROTEIN BY A SHORT ELASTIN-LIKE POLYPEPTIDE (ELP). THESE IMPORTANT EXPERIMENTS INDICATE THE PREFERRED CURVATURE BETWEEN PROTEIN SUBUNITS IS BASED ON THE VARIATION OF THE SOLUTION ENVIRONMENT. CLOSELY COLLABORATING WITH THIS GROUP, WE HAVE DEVELOPED A MODEL FOR THE DISASSEMBLY OF ONE STRUCTURE AND REASSEMBLY OF ANOTHER ONE AS A FUNCTION OF TIME. USING METHODS OF THEORETICAL PHYSICS, WE ARE INVESTIGATING WHAT CAUSES ONE SIZE OF CAPSID, WHICH IS STABLE AT PH 5 TO DISASSEMBLE AT PH 7 AND THEN TO REASSEMBLE TO FORM ANOTHER STRUCTURE AT PH 7.

10:00 AM-11:00AM

### **TAMMY NGUYEN, BIOCHEMISTRY**

FACULTY MENTOR: STEPHANIE DINGWALL, DEPARTMENT OF BIOCHEMISTRY

#### **UREA CYCLE REVIEW USING A CASE STUDY ON ORNITHINE TRANSCARBAMYLASE DEFICIENCY**

THE SUBJECT OF BIOCHEMISTRY HAS BEEN HISTORICALLY CHALLENGING TO MASTER AS THE DISCIPLINE BOASTS A NEED FOR THE APPLICATION OF THE MATERIAL BECAUSE IT BROADLY INTEGRATES BIOLOGY, CHEMISTRY, AND PHYSICS. BECAUSE THE STUDY OF BIOCHEMISTRY CAN BE EXTENSIVE, INTRODUCTORY COURSES TEND TO BE RIGOROUS AND CONTENT-HEAVY TO COVER FOUNDATIONAL TOPICS IN A REASONABLE AMOUNT OF TIME. CONSEQUENTLY, UNDERGRADUATE STUDENTS TEND TO FAVOR SURFACE-LEVEL MEMORIZATION OVER CRITICAL ANALYSIS, WHICH OFTEN RESULTS IN LESS RETENTION OF THE MATERIAL. THE GROWING PRACTICE OF CASE-BASED LEARNING (CBL) ACTIVITIES IN STEM UNDERGRADUATE CLASSES PROVIDES AN ACTIVE LEARNING APPROACH TO IMPROVING STUDENT LEARNING OUTCOMES. TO COMBAT SURFACE-LEVEL APPROACHES AND RAISE STUDENT RETENTION OF BIOCHEMICAL CONCEPTS, A CBL ACTIVITY WAS CREATED TO BE IMPLEMENTED IN THE HONORS DISCUSSION SECTIONS OF INTRODUCTORY BIOCHEMISTRY COURSES AT THE UNIVERSITY OF CALIFORNIA, RIVERSIDE (UCR). THIS CASE WILL BE SUBMITTED TO THE NATIONAL CENTER FOR CASE STUDY TEACHING IN SCIENCE (NCCSTS) AT THE UNIVERSITY AT BUFFALO, A REPOSITORY OF SCIENTIFIC CASE STUDIES ACCESSIBLE TO EDUCATIONAL INSTITUTIONS. AT UCR, THE 10-WEEK COURSE INTRODUCES NITROGEN METABOLISM AND THE UREA CYCLE AROUND WEEK 8. STUDENTS MAY FIND IT OVERWHELMING TO LEARN THE INTRICACIES OF THE UREA CYCLE AND DEEM THE TOPIC LESS IMPORTANT TO REVIEW THAN PRIOR MATERIAL. THROUGH THE CREATION OF A CBL ACTIVITY, THE PURPOSE OF THIS PROJECT IS TO GIVE INSTRUCTORS AN ACTIVE LEARNING APPROACH THAT REINFORCES STUDENT RETENTION OF BIOCHEMICAL CONCEPTS. IN THIS CASE, THE ACTIVITY FOCUSES ON THE UREA CYCLE AND THE MEDICAL CONSEQUENCES WHEN ENZYME ORNITHINE TRANSCARBAMOYLASE IS DYSFUNCTIONAL.

10:00 AM-11:00AM

### **JADE DUONG, THEATER, FILM, DIGITAL PRODUCTION**

FACULTY MENTOR: BELLA MERLIN, DEPARTMENT OF THEATER, FILM, DIGITAL PRODUCTION

#### **WHY ZOOM ACTING HAS THE POTENTIAL TO STAY**

WHILE I WAS ABLE TO WORK ON SHE KILLS MONSTERS: VIRTUAL REALMS, I LEARNED TO NOT ONLY WORK WITH MY LITERAL SURROUNDINGS BUT FIGURE OUT HOW TO ENHANCE A THEATER PERFORMANCE THROUGH THE LIMITED SPACE OF A SCREEN. WHILE ZOOM ACTING IS A TEMPORARY HOLD ON LIVE ACTING DURING COVID, MY RESEARCH FOCUSES ON ZOOM ACTING AS A SPECIFIC PERFORMANCE STYLE THAT



HOLDS VALUABLE LESSONS THAT CANNOT BE LEARNED WITH OTHER FORMS OF ACTING. ONSTAGE AND FILM-SET ACTING BOTH HOLD UNIQUE TRAITS THAT TAKE TIME AND SKILL TO MASTER. THE IMMEDIACY OF ZOOM ACTING IS VERY SIMILAR TO THE WORLD OF LIVE-STREAMING; HOWEVER, ALONG WITH HAVING A RELATIONSHIP WITH THE CAMERA, ZOOM ACTING COMES WITH EMBODYING A SCRIPT AND CONNECTING TO SCENE PARTNERS THROUGH THE SCREEN. SCRIPTS THAT TAKE PLACE IN OUTDOOR SETTINGS MAY NOT BE VIABLE FOR THE FUTURE OF ZOOM ACTING, BUT GIVEN HOW ENGULFED THE MODERN GENERATION IS WITH LEAVING AN ONLINE FOOTPRINT, SCRIPTS THAT VITALIZE CHARACTERS USING FACETIME OR ZOOM CAN START A GENRE OF THEIR OWN, HENCE MY RESEARCH.

THE SCRIPT FOR SKM:VR WAS WRITTEN FOR ZOOM; THE CHARACTERS TELL THE STORY THROUGH GOING IN AND OUT OF CHAT ROOMS, AS WELL AS USING THEIR PHYSICAL ENVIRONMENT. ACTORS ALSO CHANGED THEIR BEDROOMS TO FIT THE CHARACTERS THEY PLAYED, AND PERSONALLY, THAT WAS AN INTIMATE WAY FOR ME TO TRULY BECOME MY CHARACTER. LIVING IN AGNES' BEDROOM FOR A MONTH, I HAVE NEVER

10:00 AM-11:00AM

#### EVAN KAM, POLITICAL SCIENCE: LAW & SOCIETY

FACULTY MENTOR: STUART KRIEGER, DEPARTMENT OF THEATRE, FILM, AND DIGITAL PRODUCTION

ANIMATION- BELLRINGER: ANIMATED SHORT

ANIMATION. IT'S AN ART MEDIUM THAT REVOLVES AROUND COMBINING MULTIPLE IMAGES TO CREATE THE ILLUSION OF MOVEMENT. SUCH MOVEMENT CAN GENERATE A LIFE OF ITS OWN, ENTERTAINING AND ENAMORING ALL OF US. AND YET, THIS ENCAPTIVATING VISUAL ART IS ALL DONE BY HUMANS THROUGH SHEER INGENUITY AND EXPERIMENTATION. I'VE BEEN ENTHRALLED BY THIS FORM OF ART, WANTING TO LEARN BUT NEVER KNOWING HOW OR THINKING I COULD DO IT. BUT, UPON LEARNING HOW WE'RE IN AN AGE WHERE INFORMATION IS AVAILABLE FREELY TO ALMOST ANYONE AND EVERYONE CAN LEARN THROUGH THEIR OWN SHEER PASSION AND CURIOSITY, I DECIDED TO LEARN HOW TO DO THE THING I WANT TO DO. THIS PROJECT AIMS TO TELL THE STORY OF AN UNDERDOG WHO GRADUALLY GROWS TO BECOME BETTER AT WHAT THEY'RE PASSIONATE ABOUT WHILE ALSO REFLECTING MY OWN STORY OF GROWTH IN LEARNING ABOUT ANIMATION AND BECOMING BETTER AT IT. THE SHORT ANIMATION, WHICH I HAVE NAMED AS BELLRINGER, IS THE PRODUCT OF PURE EXPERIMENTATION AND SELF-EDUCATION IN PURSUIT OF BECOMING BETTER AT SOMETHING I'M PASSIONATE FOR OVER THE COURSE OF 2 YEARS, WHICH I HOPE WILL HELP INSPIRE YOU OR OTHERS WHO SEE THIS PROJECT TO INVEST YOURSELF INTO SOMETHING YOU LOVE ON YOUR OWN.

10:00 AM-11:00AM

#### FAUSTO RAMIREZ, BUSINESS ADMINISTRATION

FACULTY MENTORS: ILYA BROOKWELL, MEDIA AND CULTURAL STUDIES.

YOUTUBE: LET'S CREATE CONTENT!

YOUTUBE IS A PLATFORM THAT HAS GROWN EXPONENTIALLY SINCE 2005, TO THE POINT WHERE A LOT OF PEOPLE ARE AWARE OF THE EXISTENCE OF THIS WEBSITE AND USE IT TO CREATE AND/OR CONSUME CONTENT FOR A VARIETY OF PURPOSES. CREATING AUDIOVISUAL CONTENT IS AN ART THAT REQUIRES EFFORT. YOUTUBE ALLOWS ANY PERSON TO CREATE SOMETHING AND EXPRESS AN IDEA OR SHOW A

MESSAGE. THE PURPOSE OF THIS CREATIVE PROJECT IS TO SHOW THE EDITING, RECORDING, AND PLANNING PROCESS INVOLVED IN THE CREATION OF A VIDEO TO DEMONSTRATE THE PROCESS BEHIND CONTENT CREATION. IN MY EXPERIENCE I HAVE COME ACROSS PEOPLE WHO TEND TO THINK THAT VIDEO MAKING IS NOT SOMETHING WORTH IT AND IT IS A WASTE OF TIME, TO THE POINT THAT IT IS SOMETIMES RIDICULED AND NOT SUPPORTED. THE GOAL OF THIS PROJECT IS TO TRY TO CHANGE THAT PERSPECTIVE AS I PRODUCE A SERIES OF VIDEOS WITH DIFFERENT STYLES, SUCH AS FIRST-PERSON POINT OF VIEW, COMIC DUBS, AND SKITS. STATISTICS WILL BE USED TO SHOW EVIDENCE OF HOW IMPORTANT VIDEO-SHARING PLATFORMS HAVE BECOME. I WILL USE A VARIETY OF SOFTWARE PROGRAMS SUCH AS ADOBE PROGRAMS AND AUDACITY AUDIO EDITOR TO ENSURE GOOD QUALITY VIDEO, RESULTING IN A WELL-STRUCTURED PROJECT. FINALLY, TO OBTAIN EXPERIENCE AND LESSONS FROM EXPERTS, I WILL USE LINKEDIN LEARNING TO GET A SCHOLAR PERSPECTIVE IN AUDIO AND VIDEO EDITING, VIDEO LOGS WILL NARRATE MY RECORDING AND EDITING PROCESS IN DETAIL, AND I WILL USE AN AUTOETHNOGRAPHIC APPROACH FOR THIS RESEARCH.

10:00 AM-11:00AM

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**ANDREW MARTIN, PHILOSOPHY MAJOR**

FACULTY MENTOR: LUCA FERRERO, PHILOSOPHY DEPARTMENT

**CONTEMPORARY AGENCY IN CRITICAL CURRICULUM**

IN RECENT TIMES THERE HAS BEEN A GREAT DEAL OF EMPHASIS ON STUDENT AGENCY IN CURRICULUM, SPECIFICALLY FOCUSED ON EDUCATORS FOSTERING POLITICAL AND SOCIAL AGENCY WITHIN STUDENTS. WHILE THESE FACTORS ARE VITAL TO A STUDENT'S ABILITY TO DELIBERATE ON AND ACT WITHIN THE CLASSROOM AND WORLD OUTSIDE, THERE IS RELATIVELY LITTLE WORK DONE IN CONNECTING CONTEMPORARY WORK IN PHILOSOPHY OF ACTION TO THE THEORETICAL UNDERPINNINGS OF AGENCY CURRICULUM STUDIES. IN MY WORK I WILL BE EXPLORING WHY IT IS THAT WORK IN THE PHILOSOPHY OF ACTION CAN AND SHOULD BE MORE DIRECTLY ASSOCIATED WITH HOW AGENCY THEORY IS UNDERSTOOD AND PURSUED THROUGH CURRICULUM.

I WILL START BY OUTLINING HOW PHILOSOPHY OF ACTION CAN BE UNDERSTOOD AS RELEVANT TO ISSUES OF AGENCY BY WAY OF DELIBERATION AND INTENTIONAL ACTION. I WILL THEN MOVE ON TO MATTERS OF POLITICAL AND SOCIAL AGENCY, ARGUING THAT THEY ARE GROUNDED IN AN INDIVIDUAL'S PRELIMINARY UNDERSTANDING AND CAPACITY FOR INTENTIONAL ACTION; AS SUCH A STUDENT MUST FIRST DEVELOP AN UNDERSTANDING OF AGENCY AS INTENTIONAL ACTION BUILT OUT OF DELIBERATION.

FINALLY, I WILL HIGHLIGHT RECENT WORK AND GUIDELINES DEVELOPED IN THE PHILOSOPHY OF GAMES AND CRITICAL CURRICULUM STUDIES. THESE GUIDELINES WILL BE USED TO EXPLORE SEVERAL DIFFERENT THEORETICAL APPROACHES TO AGENCY WITHIN CURRICULUM, WHICH WILL CULMINATE IN AN ARGUMENT FOR ADDITIONAL GUIDELINES THAT ARE BUILT OUT OF CONTEMPORARY WORK DONE IN THE PHILOSOPHY OF ACTION.

11:15 AM - 12:15 PM

**ELADIO GONZALEZ CABRERA, SPANISH AND SUSTAINABILITY STUDIES**

FACULTY MENTOR: XOCHITL CHAVEZ, DEPARTMENT OF MUSIC

BAYUNCAS/OS/E/X, PERO BIEN GUERRILLEROS: THE SALVADORAN DIASPORA'S CULTURAL MEMORY, NAHUAT LANGUAGE RECLAMATION/REVITALIZATION, AND LINGUISTIC OPPRESSION AT UCR

IN MY RESEARCH, I EXPLORE HOW THE SALVADORAN DIASPORA IN THE UNITED STATES RECLAIMS THEIR CULTURAL AND LINGUISTIC IDENTITIES AS A FORM OF RESISTANCE TO LINGUISTIC HIERARCHIES, CULTURAL HEGEMONIES, AND THE NOTION OF A SINGLE LATINIDAD. MY INTENDED METHODOLOGY IS ETHNOGRAPHIC RESEARCH INTERVIEWS VIA ZOOM WITH STUDENTS, FACULTY, AND COMMUNITY MEMBERS OF UCR THAT IDENTIFY AS SALVADORAN. THE SAMPLE GROUP WILL CONSIST OF ABOUT 30 PARTICIPANTS FROM AGES 18-70+, AND THE INTERVIEW WILL BE ABOUT 60-90 MINUTES. EACH PARTICIPANT WILL ANSWER OPEN-ENDED GUIDED QUESTIONS RELATED TO CULTURE, LANGUAGE, AND ANECDOTAL MEMORIES. EACH PARTICIPANT INTERVIEW WILL PROVIDE ME WITH A BETTER UNDERSTANDING OF HOW SALVADORANS NAVIGATE SPACES IN HIGHER EDUCATION. I HYPOTHEZIZE THAT INTERVIEWEES WILL LEAD THE RESEARCH TO EXPLORE HOW ACCENTS, SLANG, AND INDIGENOUS LANGUAGE RECLAMATION CONNECT TO IDENTITY FORMATION, LANGUAGE SHAMING, AND OVERALL LINGUISTIC OPPRESSION.

11:15 AM - 12:15 PM

**AMAHYRANI PINA, PSYCHOLOGY; YVETTE CHEN, MARI HAYASHI**

FACULTY MENTOR: AARON SEITZ, DEPARTMENT OF PSYCHOLOGY

SAVING MEMO: TOWARDS AN ECOLOGICALLY VALID TEST OF WORKING MEMORY.

HOW DOES THE USE OF WORKING MEMORY (WM) — THE TEMPORARY STORAGE OF INFORMATION WHILE THAT INFORMATION IS BEING USED — DIFFER BETWEEN LABORATORY MEASURES AND HOW WM IS USED IN REAL WORLD SITUATIONS? IN OCCUPATIONAL THERAPY (OT), UNIVERSAL DAY TO DAY ACTIVITIES SUCH AS BUYING GROCERIES ARE OFTEN USED AS A MARKER FOR PATIENTS' COGNITIVE STATUS AFTER A BRAIN INJURY; HOWEVER, THE DATA ACQUIRED IS OFTEN QUALITATIVE. COGNITIVE NEUROPSYCHOLOGICAL TASKS SOLVE THIS PROBLEM BY PROVIDING QUANTITATIVE MEASUREMENTS BUT USE ARTIFICIAL QUESTIONS THAT MIGHT NOT RELATE TO THE REAL WORLD. COMPUTERIZED ASSESSMENTS INTRODUCE ADAPTIVE METHODS THAT CAN BE EVEN MORE SENSITIVE, BUT ALSO DIFFER FROM HOW WORKING MEMORY IS USED IN ECOLOGICAL CONDITIONS. HOW CAN WE BRIDGE THIS GAP AND GET THE BEST OF BOTH OT AND SENSITIVE MEASUREMENTS OF COMPUTERIZED SYSTEMS? HERE PRESENT ON A NOVEL APP CALLED "SAVING MEMO" WHERE PEOPLE ARE PRESENTED WITH SCENARIOS WHERE PARTICIPANTS CHOOSE HOW MUCH INFORMATION THAT THEY WANT TO KEEP IN WORKING MEMORY AS THEY PERFORM TASKS. THIS WILL BE COMPARED TO STANDARD TASKS WHERE THE MEMORY LOAD IS DETERMINED BY THE EXPERIMENTAL PROCEDURES. WE HAVE DEVELOPED FOUR TASKS WHERE PARTICIPANTS MEMORIZE SHOPPING LISTS BEFORE GOING THROUGH A VIRTUAL SUPERMARKET, TELEPHONE NUMBERS TO CONTACT AFTERWARDS, THE ORDER IN WHICH TO SORT PACKAGES, AND DELIVERY ORDER DESTINATIONS. WE WILL PRESENT THE APP, THE APP DEVELOPMENT PROCESS, AND PRELIMINARY DATA.

11:15 AM - 12:15 PM



**JACOB RIOS, BUSINESS ADMINISTRATION WITH A CONCENTRATION IN MANAGEMENT**

FACULTY MENTOR: ELAINE WONG, BUSINESS MANAGEMENT

**SERVANT LEADERSHIP'S ROLE IN A REMOTE WORK ENVIRONMENT**

WITH LARGE ORGANIZATIONS SUCH AS SALESFORCE, SPOTIFY, AND STATE FARM TRANSITING TO AN OPTIONAL RETURN TO IN-PERSON WORK, THE VIRTUAL WORK ENVIRONMENT APPEARS TO BE HERE TO STAY. CURRENT CHALLENGES ASSOCIATED WITH VIRTUAL WORK INCLUDE DECREASED EMPLOYEE ENGAGEMENT, DECREASED SENSE OF COMMUNITY, AND INCREASED MENTAL HEALTH ISSUES IN EMPLOYEES ESPECIALLY IN MINORITY GROUPS. THIS BEGS THE QUESTION OF WHAT KIND OF LEADERSHIP IS HELPFUL FOR EMPLOYEE WELL-BEING, HEALTH, AND PERFORMANCE IN A VIRTUAL ENVIRONMENT? TO ADDRESS THIS QUESTION WE CONSIDER WHETHER SERVANT LEADERS ARE BEST EQUIPPED TO FACE THE UNIQUE CHALLENGES THAT COME WITH A VIRTUAL ENVIRONMENT. SERVANT LEADERS BRING A SET OF UNIQUE CHARACTERISTICS THAT PRIMARILY FOCUS ON THE EMPLOYEE AND THEIR WELL-BEING. WITH A PRIORITY TO LISTEN BEFORE SPEAKING AND THE ABILITY TO FACILITATE EMOTIONAL HEALING, SERVANT LEADERS HELP CREATE A WORK ENVIRONMENT WHERE EMPLOYEES FEEL APPRECIATED AND EMPOWERED. WE PREDICT THAT THESE SERVANT LEADERSHIP ATTRIBUTES ENCOURAGE EMPLOYEES TO FEEL MORE INVOLVED WITHIN THE ORGANIZATION LEADING TO A HIGHER LEVEL OF INDIVIDUAL ENGAGEMENT AND OTHER BENEFITS WHICH ARE EXPECTED TO COMBAT THE CHALLENGES EMPLOYEES ARE CURRENTLY FACING IN THIS REMOTE ENVIRONMENT. WE ARE TESTING THIS PREDICTION IN A SURVEY OF 100 PARTICIPANTS WHO ARE ALUMNI MEMBERS OF A PROFESSIONAL ORGANIZATION. WE EXPECT TO FIND THAT PARTICIPANTS WHOSE LEADERS SCORED HIGHER ON SERVANT LEADERSHIP HAVE A HIGHER LEVEL OF EMPLOYEE ENGAGEMENT, WELLBEING, AND PERFORMANCE WHILE CONDUCTING VIRTUAL WORK AS COMPARED TO THOSE WHOSE LEADERS SCORED LOWER ON SERVANT LEADERSHIP. THESE RESULTS HAVE IMPLICATIONS FOR MANAGING EMPLOYEES DURING REMOTE WORK.

11:15 AM - 12:15 PM

**ANABELLE WRIGHT, BIOENGINEERING; DANY DOUEIRI**

FACULTY MENTOR: HEIDI WALTZ, DEPARTMENT OF COMPARATIVE LITERATURE AND LANGUAGES

**DEVELOPMENT OF A LEBANESE ARABIC LEARNING GRAMMAR USING TRADITIONAL FOLK SONGS**

DUE TO THE WAR, SOCIAL UNREST, INFLATION, AND SCARCITY THAT HAS BOMBARDED LEBANON OVER THE PAST 45 YEARS, MILLIONS OF LEBANESE PEOPLE AND THEIR DESCENDANTS ARE NOW LIVING IN DIASPORA. AS A RESULT OF THE LACK OF RESOURCES FOR LEARNING THE SPOKEN LEBANESE ARABIC VARIANT, MARRIAGE WITH NON-ARABIC SPEAKING INDIVIDUALS, AND EFFORTS TO ASSIMILATION TO AMERICAN CULTURE, THERE HAVE BEEN MANY LEBANESE EMIGRANTS WHO HAVE BEEN UNSUCCESSFUL IN PASSING DOWN THEIR HERITAGE LANGUAGE TO THEIR CHILDREN, RESULTING IN LOSS OF THE LANGUAGE, OSTRACIZATION, AND DISCONNECTION FROM THE KNOWLEDGE AND FAMILY LORE USUALLY PASSED DOWN BY ARABIC-ONLY SPEAKING ELDERS TO THEIR GRANDCHILDREN.

IN AN EFFORT TO AMEND THIS, I WILL BE CREATING AN ONLINE TEACHING RESOURCE THAT TAKES ADVANTAGE OF THE VOCABULARY, GRAMMAR, AND CULTURAL LESSONS CONTAINED WITHIN TRADITIONAL LEBANESE FOLK SONGS SUNG IN DIALECTS THAT ARE SPOKEN IN AND AROUND THE CAPITAL OF BEIRUT. THIS RESOURCE WILL APPLY LESSONS LEARNED FROM THE PAST TEACHING OF OTHER SPOKEN LANGUAGES IN ORDER TO SUCCESSFULLY CONVEY THE INTRICACIES OF THE LANGUAGE AND BE MADE FREELY ACCESSIBLE IN ORDER TO REACH THE MAXIMUM NUMBER OF PEOPLE. IN DOING THIS, I HOPE TO CONTRIBUTE TO THE EXISTING YET SCARCE BODY OF TEACHING RESOURCES ALREADY AVAILABLE BY PROVIDING A NEW TEACHING TOOL THAT CATERS SPECIFICALLY TO ADULT AND YOUNG ADULT HERITAGE LANGUAGE

LEARNERS IN A WAY THAT NOT ONLY TEACHES THEM BASIC VOCABULARY AND GRAMMAR BUT ALSO THE CULTURE AND COLLOQUIALISMS THAT ARE OFTEN OVERLOOKED BY OTHER RESOURCES.

11:15 AM - 12:15 PM

**AYESHA SAMAR, NEUROSCIENCE; TAYLOR MARTIN DEL CAMPO**

FACULTY MENTOR: MEGAN ROBBINS, DEPARTMENT OF PSYCHOLOGY

ASSOCIATION BETWEEN DEMOGRAPHIC VARIABLES AND ENGAGEMENT IN POSITIVE REFRAMING DURING THE COVID-19 PANDEMIC AND BLACK LIVES MATTER MOVEMENT

THIS POSTER EXAMINES HOW PEOPLE POSITIVELY REFRAME CHALLENGING EXPERIENCES ASSOCIATED WITH THE COVID-19 PANDEMIC AND BLACK LIVES MATTER (BLM) MOVEMENT AND EXPLORES WHICH DEMOGRAPHIC VARIABLES ARE ASSOCIATED WITH ENGAGEMENT IN POSITIVE REFRAMING. THIS STUDY HAD TWO GOALS. THE FIRST GOAL WAS TO EXPLORE THE FREQUENCY OF ENGAGEMENT IN THREE TYPES OF POSITIVE REFRAMING INCLUDING GROWTH, NEW OPPORTUNITIES, AND STRENGTHENED RELATIONSHIPS. THE SECOND GOAL WAS TO ANALYZE THE ASSOCIATION BETWEEN DEMOGRAPHIC VARIABLES (GENDER, INCOME, EMPLOYMENT AND PARENTAL STATUS) AND ENGAGEMENT IN POSITIVE REFRAMING. FORTY PARTICIPANTS WERE ASKED TO RESPOND TO A QUESTION ABOUT THEIR EXPERIENCES DURING COVID-19 AND THE BLM MOVEMENT. RESPONSES WERE INDEPENDENTLY ANALYZED BY FOUR CODERS. STUDY HYPOTHESES WERE TESTED USING DESCRIPTIVE DATA ANALYSIS. RESULTS INDICATED THAT 22 PARTICIPANTS (55%) ENGAGED IN POSITIVE REFRAMING. THE MOST COMMON WAY PARTICIPANTS POSITIVELY REFRAMED WAS THROUGH REALIZING NEW OPPORTUNITIES. WOMEN AND PARTICIPANTS WITH MIDDLE TO HIGH INCOME LEVELS WERE MORE LIKELY TO ENGAGE IN POSITIVE REFRAMING RELATIVE TO MEN AND THOSE WITH LOW-INCOME LEVELS. PEOPLE WHO DID NOT HAVE A CHANGE IN INCOME POSITIVELY REFRAMED MORE THAN THOSE WHO HAD A CHANGE IN THEIR INCOME. EMPLOYED PARTICIPANTS POSITIVELY REFRAMED MORE THAN UNEMPLOYED PARTICIPANTS. LASTLY, PARTICIPANTS WITH CHILDREN POSITIVELY REFRAMED MORE THAN PARTICIPANTS WITHOUT CHILDREN. THESE RESULTS PROVIDE INSIGHT INTO HOW DEMOGRAPHIC VARIABLES PREDICT ONE'S ABILITY TO COPE (VIA POSITIVE REFRAMING) WITH THE COVID-19 PANDEMIC AND BLM MOVEMENT. FUTURE RESEARCH SHOULD EXPLORE THE MECHANISMS THROUGH WHICH THESE VARIABLES INFLUENCE ONE'S ABILITY TO ENGAGE IN POSITIVE REFRAMING.

11:15 AM - 12:15 PM

**JENIFER MEDINA, ANTHROPOLOGY**

FACULTY MENTOR: KATJA GUENTHER, GENDER AND SEXUALITY STUDIES

EXPLORING PARTICIPANT DIVERSITY WITHIN THE US PERMACULTURE MOVEMENT

FOLLOWING ITS INCEPTION IN THE LATE 1970S AND TRANSNATIONAL EMERGENCE, THE CONCEPT OF PERMACULTURE INSPIRED INDIVIDUALS TO TRANSITION AWAY FROM RELIANCE ON INTENSIVE AGRICULTURAL PRODUCTIVITY TOWARD FOOD SOVEREIGNTY AND SELF-SUFFICIENCY THROUGH SUSTAINABLE AGRICULTURAL AND SETTLEMENT PRACTICES. IN MY PRELIMINARY RESEARCH, I HAVE OBSERVED THAT PERMACULTURE IS BOTH AN IDEOLOGY AND A SET OF DESIGN PRINCIPLES, AND THAT IT EMBODIES A FORM OF ENVIRONMENTAL ACTIVISM AS

PART OF A MOVEMENT THAT ADVOCATES FOR HOLISTIC LIFESTYLE CHANGE IN ORDER TO SECURE INTERGENERATIONAL RIGHTS TO NUTRITIOUS FOOD AND AN ECOLOGICALLY HEALTHY ENVIRONMENT AMIDST ANTHROPOGENIC CLIMATE CHANGE. HOWEVER, THIS RESEARCH RECOGNIZES THAT THERE ARE ACCESSIBILITY ISSUES IN ENGAGING WITH PERMACULTURE. THIS IS EVIDENCED BY A LACK OF DIVERSE GENDER AND RACIAL REPRESENTATIONS OF PARTICIPANTS ONLINE. FURTHER, PREVIOUS RESEARCH HAS FOUND THAT MIDDLE-CLASS WHITE MEN FORM A SOCIO-DEMOGRAPHIC SUPERMAJORITY AMONG PRACTICING PERMACULTURISTS IN THE US (FERGUSON AND LOVELL, 2015). UTILIZING QUALITATIVE INTERVIEWS, THIS PROJECT AIMS TO BRING FORTH ETHNICALLY AND RACIALLY DIVERSE EXPERIENCES IN THE PERMACULTURE MOVEMENT FROM SELF-IDENTIFIED PERMACULTURISTS. THE RESEARCH CONTRIBUTES TO THE SPARSE ANTHROPOLOGICAL LITERATURE ON PERMACULTURE TO IMPROVE UNDERSTANDING OF THIS NOW-ESTABLISHED MOVEMENT. THE RESEARCH ALSO HELPS IDENTIFY BARRIERS AND GATEWAYS FOR BIPOC INTERESTED IN PERMACULTURE, AND HOW THE PERMACULTURE MOVEMENT CAN BETTER SUPPORT THEIR SUCCESS IN BECOMING SELF-SUFFICIENT AND INVOLVED IN ACTIVISM AND ENVIRONMENTAL EFFORTS.

11:15 AM - 12:15 PM

### **SUSY MORALES BENITEZ, SOCIOLOGY**

FACULTY MENTOR: JENNIFER NÁJERA, ETHNIC STUDIES

#### **EXAMINING UNDOCUMENTED MEXICAN PARENTS' K-5TH GRADE EDUCATIONAL INVOLVEMENT**

PREVIOUS DISCOURSE ON UNDOCUMENTED PEOPLE TENDS TO FOCUS ON THE LIMITATIONS OF THEIR STATUS, WHICH RESULTS IN THE IDEA THAT UNDOCUMENTED PEOPLE ARE INHERENTLY AT A DEFICIT AND ARE POWERLESS. THIS PROJECT, EXAMINING UNDOCUMENTED MEXICAN PARENTS' K-5TH GRADE EDUCATIONAL INVOLVEMENT CHALLENGES THOSE NOTIONS BY EXAMINING HOW UNDOCUMENTED PARENTS OF MEXICAN ORIGIN EXPERIENCE AND AFFECT THEIR CHILDREN'S PUBLIC SCHOOLING. I EMPLOY AN ASSET-BASED APPROACH THROUGH THE APPLICATION OF YOSSO'S THEORY OF COMMUNITY CULTURAL WEALTH (2005), WHICH VALIDATES MARGINALIZED COMMUNITIES' EXPERIENTIAL KNOWLEDGE IN NAVIGATING RACIST SOCIAL STRUCTURES. MY RESEARCH WILL BE BASED ON ETHNOGRAPHIC INTERVIEWS I WILL CONDUCT IN THE SUMMER OF 2021 WITH 7-10 SELF-IDENTIFIED UNDOCUMENTED PARENTS OF MEXICAN ORIGIN WHO ARE BETWEEN THE AGES OF 25-45. THEIR COUNTER STORIES WILL GIVE INSIGHT INTO HOW THEY APPLY THEIR EXPERIENTIAL CAPITAL TO HELP THEIR CHILD/CHILDREN NAVIGATE ELEMENTARY SCHOOL DESPITE CHALLENGES SUCH AS LOW-INCOME HOUSEHOLDS, LANGUAGE BARRIERS, AND TIME SCHEDULES. THIS PROJECT PRESENTS A COUNTER-NARRATIVE THAT CHALLENGES STEREOTYPES OF HOW UNDOCUMENTED PARENTS OF MEXICAN ORIGIN CARE AND SUPPORT THEIR CHILDREN'S EDUCATION BY ACKNOWLEDGING VARYING LEVELS OF EDUCATIONAL INVOLVEMENT. MY FINDINGS WILL UNDERScore WHAT EDUCATORS AND SYSTEMS OF EDUCATION NEED TO DO TO INTENTIONALLY SERVE UNDOCUMENTED PARENTS OF MEXICAN ORIGIN.

11:15 AM - 12:15 PM

### **KATHLEEN FONG, ENVIRONMENTAL SCIENCES**

FACULTY MENTOR: WILLIAM PORTER, ENVIRONMENTAL SCIENCES

#### **WAREHOUSES, DELIVERIES, AND HUMAN HEALTH: AN INVESTIGATION OF THE ENVIRONMENTAL JUSTICE IMPLICATIONS OF SAN BERNARDINO WAREHOUSE PROLIFERATION**



ECOMMERCE HAS BOOMED IN THE PAST DECADE, RESULTING IN AN INCREASED DEMAND FOR ASSOCIATED WAREHOUSE STORAGE AND OTHER SHIPPING INFRASTRUCTURE. IN RECENT YEARS, LAND DEDICATED TO WAREHOUSE ACTIVITIES IN AREAS SUCH AS SAN BERNARDINO HAS INCREASED TO ADDRESS THE NEEDS OF THIS GROWING ECOMMERCE MARKET. HOWEVER, INCREASING WAREHOUSE ACTIVITIES IN LOW-INCOME RESIDENTIAL AREAS CAN ALSO BRING NEGATIVE SIDE-EFFECTS, INCLUDING INCREASED TRAFFIC AND POLLUTANT EMISSIONS ASSOCIATED WITH SHIPPING AND STORAGE. THESE CONSEQUENCES OF ONGOING DEVELOPMENT HAVE PUBLIC HEALTH AND ENVIRONMENTAL JUSTICE RAMIFICATIONS, AS THEY ADD INCREASED HEALTH BURDENS ON ALREADY VULNERABLE POPULATIONS, WHO IN TURN HAVE LITTLE OR NO INPUT ON THE WAREHOUSE SITING DECISIONS THAT LED TO THESE CONSEQUENCES. HERE WE EXPLORE SPATIOTEMPORAL PATTERNS OF SAN BERNARDINO WAREHOUSE DENSITY IN RECENT DECADES, EXAMINE HOW THESE CHANGES MAY CONTRIBUTE TO LOCAL TRAFFIC TRENDS, AND ESTIMATE THE POSSIBLE CONTRIBUTION OF THESE CHANGES TO LOCAL AIR QUALITY AND AIR POLLUTION EXPOSURE.

11:15 AM - 12:15 PM

### HALEE SCOTT, CELL MOLECULAR AND DEVELOPMENTAL BIOLOGY

FACULTY MENTOR: JOSHUA MORGAN, DEPARTMENT OF BIOENGINEERING

#### MATHEMATICAL MODELING OF THE HIPPO SIGNALING PATHWAY USING ORDINARY DIFFERENTIAL EQUATIONS

WITH OUR EXPANDING KNOWLEDGE OF THE MOLECULAR INTERACTIONS UNDERLYING CELLULAR SIGNALING, THERE HAS BEEN AN INCREASING FOCUS ON DEVELOPING DETERMINISTIC COMPUTATIONAL MODELS OF CRITICAL SIGNALING PATHWAYS. PRIOR COMPUTATIONAL MODELS OF CELL SIGNALING HAVE DEPICTED THE INTERACTIONS FROM CELL SURFACE RECEPTORS TO CELLULAR EFFECTORS AS LINEAR CASCADES, ISOLATED FROM OTHER PATHWAYS. GROWING EXPERIMENTAL DATA DEMONSTRATES SIGNALING TO BE A COMPLEX NETWORK OF INTERACTING FACTORS WHICH WORK IN A CONTEXT DEPENDENT MANNER. SPECIFICALLY, THE HIPPO GROWTH CONTROL PATHWAY IS INTRICATELY REGULATED BY AND REGULATES OTHER SIGNALING SYSTEMS ORCHESTRATING A WIDE VARIETY OF CELLULAR RESPONSES. CURRENTLY, THERE ARE FEW MATHEMATICAL MODELS FOR THE HIPPO PATHWAY AND NONE INCLUDE THE CRITICAL CROSSTALK WITH OTHER PATHWAYS. IN OUR STUDY, WE DEVELOP A NOVEL DETERMINISTIC MODEL OF HIPPO SIGNALING AND CROSSTALK RELEVANT TO EPITHELIAL TO MESENCHYMAL TRANSITION (EMT). OUR MODEL TARGETS THE LOSS OF JUNCTIONAL STABILITY AND INCREASED F-ACTIN FORMATION TYPICAL OF MESENCHYMAL CELLS. OUR MODEL IS A SYSTEM OF ORDINARY DIFFERENTIAL EQUATIONS (ODEs) REPRESENTING HIPPO, TRANSFORMING GROWTH FACTOR- $\beta$ , AND ERK SIGNALING. THE MODEL IS SIMULATED USING MATLAB WITH OUTPUTS FOCUSING ON PATHWAY ACTIVATION. GOING FORWARD, WE WILL CONTINUE TO EXPAND THIS MODEL AND VALIDATE AGAINST EXPERIMENTAL REPRODUCTIONS OF EMT.

11:15 AM - 12:15 PM

### ISAIAH GRANT, DEPARTMENT OF BIOCHEMISTRY

FACULTY MENTOR: GREGOR BLAHA, DEPARTMENT OF BIOCHEMISTRY

#### CONSERVATION OF THE TRANSCRIPTION-TRANSLATION COUPLING COMPLEX IN BACILLUS SUBTILIS

BACTERIA CAN COUPLE THE TRANSCRIPTION WITH AND TRANSLATION, ALLOWING THE PROTEIN TO BE SYNTHESIZED WHILE THE RNA IS BEING

TRANSCRIBED. THIS MODEL OF CONCURRENT TRANSCRIPTION AND TRANSLATION HAS BEEN ASSUMED TO APPLY TO ALL BACTERIA. HOWEVER, A RECENTLY PUBLISHED PAPER CHALLENGES THIS PRECONCEIVED NOTION, CLAIMING THAT TRANSCRIPTION-TRANSLATION COUPLING IS ABSENT IN *BACILLUS SUBTILIS*. BECAUSE THE RATE OF RNA POLYMERASE (RNAP) SYNTHESIZING RNA IS FASTER THAN THE RATE OF RIBOSOMES SYNTHESIZING PROTEINS, THE POLYMERASE IS TOO FAR AHEAD OF THE RIBOSOME FOR COUPLING INTERACTIONS TO OCCUR. THE MAIN SUPPORT OF THIS RUNAWAY MODEL OF TRANSCRIPTION AND TRANSLATION IS BASED ON KINETIC DATA. IN MY PROJECT, I AIM TO EXAMINE THE POTENTIAL OF RNAP-RIBOSOME INTERACTIONS IN *B. SUBTILIS* FROM A STRUCTURAL PERSPECTIVE. USING AN *E. COLI* STRUCTURE OF A TRANSCRIBING RNAP IN COMPLEX WITH A TRANSLATING RIBOSOME AND BIOINFORMATICS TECHNIQUES, I CONSTRUCTED A MODEL OF THIS COMPLEX FOR *B. SUBTILIS*. THE PROTEIN STRUCTURES THAT WERE AVAILABLE FROM *B. SUBTILIS* WERE DIRECTLY ALIGNED TO THE CORRESPONDING STRUCTURES FROM *E. COLI*; THE UNAVAILABLE STRUCTURES WERE PREDICTED USING HOMOLOGY MODELING. ONCE THE COMPLEX IS CREATED, THE ACTIVE SITE RESIDUES WILL BE COMPARED WITH THOSE OF *E. COLI* TO SEE IF THIS COUPLING IS VIABLE IN *B. SUBTILIS*. BECAUSE THE PROTEINS INVOLVED IN THE INTERACTIONS ARE HIGHLY CONSERVED, I EXPECT MANY OF THE INTERACTIONS IN *E. COLI* WILL BE CONSERVED IN *B. SUBTILIS*. HOWEVER, SOME OF THE DOMAINS IN THE NUS PROTEINS ARE NOT CONSERVED, SO THIS MAY AFFECT WHETHER THE DIRECT INTERACTIONS BETWEEN RNAP AND RIBOSOMES ARE CONSERVED AND THEREFORE POSSIBLE IN *B. SUBTILIS*.

11:15 AM - 12:15 PM

#### **ASHLEY TRINIDAD, NEUROSCIENCE**

FACULTY MENTOR: WILLIAM PORTER, ENVIRONMENTAL SCIENCES

#### **COVID-19 IMPACTS ON POLLUTION IN SOUTHERN SCIENCES**

THE SUDDEN SHUTDOWN OF BUSINESSES, CANCELLATION OF EVENTS, AND STAY-AT-HOME ORDERS AT THE ONSET OF THE COVID-19 PANDEMIC CAUSED DRASTIC CHANGES IN MANY ANTHROPOGENIC ACTIVITIES, AS WELL AS IN THEIR ASSOCIATED ANTHROPOGENIC EMISSIONS OF GREENHOUSE GASES AND POLLUTANTS. THIS STUDY ANALYZES THE ATMOSPHERIC IMPACTS OF THE COVID-19 LOCKDOWN IN SOUTHERN CALIFORNIA, WITH A FOCUS ON SPATIOTEMPORAL DIFFERENCES IN POLLUTION AND POLLUTANT PRECURSORS. HERE WE ANALYZE OBSERVED SURFACE LEVELS OF OZONE (O<sub>3</sub>), PARTICULATE MATTER (PM<sub>2.5</sub> AND PM<sub>10</sub>), AND CARBON MONOXIDE (CO) BETWEEN THE YEARS 2015 AND 2020. TO ASSESS SPATIAL DIFFERENCES IN LOCKDOWN IMPACTS WE SELECTED EPA STATIONS LOCATED ACROSS SOUTHERN CALIFORNIA, COMPARING POLLUTANT LEVELS OBSERVED AT EACH STATION TO VALUES REPORTED IN PREVIOUS YEARS TO ASSESS AND INTERPRET DIFFERENCES AND SIMILARITIES.

11:15 AM - 12:15 PM

#### **HANNAH HYATT, THEATRE, FILM AND DIGITAL PRODUCTION**

FACULTY MENTOR: ANNIKA SPEER, THEATRE, FILM, AND DIGITAL PRODUCTION

'JESSIE'

JESSIE IS A MULTIMEDIA PRESENTATION THAT CREATIVELY RESPONDS TO ANNA DEAVERE SMITH'S APPROACH TO CAPTURING AND ADAPTING REAL LIFE STORIES FOR THE STAGE, TO CREATE REAL CHANGE FOR THE COMMUNITIES THESE STORIES CAME FROM. WITH MY RESEARCH I HAVE GOTTEN TO KNOW MY GRANDMOTHER IN A DEEPER WAY AND HAVE REFLECTED ON MY RELATIONSHIP WITH HER THROUGH VARIOUS MODES

OF ARTISTIC EXPRESSION. JESSIE EMPLOYS TECHNIQUES AND PRACTICES DEVELOPED BY THE ACCLAIMED PLAYWRIGHT AND ACTOR. THE MOST IMPORTANT BELIEF I'VE ADAPTED IS THE IMPORTANCE OF CENTERING THE PERSON BEING INTERVIEWED SO THAT THEY HAVE AUTONOMY AND CONTROL OVER THE BODY, VOICE, AND SPIRIT THAT THE FILM OR PLAY IS ATTEMPTING TO CAPTURE. AS A FILMMAKER COVID HAS FORCED ME TO ADAPT THE WAY IN WHICH I TELL STORIES, AND WHERE I FIND THEM; WITH THIS PROJECT I CHOSE TO LOOK INWARD, AT MY OWN FAMILY. MY GRANDMOTHER'S NARRATIVE IS ONE OF STRENGTH, RESILIENCY AND LOVE, AND I HAVE DEVELOPED THIS VISUAL STORY, WITH AND FOR HER USING BOTH CURRENT AND ARCHIVAL MEDIA BY USING A COMBINATION OF AUDIO, ANIMATION, FILM, AND MIXED MEDIA ART.

11:15 AM - 12:15 PM

### **DANNIEL MONROY, DANCE MAJOR.**

FACULTY MENTOR: LUIS LARA MALVACÍAS, DEPARTMENT OF DANCE

'TRIP\_ '

IN TRIP\_ I EXPLORE WHAT IT IS TO BE A DANCER, A CITIZEN AND A MIGRANT AND HOW THESE "ROLES" INTERACT AND CONFLICT WITH EACH OTHER DURING TIMES OF CRISIS AND CHANGE. THE CHOREOGRAPHY OF THE FILM TELLS THE STORY OF MY PEOPLE THROUGH HISTORY AND SPACE. SINCE I CAME TO THE USA ALMOST 7 YEARS AGO IT WAS FRUSTRATING NOT BEING ABLE TO COMMUNICATE COMPLEX IDEAS. WHEN YOU OPEN YOUR MOUTH AND SPEAK FROM YOUR HEART, AND ALL YOU HEAR IS A SOFT LAUGH AND THE CONSTANT QUESTIONS, "WAIT... WHAT DID YOU SAY? WHAT WAS THAT WORD? WHERE ARE YOU FROM?"

I REMEMBER HOW I WAS TAUGHT THE STORY OF HERNÁN CORTÉS AND I WONDERED HOW I WOULD HAVE FELT IF I HAD TO COME TO MÉXICO FROM SPAIN TO A WORLD WHERE EVERYONE WEARS DIFFERENT CLOTHES AND SPEAKS A DIFFERENT LANGUAGE. I IMAGINED WHAT IT WOULD BE TO TRAVEL BEFORE THE INTERNET, BEFORE PHONES AND EVEN BEFORE BOOKS WANDERING THROUGH A CROWDED SCHOOL BUT THIS TIME WITHOUT HEADPHONES OR A BACKPACK TO PROTECT ME. INSPIRED BY THIS AND OTHER IDEAS, THE FINAL WORK IS A MEDLEY OF IMAGES AND CONCEPTS RELATED TO LATINIDAD AND HERITAGE CONNECTED WITH EACH OTHER BY MY OWN PERSONAL EXPERIENCE.

THIS FILM IS THE RESULT OF NEARLY A YEAR OF RESEARCH IN ISOLATION DUE TO THE COVID-19 PANDEMIC, WHILE THE SCORE IS A SLOW DESCENT INTO MADNESS, A PLACE WE ARE MUCH COMFORTABLE.

11:15 AM - 12:15 PM

### **LILLYANNA LOPEZ, ACTING AND DIRECTING**

FACULTY MENTOR: BELLA MERLIN, THEATRE, FILM, AND DIGITAL PRODUCTION

THE SILENT SCENE: EFFECTS OF MUSIC ON THE MUTED ACTING WORLD VIA ZOOM

THE ONLINE PLATFORM, ZOOM, HAS BEEN WIDELY ACCEPTED AS A NEW REALM FOR CONNECTIVITY FOR THE PERFORMING ARTS. THIS PROJECT WILL INVESTIGATE HOW THE USE OF MUTE AND SOUND IN THE VIRTUAL ACTING WORLD EFFECTS THEATRE THROUGH THE ZOOM ENVIRONMENT. ACTORS WILL BE GIVEN THE SAME SYNOPSIS OF VARIOUS SCENES AT THE SAME TIME. ALL WILL HAVE NO GIVEN LINES AND WILL REMAIN MUTED THROUGHOUT THE RESEARCH. THE ACTORS WILL IMPROVISATIONALLY PERFORM WITH ACTIONS, FACIALS, AND BODY



LANGUAGE. ACTORS WILL HAVE FREEDOM OF THEIR IMAGINATIVE SPACES BESIDES WHAT INFORMATION HAS BEEN GIVEN TO THEM WHEN PERFORMING. ONCE THE ACTORS HAVE BEGUN THEIR INDIVIDUAL PERFORMANCES, DIVERSE TYPES OF MUSIC WILL BE PLAYED. THE SOUND OF THE MUSIC WILL BE HEARD BY ALL ACTORS AT THE SAME TIME AND WILL BE CHANGED PERIODICALLY AS SCENES PROGRESS. AS SOUND IS INTRODUCED TO THE PERFORMANCE, ACTORS MAY REACT AND CHANGE THEIR INTERPRETATION OF A SCENE OR REMAIN UNCHANGED. THIS RESEARCH WILL ANALYZE HOW A SCENE MAY BE CHANGED ORIGINALLY WITH THE USE OF SILENCE TO THE ADDITION OF MUSIC. SOUND IS ESSENTIAL IN PERFORMANCE, ESPECIALLY IN VIRTUAL SPACE IN WHICH IT CAN BE COMPLETELY AVOIDED WITH A MUTE BUTTON. EXPECTEDLY, PERFORMANCES AND INTERPRETATIONS WILL CHANGE WITH THE ADDITION OF SOUND TO A SCENE. EXCERPTS OF PERFORMANCES WITH BOTH SILENCE AND MUSIC WILL BE SHOWN AT THE SYMPOSIUM.

11:15 AM - 12:15 PM

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**ARIANA DIAZ, PSYCHOLOGY**

FACULTY MENTOR: JOHN FRANCHAK, DEPARTMENT OF PSYCHOLOGY

**LEARNING TO WALK CHANGES OPPORTUNITIES FOR LANGUAGE DEVELOPMENT**

LEARNING TO WALK DURING INFANCY IS CORRELATED WITH LARGER PRODUCTIVE AND RECEPTIVE VOCABULARY (WALLE & CAMPOS, 2013). HOWEVER, WALKING LIKELY DOES NOT DIRECTLY LEAD TO BETTER LANGUAGE SKILLS. RATHER, THE ABILITY TO WALK CHANGES HOW INFANTS INTERACT WITH AND EXPLORE THE WORLD. FOR EXAMPLE, UNLIKE CRAWLERS, WALKERS ARE ABLE TO USE THEIR HANDS TO CARRY AND RETRIEVE DISTANT OBJECTS AND OFTEN RECEIVE MORE COMPLEX VERBAL RESPONSES FROM CAREGIVERS WHEN INTERACTING WITH OBJECTS (KARASIK, TAMIS-LEMONDA, & ADOLPH, 2011; 2014). THE RELATIONSHIP BETWEEN WALKING AND LANGUAGE DEVELOPMENT MAY BE EXPLAINED BY THE INCREASED ABILITY TO INTERACT WITH OBJECTS. THIS STUDY AIMS TO TEST WHETHER LEARNING TO WALK INCREASES THE FREQUENCY OF OBJECT INTERACTION AND WHETHER THIS INCREASE IN OBJECT INTERACTION LEADS TO GREATER VOCABULARY SIZE. THIS STUDY TESTED 31 INFANTS FROM THE AGES OF 10-13 MONTHS. THE STUDY CONSISTED OF FOUR MONTHLY SESSIONS IN WHICH PARENTS OF THE PARTICIPANTS WERE SENT 40 AUTOMATED TEXT MESSAGE SURVEYS OVER A FOUR-DAY PERIOD FOR EACH SESSION. THE SURVEY PROMPTED THE PARENTS TO REPORT WHETHER THEIR INFANT WAS HOLDING AN OBJECT. PARENTS WERE ASKED TO REPORT SIGNIFICANT MOTOR MILESTONES SUCH AS THE AGE THEIR INFANT BEGAN TO CRAWL AND WALK. A LANGUAGE ASSESSMENT ASKED PARENTS TO REPORT THE NUMBER OF WORDS THEIR INFANT COULD UNDERSTAND AND PRODUCE. PRELIMINARY DATA INDICATES THAT THE AMOUNT OF WORDS INFANTS UNDERSTAND AT 13 MONTHS VARIES WIDELY, RANGING FROM 13 TO 395 WORDS ( $SD = 109.8$ ). ONGOING ANALYSES WILL DETERMINE IF LARGER RECEPTIVE VOCABULARIES ARE ASSOCIATED WITH EARLIER WALKING ONSET AND MORE FREQUENT MANUAL OBJECT INTERACTION. FREQUENT SAMPLING OF DATA CAN PROVIDE NEW INSIGHTS TO INFANTS' EVERYDAY EXPERIENCES.

1:00 PM - 2:00 PM

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**CHRISTINA RODRIGUEZ, PSYCHOLOGY**

FACULTY MENTOR: AARON SEITZ, PSYCHOLOGY

**THE EFFECTS OF PERCEIVED DISCRIMINATION ON COGNITIVE PERFORMANCE MEDIATED THROUGH SELF-EFFICACY**

MINORITY GROUPS ARE FORCED TO CONSISTENTLY COPE WITH DAILY DISCRIMINATORY STRESSORS AS A RESULT OF SYSTEMIC INJUSTICE. THE

ACCUMULATION OF THESE NEGATIVE EXPERIENCES CAN PLACE INDIVIDUALS WITHIN THESE GROUPS AT A DISADVANTAGE IN ALL ASPECTS OF LIFE. ONE FACET THAT OFTEN GOES UNDERLOOKED WHEN STUDYING THE EFFECTS OF DISCRIMINATION IS COGNITION. THIS PROJECT WILL LOOK AT THE INFLUENCE OF LONG- AND SHORT-TERM PERCEIVED RACIAL DISCRIMINATION ON EXECUTIVE FUNCTION PERFORMANCE IN COLLEGE STUDENTS. THE STUDY WILL ALSO LOOK AT HOW THE RELATIONSHIP BETWEEN PERCEIVED RACIAL DISCRIMINATION AND COGNITIVE PERFORMANCE IS MEDIATED BY SELF-EFFICACY. SUBJECTS WILL CONSIST OF UNDERGRADUATE STUDENTS AT UC RIVERSIDE AND UC IRVINE. THE STUDY WILL USE THE PERCEIVED DISCRIMINATION SCALE (WILLIAMS ET AL., 1997) TO MEASURE SUBJECTS' EXPERIENCES AND COMPUTERIZED EXECUTIVE FUNCTION TASKS TO MEASURE THEIR COGNITIVE PERFORMANCE. THE GENERAL SELF-EFFICACY SCALE (SCHWARZER & JERUSALEM, 1995) WILL BE USED TO MEASURE SELF-EFFICACY. COMPARING THE DATA COLLECTED FROM BOTH THE EXERCISES AND QUESTIONNAIRES, IT IS HYPOTHESIZED THAT THE HIGHER LEVEL OF PERCEIVED DISCRIMINATION, THE LOWER THE SUBJECT'S PERFORMANCE WILL BE ON THE COGNITIVE TASKS. A SECONDARY HYPOTHESIS WILL BE THAT THE LEVEL OF SELF-EFFICACY WILL MEDIATE THE RELATIONSHIP BETWEEN PERCEIVED DISCRIMINATION AND COGNITIVE PERFORMANCE. A TERTIARY HYPOTHESIS EXAMINES WHETHER COGNITIVE TRAINING CAN RAISE LEVELS OF POSITIVE SELF-EFFICACY IN SUBJECTS. THE ANTICIPATED RESULTS OF THE PROJECT WILL HOPEFULLY PROVIDE INSIGHT INTO THE EXTENT TO WHICH PERCEIVED DISCRIMINATION INFLUENCES INDIVIDUALS IN A COGNITIVE CONTEXT AND THUS GIVE WAY TO DEVELOP NEW FORMS OF TREATMENT FOR THOSE STRUGGLING TO COPE WITH THESE STRESSORS.

1:00 PM - 2:00 PM

#### **PUERNIMA QAMAR, PSYCHOLOGY**

FACULTY MENTOR: KALINA J. MICHALSKA, PSYCHOLOGY

#### **THE CONSEQUENCES OF CHILD EMPATHY AND PARENTAL NEGATIVE EMOTIONALITY ON ANXIETY IN LATINA GIRLS**

ALTHOUGH EMPATHY IS USUALLY SEEN AS A PROTECTIVE FACTOR FOR MENTAL HEALTH, ELEVATED EMOTIONAL RESPONSES TO OTHERS' DISTRESS CUES MAY SOMETIMES HAVE NEGATIVE REPERCUSSIONS FOR CHILDREN. FOR EXAMPLE, CHILDREN WITH ANXIETY MAY EXPERIENCE EXCESSIVE EMOTIONAL REACTIONS THAT CAN OR RESULT IN SELF-FOCUSED COMFORTING OR RUMINATION (ZAHN-WAXLER ET AL., 1999). BECAUSE GIRLS ARE AT AN ELEVATED RISK FOR ANXIETY (KESSLER ET AL., 2005) AND REPORT GREATER EMPATHY THAN BOYS (MICHALSKA ET AL., 2013), THEY ARE AN IMPORTANT POPULATION TO STUDY THE RELATIONSHIP BETWEEN THESE FACTORS. FURTHER, THE RELATIONSHIP BETWEEN ANXIETY AND EMPATHY MAY BE INFLUENCED BY OVEREXPOSURE TO PARENTS' NEGATIVE AFFECT (TONE & TULLY, 2014).

WE EXAMINE NEUROTICISM AND DEPRESSION IN PRIMARY CAREGIVERS AS MODERATING THE RELATIONSHIP BETWEEN ANXIETY AND EMPATHY IN LATINA GIRLS, A GROUP OFTEN OVERLOOKED IN THE DEVELOPMENTAL LITERATURE. FIFTY-NINE LATINA GIRLS (MAGE = 9.7 YEARS + 1.8) AND THEIR CAREGIVERS PARTICIPATED IN THE FIRST VISIT OF A LONGITUDINAL STUDY. GIRLS REPORTED ON THEIR ANXIETY AND EMPATHY LEVELS VIA THE SCREEN FOR CHILD ANXIETY RELATED DISORDERS (BIRMAHER ET AL. 1997) AND THE EMPATHY QUESTIONNAIRE (RIEFFE ET AL. 2010). CAREGIVERS' DEPRESSION AND NEUROTICISM WERE ASSESSED VIA SELF-REPORT ON THE BECK DEPRESSION INVENTORY (BECK 1961) AND THE BIG FIVE INVENTORY (JOHN ET AL., 1991). WE TEST THE INDEPENDENT AND INTERACTING INFLUENCES OF CHILD EMPATHY, PARENT DEPRESSION, AND PARENT NEUROTICISM ON CHILDREN'S ANXIETY SYMPTOMS WITH MULTIPLE LINEAR REGRESSION. THIS STUDY MAY INFORM INTERVENTIONS FOR CHILD ANXIETY THAT INVOLVE PARENTING TRAINING AND CONTRIBUTE TO THE EXPANDING LITERATURE ON THE DEVELOPMENT OF LATINA YOUTH.

1:00 PM - 2:00 PM

**LUNETTE SI, PSYCHOLOGY**

FACULTY MENTOR: JOHN FRANCHAK, PSYCHOLOGY

**ARE PEOPLE AWARE OF THE EFFECTIVENESS OF THEIR COPYING TRADEOFF?**

PEOPLE MAY TRADE OFF PHYSICAL AND COGNITIVE EFFORTS DIFFERENTLY WHEN COPYING INFORMATION. FOR EXAMPLE, WHEN COPYING DATES FROM THE SYLLABUS TO THEIR CALENDAR, SOME STUDENTS MOVE THEIR EYES AND HEAD FREQUENTLY TO LOOK, REMEMBER 1 OR 2 DATES AT A TIME, AND COPY THEM TO THE CALENDAR. OTHERS MAY REMEMBER MORE DATES AT A TIME TO REDUCE THE TIMES THEY NEED TO LOOK BACK AND FORTH, USING LESS PHYSICAL EFFORT. MY STUDY WILL ASK: AFTER TRYING DIFFERENT WAYS TO COPY INFORMATION, WILL PEOPLE SPONTANEOUSLY CHOOSE THE TRADEOFF THAT WORKS BEST FOR THEM?

IN THE STUDY, COLLEGE STUDENTS WILL COPY PATTERNS COMPOSED OF 8 CIRCLES ON A BROWSER-BASED INTERFACE. PARTICIPANTS WILL FIRST BE FORCED TO COPY THE PATTERNS IN CERTAIN WAYS, WITH LIMITED TIMES THEY CAN LOOK AT THE PATTERNS AND NUMBER OF CIRCLES THEY HAVE TO REMEMBER DURING EACH LOOK. THE WAY PARTICIPANTS COPY THE PATTERN WITH THE HIGHEST CORRECT RATE WILL BE DEFINED AS THE OPTIMAL TRADEOFF FOR EACH PARTICIPANT. IF PARTICIPANTS ARE ABLE TO CORRECTLY COPY THE PATTERNS THROUGH DIFFERENT TRADEOFFS, THE OPTIMAL TRADEOFF WILL BE THE ONE THAT WAS DONE THE QUICKEST. AFTERWARDS, THEY WILL DO THE SAME TASK WITHOUT ANY LIMITATIONS, AND I WILL RECORD HOW MANY TIMES THEY LOOK AT THE PATTERNS SPONTANEOUSLY. I PREDICT THAT, AFTER GAINING EXPERIENCES OF DIFFERENT TRADEOFFS IN THE FORCED TRIALS, PARTICIPANTS WILL CHOOSE THEIR OWN OPTIMAL TRADE-OFF IN THE SPONTANEOUS TRIALS.

1:00 PM - 2:00 PM

**MATTHEW HANNA, BIOLOGY; CRYSTAL CHEN**

FACULTY MENTOR: BRENT HUGHES, PSYCHOLOGY

**SOCIOECONOMIC STATUS AND PERCEPTION OF POLITICAL POLARIZATION AS PREDICTORS OF PREFERENCE FALSIFICATION**

PAST RESEARCH HAS INDICATED THAT INDIVIDUALS WILL PUBLICLY CLAIM BELIEFS CONTRADICTORY TO THEIR OWN IN ORDER TO CONFORM TO THE GROUP OPINION DURING DISCUSSION ON CONTROVERSIAL ISSUES. THIS POSTER EXPLORES THIS PHENOMENA OF PREFERENCE FALSIFICATION AND ITS PREVALENCE WITHIN THE CONTEXT OF INDIVIDUALS BELONGING TO VARIED SOCIOECONOMIC STATUSES. 518 PARTICIPANTS AGED 18-65 WERE SURVEYED ON THEIR APPROVAL OF VARIOUS TOPICS AND ASSIGNED TO CONDITIONS IN WHICH THEY WERE OSTENSIBLY PROVIDING DATA FOR A REPUBLICAN, DEMOCRAT, OR NON-PARTISAN RESEARCH GROUP. PRELIMINARY ANALYSES OF SUBJECT LEVEL METRICS LIKE POLITICAL STANCE, SOCIOECONOMIC STATUS, AND INCOME DESCRIBE A CORRELATION BETWEEN AFFECTIVE POLARIZATION AND LEVELS OF FALSIFICATION ON AN IN-GROUP/OUT-GROUP BASIS. ADDITIONALLY, WE OBSERVE AN INVERSE RELATIONSHIP BETWEEN AN INDIVIDUAL'S SUBJECTIVE SOCIAL STATUS AND FALSIFICATION. EARLY FINDINGS SUGGEST THAT INDIVIDUALS SELF RANKING HIGH ON SOCIAL STATUS AND INDIVIDUALS PERCEIVING POLITICAL GROUPS TO BE HIGHLY POLARIZED ARE LESS LIKELY TO FALSIFY THEIR OPINION.

1:00 PM - 2:00 PM



**RICARDO DELGADO SOLIS, SOCIOLOGY AND GENDER AND SEXUALITY STUDIES**

FACULTY MENTOR: RICHARD. T. RODRIGUEZ, MEDIA & CULTURAL STUDIES

**THE CHALLENGES OF LATINX UNDOCUQUEER TRANSFER STUDENTS IN HIGHER EDUCATION**

THIS CREATIVE PROJECT/ESSAY EXPLORES THE CHALLENGES AND EXPERIENCES OF LATINX UNDOCUMENTED QUEER STUDENTS WHO ALSO IDENTIFY AS FIRST-GENERATION TRANSFER STUDENTS. THE GOAL IS TO ANSWER THE FOLLOWING QUESTIONS: WHAT ARE THE EXISTING CHALLENGES UNDOCUMENTED QUEER STUDENTS FACE IN HIGHER EDUCATION INSTITUTIONS? HOW DO THESE CHALLENGES INTERSECT WITH EACH OTHER AND, IF SO, WHAT BARRIERS ARE CREATED? FINALLY, IS THERE A CORRELATION BETWEEN THESE CHALLENGES AND THE LACK OF REPRESENTATION OF LATINXS AT THE PH.D. LEVEL? A CREATIVE PROJECT BASED ON A LITERATURE REVIEW EMPHASIZING THEORIES OF INTERSECTIONALITY IS INCORPORATED TO DEPLOY AN ANALYTICAL FRAMEWORK TO BETTER UNDERSTAND HOW THESE OVERLAPPING IDENTITIES AMPLIFY THE SITUATIONS OF QUEER UNDOCUMENTED LATINX TRANSFER STUDENTS.

1:00 PM - 2:00 PM

**MORGAN WATERMAN, PSYCHOLOGY**

FACULTY MENTOR: DAVID FUNDER, PSYCHOLOGY

**WHAT DOES YOUR MUSICAL INSTRUMENT SAY ABOUT YOU: ANALYZING THE INFLUENCE OF MUSICAL INSTRUMENTS ON THE BIG 5 PERSONALITY TRAITS**

PAST LITERATURE HAS INDICATED A CONNECTION BETWEEN THE BIG 5 PERSONALITY TRAITS AND MUSIC GENRE PREFERENCE. HOWEVER, FEW STUDIES HAVE BEEN CONDUCTED TO EXPLAIN THIS CORRELATION IN TERMS OF THE ELEMENTS OF MUSIC. THE PRESENT STUDY EXPANDS UPON PREVIOUS LITERATURE TO FILL IN THE GAP IN RESEARCH WITH RESPECT TO THE STUDY OF MUSICOLOGY BY ASKING THE QUESTION: IS MUSICAL INSTRUMENT PREFERENCE PREDICTED BY ANY OF THE BIG 5 PERSONALITY TRAITS OF OPEN-MINDEDNESS, CONSCIENTIOUSNESS, EXTRAVERSION, AGREEABLENESS, AND NEGATIVE AFFECT? THIS QUESTION WAS ADDRESSED BY RECRUITING PARTICIPANTS FROM THE UNIVERSITY OF CALIFORNIA, RIVERSIDE AND AMAZON MECHANICAL TURK. WITH THIS DATA, I WILL RUN STATISTICAL ANALYSES TO IDENTIFY ANY CORRELATION BETWEEN MUSICAL INSTRUMENT PREFERENCE AND ANY OF THE BIG 5 PERSONALITY TRAITS. FOR EXAMPLE, I EXPECT THERE TO BE A SIGNIFICANT DIFFERENCE IN "OPENNESS" BETWEEN CERTAIN INSTRUMENTS, SUCH AS DRUMS AND GUITAR, BUT NOT NECESSARILY OTHERS. I PREDICT THIS TO BE THE CASE BECAUSE PREVIOUS LITERATURE HAS INDICATED A CORRELATION BETWEEN "OPENNESS" AND MANY GENRES OF MUSIC, EACH HAVING ITS OWN, UNIQUE INSTRUMENTALLY DRIVEN ASPECTS.

1:00 PM - 2:00 PM

**ADVYTH RAMACHANDRAN, BIOLOGY; RHEA AMATYA, THUY-TIEN BUI, CARYN IWANAGA**

FACULTY MENTOR: MARKO SPASOJEVIC, EVOLUTION, ECOLOGY, AND ORGANISMAL BIOLOGY

**THATCH REMOVAL INCREASES NATIVE PLANT DIVERSITY IN COASTAL SAGE SCRUB**

HIGHLY DIVERSE COASTAL SAGE SCRUB IS ONE OF THE MOST ENDANGERED PLANT COMMUNITIES IN THE U.S. INVASION BY EXOTIC ANNUALS

AND THE SUBSEQUENT CONVERSION TO ANNUAL GRASSLAND HAS REDUCED NATIVE BIODIVERSITY. TO ADDRESS THIS CONSERVATION CHALLENGE, AN EXPERIMENT WAS ESTABLISHED IN 2008 TO TEST IF THATCH ACCUMULATION BY EXOTIC ANNUALS REDUCES NATIVE SPECIES SUCCESS. BIOLOGY UNDERGRADUATES HELPED ESTABLISH 180 1.5x3 M PLOTS IN DEGRADED COASTAL SAGE SCRUB PLANT COMMUNITIES ON THE UCR CAMPUS. PLOTS WERE INSTALLED USING A PAIRED DESIGN, WHERE ONE PLOT RECEIVED THATCH REMOVAL WHILE THE OTHER WAS LEFT AS AN UNMANIPULATED CONTROL. TOTAL SPECIES RICHNESS, NATIVE SPECIES RICHNESS, AND THE DOMINANCE OF THE INVASIVE GRASS BROMUS DIANDRUS WERE RECORDED ANNUALLY OVER 7 YEARS TO ASK WHAT EFFECT THATCH REMOVAL HAD ON PLANT DIVERSITY IN INVADDED COASTAL SAGE SCRUB ECOSYSTEMS.

WE FOUND THAT THATCH REMOVAL INCREASED BOTH NATIVE SPECIES RICHNESS AND OVERALL SPECIES RICHNESS, AND REDUCED THE DOMINANCE OF BROMUS. THESE RESULTS SUGGEST THAT MANUAL THATCH REMOVAL HAS THE POTENTIAL TO INCREASE NATIVE PLANT DIVERSITY IN DEGRADED COASTAL SAGE SCRUB WITHOUT THE CHALLENGES ASSOCIATED WITH SPRAYING TOXIC HERBICIDES. THE UCR SEEDS CHAPTER WILL REINITIATE THATCH REMOVAL TREATMENTS IN FALL 2021 TO EXAMINE THEIR LONG-TERM IMPACTS AND PROVIDE FURTHER INSIGHT INTO THE EFFICACY OF THATCH REMOVAL AS A MANAGEMENT STRATEGY. CONTROLLING ANNUAL GRASS INVASION IN COASTAL SAGE SCRUB IS EXPECTED TO INCREASE THE COVER OF NATIVE PLANTS ASSOCIATED WITH MULTIPLE ENDANGERED SPECIES, WHILE ALSO HAVING IMPLICATIONS FOR WILDFIRE MANAGEMENT.

1:00 PM - 2:00 PM

#### **BRITNEY HUYNH, CELLULAR, MOLECULAR AND DEVELOPMENTAL BIOLOGY**

FACULTY MENTOR: SHOU-WEI DING, DEPARTMENT OF MICROBIOLOGY & PLANT PATHOLOGY

SUPPRESSION OF ANTI-VIRAL RNAi BY VIRAL 2B AND B2 PROTEINS IN PLANTS, INSECTS AND MAMMALIAN CELLS

RNA INTERFERENCE (RNAi) IS A MECHANISM THAT REGULATES THE GENE ACTIVITY AND HELPS DEFEND AGAINST VIRAL INFECTION. THE GENOMES OF VIRUSES INFECTING HOST ORGANISMS SUCH AS PLANTS AND ANIMALS ARE VERY SIMILAR. ONE COMMON SIMILARITY OF PLANT, INSECTS AND MAMMALIAN CELLS IS HOW ALL OF THESE CELLS HAVE A PROTEIN THAT INTERACTS WITH RNAi. INSECT AND MAMMALIAN CELLS HAVE B2 PROTEIN WHILE PLANTS HAVE 2B PROTEINS. BOTH OF THESE PROTEINS ARE VIRAL SUPPRESSORS OF RNAi, EVOLUTIONARILY SIMILAR AND HAVE THE SAME BIOCHEMICAL ACTIVITY. B2 AND 2B PROTEINS HAVE DOUBLE STRANDED RNA BINDING PROTEINS, WHICH WILL BIND TO THE DOUBLE STRANDED RNA WITHIN THE INFECTED CELL. THE VIRAL INFECTION OF THESE CELLS PROMOTES THE USE OF DICER PROCESSING, WHICH FACILITATES THE START OF THE RNA-INDUCED SILENCING COMPLEX. B2 AND 2B PROTEINS RESTRICT DICER PROCESSING WHICH CUTS VIRAL RNA TO VIRAL siRNA, RESULTING IN USE OF THE SAME MECHANISM TO SUPPRESS RNAi RESPONSE IN THE HOST'S VIRAL DEFENSE. THE SIMILARITIES AND DIFFERENCES BETWEEN THE ASSETS OF B2 AND 2B PROTEINS CAN TELL US ABOUT HOW RNAi PLAY AN IMPORTANT ROLE IN MULTIPLE VIRUSES AND HOW RNAi FUNCTIONS TO SUPPRESS VIRUSES SUCH AS COVID-19 AND CUCUMBER MOSAIC VIRUS (CMV).

1:00 PM - 2:00 PM

**EMILY VILLALPANDO, BIOCHEMISTRY; RYAN GATES**

FACULTY MENTOR: ERNEST MARTINEZ, BIOCHEMISTRY

#### THE IMPACT OF MYC ACETYLATION ON GENE-SPECIFIC REGULATION AND BREAST CANCER

OVEREXPRESSION OF THE MYC TRANSCRIPTION FACTOR HAS BEEN OBSERVED IN A VARIETY OF CANCERS AND IS GENERALLY ASSOCIATED WITH AGGRESSIVE TUMORIGENESIS AND A POOR PROGNOSIS. MYC IS INVOLVED IN SEVERAL CELLULAR PROCESSES, SUCH AS CELL GROWTH AND DEATH, DIFFERENTIATION, METABOLISM, PROLIFERATION, AND GENE EXPRESSION. ITS INVOLVEMENT IN THESE CELLULAR PROCESSES IS RESPONSIBLE FOR THE ASSOCIATION OF MYC WITH TUMORIGENESIS WHEN DEREGLATED AND OVEREXPRESSED IN CANCER. THE MYC PROTO-ONCOGENE IS NORMALLY HEAVILY REGULATED IN CELLS BY MULTIPLE MECHANISMS AND FEEDBACK LOOPS BUT HAS BEEN SHOWN TO BE DEREGLATED IN CANCER CELLS DUE TO ABERRANT UPSTREAM SIGNALING PATHWAYS AND POSTTRANSLATIONAL MODIFICATIONS, SUCH AS PHOSPHORYLATION, UBIQUITINATION, SUMOYLATION, AND ACETYLATION. IN CANCER CELLS, DEREGLATION OF MYC AND LOSS OF CHECKPOINTS LEADS TO MALIGNANT TRANSFORMATION, BUT THE EXACT PATHWAYS ARE YET TO BE COMPLETELY UNDERSTOOD. THE RELIANCE OF MYC-DRIVEN CANCERS ON POST-TRANSLATIONAL MODIFICATIONS AND COFACTORS PROVIDE A POSSIBLE BIOMARKER FOR CANCER AND THE OPPORTUNITY FOR NOVEL ANTI-CANCER TREATMENTS.

I WILL DISCUSS THE ROLE OF MYC IN THE BODY AND IN BREAST CANCER, WITH THE FOCUS ON THE POST-TRANSLATIONAL MODIFICATIONS OF MYC AND POSSIBLE CONNECTION TO TUMORIGENESIS. IN ADDITION TO THIS, I WILL DISCUSS PRELIMINARY DATA COLLECTED BY THE MARTINEZ LABORATORY, WHICH DISTINGUISHES MYC ACETYLATION OF LYSINE RESIDUES AS A POSSIBLE NOVEL POST-TRANSLATIONAL MODIFICATION PATHWAY SPECIFIC TO MYC'S INTERACTION WITH HISTONE ACETYLTRANSFERASES (HATS) IN CELL LINES. WE PLAN TO USE RNA-SEQUENCING TO IDENTIFY MYC TARGET GENES THAT REQUIRE THE SPECIFIC ACETYLATED LYSINE RESIDUES OF MYC THAT ARE TARGETED BY P300 AND GCN5 HATS.

1:00 PM - 2:00 PM

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**ETHAN TANCHOCO, MICROBIOLOGY; SIYI GE, JENNIFER CHO**

FACULTY MENTOR: ANSEL HSIAO, DEPARTMENT OF MICROBIOLOGY AND PLANT PATHOLOGY

#### EFFECTS OF A LACTOBACILLUS-DERIVED BACTERIOCIN ON VIBRIO CHOLERAЕ INFECTION AND THE MICROBIOME

VIBRIO CHOLERAЕ, A DIARRHEAL PATHOGEN THAT THREATENS DEVELOPING COUNTRIES WORLDWIDE, AFFECTS ~3 MILLION PEOPLE YEARLY. ALTHOUGH VACCINES HAVE BEEN DEVELOPED, MORE ECONOMICAL AND ACCESSIBLE TREATMENTS ARE NEEDED FOR THIS CONSTANTLY RE-EMERGING ILLNESS. THE MOLECULAR MECHANISMS OF V. CHOLERAЕ INFECTION ARE WELL DESCRIBED, BUT ITS INTERACTIONS WITH THE GUT MICROBIOME, THE TOTALITY OF BACTERIA AND OTHER MICROBES WITHIN THE GASTROINTESTINAL TRACT, ARE NOT. THEREFORE, THE MICROBIOME SERVES AS AN IMPORTANT AREA OF STUDY FOR FINDING NOVEL TREATMENT STRATEGIES AGAINST ENTEROPATHOGENS. USING AN INFANT MOUSE MODEL, WE WILL INVESTIGATE THE EFFECTS OF THE ANTIBACTERIAL PEPTIDE GASSERICIN A, PRODUCED BY MICROBIOTA MEMBER LACTOBACILLUS GASSERI LA39, ON CHOLERA AND MICROBIOME MEMBERS THAT MEDIATE RESISTANCE AND RECOVERY FROM INFECTION. PRELIMINARY DATA SUGGESTS THAT GASSERICIN A DECREASES FLUID ACCUMULATION AND V. CHOLERAЕ COLONIZATION IN THE INTESTINE, TWO IMPORTANT INDICATORS OF REDUCED DIARRHEAL SYMPTOMS. FUTURE STUDIES WILL FOCUS ON PERFORMING INSERTIONAL MUTAGENESIS ON THE GASSERICIN BIOSYNTHETIC LOCUS TO CONFIRM THE IMPORTANCE OF GASSERICIN ON V. CHOLERAЕ PATHOGENESIS. ADDITIONALLY, PREVIOUS STUDIES HAVE SHOWN THAT VARIATIONS IN THE MICROBIOME CAN EITHER INCREASE RESISTANCE OR



SUSCEPTIBILITY TO INFECTION. CONSEQUENTLY, WE WILL ALSO EVALUATE OUTCOMES OF CHOLERA INFECTION IN THE PRESENCE OF BOTH GASSERICIN AND BACTERIAL STRAINS THAT HAVE BEEN IDENTIFIED AS MEDIATORS OF THESE HEALTHY, INFECTION-RESISTANT AND DYSBIOTIC, SUSCEPTIBLE MICROBIOME VARIATIONS WHILE EXAMINING THE EFFECTS OF THIS BACTERIOCIN ON GUT MICROBIOME STRUCTURE. IDENTIFYING THIS POTENTIALLY NOVEL MICROBIOTA-DERIVED RESISTANCE MECHANISM TO *V. CHOLERA*E WILL FURTHER OUR UNDERSTANDING OF INTERACTIONS BETWEEN PATHOGENS AND THE MICROBIOME WHILE DEFINING NEW ANTIMICROBIAL TREATMENTS FOR CHOLERA.

1:00 PM - 2:00 PM

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**RAAJITHA RAJKUMAR, COMPUTER ENGINEERING**

FACULTY MENTOR: CHRISTIAN R. SHELTON, COMPUTER SCIENCE AND ENGINEERING

**LOGIC MINIMIZATION VIA BINARY DECISION DIAGRAMS FROM CHESS ENDGAME DATA**

THE HIGH PROCESSING TIMES AND LARGE STORAGE LEVELS THAT CERTAIN DATA REQUIRES CAN BE MINIMIZED WITH CONCEPTS USED IN ELECTRONICS, YET CAN STILL BE UTILIZED IN THE ARTIFICIAL INTELLIGENCE COMMUNITY. THIS EMERGING STUDY AIMS TO DISPLAY THE POSSIBLE COMPRESSION OF THE LARGE AMOUNTS OF DATA IN CHESS ENDGAME TABLES (EGTs) WITH THE USE OF BINARY DECISION DIAGRAMS. EGT DATA REPRESENTS THE RESULT OF THE GAME ASSUMING THE PERFECT PLAY FOR VARIOUS CONFIGURATIONS OF THE PIECES AND THEIR POSITIONS ON THE CHESS BOARD. THESE DATA ARE CRITICAL TO THE SUCCESS OF COMPUTER CHESS PROGRAMS. THE MORE CONFIGURATIONS THAT CAN BE STORED AND QUERIED, THE CLOSER TO PERFECT PLAY POSSIBLE. COMPRESSION OF THESE TABLES IS, THEREFORE, KEY TO IMPROVING COMPUTER CHESS PLAY BY ALLOWING THE STORAGE OF LARGER TABLES. BDD'S REPRESENT FUNCTIONS IN COMPACT FORMS, AND THEREFORE ALLOW US TO MAP CERTAIN CHESS POSITIONS TO THEIR GAME OUTCOMES. FOR THIS STUDY, WE EXAMINE BDD'S ABILITY TO COMPRESS TWO-PIECE, THREE-PIECE, AND FOUR-PIECE EGTs. IN FUTURE WORK, WE WILL EXAMINE COMPRESSING EGTs USING MULTIWAY DECISION DIAGRAMS TO IMPROVE COMPRESSION LEVELS.

1:00 PM - 2:00 PM

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**JEREMIAH DIXON, NEUROSCIENCE**

FACULTY MENTOR: XIAPING HU, BIOENGINEERING

**MIGRATORY CELL TRACING: INVESTIGATING MAGNETO-TACTIC BACTERIA MMS6 FOR MR REPORTER GENE VIABILITY**

UNDERSTANDING THE FUNDAMENTALS OF DNA TRANSCRIPTION IS CRUCIAL TO GENE THERAPY. IT IS THEORIZED THAT IN COMPREHENDING TRANSCRIPTION BASICS, WE CAN DEVELOP THERAPEUTIC AND DIAGNOSTIC TECHNIQUES FOR VARIOUS DISEASES AND CONDITIONS - THE IDEA OF WHICH WOULD BE THE APEX OF GENE THERAPY. INNOVATIVE MAGNETIC RESONANCE IMAGING (MRI) TECHNIQUES LEAD THIS ADVANCEMENT USING OPTICAL - NOW MAGNETIC RESONANCE (MR) - REPORTER GENES. DERIVED FROM AQUATIC MAGNETOTACTIC BACTERIA (MTB), MR REPORTER GENES ALLOW CELLS TO ACCUMULATE EXTRACELLULAR IRON THAT BOTH INTENSIFY CELLULAR IMAGE CONTRAST AND TRACE MIGRATING CELL POPULATIONS - A CONSIDERABLE IMPROVEMENT TO THEIR OPTICAL COUNTERPARTS. HOWEVER, CURRENT MR REPORTER GENES PURPORT RISKS OF CYTOTOXICITY (MAGA) IN THEIR HOSTS. THIS STUDY AIMS TO OBSERVE THE BACTERIAL

GENE MMS6 AS A POSSIBLE MR REPORTER GENE TO IMPROVE MR IMAGING - ADDING SIGNIFICANT STEPS IN GENE THERAPY ADVANCEMENT.

1:00 PM - 2:00 PM

**KIMBERLY BENNETT, DEPARTMENT OF BIOENGINEERING**

FACULTY MENTORS: VICTOR RODGERS, DEPARTMENT OF BIOENGINEERING; BYRON FORD, DEPARTMENT OF BIOMEDICAL SCIENCE

TRANSCRIPTOMIC ANALYSIS OF MOLECULAR MECHANISMS OF NEUROPROTECTION BY NEUREGULIN-1 FOLLOWING ISCHEMIC STROKE

ISCHEMIC STROKE IS A GLOBAL HEALTH PROBLEM THAT IS CHARACTERIZED BY EARLY NEURONAL DEATH, APOPTOSIS, INFLAMMATION, AND OXIDATIVE STRESS FOLLOWING AN OBSTRUCTION OF THE BLOOD SUPPLY TO THE BRAIN. PREVIOUS STUDIES HAVE SHOWN THAT ISCHEMIC STROKE CAUSES A RELEASE OF PRO-INFLAMMATORY CYTOKINES THAT PRODUCE CHANGES IN GENE EXPRESSION, PRIMARILY IN INFLAMMATION AND CELL DEATH. NEUREGULIN-1 (NRG-1) IS GROWTH FACTOR THAT HAS BEEN INVESTIGATED FOR ITS NEUROPROTECTIVE PROPERTIES AND ABILITY TO DELAY NEURONAL DEATH FOLLOWING ISCHEMIC STROKE. WHILE NRG-1 HAS SHOWN SIGNIFICANT PROMISE IN PREVENTING BRAIN DAMAGE AND STIMULATING POST-INJURY REPAIR FOLLOWING STROKE, THE MECHANISMS BEHIND ITS NEUROPROTECTIVE EFFECTS ARE UNCLEAR. THE GOAL OF THIS RESEARCH WAS TO INVESTIGATE THE EFFECTS OF NRG-1 TREATMENT ON ISCHEMIA-INDUCED GENE EXPRESSION PROFILES FOLLOWING A PERMANENT MIDDLE CEREBRAL ARTERY OCCLUSION (PMCAO) IN RAT MODELS. RATS WERE SACRIFICED 12 H FOLLOWING VEHICLE OR NRG-1 TREATMENT. FROM THE TOTAL RNA EXTRACTED FROM THE RAT BRAINS, MRNA FROM THE PERI-INFARCT CORTEX WAS USED TO GENERATE MICROARRAYS, WHICH WERE THEN HYBRIDIZED TO AN AFFYMETRIX RAT GENOME 2.0ST GENE CHIP AND ANALYZED USING THE AFFYMETRIX TRANSCRIPTOME ANALYSIS CONSOLE (TAC) SOFTWARE. OUR RESULTS SHOW THAT NRG-1 DELIVERY INCREASES THE REGULATION OF SURVIVAL AND INFLAMMATORY GENES. MOST NOTABLY, NRG-1 TREATMENT UPREGULATES THE CREB1 AND FOXO1 TRANSCRIPTION FACTORS, INVOLVED IN INCREASING CELL SURVIVAL AFTER ISCHEMIC STROKE, HIGHLIGHTING THE REGULATORY MECHANISMS OF NRG-1 NEUROPROTECTION.

1:00 PM - 2:00 PM

**LYNNE XU, ENVIRONMENTAL SCIENCE**

FACULTY MENTOR: WILLIAM PORTER, ENVIRONMENTAL SCIENCE

INVESTIGATING BENEFITS OF PRESCRIBED FIRE USING WRF-CHEM

WILDFIRE IS AN ONGOING THREAT FOR SOUTHERN CALIFORNIA RESIDENTS, WITH RISKS ONLY EXPECTED TO INCREASE UNDER FUTURE WARMING SCENARIOS. PRESCRIBED BURNS ARE ONE PROPOSED MITIGATION STRATEGY ALREADY IN HEAVY USE IN OTHER REGIONS OF THE UNITED STATES, BUT THUS FAR THEIR APPLICATION TO CALIFORNIA AREAS HAS BEEN LIMITED. ONE CONCERN RELATED TO PRESCRIBED FIRE USE IS THAT OF POLLUTION MITIGATION: BURN WINDOWS MUST BE CHOSEN SUCH THAT AIR QUALITY IMPACTS ON NEARBY COMMUNITIES ARE MINIMIZED AS MUCH AS POSSIBLE. HERE WE USE THE CHEMICAL TRANSPORT MODEL WRF-CHEM TO EXPLORE HISTORICAL FIRE EVENTS IN CALIFORNIA ALONG WITH HYPOTHETICAL PRESCRIBED FIRE ALTERNATIVES TO ASSESS THE BENEFITS OF BURNING UNDER DIFFERENT CONDITIONS AND AT DIFFERENT TIMES.



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**JASON TSE, DEPARTMENT OF THEATRE, FILM, AND DIGITAL PRODUCTION**

FACULTY MENTOR: BELLA MERLIN, THEATRE, FILM, AND DIGITAL PRODUCTION

**CREATING A NARRATIVE MUSIC VIDEO WITH LIMITED EQUIPMENT**

COVID HAS CREATED NUMEROUS DIFFICULTIES REGARDING THE ABILITY TO SHOOT AND PRODUCE FILMS. DURING THIS QUARANTINE, I ASKED THE QUESTION OF HOW FILMMAKERS CAN CREATE NARRATIVE WORKS WITH LIMITED EQUIPMENT AND PERSONNEL. USING ONLY A SMARTPHONE AND A CREW OF TWO PEOPLE INCLUDING MYSELF, I DECIDED TO TAKE A SONG I HAD WRITTEN FOR AN EP FOR A PREVIOUS UNDERGRADUATE SYMPOSIUM, 'CHINATOWN,' AND CREATE A NARRATIVE MUSIC VIDEO THAT RESPECTED THE BOUNDARIES OF SOCIAL DISTANCING WHILE EXPLORING THE CREATIVE OPTIONS AVAILABLE WITH A LIMITED TEAM. THE FINAL PRODUCT CONSISTS OF A HIKE UP TO THE CONCRETE UCR 'C' THAT RESTS AT THE TOP OF THE BOX SPRINGS MOUNTAINS, WITH SEVERAL ACTS FEATURING SPED-UP CHOREOGRAPHY. THE STRUCTURAL AND TECHNICAL FEATURES OF THE MUSIC VIDEO WERE INFLUENCED BY THE MUSIC VIDEOS OF THE AMERICAN ROCK BAND OK GO, SPECIFICALLY FOR THEIR MUSIC 'END LOVE,' THAT ALSO UTILIZED SPED UP FOOTAGE.

EACH ACT OF THE MUSIC VIDEO IS ASSOCIATED TO A VERSE OR CHORUS OF THE SONG. WITH THE HELP OF MY ROOMMATE, WE TESTED EACH ACT IN OUR APARTMENT TO PRACTICE THE TIMING BEFORE TESTING THE ACTS ON THE MOUNTAINS AND DETERMINING IDEAL SHOOTING LOCATIONS. ON OUR THIRD TIME HIKING UP THE MOUNTAIN, WE BROKE APART PIECES OF THE SLOWED DOWN SONG AND FILMED THE FINAL PRODUCT. IN POST-PRODUCTION, THE FOOTAGE WAS SPED UP SO THAT THE CHOREOGRAPHY MATCHED THE ACTUAL TEMPO OF THE SONG. THE FINAL PRODUCT WILL BE RELEASED ALONGSIDE A COLLECTION OF UKULELE SONGS COMPOSED THROUGHOUT MY UCR CAREER.

1:00 PM - 2:00 PM

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**KIKI CHAVEZ, THEATRE, FILM, AND DIGITAL PRODUCTION MAJOR**

FACULTY MENTORS: ERITH JAFFE-BERG, DEPARTMENT OF THEATRE, FILM, AND DIGITAL PRODUCTION DEPARTMENT; DR. BELLA MERLIN, DEPARTMENT OF THEATRE, FILM, AND DIGITAL PRODUCTION DEPARTMENT

**IMPACT OF THE COVID-19 PANDEMIC ON THE ROMANTIC LIVES OF YOUNG ADULTS**

WITHIN THIS PAST YEAR, HUMAN CONNECTION HAS CHANGED DRASTICALLY DUE TO THE NOVEL CORONAVIRUS. THIS PRACTICE-BASED RESEARCH PROJECT ASKS HOW ROMANTIC ENGAGEMENT AMONG ONE'S PEERS HAS ADAPTED FROM THE IMPACT OF THE PANDEMIC. PARTICIPANTS WERE A GROUP OF VOLUNTEERS WHO WERE INTERVIEWED ON THEIR EXPERIENCES DATING AND NAVIGATING RELATIONSHIPS IN THE TIME PERIOD AFTER THE PANDEMIC. SUCCESSFUL, LONG-TERM RELATIONSHIPS WERE NOT REQUIRED TO PARTICIPATE. THE METHOD OF APPROACHING THE SUBJECT MATTER WAS AN ARTISTIC FILTERING USING THE MATERIAL TO CREATE A FACT-BASED DRAMA THROUGH A LENS OF THEATRE MAKING SUCH AS PLAYWRITING, DIRECTING, AND PERFORMANCE. THE FINAL PIECE WAS NOT A VERBATIM USAGE OF THE INTERVIEWS. INSTEAD, THE PROJECT WAS A CREATIVE PROCESS OF FICTIONALIZING FACT AND INCLUDING THE ARTISTS' PERSPECTIVES AND EXPERIENCES WHEN NEGOTIATING WITH THE MATERIAL. THE IMPORTANCE OF THIS PIECE IS THE ANTICIPATION OF LONG-TERM SOCIOLOGICAL IMPACTS TO THE ROMANTIC SPHERE OF YOUNG ADULT'S LIVES IN THE FUTURE. CURRENTLY, CONVERSATIONS SURROUNDING LIFE-STYLE ADAPTATIONS HAVE CENTERED AROUND PURPOSES OF SAFETY, SUCH AS CONTROVERSIAL MASK-MANDATES AND SOCIAL DISTANCING



MEASURES. HOWEVER, RESEARCH REGARDING THE EFFECTS OF PANDEMIC LIVING ON ROMANTIC AND SEXUAL ENCOUNTERS HAS YET TO BE EXPLORED. THE RESULTS OF THIS PROJECT WAS PRACTICE-BASED RESEARCH MANIFESTED INTO THE ART OF A THEATRICAL STAGE PLAY, APPROXIMATELY 35 MINUTES IN LENGTH AND STREAMED TO AUDIENCES VIA YOUTUBE. THE EFFECTS OF COVID-19 ON BEHAVIOR WAS ALSO MIRRORED IN THE EXPERIENCES OF PARTICIPATING ARTISTS, AS THE PROJECT WAS COMPLETED OVER ZOOM, A VIDEOCONFERENCE APPLICATION INTENDED TO RESPECT SOCIAL DISTANCING GUIDELINES.

1:00 PM - 2:00 PM

### **MAXINE GARCIA FILMMAKING AND ART HISTORY**

FACULTY MENTOR: PATRICIA CARDOSO THEATER, FILM, AND DIGITAL PRODUCTION

THIS FILM WAS MADE WITH VIDEO

THIS FILM WAS MADE WITH VIDEO IS A DIGITAL MUSICAL STORY OF FINDING YOURSELF IN A WORLD UNKNOWN. THE FILM'S PURPOSE IS TO HIGHLIGHT A VISUAL FEELING OF HOW ONE FEELS WHEN LOST. THE STORY IS TOLD THROUGH ARTISTIC VISION THAT COMBINES THE DIGITAL WORLD WITH THE REAL ONE. THE MAIN CHARACTER, THE ENIGMA, HAS A MIRRORED IDENTITY IN WHICH THEY REFLECT EVERYTHING BUT THEMSELVES. THE ENIGMA FINDS A ROSE WITH A GOLDEN BOX ATTACHED TO IT, NOT KNOWING WHAT TO DO WITH IT, THE ENIGMA LEAVES AND SEARCHES FOR THEIR SOUL. AS THE ENIGMA WONDERS, THEY FALL INTO THEIR OWN PSYCHE WHICH REVEALS THE DARKEST PARTS OF THEMSELVES. THE ENIGMA ESCAPES THE DARKNESS OF THEIR OWN MIND AND CONTINUES TO SEARCH FOR THEIR SOUL. THEY ARE CHANGED NOW THAT THEY HAVE SEEN THE DARKNESS, AND THEY NOW LOOK AT THE WORLD DIFFERENTLY. THE ENIGMA TRAVELS LONG AND FAR WHEN THEY SPOT ANOTHER BEING THAT IS IDENTICAL TO THEMSELVES. THE OTHER BEING IS HOLDING ONTO A GOLD BOX, THE SAME ONE THE ENIGMA FOUND. THE ENIGMA AND THE OTHER BEING RUN TOWARDS EACH OTHER, AND THEY TOUCH HANDS AND BECOME ONE. THE ENIGMA IS NO LONGER LOST AND HAS FOUND THEMSELVES, THE GOLD BOX IS THE ENIGMAS SOUL. NOW THAT THEY HAVE SEEN THE WORLD THE ENIGMA NOW KNOWS WHAT TO DO WITH THEIR SOUL. THEY NO LONGER HIDE BEHIND THE MIRRORED MASK, THE ENIGMA HAS AN IDENTITY. THE ENIGMA IS REBORN, AND SHE CAN NOW LIVE HER LIFE UNMASKED AND FREE OF HER INNER SABOTEUR.

1:00 PM - 2:00 PM

### **HU, YIXIN, THEATER, FILM AND DIGITAL PRODUCTION MAJOR**

FACULTY MENTOR: RUSSIN, ROBIN, DEPARTMENT OF THEATER, FILM AND DIGITAL PRODUCTION

EXCHANGE: A SCREENPLAY ABOUT BOTH STUDY LIVES IN THE US AND CHINA

AS AN INTERNATIONAL STUDENT FROM CHINA, I FIND THAT CULTURES IN CHINA AND THE US ARE VERY DIFFERENT. IN PARTICULAR, FAMILIAL RELATIONSHIPS AND EDUCATION MAKE CHINESE AND AMERICANS HAVE DIFFERENT CHARACTERISTICS. CHINESE FAMILIES VALUE RESPECTING THE ELDERS THE MOST, AND THEY FOCUS MORE ON CHILDREN'S ACADEMIC PERFORMANCE THAN INTERESTS IN EDUCATION. ON THE CONTRARY, PARENTS AND CHILDREN CAN GET ALONG LIKE FRIENDS IN THE US FAMILIES, AND THEY ALSO ENCOURAGE CHILDREN TO HAVE INTERESTS AND COMMUNITY SERVICES. I WILL WRITE A SCREENPLAY ABOUT TWO GIRLS FROM CHINA AND THE US WHO SWITCH THEIR BODIES AND GET A CHANCE TO EXPERIENCE EACH OTHER'S LIVES. AFTER THEY CHANGE BACK, THEY ALSO LEARN HOW TO DEAL WITH THEIR OWN PROBLEMS. THE AUDIENCE WILL SEE THESE DIFFERENT CULTURES, SUCH AS FAMILY RELATIONSHIPS, BOY AND GIRLFRIEND

RELATIONSHIPS, LIFE STYLES, FOOD CULTURE, AND EDUCATIONAL EXPERIENCES, THROUGH THE EYES OF TWO GIRLS. I WANT TO MAKE MY STORY MORE REAL AND INTERESTING SO THAT EVERYONE CAN KNOW WHAT THESE TWO CULTURES ARE LIKE EXACTLY. CHINESE AND AMERICANS ARE ABLE TO HAVE A SYMPATHETIC CHORD ABOUT THEIR LIVES, AND GET TO KNOW EACH OTHER'S DIFFERENT CULTURES. I WILL RESEARCH IDEAS AND EXPERIENCES SURROUNDING FAMILY AND EDUCATION FROM BOTH PERSPECTIVES, INCLUDING INTERVIEWING FRIENDS AND STUDENTS FROM CHINA AND THE US. MY SCREENPLAY WILL ALLOW THE AUDIENCE TO STEP INTO BOTH WORLDS AND LEAVE WITH A BETTER UNDERSTANDING AND APPRECIATION OF THESE DIVERSE CULTURES, WHICH WILL HELP TO BREAK DOWN HARMFUL STEREOTYPES AND FOSTER OPEN-MINDEDNESS AND ACCEPTANCE OF OTHERS.

1:00 PM - 2:00 PM

### ALEXANDER BRINKLEY, ENTOMOLOGY

FACULTY MENTOR: SARAH WOODARD. ENTOMOLOGY

#### QUANTIFYING SUGAR LEVELS IN BUMBLE BEE HEMOLYMPH IN RELATION TO SUBLETHAL DOSAGES OF PESTICIDES

BUMBLE BEES (GENUS *BOMBUS*) USE SUGARS FROM NECTAR AS THEIR PRIMARY SOURCE OF ENERGY; THESE SUGARS ARE ESSENTIAL FOR THE COLLECTION, UTILIZATION, AND DISTRIBUTION OF ENERGY WITHIN BEES. BUMBLE BEES MUST EXIST IN A RAPID STATE OF ABSORBING AND BREAKING DOWN SUGARS INTO USABLE ENERGY TO FUEL THEIR FLIGHT; THUS, BUMBLE BEES ARE IDEAL ORGANISMS FOR STUDYING ENERGETICS AND THE PROCESS BY WHICH SUGARS ARE BIOCHEMICALLY REDISTRIBUTED THROUGHOUT BODY SYSTEMS. A DEEPER UNDERSTANDING OF BUMBLE BEE ENERGETICS SEGUES TO FURTHER COMPREHENSION OF BUMBLE BEES' FUNCTIONAL ABILITY AND IMPACT ON VARIOUS ECOSYSTEMS AS A CRITICAL POLLINATOR. I HYPOTHEZIZE THAT THE NEONICOTINOID FAMILY OF INSECTICIDES MAY ADVERSELY IMPACT THE BEE ENERGETIC STATE. I WILL ANALYZE THE SUGAR CONCENTRATION OF BUMBLE BEE HEMOLYMPH (I.E., INSECT BLOOD) UNDER SEPARATE CONDITIONS (BEES FED A NORMAL DIET, BEES STARVED, BEES EXPOSED TO SUBLETHAL DOSAGES OF PESTICIDES). I ANTICIPATE THAT EXPOSING BEES TO SUBLETHAL DOSES OF INSECTICIDES WILL DECREASE THE CONCENTRATION OF SUGARS IN THEIR HEMOLYMPH, SUBSEQUENTLY DECREASING THEIR FUNCTIONAL ABILITY, WHICH MAY ULTIMATELY IMPACT POLLINATION WHERE BUMBLE BEES ARE CRITICAL TO THE ECOSYSTEM.

1:00 PM - 2:00 PM

### BATIS GOLESTANY, BIOLOGY; MICAH FERI

FACULTY MENTOR: SEEMA TIWARI-WOODRUFF, BIOMEDICAL SCIENCES

#### COMBINED THERAPY TO INDUCE NEUROPROTECTION IN A MOUSE MODEL OF MULTIPLE SCLEROSIS

MULTIPLE SCLEROSIS (MS) IS A CHRONIC INFLAMMATORY AND NEURODEGENERATIVE DISEASE, LEADING TO VISUAL, MOTOR, AND COGNITIVE IMPAIRMENTS. MS HAS PROFOUND DELETERIOUS EFFECTS IN THE VISUAL PATHWAY, INCLUDING RETINAL GANGLION CELL (RGC) DEATH AND AXON DEGENERATION, SOMETIMES WITH IRREVERSIBLE CONSEQUENCES (THOMSON, 2018). INHIBITING RGC DEATH, ALONG WITH REMYELINATING STRUCTURALLY INTACT AXONS, CAN GREATLY PREVENT DISEASE PROGRESSION. MOST THERAPEUTIC DRUGS ARE

IMMUNOMODULATORY AND THERE IS AN UNMET NEED FOR THERAPIES THAT PROVIDE NEUROPROTECTION AND REMYELINATION. CALPAIN, A CALCIUM DEPENDENT PROTEASE, HAS BEEN OBSERVED AS A POTENTIAL CONTRIBUTOR TO NEUROLOGICAL IMPAIRMENT IN MS AND HAS BEEN SHOWN TO UPREGULATE IN MS LESIONS. CALPAIN INCREASE IN EAE WAS MITIGATED BY CALCIUM INHIBITORS IN A STUDY PERFORMED BY BANIK RESEARCH GROUP (SHIELDS, 1999). OUR GROUP HAS SHOWN SIGNIFICANT REMYELINATING AND IMMUNOMODULATORY EFFECTS USING AN ESTROGEN RECEPTOR BETA LIGAND, INDAZOLE-CL AND ITS ANALOGUES (KARIM, 2019) IN EXPERIMENTAL AUTOIMMUNE ENCEPHALOMYELITIS (EAE). IN THIS PROPOSAL, I WILL TEST THE HYPOTHESIS THAT EARLY COMBINED TREATMENT WITH A CALCIUM INHIBITOR, BLD-2660 (IMPERIAL, 2020) AND THE REMYELINATING AGENT, INDCL (MOORE, 2014), WILL PROTECT RGCs, OPTIC NERVE AND OPTIC TRACT AXONS, INITIATE REMYELINATION, AND ALLEVIATE VISUAL DYSFUNCTION DURING EAE. THIS COMBINATION THERAPY MAY BE SUCCESSFUL IN PREVENTING AXON DEGENERATION. IF SUCCESSFUL, THIS RESEARCH WILL HELP US UNDERSTAND THE ROLE OF CALPAIN INHIBITION COMBINED WITH REMYELINATION TO ALLEVIATE FUNCTIONAL VISUAL DEFICIT IN A MOUSE MODEL OF MS THAT CAN BE A TEMPLATE FOR BETTER MS THERAPIES.

1:00 PM - 2:00 PM

**DOROTHY C. ESTRADA, CELL, MOLECULAR AND DEVELOPMENTAL BIOLOGY**

FACULTY MENTOR: MONICA J. CARSON, DIVISION OF BIOMEDICAL SCIENCES

**SEX-SPECIFIC INFLAMMATORY GENE RESPONSES TO LPS SYSTEMIC INFLAMMATION IN MURINE JEJUNUM**

THE PERITONEAL CAVITY IS A HIGHLY STERILE ENVIRONMENT ENCLOSING THE VISCERA. THE JEJUNUM OF THE SMALL INTESTINES ABSORB NUTRIENTS AND OTHER SOLUTES, WHILE CONFINING LUMINAL BACTERIA. MACROPHAGES ARE INNATE IMMUNE CELLS THAT DETECT AND DESTROY BACTERIA, INITIATING INFLAMMATION BY RELEASING CYTOKINES, WHICH ACTIVATE OTHER CELLS. LIPOPOLYSACCHARIDE (LPS) IS A GRAM-NEGATIVE BACTERIAL ENDOTOXIN THAT COULD TRIGGER SYSTEMIC INFLAMMATION. DURING INTRAPERITONEAL LPS INJECTION, THE RESIDENT IMMUNE CELLS RECOGNIZE LPS VIA TOLL-LIKE RECEPTOR 4 (TLR4) AND RELEASE SIGNALS THAT TRIGGER INFLAMMATORY RESPONSES. THIS RESULTS IN LOCAL AND, EVENTUALLY, SYSTEMIC INFLAMMATION. WE EXAMINE THE JEJUNUM'S RESPONSE TO SYSTEMIC INFLAMMATION BY QUANTIFYING THE TISSUE'S HISTOLOGIC AND GENE EXPRESSION RESPONSES. THE CLAUDIN-3 (CLDN3) TIGHT JUNCTION PROTEIN PARTICIPATES IN THE JEJUNUM'S EPITHELIAL BARRIER INTEGRITY, AND PROVIDES A MEASURE OF THE TISSUE'S RESPONSE TO SYSTEMIC INFLAMMATION THROUGH THE DEGREE OF ITS INTERNALIZATION. WE DEMONSTRATED THAT FEMALES RESPONDED MORE ROBUSTLY TO INTRAPERITONEAL LPS INJECTION IN BOTH DEGREE OF CLDN3 INTERNALIZATION AND GENE EXPRESSION. UPREGULATION OF GENES ENCODING MOLECULES FOR MONOCYTE AND NEUTROPHIL RECRUITMENT WERE OBSERVED IN BOTH SEXES, BUT MORE ROBUSTLY IN FEMALE MICE. GENERALLY, FEMALES MOUNT STRONGER IMMUNE RESPONSES TO INFLAMMATORY SIGNALS, MAKING THEM MORE RESISTANT TO PATHOGENS, BUT MORE SUSCEPTIBLE TO INFLAMMATORY CONDITIONS. THEREFORE, DUE TO THE GREATER NUMBER OF PROINFLAMMATORY GENES UPREGULATED IN FEMALES, WE HYPOTHEZIZE THAT FEMALES WILL DEMONSTRATE A HIGHER NUMBER OF MACROPHAGES INFILTRATING THE JEJUNUM. USING DOUBLE-BLINDED METHODOLOGIES AND IMAGEJ, WE ARE QUANTIFYING THE NUMBER OF MACROPHAGES IN THE JEJUNUM OF BOTH MALES AND FEMALES TO DEFINE SEX-SPECIFIC INFLAMMATORY RESPONSES.

1:00 PM - 2:00 PM



**RASHID SYED, BIOLOGY MAJOR**

FACULTY MENTOR: IRYNA M. ETHELL, DIVISION OF BIOMEDICAL SCIENCES

**JZL-184 INCREASES 2-AG LEVELS AND REDUCES ANXIETY-LIKE BEHAVIORS IN A MOUSE MODEL OF FRAGILE X SYNDROME**

INDIVIDUALS WITH FRAGILE X SYNDROME (FXS) EXHIBIT INTELLECTUAL DEFICITS AND AUTISTIC-LIKE BEHAVIOR, SUCH AS HYPERSENSITIVITY AND ANXIETY, WHICH CAN BE OBSERVED IN THE FRAGILE X MENTAL RETARDATION GENE 1 KNOCKOUT (FMR1 KO) MICE (DAHLHAUS 2018). JZL-184, AN IRREVERSIBLE MONOACYLGLYCEROL LIPASE INHIBITOR THAT PROMOTES ENDOCANNABINOID (ECB) SIGNALING BY INCREASING 2-ARACHIDONOLYLGLYCEROL (2-AG) LEVELS, IS ONE TREATMENT THAT HAS SHOWN TO REDUCE ANXIETY-LIKE BEHAVIOR IN FMR1 KO MICE (JUNG, 2012). WE HYPOTHEZIZE THAT INCREASED 2-AG LEVELS MAY NORMALIZE CORTICAL RESPONSES AND BEHAVIORAL PHENOTYPES IN FMR1 KO MICE. TO TEST THIS, ELECTROENCEPHALOGRAPHY (EEG) WAS USED TO ASSESS ELECTROCORTICAL ACTIVITY IN VEHICLE-TREATED AND 8MG/KG JZL-184 TREATED MICE AT 4H OR 24H POST-TREATMENT. FURTHERMORE, THE OPEN FIELD AND ELEVATED PLUS-MAZE TASKS WERE USED TO ASSESS ANXIETY-LIKE BEHAVIOR AND HYPERACTIVITY. PRELIMINARY ANALYSIS OF ELECTROCORTICAL ACTIVITY SHOWS IMPAIRMENTS IN ALPHA-LOW GAMMA AND THETA-LOW GAMMA COUPLING IN LEFT AND RIGHT FRONTAL REGIONS IN FMR1 KO MICE COMPARED TO WT MICE. WE PREDICTED JZL-184 ADMINISTRATION WOULD NORMALIZE THESE IMPAIRMENTS AND IMPROVE ASSOCIATED BEHAVIORS. COMPARISONS BETWEEN VEHICLE-TREATED AND JZL-184-TREATED FMR1 KO MICE REVEALED SIGNIFICANT TREATMENT EFFECTS IN ALL MEASURES, AND POST HOC PAIRWISE COMPARISONS SHOWED A SIGNIFICANT DECREASE IN HYPERACTIVITY AND ANXIETY MEASURES. OUR RESULTS DEMONSTRATE UPREGULATION OF 2-AG LEVELS FOLLOWING JZL-184 TREATMENT REDUCES ANXIETY-LIKE BEHAVIORS AND HYPERACTIVITY IN AN FXS MOUSE MODEL. THESE FINDINGS SUPPORT A ROLE FOR ECB SYSTEM MODULATION AS A TREATMENT FOR FXS. INDIVIDUALS WITH FXS CAN BENEFIT FROM TARGETED ECB SYSTEM MODULATION AS IT MAY REDUCE ANXIETY AND IMPROVE THE WELFARE OF INDIVIDUALS WITH FXS.

1:00 PM - 2:00 PM

**HAFAH MIRZA, MATHEMATICS FOR TEACHERS OF SECONDARY SCHOOL; SAM BOLOORIAN**

FACULTY MENTOR: LAWRENCE ROSENBLUM, PSYCHOLOGY

**ARE WE CONSCIOUSLY AWARE WHEN PEOPLE ALIGN TO OUR ACCENTED SPEECH?**

DURING SPOKEN COMMUNICATION, SPEAKERS TEND TO CONVERGE THEIR SPEECH TO THEIR PARTNER'S PRONUNCIATION PATTERNS (GOLDINGER, 1998). THIS IS ALSO EVIDENCED WHEN LISTENERS ALIGN TO FOREIGN ACCENTS AND COMPREHEND ACCENTED SPEECH BETTER AFTER IMITATING AN ACCENTED SPEAKER (ADANK ET AL., 2010). HOWEVER, IT IS NOT CLEAR IF ACCENTED SPEAKERS ARE CONSCIOUSLY AWARE WHEN LISTENERS ALIGN TO THEIR ACCENTS. THE CURRENT STUDY WILL THEREFORE EXAMINE THE ABILITY OF RATERS IN IDENTIFYING SPANISH ACCENTED SPEAKERS. THE STIMULI FROM LEWANDOWSKI AND NYGAARD'S STUDY (2018) WILL BE USED IN WHICH TWO PRERECORDED SPANISH ACCENTED MODELS AND TWO NATIVE ENGLISH MODELS HAVE RECITED 150 WORDS OUT LOUD FROM A GIVEN WORD LIST. THEN TWENTY-THREE NATIVE ENGLISH SPEAKERS WERE GIVEN THE TASK OF REPEATING (SHADOWING) THE WORDS SPOKEN BY THE MODELS. IN THE CURRENT STUDY, WE WILL PRESENT THE SHADOWED WORDS TO NAÏVE NATIVE ENGLISH AND SPANISH ACCENTED RATERS AND WILL ASK THEM TO IDENTIFY THE WORDS OF THE SHADOWERS WHO SHADOWED A SPANISH-ACCENTED SPEAKER. EACH TRIAL WILL INCLUDE TWO UTTERANCES OF THE SAME WORD SHADOWED BY THE SAME PERSON (ONE UTTERANCE SHADOWING THE SPANISH ACCENTED MODEL AND ANOTHER SHADOWING THE NATIVE ENGLISH MODEL). THEN THE NAÏVE RATERS WILL BE ASKED TO DETERMINE WHICH

UTTERANCE WAS A SHADOW OF THE SPANISH SPEAKING MODEL. BASED ON THE FINDINGS OF SCALES ET AL. (2006), WE PREDICT THAT NATIVE ENGLISH RATERS WILL PERFORM BETTER AT IDENTIFYING THE SPANISH ACCENTED SPEECH COMPARED TO THE SPANISH-ACCENTED RATERS. THE RESULTS SHOULD HAVE IMPLICATIONS FOR INDIVIDUALS WITH HEARING AND LANGUAGE IMPAIRMENTS.

2:15 PM - 3:15 PM

#### JANICE KIM, BIOLOGY

FACULTY MENTOR: AUGUSTINE KPOSOWA, DEPARTMENT OF SOCIOLOGY

#### MINORITY CONCENTRATION AND COVID-19 MORTALITY IN THE UNITED STATES

COVID-19 IS A HIGHLY INFECTIOUS RESPIRATORY DISEASE THAT LED TO A GLOBAL PANDEMIC WITHIN THREE MONTHS OF ITS FIRST CASE. THE FIRST CASE BEGAN IN WUHAN, CHINA IN DECEMBER 2019, AND THE VIRUS QUICKLY SPREAD WORLDWIDE. ONE OF THE MOST HIGHLY COVID-CONCENTRATED NATIONS IS THE UNITED STATES WHICH HAS BEEN CONSISTENTLY ACCUMULATING CASES SINCE LATE JANUARY 2020. ON MARCH 11 2020, THE WORLD HEALTH ORGANIZATION (WHO) DECLARED THE OUTBREAK A PANDEMIC OF PUBLIC HEALTH SIGNIFICANCE. SINCE THEN, NUMEROUS STUDIES HAVE BEEN CONDUCTED WITH THE AIMS OF INVESTIGATING FACTORS THAT CONTRIBUTE TO MORBIDITY AND MORTALITY. HOWEVER, SUCH RESEARCH HAS BEEN MAINLY FOCUSED ON MEDICINE RATHER THAN ASPECTS PERTAINING TO SOCIOLOGY. THE PURPOSE OF THIS STUDY IS TO EXAMINE THE ASSOCIATION BETWEEN MINORITY STATUS, MINORITY CONCENTRATION AND COVID-19 MORTALITY ACROSS U.S. STATES. THE STUDY ALSO CONTROLS FOR STATE DEMOGRAPHICS TO AVOID DRAWING FALSE CONCLUSIONS. DATA UTILIZED WERE COMPILED FROM PUBLIC SOURCES INCLUDING THE CENTERS FOR DISEASE CONTROL AND PREVENTION AND THE CENSUS BUREAU. FINDINGS SHOWED SIGNIFICANT CORRELATION BETWEEN MINORITY POPULATIONS AND COVID-19 MORBIDITY. HOWEVER, THE EFFECT OF BLACK RACE WAS STRONGER ON COVID MORTALITY THAN THAT OF OTHER RACE GROUPS.

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#### THANIYA SHANKAR, NEUROSCIENCE

FACULTY MENTOR: KATHERINE STAVROPOULOS, GRADUATE SCHOOL OF EDUCATION

#### MEASURING EMPATHY AND THEORY OF MIND VIA ZOOM IN CHILDREN WITH AUTISM SPECTRUM DISORDER

INDIVIDUALS WITH AUTISM SPECTRUM DISORDER (ASD) MAY STRUGGLE WITH THEORY OF MIND (TOM), COGNITIVE EMPATHY, AND AFFECTIVE EMPATHY. AS CRITICAL ATTRIBUTES THAT AFFECT SOCIAL COGNITION, TOM REFERS TO THE ABILITY TO UNDERSTAND THE KNOWLEDGE OR BELIEFS OF OTHERS, COGNITIVE EMPATHY INVOLVES ANALYZING THE EMOTIONAL STATES OF OTHERS, AND AFFECTIVE EMPATHY RELATES TO THE ABILITY TO SHARE AND UNDERSTAND THOSE EMOTIONAL STATES. PREVIOUS RESEARCH HAS INVESTIGATED THESE THREE CONSTRUCTS TO ANALYZE THE CAPACITIES OF EACH IN ASD INDIVIDUALS. DUE TO COVID-19, RESEARCHERS HAVE NOT BEEN ABLE TO CONDUCT THESE TESTS IN PERSON. THEREFORE, IT IS CRUCIAL TO DEVELOP A VIRTUAL WAY OF MEASURING THESE PSYCHOLOGICAL CONSTRUCTS TO BETTER DETERMINE SOCIAL FUNCTIONING IN CHILDREN WITH ASD. IN THIS STUDY, WE WILL RECRUIT A GROUP OF PARTICIPANTS AGES 3-8 YEARS OLD WITH AND WITHOUT ASD. WE WILL USE A MODIFIED VERSION OF THE SALLY-ANNE TEST, A COMMON TOM ASSESSMENT, TO EVALUATE CHILDREN'S ABILITY TO DISTINGUISH BETWEEN THEIR OWN PERSPECTIVES AND OTHERS'. TO MEASURE EMPATHY, PARTICIPANTS' PARENTS WILL COMPLETE THE EMPATHY QUESTIONNAIRE (EMQUE). WE ANTICIPATE THAT CHILDREN WITH ASD

WILL DISPLAY DEFICITS IN TOM AND EMPATHY DUE TO THEIR INABILITY TO REPRESENT DIFFERENT MENTAL STATES AND EMOTIONS, EVEN MORE SO COMPARED TO IF THE TESTS WERE TAKEN IN PERSON. MEASURING EMPATHY AND TOM OVER ZOOM WILL NOT ONLY PROVIDE MEANINGFUL INSIGHTS ON SOCIAL AND COGNITIVE FUNCTIONS IN CHILDREN WITH ASD, BUT WILL ALSO SERVE AS A SUSTAINABLE MECHANISM FOR THE ENHANCEMENTS OF EDUCATIONAL APPROACHES FOR CHILDREN IN A REMOTE LEARNING ENVIRONMENT.

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#### **G. PINEDA - GENDER AND SEXUALITY STUDIES & MEDIA AND CULTURAL STUDIES**

FACULTY MENTOR: BRANDON ROBINSON, GENDER AND SEXUALITY STUDIES; SESTU SHIGEMATSU, MEDIA AND CULTURAL STUDIES

“LGBTQ+ ACTIVISM ON SOCIAL MEDIA: A REPRODUCTION OF CARCERality THROUGH TRANSPHOBIC VIOLENCE”

WHILE PREVIOUS RESEARCH FOCUSING ON VIOLENCE HAS CRITIQUED ANTI-VIOLENCE ACTIVISM, THE NEW ONLINE DIALOGUES DERIVING FROM THE UPSURGE IN THE SUPPORT OF THE #BLACKLIVESMATTER AND #TRANSLIVESMATTER MOVEMENTS ALLOW FOR INTERVENTIONS SURROUNDING TRANSPHOBIC VIOLENCE, ONLINE ACTIVISM, AND ABOLITIONISM IN MAINSTREAM DIGITAL MEDIA. MY PROJECT PROPOSES A CRITICAL APPROACH TO EXAMINING VIOLENCE AGAINST TRANSGENDER PEOPLE AND A RADICAL QUEER ANALYTIC TO STUDYING IDENTITY-BASED ACTIVISM ON TWITTER. IN APPLYING A FEMINIST RESEARCH METHODOLOGY, MY INTERDISCIPLINARY RESEARCH FRAMEWORK COMBINES THE SCHOLARLY DISCOURSES OF CARCERAL STUDIES, CRITICAL QUEER AND TRANS POLITICS, AND INTERNET STUDIES. IN CONSIDERATION FOR THE ONLINE PUBLIC OUTCRY TO A SPECIFIC PUBLIC ATTACK AGAINST THREE TRANS WOMEN OF COLOR IN WEST HOLLYWOOD OF AUGUST 2020, THIS QUALITATIVE STUDY WILL OBSERVE THE CONTEXTS OF THIS RECORDED BRUTAL ASSAULT AND HOW IT GAINED MOMENTUM INTO MAINSTREAM AWARENESS FROM MEDIA OUTLETS, POPULAR ADVOCATES, AND LGBTQ COMMUNITY ORGANIZATIONS. IN HOPES OF FORMULATING AN ABOLITIONIST INTERVENTION TO ANTI-VIOLENCE ACTIVISM, I WILL BE LINKING THE EMPIRICAL CASE OF TWITTER WITH BLACK FEMINIST THEORY AND CARCERAL POLITICS TO DEMONSTRATE HOW THE REPRODUCTION OF CARCERAL LOGICS IN CURRENT ANTI-VIOLENCE RHETORIC ON TWITTER ULTIMATELY HARMS TRANS WOMEN OF COLOR AND HENCE SHOULD NOT BE HOW WE MOVE FORWARD IN ADDRESSING VIOLENCE.

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#### **NAVA MAJLESI, PUBLIC POLICY**

FACULTY MENTOR: KIM FROST, DEPARTMENT OF PHILOSOPHY

THE IMPLICATIONS OF ADJUDICATING SEX OFFENDERS ‘NOT GUILTY BY REASON OF INSANITY’ ON THE LEGITIMACY OF THE INSANITY DEFENSE

FOLLOWING THE PROGRESSION OF THE CRIMINAL SEXUAL PSYCHOPATH (CSP) STATUTES, THE INSANITY DEFENSE REFORM ACT OF 1984, AND SEX OFFENDERS FOUND NOT GUILTY BY REASON OF INSANITY (NGRI), THIS PAPER SERVES TO ASSESS THE LEGITIMACY OF THE INSANITY DEFENSE BY DISSECTING ITS PSYCHOLOGICAL PROCESSES, PHILOSOPHICAL THEORIES, AND LEGAL IMPLEMENTATION. IT WILL CHRONOLOGICALLY DISCUSS THE INSANITY DEFENSE IN RELATION TO SOCIETY’S DEVELOPED PERCEPTION OF SEXUAL OFFENDERS AND THEIR IMPACT ON THE COMMUNITY. FURTHERMORE, IN ORDER TO COMPREHENSIVELY ASSESS THE LEGITIMACY OF A SUCCESSFUL INSANITY PLEA BY SEX OFFENDERS, I WILL ALSO ANALYZE RECIDIVISM RATES AMONG INSANE SEX OFFENDERS AND THE SUBSEQUENT EFFECTS ON THEIR



COMMUNITIES. TO APPROPRIATELY DETERMINE THE ADJUDICATION AND CRIMINAL CAREER TRAJECTORIES OF SEX OFFENDERS OVER TIME, THE LEGAL AND PSYCHOLOGICAL CHARACTERISTICS OF THESE INDIVIDUALS WILL BE EXAMINED AS WELL. THIS PAPER WILL ALLOW MULTIFACETED CONCLUSIONS TO BE DRAWN ABOUT THE LEGITIMACY OF THE INSANITY DEFENSE IN ITS CURRENT STATE BY DETERMINING THE EFFECTS OF AN NGRI VERDICT FOR SEX OFFENDERS. I HOPE TO SHED LIGHT ON THE TIMELY SIGNIFICANCE OF UNDERSTANDING AND DEDUCING REFORMS FOR THIS PARTICULAR ASPECT OF THE CRIMINAL JUSTICE SYSTEM. ADDITIONALLY, REHABILITATION, PUBLIC OPINION, AND THE METAPHYSICS OF RESPONSIBILITY ARE FURTHER DISCUSSED IN THIS PAPER RELATED TO THEIR EFFECTS ON THE NGRI VERDICT.

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**SETAREH FEIZI, PSYCHOLOGY**

FACULTY MENTOR: NICOLE RAFFERTY, EVOLUTION, ECOLOGY AND ORGANISMAL BIOLOGY

HOW DO FLORAL FUNCTIONAL TRAITS VARY ALONG AN ENVIRONMENTAL STRESS GRADIENT?

ANTHROPOGENIC CLIMATE CHANGE IS RAPIDLY ALTERING ECOLOGICAL COMMUNITIES DUE TO TRENDS IN TEMPERATURE AND PRECIPITATION. TWO IMPORTANT RESPONSES SEEN IN ECOLOGICAL COMMUNITIES ARE CHANGES IN PHENOLOGY, OR THE BIOLOGICAL TIMING OF SEASON EVENTS, AND ELEVATION. CLIMATIC WARMING IS ADVANCING THE TIMING OF PHENOLOGICAL EVENTS, SUCH AS FLOWERING AND POLLINATION. NOT ONLY THAT, BUT WARMING IS CAUSING ANIMALS AND PLANTS TO SHIFT UPWARDS IN ELEVATION TO MAINTAIN THEIR HISTORICAL TEMPERATURES AND CLIMATE. SPATIAL AND PHENOLOGICAL SHIFTS CAN IMPACT ECOSYSTEM FUNCTIONING BY INTERFERING WITH POLLINATION, AN ECOSYSTEM SERVICE THAT IS CRITICAL FOR HEALTHY AGRICULTURAL AND NATURAL SYSTEMS. THIS STUDY WILL COLLECT FLORAL PHENOLOGY AND FUNCTIONAL TRAIT DATA FROM 5 DIFFERENT PLANTS FROM DIFFERENT TRANSECTS WITH DIFFERENT ELEVATIONS FROM THE BOYD DEEP CANYON RESERVE IN PALM DESERT, CA. IN THE LAB, NUTRITIONAL FUNCTIONAL TRAITS FROM COLLECTED FLOWERS WILL HAVE THEIR SUGAR CONTENT AS WELL AS THEIR POLLEN LIPID AND CARBOHYDRATE QUANTITIES. AFTER ORGANIZING THE DATA, LINEAR MIXED EFFECT MODELS WILL BE USED TO UNDERSTAND HOW CLIMATE INFLUENCES FLORAL FUNCTIONAL TRAITS. THIS PROJECT WILL PROVIDE THE OPPORTUNITY FOR BETTER UNDERSTANDING OF HOW POLLINATION-MEDIATING FUNCTIONAL TRAITS ARE AFFECTED BY CLIMATE CHANGE.

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**ALEXANDRA VACARU, APPLIED MATHEMATICS, CONCENTRATION IN CHEMISTRY**

FACULTY MENTOR: JULIA BAILEY-SERRES, BOTANY AND PLANT SCIENCES

EXPLORING NEW STRATEGIES FOR ENGINEERING CLIMATE CHANGE RESILIENT RICE

RICE IS A GLOBALLY IMPORTANT STAPLE CROP FOR HALF THE WORLD'S POPULATION. FLOODING AND ITS ATTENDANT REDUCTION IN GROWTH AND REPRODUCTION IS AN ANNUAL THREAT, AFFECTING MORE THAN 135 MILLION HECTARES OF RAINFED LOWLAND FIELDS WHICH SUPPORT APPROXIMATELY 19% OF THE WORLD'S RICE PRODUCTION. NEW STRATEGIES FOR RESILIENCE ARE NEEDED TO ADDRESS THIS THREAT. NUTRIENT PROVISION DURING STRESS MAY BE ESPECIALLY CRITICAL FOR SHOOT MERISTEM PRIMORDIA. THESE ARE COMPRISED OF THE SLOWLY DIVIDING UNDIFFERENTIATED STEM CELL NICHE AND ADJACENT ACTIVELY DIVIDING AND DIFFERENTIATING MERISTEMATIC REGIONS THAT GIVE RISE TO THE LEAF AND FLORAL ORGANS OF THE SHOOT. TO STUDY THIS PROCESS, WE ARE MANIPULATING NUTRIENT TRANSPORTER

GENES THAT ARE UPREGULATED IN THESE CELLS UPON SUBMERGENCE. TO ASSESS THE DOWNSTREAM EFFECTS, GENE EXPRESSION, NUTRIENT METABOLITES (SUGARS AND AMINO ACIDS) AND STRESS RESILIENCE ARE MONITORED. PRESENTLY, NON-RADIOACTIVE ISOTOPE CARBON-13 ( $^{13}\text{CO}_2$ ) TRACING IS BEING ESTABLISHED TO TRACK THE MOVEMENT (FLUX) OF METABOLITES TO THE SHOOT MERISTEM REGIONS IN RESPONSE TO SUBMERGENCE AND A PERIOD OF RECOVERY. MANIPULATION OF METABOLITE TRANSPORT MECHANISMS MAY BENEFIT YIELDS OF RICE AND OTHER CROPS, AS THE FREQUENCY AND DURATION OF FLOODS INCREASE DUE TO GLOBAL CLIMATE CHANGE.

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### MARCO DUENAS, BIOLOGY

FACULTY MENTOR: AMY LITT, DEPARTMENT OF BOTANY AND PLANT SCIENCES

TITLE: FUNCTIONAL VALIDATION OF PPHKT1 GENE USING ATHKT1 ARABIDOPSIS MUTANTS

SALINE SOIL NEGATIVELY AFFECTS PLANT GROWTH. TO COMBAT THIS, PLANTS HAVE MANY METHODS TO RELIEVE SALINITY STRESS. ONE IS TO CONTROL ION MOVEMENT FROM ROOT TO SHOOT BY CONTROLLING THE LOADING OF  $\text{Na}^+$  IN THE TRANSPIRATION STREAM. THE GENE HKT1 IS KNOWN TO PLAY A ROLE IN THE REMOVAL OF  $\text{Na}^+$  FROM THE SHOOT TO ROOT. ALMOND IS A SALT-SENSITIVE CROP, MEANING THE ROOTSTOCK IS VITAL FOR CULTIVATION IN SALT-AFFECTED REGIONS. IN THIS STUDY, WE COMPLEMENTED THE ARABIDOPSIS ATHKT1 KNOCKOUT MUTANT WITH HKT1 ORTHOLOG (PPHKT1) FROM THE ALMOND ROOTSTOCK 'NEMAGUARD'. UTILIZING ARABIDOPSIS THALIANA, TRANSGENIC LINES WERE MADE IN ATHKT1 BACKGROUND WITH THE CONSTITUTIVE PROMOTER (PPHKT1OE2.2) AND THE NATIVE PROMOTER (PPHKT1NP6). THESE LINES WERE TREATED WITH SALT STRESS TO VALIDATE FUNCTIONALITY OF PPHKT1. BOTH TRANSGENIC LINES SURVIVED SALT CONCENTRATIONS UP TO 120 mM NaCl. HOWEVER, THE MUTANT ATHKT1 FAILED TO SURVIVE 18 DAYS UNDER 120 mM NaCl. UNDER 90 mM NaCl TREATMENTS, THE DRY WEIGHT OF THE ATHKT1 LINES WAS MUCH LESS IN COMPARISON TO THE TRANSGENIC LINES. LATERAL ROOT GROWTH WAS ALSO LARGER IN THE TRANSGENIC LINES WHEN COMPARED TO ATHKT1 UNDER 80 mM NaCl SOLUTIONS. THE TRANSGENIC LINES SHOWED LOWER ELECTROLYTE LEAKAGE AND HIGHER RELATIVE WATER CONTENT COMPARED TO ATHKT1, MEANING THAT TRANSGENIC PLANTS DID BETTER IN CONDITIONS OF INCREASED SALT CONCENTRATION DUE TO THE MAINTENANCE OF THE INTEGRITY OF THE MEMBRANES. THE EXPRESSION ANALYSES SHOWED THAT PPHKT1 INDUCTION WAS SUCCESSFUL, WHICH CONFIRMED THAT BOTH OVER-EXPRESSION AND NATIVE EXPRESSION OF PPHKT1 CAN COMPLEMENT SALT FUNCTION IN HKT1 ARABIDOPSIS MUTANTS.

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### ABEL VARGAS, UNDERGRADUATE PROGRAM IN BIOCHEMISTRY

FACULTY MENTOR: KATHERINE A. BORKOVICH, DEPARTMENT OF MICROBIOLOGY AND PLANT PATHOLOGY

PTH-11 LIKE GPCRS REGULATE GROWTH IN NEUROSPORA CRASSA

EUKARYOTIC ORGANISMS INTERROGATE THEIR SURROUNDINGS USING G-PROTEIN COUPLED RECEPTORS (GPCRS). FUNGI UTILIZE GPCRS TO SENSE AND RESPOND TO POTENTIAL CARBON SOURCES FOUND IN THE ENVIRONMENT. IN PATHOGENIC FUNGI, CERTAIN GPCRS ARE CRITICAL FOR INFECTION OF THE HOST ORGANISM. FOR EXAMPLE, THE FUNGAL PLANT PATHOGEN MAGNAPORTHE ORYZAE REQUIRES THE PREDICTED GPCR KNOWN AS PTH11 TO FORM STRUCTURES NECESSARY FOR PATHOGENESIS. LARGE GENE FAMILIES OF CONSERVED PTH-11 LIKE GPCRS

HAVE BEEN FOUND IN BOTH PATHOGENIC AND SAPROPHYTIC MEMBERS OF THE DIVISION PEZIZOMYCOTINA, INCLUDING 27 GENES IN THE MODEL FILAMENTOUS FUNGUS *NEUROSPORA CRASSA*. PREVIOUS RESEARCH HAS SHOWN THAT THE HETEROTRIMERIC G PROTEIN GA SUBUNITS *GNA-1* AND *GNA-3* ARE REQUIRED FOR NORMAL GROWTH ON CELLULOSE MEDIUM AND TRANSCRIPTION OF ENZYMES NECESSARY FOR CELLULOSE METABOLISM TO OCCUR. WE HYPOTHEZIZE THAT IF A PTH11 LIKE GPCR LIES UPSTREAM OF ONE OF THESE TWO GA SUBUNITS, THEN STRAINS LACKING THAT PTH11 LIKE GPCR WILL EXHIBIT GROWTH DEFECTS WHEN GROWN ON CELLULOSE CONTAINING MEDIA. DIRECT INOCULATION DATA INDICATES THAT TEN OF THE MUTANTS SHOWED A DECREASE IN GROWTH AND FIVE SHOWED INCREASED GROWTH, SUGGESTING THAT THOSE GPCRS MIGHT ACT UPSTREAM OF THE GA SUBUNITS. SINCE NO SINGLE GENE-DELETION MUTANTS APPEAR TO AFFECT CELLULOSE GROWTH AS DRAMATICALLY AS MUTANTS LACKING EITHER GA, IT IS LIKELY THAT THE PTH-11 LIKE GPCRS THAT SENSE CELLULOSE FUNCTION IN TANDEM WITH EACH OTHER.

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### JORDAN ROLSMA, BIOENGINEERING

FACULTY MENTOR: JOSHUA MORGAN, DEPARTMENT OF BIOENGINEERING

#### AN EXPANDED MATHEMATICAL MODEL OF MAMMALIAN CELL CYCLE REGULATION IN RESPONSE TO VARIED CIRCADIAN RHYTHM AND DNA DAMAGE

THE MAMMALIAN CELL CYCLE IS CHARACTERIZED BY A SERIES OF STAGES THAT REGULATE CELL GROWTH AND DIVISION AND IS DEPENDENT ON A BROAD RANGE OF INTERCELLULAR AND EXTRACELLULAR FACTORS (HUNT ET AL., 2011). AN AGING CELL IS CONSIDERED TO BE SENESCENT WHEN IT HAS FORMALLY EXITED THE CELL CYCLE AND IS NO LONGER CAPABLE OF DIVISION. IN RECENT YEARS, NUMEROUS COMPUTATIONAL MODELS HAVE BEEN CONSTRUCTED TO GAIN A COMPREHENSIVE UNDERSTANDING OF THE INTERACTIONS AMONG REGULATORY MOLECULES THAT GOVERN THIS CYCLE AND ENTRANCE INTO SENESCENCE; HOWEVER, THESE MODELS ARE OFTEN OVERSIMPLIFIED AND RELY ON DNA DAMAGE AS A SINGULAR METHOD OF SENESCENCE INDUCTANCE (ABROUDI ET AL., 2017; IWAMOTO ET AL., 2011). NOTABLY, NO CURRENT SYSTEMS EXIST TO MODEL THE COMPLEX INTERACTIONS BETWEEN REGULATORS OF THE CELL CYCLE AND CIRCADIAN RHYTHM PROTEINS, OR BIOCHEMICAL FEEDBACK LOOP MOLECULES THAT GENERATE THE CHARACTERISTIC 24-HOUR OSCILLATORY RHYTHM OF THE MAMMALIAN SLEEP-WAKE CYCLE AND MAINTAIN HOMEOSTASIS OF TEMPERATURE AND METABOLISM (HUANG ET AL., 2011; REFINETTI & MENAKER, 1992). IN ADDITION TO THE AFOREMENTIONED REGULATORY ROLES, CIRCADIAN RHYTHM PROTEINS HAVE ALSO BEEN SHOWN TO REGULATE IN VIVO SENESCENCE IN MAMMALIAN CELLS (KHAPRE ET AL., 2011). TO THIS END, I INTEND TO CONSTRUCT A RELIABLE, IMPROVED COMPUTATIONAL MODEL OF THE MAMMALIAN CELL CYCLE THAT CONSIDERS BOTH DNA DAMAGE AND CIRCADIAN RHYTHM VARIATION AS FACTORS CONTRIBUTING TO CYCLE REGULATION AND INDUCTANCE OF REVERSIBLE AND IRREVERSIBLE SENESCENCE. THIS MODEL WILL PROVIDE A MATHEMATICALLY MULTIDIMENSIONAL PERSPECTIVE OF THE CELL CYCLE AND OFFER INSIGHT INTO COMPLEX CELLULAR BEHAVIOR AND BIOMOLECULAR RELATIONSHIPS.

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### NIKHIL PUVVULA, BIOLOGY MAJOR

FACULTY MENTOR: ERICA C. HEINRICH, DIVISION OF BIOMEDICAL SCIENCES



## VARIATION IN THE ERYTHROPOIETIN RECEPTOR GENE (EPOR) IN ANDEAN HIGH-ALTITUDE RESIDENTS WITH EXCESSIVE ERYTHROCYTOSIS

THE ERYTHROPOIETIN RECEPTOR (EPOR) BINDS ERYTHROPOIETIN (EPO), A PEPTIDE HORMONE THAT PROMOTES RED BLOOD CELL PRODUCTION. EXCESSIVE ERYTHROCYTOSIS (EE) OCCURS WHEN RED BLOOD CELL PRODUCTION BECOMES EXCESSIVE ( $[Hb] \geq 21$  G/DL IN MEN AND 19 G/DL IN WOMEN) IN RESPONSE TO CHRONIC HYPOXIA. THIS CAN INCREASE BLOOD VISCOSITY AND DAMAGE THE VASCULATURE, THEREBY IMPACTING BLOOD FLOW TO TISSUES. UP TO 30% OF ANDEAN MEN DEVELOP CHRONIC MOUNTAIN SICKNESS (CMS) BY AGE 60 AS A RESULT OF EE. CMS IS ASSOCIATED WITH PULMONARY HYPERTENSION, COGNITIVE IMPAIRMENT, AND A NUMBER OF OTHER SYMPTOMS WHICH REDUCE LIFESPAN AND QUALITY OF LIFE. MEN WITH EE HAVE SIMILAR LEVELS OF CIRCULATING EPO, BUT LOWER LEVELS OF SOLUBLE EPOR, WHICH ACTS AS AN EPO SCAVENGER, COMPARED TO AGE- AND SEX-MATCHED HEALTHY CONTROLS. IT IS UNCLEAR WHAT DRIVES THIS DIFFERENCE IN SOLUBLE EPOR EXPRESSION. MY PROJECT AIMED TO DETERMINE IF GENETIC VARIATION IN THE EPOR GENE CONTRIBUTES TO EE DEVELOPMENT. TO ACCOMPLISH THIS, I EXAMINED THE SEQUENCES OF EPOR EXONS 7 AND 8 IN ANDEAN MEN WITH AND WITHOUT EE. MY PRELIMINARY DATA SUGGESTS A POSSIBLE DELETION 43 BASE PAIRS UPSTREAM OF EXON 7 IN ALL ANDEAN PARTICIPANTS. THIS DELETION WAS OBSERVED IN 100% OF SAMPLES (N=6), OF WHICH 66% HAD EE (N=4) AND 34% DID NOT HAVE EE (N=2). THIS DELETION MAY IMPACT EPOR EXPRESSION BY TRUNCATING THE C-TERMINAL REGULATORY DOMAIN OR MODULATING ALTERNATIVE SPLICING PATTERNS WHICH DETERMINE IF THE RECEPTOR BECOMES SOLUBLE OR MEMBRANE BOUND.

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## KARINA RIOS, APPLIED MATHEMATICS

FACULTY MENTOR: ANDREW GRAY, DEPARTMENT OF ENVIRONMENTAL SCIENCE

## POST-FIRE SOIL HYDRAULIC PROPERTIES ON DIFFERENT EROSIONAL SURFACES

FIRE IS INCREASING IN FREQUENCY AND SEVERITY IN THE WESTERN UNITED STATES, POSING A SERIOUS HAZARD TO DOWNSTREAM COMMUNITIES THROUGH INCREASED LIKELIHOOD OF FLASH FLOODS AND DEBRIS FLOWS. A MAJOR DRIVER OF THESE RUNOFF EVENTS IS REDUCED SOIL WATER INFILTRATION CAPACITY. HOWEVER, MORE DATA ACROSS RAPIDLY EVOLVING POST-FIRE SOIL SURFACES IS NEEDED TO BETTER CHARACTERIZE THIS HAZARD. THE OBJECTIVE OF THIS STUDY IS TO EVALUATE WATER INFILTRATION RATES OF POST-WILDFIRE SOILS ON CENTIMETER-SCALE EROSIONAL FEATURES KNOWN AS RILLS COMPARED TO MORE SHALLOWLY ERODED INTERRILL SPACES. OUR HYPOTHESIS IS THAT WATER WILL INFILTRATE FASTER IN RILL ERODED SOILS COMPARED TO LAND SURFACES AFFECTED BY SHALLOWER INTERRILL EROSION. TO CONDUCT THIS STUDY, MEASUREMENTS WERE OBTAINED USING A MINI-DISK INFILTROMETER ACROSS A RANGE OF SITES WITH DIFFERENT BURN SEVERITIES IN LEACH CANYON IN THE 2018 HOLY FIRE NEAR LAKE ELSINORE, CA. THERE WERE A TOTAL OF THREE FIELD VISITS FOR MONITORING AND SAMPLE COLLECTION: 4, 19, AND 25 MONTHS AFTER FIRE. DURING THE 25 MONTH PERIOD OF POST-FIRE REGENERATION, WE NOTED INCREASING INFILTRATION CAPACITIES TO LEVELS COMPARABLE TO NEARBY UNBURNED REFERENCE SITES. WE FOUND GREATER INFILTRATION CAPACITIES IN RILL COMPARED TO INTERILL ZONES, CONFIRMING OUR HYPOTHESIS. THIS IS LIKELY A RESULT OF DEEPER RILL EROSION INCISING THROUGH SURFICIAL SOILS WITH FIRE-RETARDED INFILTRATION RATES PERSISTING IN INTERRILL ZONES WITH LOWER EROSION RATES. KNOWING THAT RILL-AFFECTED SOILS HAVE GREATER INFILTRATION CAPACITIES THAN IN INTERRILL DOMAINS ALLOWS FOR MORE COMPLEX AND THOROUGH UNDERSTANDING OF POST-FIRE HYDROLOGIC PARAMETERS, WHICH SHOULD BE INCORPORATED INTO RUNOFF AND EROSION MODELS.

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**CECILIA SLOGO, DANCE**

FACULTY MENTOR: NI'JA WHITSON, CHASS DEPARTMENT

**DANCE FILM PERSEQUI**

THE WORK PERSEQUI INVESTIGATES THE NON-LINEARITY AND REPRODUCTION OF THE COLLECTIVE MEMORY AND ITS RESIDUALITY IN THE BODY. IT'S INSPIRED BY HISTORICAL EVENTS AND THEIR ONGOING REPERCUSSIONS IN CONTEMPORARY SOCIETIES. THE IDEAS BEHIND THIS PROJECT STARTED TO ARISE IN THE MIDST OF THE PANDEMIC AND THE POLITICAL CLIMATE IN THE U.S. DURING THE YEAR 2020. THE CONNECTIONS THROUGH GEOGRAPHIES, GENERATIONS AND CULTURES BECAME MORE PALPABLE. AS A STARTING POINT THE RESEARCH WAS FOCUSED ON THE RECENT HISTORICAL EVENTS THAT TOOK PLACE IN ARGENTINA DURING THE 70'S, WHERE ITS ONGOING REPERCUSSIONS CAN BE WITNESSED AS DEEP AND COMPLEX CRACKS IN THE SOCIETY AND ITS MANIFESTATIONS. PERSEQUI HAS BEEN AN INCREDIBLE EXPERIENCE THAT OPENED NEW SENSITIVITIES, NEW WAYS OF SEEING THE INDIVIDUAL IN THE COLLECTIVE AND THE INTERSECTIONS OF PAST AND PRESENT. THE EXPLORATION OF THIS PIECE INVOLVED AN INWARD AND OUTWARD ANALYSIS AND OBSERVATION. THROUGH THIS PROCESS THE IDEA OF THE EXISTENCE OF A COLLECTIVE MEMORY AND HOW IT OPERATES IN OUR BODIES BECAME THE VEHICLE TO EXPRESS DEEPER LAYERS OF COMPLEXITY MANIFESTED IN THE EMBODIMENT OF A CULTURE. THESE FINDINGS INFORMED OTHER PRACTICES AND EVENTUALLY THE TITLE OF THE PIECE APPEARED AS AN ATTEMPT TO DESCRIBE THE WAY THAT COLLECTIVE MEMORY OPERATES IN THE SUBCONSCIOUS. PERSEQUI: FOLLOW PERSEVERINGLY, HELPS TO ILLUSTRATE HOW COLLECTIVE MEMORY REPRODUCES AND OPERATES THROUGH TIME, POPULATIONS AND GEOGRAPHIES.

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**MAYA GORTAREZ**

FACULTY MENTOR: BRANDON BROWN, DEPARTMENT OF SOCIAL MEDICINE, POPULATION AND PUBLIC HEALTH

**THE CATEGORY BEING ME: A DIALOGUE BETWEEN RACE, CULTURE, AND IDENTITY**

IDENTITY, SOCIAL AND PERSONAL, IS THE QUALITIES, BELIEFS, PERSONALITY, AND FEATURES THAT MAKE A PERSON. IT IS LARGELY CONNECTED WITH THE QUESTION: "WHO ARE YOU?" AND RELATES TO OUR BASIC VALUES THAT DICTATE THE CHOICES WE MAKE IN ALL ASPECTS OF OUR LIVES. HOWEVER, IT IS RARE THAT OUR IDENTITIES ARE CHOSEN BY OURSELVES AND ARE OFTEN DECIDED BY DOMINANT CULTURE AND SOCIAL CONTEXT. SINCE SELF-CATEGORIZATION IS DEPENDENT ON OTHER PEOPLE AND GROUPS, THERE ARE OFTEN IMPLICATIONS IF ONE'S OWN GROUP/CATEGORY REJECTS THEM FOR LACK OF KNOWLEDGE OF IMPORTANT IDENTIFIERS SUCH AS LANGUAGE, LOCATION, CULTURAL KNOWLEDGE, ETC. THIS HAS REDEFINED THE QUESTION: "WHO ARE YOU?" FOR PEOPLE WHOSE IDENTITIES ARE CONTESTED BY OTHERS AND BY THOSE WHO OCCUPY THE SPACES THEY ALSO FEEL THEY, "BELONG TO".

THIS CAPSTONE'S GOALS ARE TO HOST A SET OF INTERVIEWS WITH MEMBERS OF THE UCR STUDENT BODY TO FOSTER A BETTER UNDERSTAND OF THE FEELING OF ALIENATION AND CONFUSION WHEN IT COMES TO CULTURAL, PERSONAL, AND SOCIETAL IDENTITY. THE PROJECT FEATURES A SIX-EPIISODE SERIES THAT CONSISTS OF TWO-EPIISODE ARCS WITH INTERVIEW QUESTIONS BASED OFF THESE DISTINCT CATEGORIES: FAMILY, SOCIETY, AND SELF. WITH A DIVERSE MAJORITY IT IS IMPORTANT TO UNIFY THOSE WHO FEEL DISENFRANCHISED BY THEIR OWN CULTURAL BACKGROUND. THE CONVERSATION, WHICH IS UNPOPULAR IN MOST CULTURE SPECIFIC COMMUNITIES, AND THE REALIZATION THAT THE LOSS OF IDENTITY DUE TO CULTURAL ALIENATION IS NOT A SINGULAR EXPERIENCE CAN HELP THOSE IMPACTED TO CREATE A NEW IDENTITY AND/OR BETTER UNDERSTAND THEIR OWN.

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**STEPHANIE PADILLA, THEATRE/SOCIOLOGY**

FACULTY MENTOR: BELLA MERLIN, THEATRE, FILM, AND DIGITAL PRODUCTION

**SALIENCE AND PROMINENCE OF AN "ACTORS IDENTITY" ABSTRACT**

I PROPOSE TO SHARE MY EMERGING PROJECT ABOUT THE INDIVIDUAL ASSIGNED IMPORTANCE TO AN "ACTORS IDENTITY". THE PROPOSED PROJECT WILL MAKE A CONNECTION BETWEEN QUALITATIVE RESEARCH AND CREATIVE OUTPUT AS I'LL BE STUDYING THE HIGH COMMITMENT AND IMPORTANCE OF AN "ACTOR'S IDENTITY" ALONG WITH THE NOTABLE CORRELATION WITH MENTAL HEALTH. THE FINDINGS WILL BE UNVEILED DURING A SHORT DOCUMENTARY THAT IS CURRENTLY IN PROGRESS. THIS SUBJECT IS EXTREMELY IMPORTANT AS MENTAL ILLNESS IS WIDESPREAD IN THE ACTING COMMUNITY THAT IS MORE THAN OFTEN MISUNDERSTOOD. THIS PROJECT WILL LEGITIMIZE THE HARSH EMOTIONS THAT COMES WITH REJECTION AND REDUCE THE STIGMA SURROUNDING THE CRAFT. SINCE THIS PROJECT IS STILL IN PROGRESS, I WILL PRESENT THE AUDIENCE WITH BACKGROUND INFORMATION SUCH AS METHODOLOGY, AND MY EXPECTED OUTCOMES OF MY RESEARCH. MORE SPECIALLY I WILL INTRODUCE HOW I CAME UP WITH MY RESEARCH IDEA AND HOW PERSONAL THIS SUBJECT IS TO ME AND MANY OTHERS ACTORS AS WELL. I PLAN ON GOING INTO DETAIL ABOUT THE FINDINGS THAT HAVE BEEN UNCOVERED SO FAR. I WILL UNVEIL THEM IN A POWERPOINT WITHIN A SPAN OF TEN MINUTES. AS THIS PROJECT IS STILL IN DEVELOPMENT, I WILL PROVIDE A THEORIZED EXPLANATION AS TO WHY ACTORS ARE ATTACHED TO AN IDENTITY THAT IS NOT RATIONAL TO KEEP; HOWEVER, I WILL EMPHASIZE THAT IS JUST AN EDUCATED THEORY. IN ADDITION I WILL ALSO SHOWCASE A SMALL SNIPPET OF MY DOCUMENTARY THAT WILL GIVE THE AUDIENCE A FEEL FOR THE PIECE.

2:15 PM - 3:15 PM

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**MAYA IBELAIENE, BIOLOGY**

FACULTY MENTOR: PRUE TALBOT, MOLECULAR, CELL, AND SYSTEMS BIOLOGY

**ELECTRONIC CIGARETTES: A LITERATURE REVIEW ON THE EFFECTS OF FLAVOR CHEMICALS ON EARLY EMBRYONIC DEVELOPMENT**

ELECTRONIC CIGARETTES (ECs) ARE OFTEN ADVERTISED AS "SAFER" THAN TOBACCO CIGARETTES. AS A RESULT, PREGNANT WOMEN WHO CANNOT QUIT SMOKING TOBACCO CIGARETTES HAVE SOMETIMES SWITCHED TO ELECTRONIC CIGARETTES. IN FACT, 7.0% OF WOMEN REPORT USING EC'S AT SOME POINT IN THEIR PREGNANCY, WHILE 1.4% REPORT USING ECs DURING THE LAST 3 MONTHS OF PREGNANCY. ECs AEROSOLS CONTAIN HIGH CONCENTRATIONS OF FLAVOR CHEMICALS, SUCH AS CINNAMALDEHYDE, VANILLIN, AND MENTHOL, WHICH HAVE THE POTENTIAL OF BINDING TO TRANSIENT RECEPTOR POTENTIAL (TRP) CHANNELS. SEVENTEEN TRP RECEPTORS WERE EXPRESSED AT VARIOUS STAGES OF EARLY HUMAN DEVELOPMENT INCLUDING: TRPA1, TRPV1, TRPV3, TRPV4, TRPV6, TRPM2, TRPM5, TRPM4, TRPM7, TRPM8, TRPC3, TRPC6, TRPC7, TRPML1, TRPML2, TRPP1, AND TRPP3. THIS REVIEW WILL EVALUATE THE TRP RECEPTORS AND THEIR ROLES IN THE EARLY STAGES OF HUMAN DEVELOPMENT, WHILE ALSO DELVING INTO THE SCIENTIFIC LITERATURE THAT ILLUSTRATES THAT FLAVORED CHEMICALS IN ELECTRONIC CIGARETTES ADVERSELY AFFECT HUMAN EMBRYOS THROUGH THESE TRP RECEPTORS. THE PURPOSE OF THIS REVIEW IS TO ENCOURAGE PREGNANT WOMEN NOT TO VAPE ELECTRONIC CIGARETTES UNTIL THE EFFECTS OF THEIR FLAVOR CHEMICALS ON HUMAN EMBRYOS ARE FULLY UNDERSTOOD AND PROVIDE INFORMATION THAT WILL POTENTIALLY DETER PEOPLE FROM SMOKING ELECTRONIC CIGARETTES IN GENERAL. 2:15 PM - 3:15 PM

### NAHAL KHALKHALI, NEUROSCIENCE

FACULTY MENTOR: MARTIN M. RICCOMANGO, UCR MOLECULAR, CELL AND SYSTEMS BIOLOGY

STUDY THE ROLE OF CAS FAMILY ADAPTOR PROTEINS IN THE MIGRATION OF PRECEREBELLAR NEURONS

THE PRECEREBELLAR SYSTEM CONSISTS OF SEVERAL HINDBRAIN NUCLEI THAT PROVIDE INPUT INTO THE CEREBELLUM AND INCLUDE THE PONTINE NUCLEUS (PN) – WHICH IS SUBDIVIDED INTO THE BASAL PONTINE NUCLEUS (BPN) AND RETICULOTEGMENTAL NUCLEUS (RTN) AS WELL AS THE INFERIOR OLIVARY NUCLEUS (ION), EXTERNAL CUNEATE NUCLEUS (ECN) AND LATERAL RETICULAR NUCLEUS (LRN). COLLECTIVELY, THESE FIVE NUCLEI ARE THE SOURCE OF ALL MOSSY FIBER AND CLIMBING FIBER INPUT INTO THE CEREBELLUM, AND THEIR FUNCTION IS IMPORTANT FOR RELAYING MESSAGES OF COORDINATION AND CONTROLLING THE AUTOMATED SYSTEMS OF THE BODY. DURING DEVELOPMENT, THE NEURONS CONTRIBUTING TO THE BPN AND RTN ORIGINATE FROM THE DORSAL NEUROEPITHELIUM OF THE LOWER RHOMBIC LIP AND MIGRATE ROSTRO-VENTRALLY THROUGH A TANGENTIAL MIGRATORY STREAM KNOWN AS THE ANTERIOR EXTRAMURAL STREAM (AES) TO FORM THE ADULT PN. HERE WE AIM TO DISSECT THE ROLES OF A FAMILY OF ADAPTOR PROTEINS WITH KNOWN FUNCTIONS IN CELL ADHESION AND MIGRATION (CAS FAMILY) DURING HINDBRAIN DEVELOPMENT AND PRECEREBELLAR NUCLEI FORMATION.

2:15 PM - 3:15 PM

### KEVIN FLORES, B.S. ENTOMOLOGY

FACULTY MENTOR: QUINN S. MCFREDERICK, DEPARTMENT OF ENTOMOLOGY

PHYLOGENETIC ANALYSES OF A PECTATE LYASE, HAMP-DOMAIN CONTAINING HISTIDINE KINASE, AND RESPONSE REGULATOR TRANSCRIPTION FACTOR GENE FOUND IN THE APILACTOBACILLUS MICHENERI CLADE

MICROBES ARE ESSENTIAL TO BEE HEALTH, SO IT'S IMPORTANT TO UNDERSTAND THEIR FUNCTIONAL ROLE AND THE POSSIBLE IMPACTS THESE FUNCTIONS CAN HAVE ON THE HOST. UNFORTUNATELY THOUGH, WILD BEE MICROBIOMES HAVE BEEN POORLY UNDERSTOOD AND THEIR IMPACTS ON HOST HEALTH IS STILL UNKNOWN. TO FILL THIS GAP, OUR LAB AIMS TO DISCOVER MORE ABOUT THE RELATIONSHIP BETWEEN WILD BEES AND THEIR ASSOCIATED MICROBIOTA. WE HAVE RECENTLY IDENTIFIED SOME QUORUM SENSING GENES IN THE APILACTOBACILLUS MICHENERI CLADE, SO WE EXPLORED THE EVOLUTIONARY HISTORY OF THESE GENES TO KNOW THEIR ORIGIN, WHICH CAN GIVE US INSIGHT INTO THEIR FUNCTION. WE DID THIS BY FIRST USING KEGG TO FIND THE ACCESSION NUMBERS FOR THE QUORUM SENSING GENES AND THEN WE CARRIED OUT A BLAST SEARCH FOR THE AMINO ACID SEQUENCES FOR THE GENES IN NCBI. AFTERWARDS, WE ALIGNED THE SEQUENCES AND THEN PERFORMED MAXIMUM LIKELIHOOD PHYLOGENETIC ANALYSES AND VISUALIZED THE RESULTING TREES USING MESQUITE AND THE HIGH-PERFORMANCE COMPUTING CLUSTER AT UCR. WE FOUND THAT THE RESULTING GENE GENEALOGIES SHOWCASED BRANCHING PATTERNS SIMILAR TO THAT OF THE SPECIES TREE OF LACTOBACILLI. THIS INDICATES THAT THE APILACTOBACILLUS MICHENERI CLADE INHERITED THESE GENES THROUGH VERTICAL TRANSFER. FOR FUTURE WORK, WE INTEND TO CARRY OUT ASSAYS TO SEE WHETHER THESE GENES ARE ACTUALLY FUNCTIONAL, AND IF SO, WE WANT TO SEE WHETHER REPRESSING THE EXPRESSION OF THESE GENES CAN HAVE ANY EFFECTS ON THE DEVELOPMENT OF BEES.

2:15 PM - 3:15 PM

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**DYLAN VOORHIS, HISTORY**

FACULTY MENTOR: THOMAS COGSWELL, HISTORY

THE EVOLUTION OF THE CRUSADE AGAINST EVOLUTION

I AM STUDYING THE HISTORY OF ANTI-EVOLUTION CASES AT AND AROUND THE TIME OF THE SCOPES TRIAL OF 1925, A LEGAL CASE AGAINST THE TEACHING OF EVOLUTION IN HIGH SCHOOLS IN TENNESSEE. THE RESEARCH FOCUSES ON THE USE OF SCHOOL NEWSPAPERS, JOURNALS, DIARIES, AND OTHER MATERIALS CONNECTED TO OTHER ANTI-EVOLUTION LEGISLATION AND CASES IN ORDER TO DOCUMENT THE CHANGES IN THE CRUSADE AGAINST THE THEORY OF EVOLUTION. THIS RESEARCH WILL HIGHLIGHT A CONTEST BETWEEN SCIENCE AND FAITH IN THE UNITED STATES THAT SPANS OVER 100 YEARS AND IS STILL BEING WAGED TODAY. THE BATTLES BETWEEN FAITH AND SCIENCE SPAN CITIES, CONTINENTS, AND CENTURIES.

3:30PM – 4:30 PM

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**MONOLINA SHIL, PSYCHOLOGY**

FACULTY MENTOR: EDWARD KORZUS, PSYCHOLOGY

HOW DO WE OVERCOME IRRATIONAL FEARS?: SAFETY LEARNING AND ITS UNDERLYING NEURAL MECHANISMS

FEAR IS A FUNDAMENTAL EMOTION THAT HAS A PROFOUND INFLUENCE ON HOW HUMANS INTERACT WITH AND RESPOND TO THEIR SURROUNDINGS. WHILE FEAR GENERALIZATION MAY TRIGGER IRRATIONAL FEAR, OVERGENERALIZED FEAR HAS BEEN CORRELATED WITH SEVERAL CLINICAL CONDITIONS, INCLUDING ANXIETY DISORDERS AND POSTTRAUMATIC STRESS DISORDER (PTSD). STUDIES HAVE REVEALED THAT MEDIAL PREFRONTAL CORTEX (MPFC) CIRCUIT-LEVEL MECHANISMS SUPPORT FEAR DISCRIMINATION LEARNING, ALLOWING INDIVIDUALS TO DISTINGUISH BETWEEN SAFETY AND DANGER. HUMANS HAVE THE ABILITY TO DECREASE THEIR GENERALIZED FEAR THROUGH SAFETY LEARNING; HOWEVER, THE MECHANISMS THAT UNDERLIE SAFETY LEARNING TO OVERCOME IRRATIONAL FEARS REMAIN UNCLEAR. THE PROJECT INTEGRATES NEUROIMAGING TECHNIQUES WITH COMPUTER ANALYTICS TO EXAMINE THE MECHANISMS OF SAFETY LEARNING INVOLVING THE RESPONSE TO IRRATIONAL FEARS AFTER MULTIPLE EXPERIENCES WITH FEARFUL BUT NOT DANGEROUS STIMULI. DATA FROM BEHAVIORAL TESTING WITH MICE MODELS THROUGH LARGE-SCALE IMAGING OF NEURAL DYNAMICS, USING CALCIUM BIOSENSOR GCAMP AND HEAD-MOUNTED MICROSCOPES, PROVIDES INSIGHT INTO THE MPFC CIRCUIT-LEVEL MECHANISMS THAT SUPPORT FEAR DISCRIMINATION LEARNING IN OVERCOMING IRRATIONAL FEARS. ANALYSIS REVEALS THE INVOLVEMENT OF CIRCUIT-LEVEL MECHANISMS IN THE DISAMBIGUATION BETWEEN SUCH IRRATIONAL FEARS AND SAFETY DURING FEAR ACQUISITION AND FEAR CONSOLIDATION.

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**HARRISON SELL, HISTORY**

FACULTY MENTOR: GEORG MICHELS, DEPARTMENT OF HISTORY

**VYOLA ORTNER AND THE PROGRESSIVE MOVEMENT OF AGUA CALIENTE**

RELATIVELY LITTLE HAS BEEN WRITTEN ABOUT THE AGUA CALIENTE BAND OF CAHUILLA INDIANS, A CAHUILLA TRIBAL NATION LOCATED ON A RESERVATION IN PALM SPRINGS. I CAME ACROSS THIS TOPIC A YEAR AGO, BUT I REALIZED I NEEDED TIME TO RESEARCH THIS TOPIC AND GAIN ACCESS TO RELEVANT SOURCES. I DECIDED TO RESEARCH THIS TOPIC FOR MY SENIOR THESIS AND I HAVE SPENT THE LAST YEAR LEARNING MORE ABOUT AGUA CALIENTE AND THE CAHUILLA PEOPLE. MY EMERGING RESEARCH FOCUSES ON VYOLA OTNER, WHO SERVED AS TRIBAL CHAIRWOMAN OF AGUA CALIENTE'S FIRST ALL-FEMALE TRIBAL COUNCIL DURING THE 1950S AND REPRESENTED THE SO-CALLED PROGRESSIVE MOVEMENT ON AGUA CALIENTE AT THE TIME. MS. ORTNER'S POLICIES AND THE PROGRESSIVE MOVEMENT INSPIRED SIGNIFICANT CHANGES IN THE TRIBE WHICH HAD IMPORTANT EFFECTS ON THE RESERVATION COMMUNITY. I WILL BE DISCUSSING THE SIGNIFICANCE OF MS. ORTNER'S GREATEST ACCOMPLISHMENTS SUCH AS THE CONSTITUTION AND BY-LAWS OF AGUA CALIENTE, THE RELATIONSHIPS SHE ESTABLISHED BETWEEN THE TRIBE AND GOVERNMENTS ON THE LOCAL AND FEDERAL LEVEL, AND PLANNING AS WELL AS BUILDING COMMERCIAL DEVELOPMENTS ON THE RESERVATION. AS AGUA CALIENTE'S HISTORY IS UNDERSTUDIED, I HOPE MY ORIGINAL ANALYSIS WILL ADD TO A GROWING BODY OF RESEARCH.

3:30 PM - 4:30 PM

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**MARCELA LARA, RUSSIAN HISTORY**

FACULTY MENTOR: GEORG MICHELS, DEPARTMENT OF HISTORY

**VOICES OF THE 1917 REVOLUTIONS**

HISTORIANS HAVE ESTABLISHED THE IMPORTANCE OF SOLDIERS IN THE SUCCESS OF THE RUSSIAN REVOLUTIONS. WITHOUT THE SUPPORT FROM THE SOLDIERS, REVOLUTIONS WOULD NOT HAVE OCCURRED. THE MAJORITY OF THE RUSSIAN SOLDIERS ORIGINATED FROM THE PEASANT POPULATION BUT HISTORICALLY WERE RELUCTANT TO PARTICIPATE IN PREVIOUS REBELLIONS AND WERE RESPONSIBLE FOR SUPPRESSING REBELLIONS. THEREFORE THEIR SUPPORT AND PARTICIPATION IN NOT ONLY ONE REVOLUTION BUT TWO IS A SOURCE OF SIGNIFICANT INTEREST. MY RESEARCH IS DIRECTED AT ANALYZING THE MENTAL STATE OF THESE SOLDIERS. UNDERSTANDING THEIR STATE, BOTH MENTALLY AND PHYSICALLY, IS CRUCIAL TO UNDERSTANDING THEIR SUBSEQUENT ACTIONS DUE TO THESE FACTORS. MY RESEARCH ENCOMPASSES LETTERS WRITTEN BY THESE SOLDIERS TO THEIR LOVED ONES, MANY OF WHOM NEVER MADE IT TO THEIR DESTINATION. THESE LETTERS DETAIL THEIR EXPERIENCES IN WWI, THE ABUSE THEY SUFFERED AT THE HANDS OF THEIR COMMANDERS, ISOLATION, BROTHERHOOD, HOPE, AND EVENTUAL DISILLUSIONMENT THAT GAVE RISE TO THEIR RAGE. THE MAJORITY OF THE LETTERS WERE ACQUIRED FROM THE SECRETARIAT OF THE ALL RUSSIAN CENTRAL EXECUTIVE COMMITTEE AND ITS MILITARY DEPARTMENT, ALONGSIDE OTHER RESEARCH FROM HISTORIANS SUCH AS MARK D. STEINBERG. THIS SECTION OF UNDERSTANDING THE MENTAL STATES AND EMOTIONS OF SOLDIERS IS EMERGING RESEARCH IN HISTORY. WITH MY WORK, I WILL BE ABLE TO ADVANCE THIS FIELD AS WELL AS GIVE VOICE TO THE SOLDIERS WHO WERE EITHER FORGOTTEN OR SILENCED.

3:30 PM - 4:30 PM

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**ANVITHA PILLATI, BUSINESS ADMINISTRATION**

FACULTY MENTOR: ELAINE WONG, SCHOOL OF BUSINESS

**WOMEN OF COLOR IN THE WORKPLACE: THE STEREOTYPES AND MISREPRESENTATION**

WOMEN OF COLOR HAVE BEEN SUBJECT TO INTENSE STEREOTYPING AND MISREPRESENTATION IN VARIOUS FIELDS OF WORK, WHICH HAVE IMPACTED THEM IMMENSELY (HOYT, 2005). AS THE NUMBER OF WORKING WOMEN OF COLOR IN AMERICA INCREASED, SO DID THE STEREOTYPING AND MISREPRESENTATION THEY FACED. (TOOSSI & MORISI, 2017). THE QUESTIONS THAT THIS RESEARCH SEEKS TO ANSWER ARE: HOW DOES FACING STEREOTYPES AND MISREPRESENTATION IN THEIR WORKPLACES AFFECT WOMEN OF COLOR: DOES IT INHIBIT THEM FROM PERFORMING THEIR TASKS PROFICIENTLY OR DOES IT CAUSE THEM TO WORK HARDER TOWARDS BREAKING THOSE STEREOTYPES? DOES IT AFFECT THEIR PERSONALITIES? THROUGH THIS RESEARCH, THE MOST PROMINENT STEREOTYPES AND ASPECTS OF MISREPRESENTATION, AND THE PROFESSIONAL AND PERSONAL IMPACT ON WOMEN OF COLOR WILL BE BROUGHT TO LIGHT. GIVEN THAT THERE IS A GROWING NUMBER OF WOMEN OF COLOR IN LEADERSHIP POSITIONS, IT IS IMPORTANT TO UNDERSTAND THESE ISSUES AND HOW TO DISCOURAGE THEM. FOR THIS STUDY, WE WILL SURVEY A SAMPLE OF 24 WOMEN OF COLOR FROM VARIOUS WORKING SECTORS, WHO ARE PERSONAL CONTACTS, ASKING THEM QUESTIONS REGARDING THEIR EXPERIENCES, HOW THE STEREOTYPING AND MISREPRESENTATION IMPACTED THEM PROFESSIONALLY AND PERSONALLY, AND IF THEY HAVE ADVICE FOR FUTURE WOMEN OF COLOR. THE RESULTS WILL BE COMPARED TO PRE-EXISTING RESEARCH AND ANALYZED TO LEARN HOW THE IMPACT OF STEREOTYPING AND MISREPRESENTATION HAS EVOLVED AND HOW TO PREVENT IT FROM HAPPENING IN THE FUTURE. THE EXPECTED RESULTS FOR THIS RESEARCH INCLUDE THE ANALYSIS THAT STEREOTYPING AND MISREPRESENTATION INHIBIT THE PERFORMANCE OF WOMEN OF COLOR AND NEGATIVELY IMPACTS THEIR IDENTITY.

3:30 PM - 4:30 PM

**DAVID MAY, COMPUTER SCIENCE**

FACULTY MENTOR: AARON SEITZ, PSYCHOLOGY

**CREATION OF NOVEL FLUID INTELLIGENCE TASKS**

FLUID INTELLIGENCE TESTS, MEASURING ONE'S ABILITY TO SOLVE NOVEL PROBLEMS WITHOUT PRIOR KNOWLEDGE, ARE INCREASINGLY POPULAR AS A MEASURE OF FAR TRANSFER FROM WORKING MEMORY TRAINING TASKS. CREATING MOBILE MEASUREMENTS THAT CAN BE REPEATEDLY ADMINISTERED WITH DIFFERENT ITEMS IS CRUCIAL TO ENABLE MORE COMPLEX INVESTIGATIONS OF INDIVIDUAL DIFFERENCES AND COGNITIVE ABILITY TRAINING. THE PRESENT STUDY TESTS THE VALIDITY OF NEWLY GENERATED VARIANTS OF EXISTING FLUID INTELLIGENCE PROBLEMS. THE ORIGINAL 23 PROBLEM SET WE USED CAME FROM A RECENTLY DEVELOPED MOBILE TEST, THE UNIVERSITY OF CALIFORNIA MATRIX REASONING TASK (UCMRT). WE HAVE CREATED A TEST QUESTION TOOL THAT CAN BE USED TO MANUALLY GENERATE VARIANTS OF THE EXISTING PROBLEMS WITH ALTERATIONS TO COLORS, SHAPES, ROTATIONS, AND ORIENTATIONS. THESE NEWLY GENERATED VARIANTS WILL BE VALIDATED TO DETERMINE WHETHER THEY ARE THE SAME DIFFICULTY LEVEL AS THE ORIGINAL PROBLEMS. FOLLOWING VALIDATION OF THESE VARIANTS, THE QUESTION GENERATION TOOL WILL BE DEVELOPED FURTHER TO ALLOW AUTOMATED CREATION OF NEW TEST PROBLEMS. IMPLEMENTATION OF AUTOMATED PROBLEM GENERATION WILL ENABLE REPEATED TESTING OF THE SAME INDIVIDUALS TO MEASURE THE EFFECTS OF WORKING MEMORY TRAINING TASKS OVER TIME WITH GREATER ACCURACY.

3:30 PM - 4:30 PM

## HAEMI WON, PSYCHOLOGY

FACULTY MENTOR: BRENT HUGHES, PSYCHOLOGY

### EFFECT OF GUILT ON EMOTION AND GROUP SIZE AMPLIFICATION

ENSEMBLE CODING DESCRIBES HOW PEOPLE PROCESS THEIR COMPLEX VISUAL SURROUNDINGS BY GROUPING FEATURES TOGETHER, SUCH AS THE NUMBER OF PEOPLE IN THE CROWD, THE EMOTION, AND RACE OF PEOPLE IN THE CROWD. THESE FEATURES ARE PROCESSED IN THE BRAIN AND A RELATIVELY ACCURATE ESTIMATE OF THE AVERAGE IS GENERATED IN SECONDS. CAN ONE'S CURRENT AFFECTIVE STATE (E.G. GUILT) AFFECT THE PERCEPTION OF A CROWD OF FACES? IN ORDER TO INDUCE FEELINGS OF GUILT, A SUBSET OF PARTICIPANTS WILL WRITE ABOUT A TIME IN WHICH THEY HURT SOMEONE CLOSE TO THEM. WHILE OBSERVING IMAGES OF DIFFERENT CROWDS OF FACES WITH VARYING EMOTIONAL EXPRESSIONS AND QUANTITIES OF FACES, PARTICIPANTS FROM THE GUILT AND CONTROL GROUPS WILL RATE THE AVERAGE EMOTION AND NUMBER OF FACES. THE AVERAGE EMOTIONAL EXPRESSIONS ARE DIVIDED INTO THREE LEVELS (HIGH, MEDIUM, LOW EMOTIONALITY) WITH THREE DIFFERENT KINDS OF EMOTIONS (HAPPINESS, ANGER, SADNESS). WE PREDICT THAT GUILT INFLUENCES ENSEMBLE CODING AND PARTICIPANTS IN THE GUILT CONDITION WILL OVERESTIMATE THE AVERAGE EMOTIONS OF ANGRY AND SAD IMAGES WHILE UNDERESTIMATING THE AVERAGE EMOTION OF HAPPY IMAGES. WE ALSO PREDICT THAT PARTICIPANTS WILL OVERESTIMATE THE NUMBER OF FACES IN THE IMAGE. WE WILL TEST FOR DIFFERENCES BETWEEN THE CONTROL AND GUILT CONDITION TO INTERROGATE THE EFFECT OF GUILT ON ENSEMBLE CODING. THIS STUDY MAY FURTHER ILLUSTRATE HOW CURRENT AFFECTIVE STATES CAN ALTER ENSEMBLE CODING, WHICH CAN RESULT IN INACCURATE JUDGMENTS OF A CROWD. EMOTIONS MAY AUGMENT QUALITIES WE ATTRIBUTE TO CROWDS OF UNFAMILIAR PEOPLE AND DISTORT OBJECTIVE REPRESENTATIONS OF SOCIAL GROUPS.

3:30 PM - 4:30 PM

## MAXIMILLIAN DENYS, BIOLOGY

FACULTY MENTOR: MARGARITA CURRAS COLLAZO, DEPARTMENT OF MOLECULAR, CELL & SYSTEMS BIOLOGY

### THE EFFECTS OF THYROID SUPPLEMENTATION ON ALLEVIATING DEVELOPMENTAL NEUROTOXICITY OF PBDES

POLYBROMINATED DIPHENYL ETHERS (PBDEs) ARE WIDELY USED INDOOR FLAME RETARDANTS ADDED TO COMMON HOUSEHOLD PRODUCTS TO MEET STRICT FIRE SAFETY REGULATIONS, BUT CAN BIOACCUMULATE IN HUMANS, ESPECIALLY CHILDREN, THROUGH DERMAL CONTACT, INGESTION, MATERNAL CORD BLOOD AND BREAST MILK. IN HUMANS, PBDEs HAVE BEEN ASSOCIATED WITH NEURODEVELOPMENTAL DISORDERS (NDD) LIKE ATTENTION DEFICIT-HYPERACTIVITY-DISORDER AND DEFICIENCIES IN SOCIAL COMPETENCE. WE HAVE PREVIOUSLY SHOWN THAT EARLY-LIFE EXPOSURE OF C57BL/6 F1 MICE OFFSPRING (F1) VIA DAM EXPOSURE (F0) TO A LOW DOSE (0.1 MG/KG/D) OF AN ENVIRONMENTALLY RELEVANT PBDE MIXTURE, DE-71 (L-DE-71), PRODUCES DEFICITS IN F1 OFFSPRING (BUT NOT F0) ON SOCIAL NOVELTY PREFERENCE AND SOCIAL MEMORY RECOGNITION TESTS (SMRT) THAT PROBE FOR SHORT AND LONG-TERM SOCIAL MEMORY, RESPECTIVELY, RELATIVE TO VEHICLE CONTROLS (VEH/CON). EXPOSED F1 PROGENY HAVE ALSO DISPLAYED DEFICITS ON GENERAL MEMORY DEFICITS TEST, ON NOVEL OBJECT RECOGNITION (NORT) AND OLFACTORY DISCRIMINATION TEST FOR OF SOCIAL ODORS (OHT). TO EXAMINE BRAIN REGIONS INVOLVED, WE USED IMMUNOHISTOCHEMISTRY LOGICAL STUDIES USING ANTIBODY FOR C-FOS, A MARKER FOR NEURONAL THE ACTIVATION OF NEURONAL CIRCUITS, AND FOUND WERE PERFORMED. C-FOS IMMUNOREACTIVITY ENHANCED WAS STAINING AFTER SOCIAL EXPOSURE OBSERVED IN THE CORTICO-AMYGDALAR CIRCUIT, WHICH HAS BEEN IMPLICATED IN SOCIAL RECOGNITION MEMORY. ONE KNOWN



ACTION OF PBDES IS THYROID HORMONE DISRUPTION THAT IS CRITICAL FOR NORMAL NEURODEVELOPMENT. TO POSSIBLY REVERSE THIS EFFECT, WE ARE CURRENTLY SUPPLEMENTING DE-71-EXPOSED AND CONTROL PREGNANT DAMS WITH L-THYROXINE (T4) HORMONE AND PLAN TO TEST FOR REVERSAL OF DEFICITS ON OFFSPRING ON SMRT, OHT AND AND MEASURING GENERAL BRAIN AND BODY GROWTH. VIRTUALLY NOTHING IS KNOWN ABOUT HOW PBDES DISRUPTACT ON BRAIN SOCIAL BEHAVIOR CIRCUITS TO PRODUCE BEHAVIOR DEFICITS, SOBUT THESE RESULTS WILLMAY PROVIDE NOVEL INSIGHT INTO THEIR POSSIBLE RISK THAT INDOOR POLLUTANTS LIKE PBDES CONTRIBUTE CONTRIBUTION TO NDDs.

3:30 PM - 4:30 PM

### **ANANTHA RAJEEV, BIOCHEMISTRY**

FACULTY MENTOR: WEIFENG GU, MOLECULAR, CELL & SYSTEMS BIOLOGY

#### **ROLE OF PIR-1 PROTEIN IN GENE REGULATION**

IN HUMANS, ONLY 1.2% OR ABOUT 20,000 GENES ENCODE FOR A PROTEIN, WHILE THE OTHER 98.8% NONCODING PORTION CONTAINS COMPONENTS THAT WILL NOT HAVE A MAJOR ROLE IN ENCODING PROTEINS, BUT WILL BE SYNTHESIZED INTO OTHER FUNCTIONAL RNA MOLECULES. THIS NON-CODING PORTION OF THE GENOME WAS OVERLOOKED PREVIOUSLY SINCE IT DID NOT HAVE AN INPUT IN GENETIC SCRIPT, BUT RECENT RESEARCH SUGGESTS THAT NON-CODING RNA MAKES UP MUCH MORE OF THE GENOME THAN THE CODING COUNTERPART. THE NON-CODING RNA IS BELIEVED TO PLAY A MAJOR ROLE IN GENOME STABILITY, DISEASE FORMATION, AND ANTI-VIRAL DEFENSE. NON-CODING SMALL RNA IS UNTRANSLATED TRANSCRIPTS OF RNA MOLECULES THAT IS TRANSCRIBED FROM DNA AND BASE-PAIR TO TARGET MRNA. THEY REGULATE GENE EXPRESSION WHICH CONTROLS BIOLOGICAL FUNCTIONS AND MIS-REGULATION OF THESE SRNAS HAVE BEEN CONTRIBUTED TO DISEASES SUCH AS CANCER AND ALZHEIMER'S. TO STUDY GENE EXPRESSION AND DEFENSES AGAINST VIRAL INFECTIONS, SHORT INTERFERING RNAs (siRNAs) WILL BE STUDIED THROUGH C. ELEGANS, SINCE C. ELEGANS GROW SIMILAR TO MAMMALIAN MODEL SYSTEMS, AND MANY OF ITS FUNCTIONS AND GENETIC MAKEUP IS SIMILAR TO THAT OF HUMANS. TO LEARN ABOUT RNAi, IT IS ESSENTIAL TO LEARN ABOUT PIR-1, A PROTEIN THAT INTERACTS WITH DICER, (AN ENZYME THAT CLEAVES dsRNA INTO ssRNA FRAGMENTS), AND STUDYING PIR-1 CAN CONTRIBUTE IN DISCOVERING WAYS TO FIGHT VIRUS INFECTION.

3:30 PM - 4:30 PM

### **KUNAL RAM, MICROBIOLOGY**

FACULTY MENTOR: ADLER DILLMAN, UCR DEPARTMENT OF PARASITOLOGY

#### **AN ANALYSIS OF NEMATODE CHEMOTAXIS AND THE ESTABLISHMENT OF DIFFUSION GRADIENTS**

NEMATODES ARE SMALL PARASITIC ROUNDWORMS THAT HAVE SERVED AS MODEL ORGANISMS FOR BEHAVIORAL AND GENETIC TESTS FOR DECADES. A COMMON NEMATODE BEHAVIORAL EXPERIMENT IS A CHEMOTAXIS ASSAY, IN WHICH A NEMATODE IS PLACED IN THE CENTER OF AGAR WITH A CONTROL LIQUID AND A CHEMICAL OF INTEREST ON EITHER SIDE, AND IT IS DETERMINED WHETHER OR NOT THE NEMATODE IS ATTRACTED OR REPULSED BY THE CHEMICAL. THIS ASSAY UTILIZES THE DIFFUSION OF THE CHEMICAL INTO THE AGAR TO CREATE A GRADIENT, BECAUSE THE NEMATODE SENSES THE CHEMICAL THROUGH THE AGAR BELOW IT BEFORE EXHIBITING A POSITIVE OR NEGATIVE BEHAVIOR. THIS PROCESS IS TIME-SENSITIVE, SINCE THE DIFFUSION GRADIENT MAY BECOME UNIFORM ON THE AGAR OVER TIME, MAKING NEMATODE



MOVEMENT MEANINGLESS. RECENT STUDIES ON THE MODEL MOLLUSK-INFECTING NEMATODE PHASMARHABDITIS HERMAPHRODITA HAVE DISPLAYED A WORRYING TREND TO RUN TRIALS FOR LONGER INTERVALS AND APPLY MORE THAN TWO TEST CHEMICALS PER AGAR PLATE. MODERN METHODS LACK THE MATHEMATICAL JUSTIFICATION AND CONSISTENCY PRESENT WITHIN EARLY CHEMOTAXIS METHODOLOGY; RATE OF DIFFUSION IS SELDOM INDICATED TO BE ACCOUNTED FOR, MOTILITY ASSAYS ARE RARELY MENTIONED AS AN ASSESSMENT FOR THE POTENTIAL TIME DURATION OF AN ASSAY TRIAL, AND TRIAL INTERVALS ARE MUCH LARGER WITHOUT JUSTIFICATION. WE ANALYZE THE DIFFUSION INTERVAL, OR THE TIME TAKEN FOR A DIFFUSION GRADIENT TO BECOME UNIFORM, OF DIFFERENT CHEMICALS, AS WELL AS HOW NEMATODE BEHAVIOR IS AFFECTED IN CHEMOTAXIS ASSAYS UNDER DIFFERENT TIME INTERVALS, IN HOPES TO STANDARDIZE THE CHEMOTAXIS ASSAY METHODOLOGY.

3:30 PM - 4:30 PM

**LAUREN HARRIS, BIOCHEMISTRY**

FACULTY MENTOR: JAIMIE VAN NORMAN, BOTANY AND PLANT SCIENCES (BPSC)

PROJECT TITLE: INVESTIGATING LOCALIZATION OF IRK HOMOLOGS IN ARABIDOPSIS ROOTS

DURING ORGAN DEVELOPMENT, INTERCELLULAR COMMUNICATION IS IMPERATIVE TO THE COORDINATION OF CELL SPECIFICATION AND CELL DIVISION. IN THE ARABIDOPSIS THALIANA ROOT, DIRECTIONAL SIGNALING IS PROPOSED TO HAVE KEY ROLES IN THESE PROCESSES. AMONG THE SIGNALING PROTEINS INVOLVED IN THESE TASKS, INFLORESCENCE AND ROOT APICES RECEPTOR KINASE (IRK) HAS BEEN IDENTIFIED AS A TRANSMEMBRANE RECEPTOR KINASE THAT IS POLARLY LOCALIZED IN THE PLASMA MEMBRANE OF THE ENDODERMIS AND IS REQUIRED TO REPRESS SPECIFIC, ENDODERMAL CELL DIVISIONS. IRK IS A MEMBER OF AN EVOLUTIONARILY CONSERVED FAMILY OF PROTEINS THAT IS PREDICTED TO PLAY CRITICAL ROLES IN CELL-TO-CELL SIGNALING THROUGHOUT PLANT EVOLUTION. SPECIFICALLY, THE CONSERVATION OF IRK HOMOLOGS MAY INDICATE AN EVOLUTIONARILY CONSERVED ROLE FOR IRK IN ROOT DEVELOPMENT IN VARIOUS SPECIES. WE HAVE IDENTIFIED IRK-LIKE GENES IN VARIOUS PLANT SPECIES, INCLUDING RICE, MAIZE, GRAPE, AND TOMATO. COMPARISON OF THE LOCALIZATION OF THESE HOMOLOGOUS PROTEINS MAY PROVIDE INSIGHTS INTO WHETHER IRK FUNCTION IN THESE CROP SPECIES IS SIMILAR TO ITS FUNCTION IN ARABIDOPSIS. WE HAVE FUSED THESE HOMOLOGOUS PROTEINS TO GFP TO EXAMINE THEIR LOCALIZATION IN ARABIDOPSIS. WE PREDICT THESE IRK HOMOLOGS WILL POLARLY LOCALIZE AND FUNCTION TO REGULATE CELL DIVISION IN THE ARABIDOPSIS IRK MUTANT. THESE RESULTS WOULD SUPPORT THE HYPOTHESIS THAT IRK LOCALIZATION AND FUNCTION WERE CONSERVED DURING PLANT EVOLUTION. (@209)

3:30 PM - 4:30 PM

**AARON CHEN, COMPUTER ENGINEERING; HELEN DU**

FACULTY MENTOR: PHILIP BRISK, COMPUTER SCIENCE

REAL-TIME OBJECT TRACKING AND SORTING OF PARTICLES FOR DNA SYNTHESIS

SOLID-PHASE DNA SYNTHESIS HAS A HIGH EFFICIENCY AND THROUGHPUT FOR THE PRODUCTION OF DNA AS WELL AS EXTENSIVE SYNTHETIC BIOLOGY APPLICATIONS. THE OBJECTIVE OF THIS RESEARCH IS TO CREATE A HIGH-THROUGHPUT, LOW-COST DNA SYNTHESIZER WHICH

EMPLOYS A MICROFLUIDIC MANIFOLD TO SORT SQUARE MICROTRANSPONDERS, CALLED P-CHIPS, IN REAL-TIME. PRESENTLY, OUR WORK REVOLVES AROUND THE DESIGN AND IMPLEMENTATION OF REAL-TIME ALGORITHMS FOR THE IDENTIFICATION, TRACKING, AND SORTING OF P-CHIPS.

OUR CURRENT EQUIPMENT SETUP INCLUDES A MILLED ACRYLIC MICROFLUIDIC CHANNEL, A HIGH-SPEED CAMERA, A SYRINGE PUMP, A LASER MODULE, AND A REAL-TIME CONTROLLER. UPON ILLUMINATION FROM THE LASER MODULE, P-CHIPS WILL TRANSMIT A UNIQUE IDENTIFICATION NUMBER VIA RADIO FREQUENCY SIGNALS. THE HIGH-SPEED CAMERA THEN PROVIDES IMAGES TO THE REAL-TIME CONTROLLER FOR US TO TRACK THE P-CHIPS. TO MONITOR, ANALYZE AND EXECUTE VARIOUS FUNCTIONS ON THE REAL-TIME CONTROLLER, WE UTILIZE LabVIEW, A VISUAL PROGRAMMING LANGUAGE FROM NATIONAL INSTRUMENTS. IN PARTICULAR, WE USE NATIONAL INSTRUMENTS' VISION ASSISTANT MODULE TO TRACK AND SORT P-CHIPS INTO VARIOUS MICROFLUIDIC CHANNELS FOR DNA SYNTHESIS IN REAL-TIME. SORTING PARAMETERS INCLUDING LOOP TIME AND TIME DELAY WERE CONSIDERED IN AN ATTEMPT TO OPTIMIZE SORTING EFFICIENCY. THROUGH EXPERIMENTING WITH DIFFERENT TRACKING METHODS, WE FOUND THAT FPGA-ASSISTED OBJECT TRACKING IMPLEMENTATION IS MORE DETERMINISTIC AND PRODUCES LESS JITTER OVERALL.

3:30 PM - 4:30 PM

**PAMODYA PEIRIS, COMPUTER ENGINEERING; JULYA MESTAS, ARJUN MODI, DANNYA ENRIQUEZ BARRUNDIA**

FACULTY MENTORS: KONSTANTINOS KARYDIS, ELECTRICAL AND COMPUTER ENGINEERING; ELENA KOKKONI, BIOENGINEERING

CHARACTERIZATION OF INFANT REACHING MOTION FOR ACTION RECOGNITION

ACTION RECOGNITION IS AN IMPORTANT COMPONENT TO IMPROVE AUTOMATION OF NOVEL TECHNOLOGIES AIMED AT PHYSICAL REHABILITATION APPLICATIONS. MOST EXISTING HUMAN ACTION RECOGNITION WORKS FOCUS ON ADULT REHABILITATION, HOWEVER, APPROACHES TARGETED AT INFANTS REMAIN UNDERDEVELOPED; THIS WORK CONTRIBUTES TO INFANT ACTION RECOGNITION OF REACHING MOTIONS. CENTRAL TO THE DEVELOPMENT OF ACTION RECOGNITION ALGORITHMS IS THE AVAILABILITY OF APPROPRIATE TRAINING DATA. IN THIS WORK WE DEVELOP AN ANNOTATED DATASET THAT INCLUDES REACHES PERFORMED IN SITTING POSTURES BY DIFFERENT INFANTS IN UNCONSTRAINED ENVIRONMENTS (E.G., IN HOME SETTINGS) FROM OFF-BODY STATIONARY CAMERAS. YOUTUBE VIDEOS MEETING SPECIFIC INCLUSION/EXCLUSION CRITERIA (E.G., THE CAMERA BEING STATIONARY) WERE COLLECTED AND ANALYZED. SELECTED VIDEOS WERE THEN PROCESSED THROUGH AN OPEN-SOURCE SOFTWARE (KINOVEA) TO OBTAIN ACTION ANNOTATIONS AND BOUNDING BOXES IN AN EFFORT TO INTERPRET ONSET AND OFFSET OF REACHING AND TO DETECT COMPLETE REACHING MOTIONS. COLLECTED AND ANALYZED DATA LAY THE BASIS TO TRAIN MACHINE LEARNING ALGORITHMS AIMED AT RECOGNIZING REACHING MOTIONS OF INFANTS.

3:30 PM - 4:30 PM

**ETCHI AKO, BIOENGINEERING**

FACULTY MENTORS: VICTOR RODGERS, DEPARTMENT OF BIOENGINEERING; BYRON FORD, DIVISION OF BIOMEDICAL SCIENCES

DOWNREGULATION OF GENES BY NEUREGULIN-1 IN PMCAO STROKE MODELS

EVERY YEAR, ROUGHLY 750,000 AMERICANS EXPERIENCE A STROKE, WITH ABOUT 87% OF THESE STROKE CASES BEING ISCHEMIC. ISCHEMIC

STROKE OCCURS WHEN BLOOD FLOW TO THE BRAIN IS BLOCKED, WHICH CAN LEAD TO SEVERE BRAIN DAMAGE AND NEURONAL DEATH. CURRENT THERAPIES FOR STROKE TREATMENT ARE LIMITED, AND THERE IS A DIRE NEED FOR NEW TREATMENT METHODS. PREVIOUS STUDIES HAVE SHOWN THAT NEUREGULIN-1 (NRG-1) IS A PROMISING TREATMENT FOR ISCHEMIA, DUE TO ITS ABILITY TO SUPPRESS PRO-INFLAMMATORY AND NEURONAL DEATH RESPONSES FOLLOWING STROKE. IN THIS STUDY, OUR GOAL WAS TO ANALYZE THE GENE EXPRESSION OF RATS THAT HAVE UNDERGONE PERMANENT MIDDLE CEREBRAL ARTERY OCCLUSION (PMCAO) AND NRG-1 TREATMENT. RATS WERE TREATED WITH NRG-1, UNDERWENT PMCAO AND WERE SACRIFICED 12 H AFTER INJURY. THE TRANSCRIPTOME ANALYSIS CONSOLE (TAC) SOFTWARE WAS USED TO EXAMINE GENE REGULATION AT THE BASELINE, PMCAO, AND NRG-1 TREATMENT CONDITIONS. PRELIMINARY RESULTS SUGGEST THAT NRG-1 CAN DOWNREGULATE GENES ASSOCIATED WITH PATHWAYS THAT INCREASE VASCULAR PERMEABILITY OR PROMOTE APOPTOSIS. FUTURE STUDIES WILL INCLUDE FURTHER PATHWAY ANALYSIS.

3:30 PM - 4:30 PM

### ANDREA ROMERO, PLANT BIOLOGY

FACULTY MENTOR: ERIN RANKIN, DEPARTMENT OF ENTOMOLOGY

EXPLORING PATTERNS OF PLANT UTILIZATION BY VANESSA CARDUI USING COMMUNITY SCIENCE

INCREASED URBAN DEVELOPMENT, PLANT INVASIONS, AND HUMAN-CAUSED FIRES ARE CONTRIBUTING TO THE DESTRUCTION OF VITAL POLLINATOR HABITATS. ONE SUCH HABITAT IS COASTAL SAGE SCRUB, A QUINTESSENTIAL RIVERSIDE COUNTY ECOSYSTEM USED BY THE PAINTED LADY (VANESSA CARDUI) BUTTERFLY DURING ITS SPRING MIGRATION. VANESSA CARDUI IS A GENERALIST POLLINATOR, KNOWN TO UTILIZE AN ARRAY OF PLANT SPECIES THROUGHOUT ALL STAGES OF ITS LIFECYCLE. THIS PROJECT AIMS TO QUANTIFY PATTERNS IN PLANT VISITATION BY ADULT V. CARDUI IN RIVERSIDE COUNTY USING OBSERVATIONS SUBMITTED THROUGH iNATURALIST, A COMMUNITY SCIENCE PLATFORM, DURING THE PERIOD 2008-2020. WE WILL CATEGORIZE EACH PLANT THE BUTTERFLY WAS OBSERVED ON BY FUNCTIONAL TYPE (FORB, SHRUB, OR ORNAMENTAL) AND WILL BE GIVEN A NATIVE OR NON-NATIVE DESIGNATION. ADDITIONALLY, WE WILL ASSIGN A LAND COVER TYPE TO THE LOCATION OF EACH OBSERVATION USING THE NATIONAL LAND COVER DATABASE 2016. COMMUNITY SCIENCE ALLOWS FOR LARGE-SCALE TEMPORAL AND SPATIAL ANALYSIS OF ECOLOGICAL PROCESSES WITH A FRACTION OF THE EFFORT AND TIME TRADITIONAL DATA COLLECTION METHODS REQUIRE. FURTHER, RECENT V. CARDUI MIGRATIONS HAVE BEEN SO LARGE, THEY HAVE CAPTURED THE ATTENTION OF THE PUBLIC AND iNATURALIST OBSERVERS. BY EXAMINING THE INCREASING NUMBER OF PAINTED LADY OBSERVATIONS SUBMITTED SINCE 2008, WE WILL GAIN KEY INSIGHTS INTO THE BUTTERFLY'S PLANT PREFERENCES AND THE ADAPTABILITY OF V. CARDUI ACROSS CHANGING LANDSCAPES.

4:40 PM - 5:40 PM



## MATTHEW NGUYEN, NEUROSCIENCE

FACULTY MENTOR: TARA NORDGREN, BIOMEDICAL SCIENCES

### THE CARCINOGENIC AND PRO-INFLAMMATORY EFFECTS OF CHRONIC AGRICULTURAL DUST EXPOSURE ON LUNG GENE EXPRESSION

IT IS WELL ESTABLISHED THAT CHRONIC INFLAMMATION CAN DRIVE LUNG CARCINOGENESIS. THE LUNG INFLAMMATORY EFFECTS ELICITED BY AGRICULTURAL ORGANIC DUST EXPOSURE HAVE BEEN WELL-DOCUMENTED; HOWEVER, THE CHRONIC INFLAMMATORY AND CARCINOGENIC EFFECTS OF THESE DUSTS HAVE YET TO BE WELL-CHARACTERIZED. THIS STUDY SOUGHT TO INVESTIGATE THESE CHRONIC EFFECTS THROUGH IDENTIFYING TRANSCRIPT AND PATHWAY-LEVEL GENE EXPRESSION ALTERATIONS INDUCED BY CHRONIC EXPOSURE TO AGRICULTURAL DUSTS IN A MOUSE MODEL.

TO BEGIN, A/J MICE WERE EXPOSED TO DUST EXTRACTS FROM HOG CONFINEMENT FACILITIES (HDE) THREE TIMES A WEEK FOR TWENTY-FOUR WEEKS. AT WEEK 4, THESE MICE WERE GIVEN A ONE-TIME INTRAPERITONEAL INJECTION OF THE TOBACCO CARCINOGEN NNK TO INDUCE LUNG TUMORIGENESIS. TWENTY-ONE WEEKS POST-INJECTION, MICE WERE EUTHANIZED, AND LUNG TISSUES WERE HOMOGENIZED TO ASSESS TRANSCRIPT AND PATHWAY-LEVEL GENE EXPRESSION CHANGES USING THE NANOSTRING PAN CANCER MOUSE IMMUNOLOGY PANEL. OUR ANALYSES IDENTIFIED 112 DIFFERENTIALLY EXPRESSED GENES ( $P < 0.05$ ) AMONG THE HDE VS. SALINE-TREATED MICE, AND FIVE WITHIN THE NO NNK VS. NNK-EXPOSED MICE THAT WERE EXPOSED TO HDE. FURTHERMORE, WE FOUND THAT PATHWAY-LEVEL EXPRESSION CHANGES WERE PRIMARILY DRIVEN BY HDE EXPOSURE, NOT NNK, ALTHOUGH SOME PATHWAYS DISPLAYED A SUPPRESSIVE EFFECT FROM NNK TREATMENT. OVERALL, HDE WAS FOUND TO DRIVE THE MOST INCREASED EXPRESSION CHANGES IN PATHWAYS OF INFLAMMATION AND CANCER PROGRESSION. IT IS OUR HOPE THAT THIS EXPERIMENT ELUCIDATES AN OCCUPATIONAL HAZARD THAT ROUGHLY 2.6 MILLION AMERICANS FACE IN THE AGRICULTURAL INDUSTRY.

4:40 PM - 5:40 PM

## SHAYAN SAEED, MIDDLE EAST AND ISLAMIC STUDIES

FACULTY MENTOR: MANUELA MARTINS-GREEN, MOLECULAR, CELL AND SYSTEMS BIOLOGY

### TREATMENT OF CHRONIC WOUNDS THROUGH INHIBITION OF NADPH OXIDASE

NON-HEALING CHRONIC WOUNDS POSE A MAJOR BURDEN ON BOTH PATIENTS AND HEALTHCARE SYSTEMS, COSTING AN EXCESS OF \$25 BILLION ANNUALLY AND AFFECTING OVER 6.5 MILLION PATIENTS IN THE US ALONE. ALTHOUGH THE UNDERLYING PATHOPHYSIOLOGY OF CHRONIC WOUNDS REMAINS LARGELY ELUSIVE, IT IS KNOWN THAT HIGH LEVELS OF OXIDATIVE STRESS (OS), INDUCED BY NADPH OXIDASE (NOX)-GENERATED REACTIVE OXYGEN SPECIES (ROS), PLAY A CRITICAL ROLE IN THE DEVELOPMENT OF CHRONIC WOUNDS. THE PURPOSE OF THIS STUDY IS TO INVESTIGATE THE POTENTIAL USE OF APOCYNIN, AN EFFECTIVE NOX INHIBITOR, AS A TREATMENT FOR CHRONIC WOUNDS. FIRST, APOCYNIN ACTIVITY AS A NOX INHIBITOR WILL BE VALIDATED IN CULTURE OF HACAT CELLS AND QUANTIFIED USING AN NADP<sup>+</sup>/NADPH ELISA. SECOND, APOCYNIN TREATMENT WILL BE UNDERTAKEN IN A CHRONIC WOUND MOUSE MODEL GENERATED ON DB/DB-/- MICE. APOCYNIN WILL BE TOPICALLY ADMINISTERED ON WOUNDS, AT VARYING CONCENTRATIONS, 6, 12, 24, AND 48 HOURS POST-WOUNDING. TREATMENT EFFICACY WILL BE DETERMINED BY GROSS OBSERVATION OF WOUND CLOSURE, ASSESSMENT OF NADP<sup>+</sup> AND NADPH CONCENTRATIONS USING ELISA, AND HISTOLOGICAL STAINING OF TISSUES FOR VISUALIZATION OF RE-EPITHELIALIZATION, GRANULATION TISSUE FORMATION, AND COLLAGEN DEPOSITION. I EXPECT ELISA TO SHOW INCREASED CONCENTRATIONS OF NADPH IN

BOTH IN VITRO AND IN VIVO EXPERIMENTS. MOREOVER, TREATED WOUNDS SHOULD EXHIBIT GREATER WOUND CLOSURE AS WELL AS ACCENTUATED RE-EPITHELIALIZATION, GRANULATION TISSUE FORMATION, AND COLLAGEN DEPOSITION. IF MY HYPOTHESIS IS SUPPORTED, THE PROMISING EFFECTS OF APOCYNIN CAN PROVIDE INSIGHT INTO THE DEVELOPMENT OF NEW THERAPEUTICS FOR CHRONIC WOUNDS, WHICH MAY HELP THE LIVES OF MILLIONS OF INDIVIDUALS.

4:40 PM - 5:40 PM

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**CARMEN CASTILLO, BIOCHEMISTRY**

FACULTY MENTOR: WENWAN ZHONG DEPARTMENT OF CHEMISTRY

**CHARACTERIZATION AND TOXICITY OF 2D NANOMATERIALS WITH THE PROTEIN CORONA**

NANOMATERIALS ARE STUDIED IN BIOMEDICAL RESEARCH BECAUSE OF THEIR EXTENSIVE PROPERTIES. FURTHERMORE, UPON CONTACT WITH BIOLOGICAL MEDIA, NANOMATERIALS FORM A SURFACE LAYER CALLED THE PROTEIN CORONA, WHICH IS UNIQUE TO EACH NANOMATERIAL AND CAN AFFECT THEIR BEHAVIOR. THEREFORE, OUR INTEREST LIES IN IDENTIFYING THE COMPOSITION OF THE PROTEIN CORONA AND ITS EFFECT ON THEIR TOXICITY. THIS STUDY AIMED TO CHARACTERIZE THE COMPOSITION OF 2D NANOMATERIALS, PREDOMINANTLY USED IN ELECTRONICS, IN ORDER TO UNDERSTAND THEIR TOXICITY. THE VIABILITY OF BREAST CELLS WAS MEASURED AFTER EXPOSURE TO SIX MATERIALS (RGO, PRGO, GO, MoS<sub>2</sub>, G-PF108, AND HBN) AT SHORT INCUBATION TIMES. ADDITIONALLY, THE "PROTECTIVE EFFECT" OF THE NANOMATERIAL CORONA WAS STUDIED ALONG WITH THE SURFACTANT'S ROLE IN THE TOXICOLOGICAL PROFILE OF THESE MATERIALS. LASTLY, THE MATERIAL'S CHARACTERIZATION WAS DONE BY MEASURING SIZE CHANGE VIA NANOPARTICLE TRACKING ANALYSIS AND THE FORMATION OF THE PROTEIN CORONA ON THE PRISTINE 2D NANOMATERIALS AND CONCENTRATED MATERIALS VIA SDS-PAGE.

PRELIMINARY FINDINGS SUGGEST THAT THE SIX NANOMATERIALS ARE SLIGHTLY TOXIC TO ALL CELL LINES, AND THE BIOCORONA DOES NOT INFLUENCE THE TOXICITY. THE CONCENTRATED MATERIALS ARE MORE TOXIC, SUGGESTING THAT THE SURFACTANT IS NOT SOLELY RESPONSIBLE FOR THE TOXICITY. MOREOVER, ONLY GRAPHENE OXIDE-BASED MATERIALS SHOWED AN INCREASE IN SIZE WITH THE CORONA. SDS-PAGE RESULTS SHOWED HIGHER PROTEIN ON THE CONCENTRATED MATERIALS THAN THE PRISTINE, SUGGESTING POTENTIAL PROTEIN CONFORMATION AND FUNCTION CHANGES. FURTHER STUDIES WILL INCLUDE MEASURING UPTAKE, IDENTIFYING PROTEINS OF THE CORONAS, AND THE BIOLOGICAL IMPACT OF THE NANOMATERIAL-PROTEIN INTERACTIONS.

4:40 PM - 5:40 PM

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**FARZANEH TALEBI LIASI, BIOLOGY MAJOR**

FACULTY MENTOR: KATAYOON DEHESH, DEPARTMENT OF BOTANY & PLANT SCIENCES

**THE MEP-PATHWAY SIGNATURE IN PLANT GROWTH AND DEVELOPMENT**

ALL ORGANISMS ARE SUSCEPTIBLE TO ABIOTIC AND BIOTIC STRESSES. AMONG THE STRESS INDUCED PATHWAYS COMMON TO EUBACTERIA AND PLASTID CONTAINING ORGANISMS IS THE BIOCHEMICAL ROUTE, THE MEP-PATHWAY THAT COMPRISES OF 6 GENES RESPONSIBLE FOR THE PRODUCTION OF ESSENTIAL METABOLITES KNOWN AS ISOPRENOIDS. TO EXAMINE THE INDIVIDUAL ROLE(S) OF THE MEP-PATHWAY INTERMEDIATES IN THE STRESS RESPONSE CASCADE, WE HAVE GENERATED TRANSGENIC LINES EXPRESSING INDUCIBLE RNAi CONSTRUCTS FOR

EACH OF THE MEP-PATHWAY GENES. THIS APPROACH REDUCES THE EXPRESSION AND BY EXTENSION PRODUCTION OF THE INDIVIDUAL ENZYMES, AND ULTIMATELY RESULTING IN ACCUMULATION OF THE UPSTREAM METABOLITES. THESE PLANTS PROVIDE A KEY EXPERIMENTAL PLATFORM FOR EXAMINING THE FUNCTION OF THE MEP-PATHWAY INTERMEDIATES IN STRESS SIGNALING. WE WILL BE APPLYING A MULTI-OMICS APPROACH (TRANSCRIPTOMICS, PROTEOMICS, AND METABOLOMICS) FOR THESE STUDIES.

4:40 PM - 5:40 PM

**MEGAN WOODS, CHEMISTRY,**

FACULTY MENTOR: DRs. YING-HSUAN LIN AND ROYA BAHREINI, DEPARTMENT OF ENVIRONMENTAL SCIENCES

**IN-SILICO INVESTIGATION OF ELECTRON IONIZATION MASS SPECTRA OF BROWN CARBON AEROSOLS**

THE INCREASING GLOBAL POPULATION AND INDUSTRIAL DEVELOPMENT HAVE ALTERED OUR CLIMATE DRASTICALLY WITHIN THE LAST CENTURY. BROWN CARBON (BRC) AEROSOLS HAVE RECENTLY ATTRACTED INTEREST AS A FACTOR IN CLIMATE FORCING. BRC AEROSOLS ARE LIGHT-ABSORBING ORGANIC PARTICLES SUSPENDED IN THE AIR, WHICH ARE KNOWN TO BE PRODUCED FROM BIOMASS BURNING EVENTS, FOSSIL FUEL COMBUSTION, AND ATMOSPHERIC TRANSFORMATION OF VOLATILE ORGANIC COMPOUND (VOC) PRECURSORS. MASS SPECTROMETRY-BASED ANALYTICAL MEASUREMENTS HAVE BEEN WIDELY USED TO SPECIATE BRC AEROSOL CONSTITUENTS THAT ARE NECESSARY FOR DEVELOPING COMPREHENSIVE CLIMATE MODELS. HOWEVER, DUE TO THE LARGE VARIETY AND CHEMICAL COMPLEXITY OF BRC AEROSOLS, THERE IS A LACK OF AUTHENTIC STANDARDS READILY AVAILABLE TO AID IN THE IDENTIFICATION OF THESE COMPOUNDS. UTILIZING QUANTUM CHEMICAL ELECTRON IONIZATION MASS SPECTRA (QCEIMS) TO GENERATE A THEORETICAL EI MASS SPECTRUM, THIS WORK OFFERS SUPPLEMENTAL INFORMATION IN IDENTIFYING UNKNOWN BRC MOLECULES. BY INVESTIGATING THE IMPACTS OF GRADUAL GRADIENT APPROXIMATION (GGA) FUNCTIONAL METHODS SUCH AS PBE, BLYP, AND B97D, AS WELL AS THE NEW STANDALONE GFN2-XTB METHOD, WE CAN DETERMINE THE METHOD WITH HIGH ACCURACY AND COMPUTATIONAL EFFICIENCY NECESSARY TO PREDICT AN EI SPECTRA OF MOLECULES OF INTEREST. PRELIMINARY RESULTS DEMONSTRATE THAT THE COMBINATION OF QCEIMS GENERATED EI SPECTRA, NIST MASS SPECTRAL LIBRARIES, AND EXPERIMENTAL RESULTS ACQUIRED FROM AEROSOL MASS SPECTROMETER (AMS) MEASUREMENTS CAN ALLOW FOR ACCURATE DETERMINATION OF UNIDENTIFIED BRC CONSTITUENTS WHEN AUTHENTIC STANDARDS ARE NOT AVAILABLE.

4:40 PM - 5:40 PM

**SAMANTHA CRIPPEN, ENVIRONMENTAL SCIENCE**

FACULTY MENTOR: WILLIAM PORTER, DEPARTMENT OF ENVIRONMENTAL SCIENCES

**WINDS AND WILDFIRE: COMPARING AIR-QUALITY IMPACTS OF SANTA ANA WIND EVENTS**

SANTA ANA WIND (SAW) EVENTS ARE CHARACTERIZED BY STRONG, DRY AIR MOVING WESTWARD ACROSS SOUTHERN CALIFORNIA, AND ARE TYPICALLY DRIVEN BY THE FORMATION OF HIGH-PRESSURE SYSTEMS IN NEVADA DURING THE COLDER AND DRIER MONTHS. SAW EVENTS CAN HAVE MAJOR IMPACTS ON AIR QUALITY IN THE REGION, NOT ONLY THROUGH THEIR DIRECT IMPACTS ON THE EMISSIONS AND TRANSPORT OF CRITERIA POLLUTANTS, BUT ALSO THROUGH THEIR TENDENCY TO ENHANCE WILDFIRE RISK AND INTENSITY. IN THIS WORK, WE ANALYZE POLLUTION LEVELS ASSOCIATED WITH HISTORICAL SAW EVENTS TO COMPARE THEIR IMPACTS ON AIR QUALITY BOTH WITH AND WITHOUT THE PRESENCE OF CONCURRENT WILDFIRES. AS CASE STUDIES, WE FOCUS ON THE TWO DEADLY FIRES DURING A SAW EVENT: OLD AND



ESPERANZA. EXAMINING POLLUTION LEVELS AT NEARBY STATIONS BEFORE, DURING, AND AFTER THESE EVENTS, WE COMPARE THEIR ANOMALIES TO CONDITIONS SEEN DURING OTHER NON-FIRE SAW EVENTS, AS WELL AS CONDITIONS IN THE ABSENCE OF SAW CONDITIONS TO HELP QUANTIFY THE RISKS POSED BY THIS METEOROLOGICAL PHENOMENON.

4:40 PM - 5:40 PM

### ALEXA AREVALO, POLITICAL SCIENCE

FACULTY MENTOR: DAVID PION-BERLIN, POLITICAL SCIENCE

#### A COMPARATIVE ANALYSIS OF CIVIL-MILITARY RELATIONS AND DEMOCRATIZATION IN ALGERIA AND SOUTH KOREA

A MAJORITY OF THE COMPARATIVE LITERATURE ON DEMOCRATIZATION HAS FOCUSED ON INTRA-REGIONAL STUDIES THAT ANALYZE VERY SIMILAR COUNTRIES. CONSIDERING THE DIVERSE LITERATURE ON DEMOCRACY, THE NECESSARY VARIABLES FOR CAUSALITY REMAIN WIDELY DISPUTED. IN THE FIELD OF POLITICAL SCIENCE, A GROWING BODY OF SCHOLARSHIP HAS DEMONSTRATED THE SIGNIFICANCE OF CIVIL-MILITARY RELATIONS IN DIRECTING THE PROCESSES OF DEMOCRATIZATION. THIS PAPER EXAMINES THE RELATIONSHIP BETWEEN CIVIL-MILITARY RELATIONS AND DEMOCRATIZATION IN ALGERIA AND SOUTH KOREA. TO COMPARATIVELY ANALYZE THESE TWO VERY DIFFERENT COUNTRIES, I UTILIZED A MOST DIFFERENT SYSTEMS DESIGN (“MDSD”) TO DETERMINE AND CONTROL THE INTERVENING VARIABLES AND HIGHLIGHT THE SIMILARITIES SEEN BETWEEN THE COUNTRIES’ PROCESS OF TRANSITION. THE COMPARATIVE STUDY OF ALGERIA AND SOUTH KOREA REVEALED NO CAUSAL RELATIONSHIP BETWEEN DEMOCRATIZATION AND CULTURE, RELIGION, GEOGRAPHIC PROXIMITY TO OTHER DEMOCRACIES, AND NATIONAL WEALTH. RATHER, MY FINDINGS DEMONSTRATE THE SIGNIFICANCE OF CIVIL-MILITARY RELATIONS IN DETERMINING THE SUCCESS OF MASS POPULAR UPRISINGS IN CHALLENGING AUTHORITARIAN REGIMES. SPECIFICALLY, MILITARY DEFECTION RESULTED IN THE AUTHORITARIAN COLLAPSE WHILE MILITARY SUBORDINATION LED TO THE REPRESSION OF CIVILIAN PROTESTS AND THE REGIME’S SURVIVAL. MY STUDY SUGGESTS THAT SUBSEQUENT ELECTORAL PROCESSES DEPEND ON THE STATE OF CIVIL-MILITARY RELATIONS DURING LIBERALIZATION AND TRANSITION, WHICH VARY DEPENDING ON A REGIME’S POSITIVE CONTRIBUTIONS TO NATIONAL DEVELOPMENT, A HISTORY OF MILITARY REPRESSION, AND PATH DEPENDENCY.

10:00 AM-11:00AM

### SARAH PANAMENO, PSYCHOLOGY MAJOR/EDUCATION MINOR

FACULTY MENTOR: REBEKAH RICHERT, PSYCHOLOGY; KIRSTEN LESAGE, EDUCATION DEPARTMENT POST-DOCTORAL RESEARCHER AT BOSTON UNIVERSITY

#### SURVEY OF VACCINE VIEWS IN HISPANIC PARENTS (SOVVIHP)

DURING A GLOBAL PANDEMIC WHERE COVID-19 VACCINES ARE STARTING TO BE ADMINISTERED, THE IMPACT OF VACCINE HESITANCY ON VACCINATION RATES IS SALIENT NOW MORE THAN EVER. PREVIOUS RESEARCH INDICATES THAT DEMOGRAPHIC FACTORS LIKE LOWER EDUCATION AND LOWER INCOME PREDICT HIGHER LEVELS OF VACCINE HESITANCY (SHUI ET AL., 2006). ONE GOAL OF THIS STUDY WAS TO EXAMINE IF THESE FACTORS PREDICT THE VACCINE VIEWS OF HISPANIC PARENTS IN SOUTHERN CALIFORNIA. ANOTHER GOAL WAS TO INVESTIGATE IF EXPOSURE TO AND PREFERENCE OF VARIOUS HEALTH NEWS/INFORMATION SOURCES WOULD RELATE TO VACCINE HESITANCY.



MEXICAN-HERITAGE, CATHOLIC PARENTS (N = 79) COMPLETED A PHONE INTERVIEW CONSISTING OF THE WHO 10-ITEM VACCINE HESITANCY SCALE AND QUESTIONS INQUIRING ABOUT LEVEL OF TRUST (ON A SCALE OF 1-10), EXPOSURE TO, AND PREFERRED SOURCES FOR HEALTH NEWS/INFORMATION.

THE RESULTS INDICATED THAT PARENT LEVEL OF EDUCATION AND FAMILY INCOME DID NOT SIGNIFICANTLY PREDICT LEVEL OF VACCINE HESITANCY. HOWEVER, THOSE WHO STATED THAT THEY DO NOT SEE HEALTH NEWS/INFORMATION FROM THE GOVERNMENT AND TELEVISION WERE MORE VACCINE HESITANT THAN THOSE WHO SAID THEY DO ( $t(73) = 2.434$ ,  $p = .017$ ,  $d = .548$ ;  $t(75) = 2.041$ ,  $p = .045$ ,  $d = .468$ ). LEVELS OF TRUST IN THE GOVERNMENT AND TELEVISION AS SOURCES FOR HEALTH NEWS/INFORMATION WERE ALSO BOTH SIGNIFICANTLY, NEGATIVELY CORRELATED WITH VACCINE HESITANCY SCORES ( $r(73) = -.381$ ,  $p = .001$ ;  $r(76) = -.365$ ,  $p = .001$ ). EXPLORATORY ANALYSES OF VIEWS ON A CONNECTION BETWEEN AUTISM AND VACCINES AND PARENTS' WILLINGNESS FOR THEIR CHILD TO RECEIVE THE COVID-19 VACCINE WILL ALSO BE DISCUSSED.

10:00 AM-11:00AM

#### KIMIA SHAMSAN, BIOLOGY

FACULTY MENTOR: BRENT HUGHES, PSYCHOLOGY

#### SELECTIVE SEEING: THE EFFECT OF PARTISAN MOTIVATIONS ON EVIDENCE ACCUMULATION

POLITICAL MOTIVATIONS SIGNIFICANTLY AFFECT WHICH POLICIES AND CANDIDATES AN INDIVIDUAL ADVOCATES, HOWEVER, LESS IS KNOWN ABOUT HOW POLITICAL MOTIVATIONS BIAS THE WAY PEOPLE GATHER AND INTERPRET INFORMATION. IN THIS STUDY, WE EXAMINE HOW INDIVIDUALS COLLECT AND INTERPRET FACT-CHECK RATINGS FROM DEMOCRAT AND REPUBLICAN CANDIDATES. WE RECRUITED CLOUDREARCH WORKERS (N = 122) WHO EVALUATED FACT-CHECK RATINGS FROM A RECENT POLITICAL DEBATE. PARTICIPANTS WERE TOLD TO QUICKLY AND ACCURATELY PREDICT WHICH CANDIDATE WAS MORE HONEST ACROSS VARIOUS ISSUES. ON HALF OF THE TRIALS, PARTICIPANTS WERE ASSIGNED A DISTRIBUTION OF RATINGS WHERE DEMOCRATS WERE MORE HONEST AND REPUBLICANS WERE LESS HONEST, AND THE OTHER HALF WHERE REPUBLICANS WERE MORE HONEST, AND DEMOCRATS WERE LESS HONEST. TO INCENTIVIZE ACCURACY, PARTICIPANTS WERE BONUSED FIVE CENTS ON CORRECT TRIALS AND DEDUCTED FIVE CENTS ON INCORRECT TRIALS. WE PREDICTED THAT PARTICIPANTS WOULD BE MORE ACCURATE AND NEED LESS EVIDENCE WHEN CORRECTLY PREDICTING THAT THEIR POLITICAL INGROUP WAS BETTER, AS COMPARED TO CORRECTLY PREDICTING THAT THE OUTGROUP WAS BETTER. IN LINE WITH OUR HYPOTHESIS, PARTICIPANTS WERE MORE ACCURATE AT PREDICTING WHEN THEIR INGROUP CANDIDATE WAS MORE HONEST ( $M_s = 62\% \& 54\%$ ,  $t(258) = 4.144$ ,  $d = .5$ ,  $p < .001$ ), AND REQUIRED LESS INFORMATION TO ARRIVE AT THIS CONCLUSION ( $b = .81$ ,  $SE = .08$ ,  $z = 9.77$ ,  $p < .00001$ ; ( $b = .57$ ,  $SE = .09$ ,  $z = 6.27$ ,  $p < .00001$ ). IN AN EFFORT TO EXAMINE THE MECHANISMS UNDERLYING BIASED INFORMATION PROCESSING, WE APPLIED DRIFT-DIFFUSION MODELING. THIS ALLOWED US TO ESTIMATE TO WHAT EXTENT BIASED PROCESSING REFLECTS (1) THE DEGREE OF A PRIORI BIAS ONE HOLDS TOWARDS THE INGROUP (I.E., THE STARTING POINT) AND (2) THE RATE AT WHICH INGROUP EVIDENCE IS WEIGHTED IN FAVOR OF THE INGROUP (I.E. DRIFT RATE). USING MODEL COMPARISON, WE FOUND THAT THE BEST FITTING MODEL HELD BOTH A BIAS STARTING POINT AND DRIFT RATE. THIS STUDY PROVIDES INSIGHT INTO THE MECHANISMS UNDERLYING HOW INFORMATION PROCESSING CAN SKEW PERCEPTIONS OF INFORMATION TO FAVOR ONE'S OWN GROUP, AND SHEDS LIGHT ON HOW PEOPLE CAN SEE THE SAME INFORMATION YET WALK AWAY WITH DRASTICALLY DIFFERENT INTERPRETATIONS.

10:00 AM-11:00AM

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**AYANO YUKIMOTO, POLITICAL SCIENCE/INTERNATIONAL AFFAIRS**

FACULTY MENTOR: KIM DIONNE, POLITICAL SCIENCE

EDUCATION SYSTEMS IN SOUTHEAST ASIA

I STARTED THINKING THAT I WANTED TO STUDY ABOUT THIS TOPIC THREE YEARS AGO WHEN I WORKED AS A FUNDRAISER OF UNICEF. THE REASON WHY I CHOSE A TOPIC RELATED TO SOUTHEAST ASIA FOR MY CAPSTONE PROJECT IS THAT THE EDUCATION SYSTEMS THERE FROM MY PERSPECTIVE ARE NOT GOOD QUALITY OR INFERIOR, COMPARED TO THE OTHER PARTS OF THE WORLD, PARTICULARLY IN ASIA. THE MAIN PROBLEM I WANT TO STUDY IS TO FIGURE OUT WHETHER THE EDUCATION SYSTEM IN SOUTHEAST ASIA IS GETTING BETTER AND AS MEANS OF WHAT. UNICEF OR OTHER INTERNATIONAL INSTITUTIONS, FOR INSTANCE, PERIODICALLY REPORT THEIR ACHIEVEMENT THAT UNDERDEVELOPED COUNTRIES HAVE BEEN DEVELOPED. IN THE BEGINNING, I WAS ESPECIALLY INTERESTED IN THREE SOUTHEAST ASIAN COUNTRIES: CAMBODIA, VIETNAM, AND MYANMAR. ALL THREE COUNTRIES ARE COMMUNIST AND HAVE A CRUEL HISTORY. HOWEVER, I HAVE DECIDED TO EXCLUDE VIETNAM FROM THE FACT MY FRIENDS GRADUATED FROM UNIVERSITY IN VIETNAM, AND THEN I ASSUMED THAT VIETNAM IS MORE DEVELOPED THAN CAMBODIA AND MYANMAR. INSTEAD, I FOCUS ON CAMBODIA AND MYANMAR IN THIS THESIS. MY HYPOTHESIS IS THAT THE RANGE OF DEVELOPMENT IS DIFFERENT BETWEEN REGIONS AND THESE COUNTRIES STILL NEED TO DEPEND ON EXTERNAL SOURCES FOR THEIR DEVELOPMENT. ALSO, WHILE CONDUCTING RESEARCH, THE PANDEMIC OCCURRED. THUS, I ADD THE RECENT ACTIVITIES IN THESE COUNTRIES IN TERMS OF EDUCATION IN THE END.

10:00 AM-11:00AM

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**ETHAN ROESLER, HISTORY**

FACULTY MENTOR: DR. GEORG MICHELS, HISTORY

AMERICA'S COLONIAL SUBJECTS: THE ORIGINS & LEGACY OF U.S. IMPERIALISM IN AMERICAN SAMOA

I EXPLORE THE IMPERIALIST ORIGINS OF AMERICA'S COLONIAL RELATIONSHIP WITH SAMOA AND CHALLENGE HISTORICAL MISREPRESENTATIONS THAT FAIL TO EXPLAIN WHY SAMOAN-AMERICANS REMAIN UNPROTECTED, INVISIBLE, AND VOICELESS WITHIN AMERICA. FROM 1872-1900, SAMOA CONFRONTED AMERICAN AND EUROPEAN IMPERIALIST SUBJUGATION. I EXPOUND ON THE FOLLOWING THEMES: ECONOMIC MOTIVES FOR U.S. IMPERIALIST INVOLVEMENT; POLITICAL AND MILITARY ACTIONS TAKEN BY THE U.S. GOVERNMENT; THE EFFECTS OF U.S. NATIONALISM AND DISCRIMINATION TOWARDS ITS COLONIAL SUBJECTS; AND FINALLY, THE MODERN-DAY CONSEQUENCES OF U.S. IMPERIALISM. TO ACCOMPLISH THIS GOAL, I ANALYZE GOVERNMENT DOCUMENTS, FINANCIAL RECORDS, DIPLOMATIC LETTERS, AND RELEVANT HISTORIOGRAPHY PERTAINING TO THE FIELD.

10:00 AM-11:00AM

**SETH SPEERSTRA, HISTORY AND LANGUAGE AND LITERATURE/CLASSICAL STUDIES**

FACULTY MENTOR: GEORGE MICHELS, DEPARTMENT OF HISTORY

**ARACHNE'S TAPESTRY: WOMEN'S VOICES IN OVID'S METAMORPHOSES**

MY RESEARCH AIMS TO DETERMINE HOW ACCURATELY OVID REPRESENTS THE EXPERIENCES OF ROMAN WOMEN WITHIN THE METAMORPHOSES. TO FIND WHETHER OVID PROVIDES MEANINGFUL INFORMATION ON THE EXPERIENCES OF ACTUAL ROMANS, I COMPARED THE TEXT TO HISTORICAL SOURCES, SUCH AS LIVY AND THE AUGUSTAN MORAL LAWS. MY RESEARCH SUGGESTS THAT OVID WAS KEENLY ATTUNED TO THE PLIGHT OF WOMEN WITHIN HIS SOCIETY AND THAT HE STROVE TO COMMENT ON AND CRITICIZE THE TREATMENT OF WOMEN. THE METAMORPHOSES DESCRIBES HOW SEXUAL ASSAULT AND OBJECTIFICATION WERE A SOURCE OF TRAUMA FOR ROMAN WOMEN, HOW ROMAN PREOCCUPATION WITH CHASTITY CREATED AN ABUSIVE CULTURE, AND HOW ROMAN SOCIETY UNJUSTLY BLAMED FEMALE VICTIMS FOR THEIR OWN VICTIMHOOD. IN ADDITION, OVID DEMONSTRATED THAT ROMAN WOMEN WERE ABLE TO, AND DID, ASSERT THEIR OWN VOICE AND AGENCY AND HE DEPICTED ROMAN WOMEN AS NUANCED PEOPLE RATHER THAN CARICATURES OF VIRTUE OR VICE.

10:00 AM-11:00AM

**RICARDO TOLENTINO, CHEMISTRY**

FACULTY MENTOR: HAOFEI ZHANG, CHEMISTRY

**REVISITING SOAS 2013 WITH EXPLORATORY DATA ANALYSIS AND MACHINE LEARNING**

ATMOSPHERIC ORGANIC AEROSOLS ARE HIGHLY MISUNDERSTOOD AND HAVE BROAD IMPLICATIONS ON OUR CLIMATE, AIR QUALITY, AND THE HEALTH OF HUMANITY (XU ET AL., 2015). UNDERSTANDING THE ORIGINS OF ORGANIC AEROSOLS AND THE MECHANISMS BY WHICH THEY ARE TRANSFORMED IS DIFFICULT DUE TO THE COMPLEXITY OF THE MULTIPHASE CHEMISTRY WITHIN THE SPECIES. ACHIEVING SUCH UNDERSTANDING WILL GREATLY ADVANCE THE SCIENTIFIC COMMUNITY IN TACKLING OUR GLOBAL CLIMATE CRISIS. RECENT ADVANCES IN TECHNOLOGY HAVE ALLOWED RESEARCHERS TO BE MORE PRECISE IN CATEGORIZATION AND CHARACTERIZATION OF ORGANIC AEROSOLS AND THEIR SOURCES. THIS PROJECT WILL BE REVISITING THE DATA SET OF ZHANG ET AL., 2018 USING EXPLORATORY DATA ANALYSIS AND MACHINE LEARNING TO EXAMINE: (1) IF THERE EXIST MORE CATEGORIES THAN HAVE ALREADY BEEN DETERMINED UNDER MONOTERPENE SOA; (2) UNDER THE PREVIOUSLY DETERMINED CATEGORIES, WHETHER SUB-GROUPS OF SPECIES COULD BE CREATED WHICH INFORM UNIQUE FORMATION PATHWAYS RATHER THAN JUST THE SOURCES; (3) CLAIMS OF ANTHROPOGENIC INFLUENCE ON BIOGENIC SECONDARY ORGANIC AEROSOL FORMATION; AND (4) MECHANISTIC UNDERSTANDINGS OF ABSENCE OF NEW PARTICLE FORMATION (HIGHLY RELEVANT TO CLOUD FORMATION).

10:00 AM-11:00AM

**ISABELLA ARAIZA, DEPARTMENT OF ANTHROPOLOGY**

FACULTY MENTOR: ELIZABETH BERGER, DEPARTMENT OF ANTHROPOLOGY

IS ULNA CURVATURE OF THE STW 573 AUSTRALOPITHECUS ('LITTLE FOOT') NORMAL OR PATHOLOGICAL?

PREVIOUS WORK SUGGESTS THE SIGNIFICANT CURVATURE OF THE STW 573 ('LITTLE FOOT') ULNA SHAFT REPRESENTS PATHOLOGICAL TRAUMATIC BOWING FROM A CHILDHOOD FALL. HERE WE TEST THIS HYPOTHESIS VIA ELLIPTICAL FOURIER SHAPE ANALYSIS IN A SAMPLE OF APES, MODERN HUMANS, INCLUDING CLINICAL HUMANS WITH THIS PATHOLOGY. FOSSIL HOMININS ALSO COMPARED HERE INCLUDE: SAHELANTHROPUS TCHADENSIS (N = 1) REPRESENTED BY TM 266-01-050; AUSTRALOPITHECUS AFARENSIS (N = 2) REPRESENTED BY A.L. 288 AND A.L. 438-1; PARANTHROPUS BOISEI (N = 2) REPRESENTED BY OH 36 AND L40-19; AUSTRALOPITHECUS SEDIBA (N = 1) REPRESENTED BY U.W. 88-62; HOMO NALEDI REPRESENTED BY U.W. 101-499; AND HOMO ERECTUS (N = 2) REPRESENTED BY KNM-WT 15000 AND KNM-BK 66. RESULTS REJECT THE TRAUMATIC BOWING HYPOTHESIS. INSTEAD, THE 'LITTLE FOOT' ULNA REFLECTS A NATURAL DEGREE OF CURVATURE OBSERVED IN APES AND SEVERAL EARLY HOMININS.

10:00 AM-11:00AM

**DARIAN DIK, PSYCHOLOGY**

FACULTY MENTOR: KATE SWEENEY, PSYCHOLOGY

WELL-BEING IN THE AGE OF COVID-19: THE EFFECTS OF SOCIAL DISTANCING

IN MARCH OF 2020, THE WORLD HEALTH ORGANIZATION DECLARED COVID-19 AN INTERNATIONAL PUBLIC HEALTH EMERGENCY. IN AN ATTEMPT TO SLOW THE SPREAD OF COVID-19, THE CDC RECOMMENDED THE IMPLEMENTATION OF SOCIAL DISTANCING. IN THIS STUDY (N = 732), WE EXAMINED SELF-REPORTED INDICATORS OF SOCIAL DISTANCING (E.G., AVOIDING PHYSICAL CONTACT, DECLINING SOCIAL GATHERINGS), DURATION SOCIAL DISTANCING (IN DAYS), AND THE NUMBER OF TIMES PARTICIPANTS WENT OUTSIDE IN THE PAST WEEK AS SIMULTANEOUS PREDICTORS OF VARIOUS MEASURES OF WELL-BEING. WHEN CONTROLLING FOR OVERALL SATISFACTION OF LIFE, FINDINGS SUGGEST THAT INDIVIDUALS WHO REPORTED HIGHER LEVELS OF SOCIAL DISTANCING ON AVERAGE ALSO REPORTED MORE NEGATIVE EMOTIONS, LESS POSITIVE EMOTIONS, AND MORE ANXIETY SYMPTOMS. INDIVIDUALS WHO REPORTED GOING OUTSIDE MORE OFTEN INDICATED LESS LONELINESS, FEWER DEPRESSIVE SYMPTOMS, AND FEWER ANXIETY SYMPTOMS. SURPRISINGLY, INDIVIDUALS WHO REPORTED HIGHER LEVELS OF SOCIAL DISTANCING REPORTED LESS LONELINESS. THESE FINDINGS SUGGEST THAT SOCIAL DISTANCING PRACTICES PLAY A SUBSTANTIAL BUT NUANCED ROLE IN WELL-BEING IN THE CONTEXT OF THE COVID-19 PANDEMIC.

11:15 AM - 12:15 PM



**GENESIS GARZA MORALES, PSYCHOLOGY**

FACULTY MENTOR: BRENT HUGHES, PSYCHOLOGY

**PREDICTING LISTENER'S EMPATHIC ACCURACY FROM LINGUISTIC FEATURES OF SELF-DISCLOSURE**

SELF-DISCLOSURE IS AN IMPORTANT WAY THAT PEOPLE CONNECT. IN THE PRESENT STUDY, WE SOUGHT TO IDENTIFY LINGUISTIC PATTERNS INDIVIDUALS CAN EMPLOY DURING SELF-DISCLOSURE TO PROMOTE LISTENERS' UNDERSTANDING. PAIRS OF FRIENDS (N=50) DISCLOSED STORIES FROM THEIR LIVES AND LISTENED TO EACH OTHER'S DISCLOSURES. PARTICIPANTS RATED VALENCE DURING EACH MOMENT OF THEIR FRIEND'S, AS WELL AS THEIR OWN, DISCLOSURES. EMPATHIC ACCURACY—HOW PRECISELY AN INDIVIDUAL INFERS THE FEELINGS OF ANOTHER—WAS COMPUTED AS THE CORRELATION BETWEEN LISTENERS' AND DISCLOSERS' VALENCE AT EACH MOMENT. LINGUISTIC FEATURES OF DISCLOSURES WERE COMPUTED USING THE SOFTWARE PROGRAMS LIWC AND WRAD. WE PREDICT A POSITIVE CORRELATION BETWEEN EMPATHIC ACCURACY IN LISTENERS AND DISCLOSERS' EMOTIONAL EXPRESSIVITY AND REFLECTED LANGUAGE. WE ALSO EXPECT A POSITIVE CORRELATION BETWEEN LISTENERS' EMPATHIC ACCURACY AND DISCLOSERS' USE OF EPISODIC DETAIL AND NARRATIVE VIVIDNESS, WHICH MEASURES THE WEIGHTED FUNCTION OF WORDS. DATA ANALYSIS IS CURRENTLY UNDERWAY. THE RESULTS OF THIS STUDY HAVE THE POTENTIAL TO IDENTIFY BETTER COMMUNICATION STRATEGIES FOCUSED ON BUILDING AND MAINTAINING SOCIAL CONNECTION, THUS REDUCING LONELINESS AND PROMOTING BETTER MENTAL AND PHYSICAL HEALTH.

11:15 AM - 12:15 PM

**MICHAELA SABBAAH, BIOLOGY**

FACULTY MENTOR: ANNIE STANFIELD DITTA, PSYCHOLOGY; STEPHANIE DINGWALL, BIOCHEMISTRY

**THE COMPLEXITY OF DECISION-MAKING: THE ROLES OF COGNITIVE DISSONANCE, SELECTIVE EXPOSURE, AND SELF-EFFICACY IN CHOOSING AN UNDERGRADUATE MAJOR**

UNDERSTANDING HOW INDIVIDUALS EVALUATE AND MAKE SIGNIFICANT LIFE DECISIONS, SUCH AS SELECTING AN ACADEMIC MAJOR, IS OF CRITICAL IMPORTANCE TO THE FUTURE OF HIGHER EDUCATION. WHEN A DISCIPLINE IS CHOSEN HAPHAZARDLY, STUDENTS RISK THE CONSEQUENCES OF LOSING INTEREST IN THEIR FIELDS AFTER GRADUATION AND IN THE WORKPLACE. IT IS NOT UNCOMMON FOR INDIVIDUALS TO EXPERIENCE EXTERNAL PRESSURES AND SUBCONSCIOUS MANIPULATIONS THAT STEER THEIR DECISIONS IN ONE DIRECTION OVER ANOTHER WHEN CHOOSING A MAJOR. THE CURRENT PROJECT INVESTIGATED THE MOTIVES BEHIND CHOOSING AN UNDERGRADUATE MAJOR BY EVALUATING THE ROLES OF COGNITIVE DISSONANCE, SELECTIVE EXPOSURE, AND SELF-EFFICACY IN THE DECISION-MAKING PROCESS. A SURVEY DESIGNED TO ASSESS THE RELATIVE IMPACTS OF EACH AFOREMENTIONED FACTOR ON BOTH SELECTING AN ACADEMIC MAJOR AND GENERAL DECISION-MAKING WAS UTILIZED TO GATHER DATA FOR FURTHER ANALYSIS. OBTAINED RESULTS ARE HYPOTHESIZED TO DEMONSTRATE THE COLLECTIVE CONTRIBUTION OF HIGH LEVELS OF COGNITIVE DISSONANCE, HIGH LEVELS OF SELECTIVE EXPOSURE, AND LOW LEVELS OF SELF-EFFICACY TO THE DECISION-MAKING PROCESS. INTERPRETATIONS OF RELATIONSHIPS AMONG THE THREE FACTORS IN THIS COMPLEX PROCESS ALLOW THE CONSTRUCTION OF A DECISION-MAKING "MODEL" OF JUDGMENT, WHICH MAY POTENTIALLY AID ACADEMIC ADVISING CENTERS TO ASSIST STUDENTS IN CHOOSING A SUITABLE MAJOR. SOUND DECISION-MAKING IS CRUCIAL TO NUMEROUS DISCIPLINES OUTSIDE ACADEMIA, ONE OF WHICH IS EMBODIED BY THE VAST DIVERGENCE OF DECISIONS ENCOUNTERED IN THE MODERN HEALTHCARE SYSTEM.

11:15 AM - 12:15 PM

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**YURITZA ESCALANTE, PSYCHOLOGY**

FACULTY MENTOR: BRENT HUGHES, PSYCHOLOGY

**IDENTIFYING AT RISK GROUPS FOR DECREASES IN SOCIAL CONNECTION CAUSED BY THE COVID-19 PANDEMIC**

SINCE HUMANS ARE A SOCIAL SPECIES, SOCIAL CONNECTION PLAYS A DOMINANT ROLE IN DETERMINING AN INDIVIDUAL'S SENSE OF WELL-BEING. AS MULTIPLE INSTITUTIONS HAVE TRANSITIONED INTO AN ONLINE FORMAT IN LIGHT OF THE COVID-19 PANDEMIC, ONE WOULD EXPECT THAT SOCIAL CONNECTION HAS ALSO DECLINED. SURPRISINGLY, RESEARCH SO FAR HAS NOT CONSISTENTLY OBSERVED AN OVERALL DECLINE IN SOCIAL CONNECTION. HOWEVER, CERTAIN INDIVIDUALS MAY BE PARTICULARLY AT RISK FOR LOWER SOCIAL CONNECTION DURING THE PANDEMIC. IN ORDER TO INVESTIGATE THIS POSSIBILITY, WE RECRUITED PARTICIPANTS (N=92 BEFORE THE PANDEMIC, N=120 DURING THE PANDEMIC) FROM THE UNIVERSITY OF CALIFORNIA, RIVERSIDE TO COMPLETE A BIG FIVE INVENTORY-2 EXTRA-SHORT FORM AND QUESTIONNAIRES ABOUT DEPRESSION AND ANXIETY. PARTICIPANTS THEN COMPLETED TEN DAILY DIARY SURVEYS TO MONITOR THEIR SENSE OF SOCIAL CONNECTION. DATA ANALYSIS IS CURRENTLY BEING CONDUCTED USING MULTILEVEL REGRESSION MODELS TO IDENTIFY PERSON-LEVEL VARIABLES THAT MODERATE THE EFFECT OF THE PANDEMIC ON DAILY CONNECTION. WE PREDICT THAT INDIVIDUALS WHO ARE LESS EXTROVERTED AND INDIVIDUALS WITH GREATER DEPRESSION AND ANXIETY ARE MORE AT RISK FOR EXPERIENCING LOWER SOCIAL CONNECTION DURING THE PANDEMIC. IDENTIFYING SOCIAL CONSEQUENCES THAT HAVE ARISEN FOR CERTAIN INDIVIDUALS BECAUSE OF THE PANDEMIC WILL PROVIDE INSIGHT INTO WHO WE SHOULD TARGET IN FUTURE INTERVENTIONS TO MITIGATE THE PANDEMIC'S NEGATIVE EFFECTS ON SOCIETY.

11:15 AM - 12:15 PM

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**ALVIN JOSH ZAFRA, PSYCHOLOGY**

FACULTY MENTOR: KATE SWEENEY, PSYCHOLOGY

**PSYCHOLOGICAL EXPERIENCES WITH GAMBLING**

GAMBLING IS A WORLDWIDE ACTIVITY THAT MANY INDIVIDUALS PARTAKE IN TO CHALLENGE THEIR LUCK. PEOPLE CAN GAMBLE ALMOST ANYWHERE, INCLUDING CASINOS, GAS STATIONS, AND ARCADES. HOWEVER, WHEN INDIVIDUALS ARE GAMBLING, ARE THEY AWARE OF THE WAYS THIS ACTIVITY MIGHT PLAY WITH THEIR EMOTIONS? CAN EMOTION REGULATION SKILLS AND TENDENCIES HELP INDIVIDUALS BETTER REGULATE THEIR GAMBLING BEHAVIOR? THE AIM OF THIS STUDY WAS TO BETTER UNDERSTAND THE ROLE OF EMOTION REGULATION DEFICITS IN GAMBLING BEHAVIOR. A SURVEY-BASED STUDY WAS CONDUCTED TO ASSESS THE RELATIONSHIP BETWEEN FREQUENCY AND TYPE OF GAMBLING BEHAVIOR AND EMOTION REGULATION DIFFICULTIES. THE PARTICIPANTS WERE GATHERED FROM THE UNIVERSITY OF CALIFORNIA, RIVERSIDE (UCR) PSYCHOLOGY SUBJECT POOL VIA SONA (N = 195; AFTER REMOVING PARTICIPANTS WHO FAILED THE ATTENTION CHECKS, N = 162). THESE PARTICIPANTS WERE DIRECTED TO A SURVEY THAT WAS ADMINISTERED VIA QUALTRICS; THE SURVEY ASSESSED PERSONAL EXPERIENCES AND BELIEFS ABOUT GAMBLING, GENERAL EMOTION REGULATION STRATEGIES, AND CHALLENGES. THE RESULTS OF THE STUDY INDICATED THAT GREATER REAPPRAISAL TENDENCIES, NOT SUPPRESSION TENDENCIES, PREDICTED MORE CONTROLLED GAMBLING BEHAVIOR. NEITHER REAPPRAISAL NOR SUPPRESSION TENDENCIES PREDICTED ANY OTHER GAMBLING EXPERIENCE OR BELIEF. TURNING TO DIFFICULTIES IN EMOTION REGULATION, GREATER DIFFICULTIES OVERALL PREDICTED HIGHER FREQUENCY OF GAMBLING BEHAVIORS AS WELL AS GREATER

LEVELS OF FUN, STRESSED, AND FOCUSED GAMBLING BEHAVIORS. THE FINDINGS SUGGEST THAT COGNITIVE REAPPRAISAL MAY PROVIDE A BENEFIT FOR INDIVIDUALS TO GAMBLE IN MODERATION AND THOSE THAT STRUGGLE WITH REGULATING THEIR EMOTIONS EXPERIENCE GAMBLING IN A DIFFERENT WAY ON VARIOUS DIMENSIONS COMPARED TO THOSE WHO STRUGGLES LESS WITH EMOTION REGULATION.

11:15 AM - 12:15 PM

**MEGAN AGUILAR, PSYCHOLOGY**

FACULTY MENTOR: MEGAN ROBBINS, PSYCHOLOGY

BEYOND AN OSN POST: LOOKING AT EMOTIONAL VALENCE AND REQUEST OF SUPPORT/INFORMATION

RHEUMATOID ARTHRITIS IS A CHRONIC AUTOIMMUNE DISEASE THAT DOES NOT HAVE A CURE. THEREFORE, IT IS IMPORTANT FOR PATIENTS TO RECEIVE SUPPORT WHICH WOULD ALLOW THEM TO ASK QUESTIONS AND EXPRESS THEIR FEELINGS. THIS STUDY AIMED TO EXAMINE ONLINE SOCIAL NETWORKS FOR PATIENTS WITH RHEUMATOID ARTHRITIS TO BETTER UNDERSTAND THE EMOTIONAL VALENCE OF THEIR INITIAL POSTS, REQUESTING AND OFFERING SUPPORT/INFORMATION, AND ANY ASSOCIATION BETWEEN POSTS WITH NEGATIVE EMOTIONAL VALENCE AND REQUESTING SUPPORT/INFORMATION. NINE HUNDRED AND EIGHTY-SIX INITIAL POSTS FROM A RHEUMATOID ARTHRITIS ONLINE SOCIAL NETWORK WERE CODED AS EITHER POSITIVE, NEGATIVE, NEUTRAL, OR MIXED. IN ADDITION, THE 986 INITIAL POSTS WERE CODED AS EITHER REQUESTING SUPPORT/INFORMATION, OFFERING SUPPORT/INFORMATION, NEITHER REQUESTING NOR OFFERING SUPPORT/INFORMATION, OR BOTH REQUESTING AND OFFERING SUPPORT/INFORMATION. NEGATIVE WAS THE MOST COMMON EMOTIONAL VALENCE IN THE INITIAL POSTS. THERE WAS ALSO A SMALL EFFECT BETWEEN INITIAL POSTS THAT HAD A NEGATIVE EMOTIONAL VALENCE AND REQUESTED INFORMATION/SUPPORT, AND INITIAL POSTS THAT HAD A NEGATIVE EMOTIONAL VALENCE BUT DID NOT REQUEST INFORMATION/SUPPORT. THIS STUDY INDICATES THE NEED FOR ADDITIONAL INFORMATION AND SUPPORT TO BE PROVIDED TO PATIENTS WITH RHEUMATOID ARTHRITIS, SO THEY CAN HAVE A BETTER EXPERIENCE AND AN EASIER WAY TO COPE WITH THEIR ILLNESS.

11:15 AM - 12:15 PM

**KATHERINE DINH, BIOLOGY; MATTHEW GREEN**

FACULTY MENTOR: KURT ANDERSON, EVOLUTION, ECOLOGY, AND ORGANISMAL BIOLOGY

AN EVALUATION OF FOOD WEBS IN SIERRA NEVADA STREAMS

THE STRUCTURE OF STREAM FOOD WEBS DEPENDS ON BOTH THE ENVIRONMENTAL CONDITIONS AND PRESENCE OF PREDATORS. GLOBAL CHANGE IS ALTERING ENVIRONMENTAL CONDITIONS AT UNPRECEDENTED RATES IN MOUNTAIN ECOSYSTEMS CAUSING SHIFTS IN SPECIES DISTRIBUTIONS. ADDITIONALLY, PREDATORS MAINTAINING TOP-DOWN CONTROL ON MACROINVERTEBRATE POPULATIONS ALSO HAVE LARGE INFLUENCES ON FOOD WEB STRUCTURE. HOWEVER, THE MECHANISM IN WHICH THESE TWO FACTORS INTERACT WITH THE MACROINVERTEBRATE FOOD WEB STRUCTURE REMAINS UNRESOLVED. IN ORDER TO UNDERSTAND THE INDIVIDUAL AND INTERACTIVE EFFECTS OF ENVIRONMENTAL CHANGE AND PREDATORS ON FOOD WEBS, I STUDIED MACROINVERTEBRATE FOOD WEBS FROM HIGH ELEVATION STREAM ECOSYSTEMS IN THE PRESENCE OF PREDATORY FISH AND DIFFERENT SPATIAL REGIONS TO CHARACTERIZE AN ENVIRONMENTAL GRADIENT. USING GENERALIZED LINEAR MODELS (GLMS) TO CHARACTERIZE SHIFTS IN FOOD WEB STRUCTURE, WE COMPARED THE INDIVIDUAL AND COMBINED EFFECTS OF PREDATORS AND ENVIRONMENTAL GRADIENTS TO EXAMINE VARIATION IN MACROINVERTEBRATE

FOOD WEB NETWORK STRUCTURE. FOOD WEB STRUCTURE WAS INTERACTIVELY SHOWN TO BE INFLUENCED BY BOTH FISH PRESENCE AND THE ENVIRONMENT, WITH COMMUNITY MEAN BODY SIZE DEMONSTRATING AN INCREASE IN DOWNSTREAM COMMUNITIES RELATIVE TO THOSE IN THE HEADWATERS. TRENDS WERE ALSO OBSERVED AMONG TWO FOOD WEB PROPERTIES: CONNECTANCE DECREASED MOVING DOWNSTREAM TOWARDS FAVORABLE ENVIRONMENTS WHICH WAS AMPLIFIED IN THE PRESENCE OF FISH, WHILE LINKAGE DENSITY INCREASED MOVING TO MORE FAVORABLE ENVIRONMENTAL CONDITIONS DOWNSTREAM AND IN THE PRESENCE OF FISH. OVERALL, ENVIRONMENTAL VARIABILITY AND PREDATORS INFLUENCED MACROINVERTEBRATE FOOD WEB STRUCTURE, ALTHOUGH THEIR EFFECTS VARIED AMONG FOOD WEB METRICS. THIS STUDY PROVIDES INSIGHT FOR LAND MANAGERS WORKING TO MAINTAIN ALPINE ECOSYSTEMS RESPONDING TO ENVIRONMENTAL CHANGES.

11:15 AM - 12:15 PM

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### **SOMMER ROWELL, BIOCHEMISTRY**

FACULTY MENTOR: PAUL LARSEN, BIOCHEMISTRY

#### **PMR6 SUBSTRATE MAY CONTROL ETHYLENE RESPONSE IN ARABIDOPSIS**

WILD TYPE ARABIDOPSIS THALIANA CONTAINS SEVERAL GENES THAT CODE FOR PECTATE LYASES, WHICH ARE ENZYMES THAT CLEAVE CELL WALL PECTIN TO SMALLER OLIGOGOLACTURONIC ACID (OGA) FRAGMENTS. PMR6-6 IS AN ARABIDOPSIS MUTANT THAT HAS A MUTATION THAT DESTROYS THE FUNCTION OF THE PMR6 PECTATE LYASE, WHICH RESULTS IN A PLANT THAT IS HYPOTHESIZED TO BE INCAPABLE OF ENZYMATICALLY DESTROYING THE PMR6 SUBSTRATE. WHEREAS WILD TYPE ARABIDOPSIS IS SUSCEPTIBLE TO INFECTIONS BY ERYSPHE CICHORACEARUM THAT RESULT IN POWDERY MILDEW DISEASE, THE PMR6-6 MUTANT IS NATURALLY RESISTANT POSSIBLY DUE TO BUILDUP OF THE PMR6 SUBSTRATE, WHICH IS SPECULATED TO BE AN OGA WITH BIOACTIVE PROPERTIES. ANALYSIS OF THE PMR6-6 MUTANT SUGGESTS THAT THIS OGA ALSO INTERACTS WITH THE ETHYLENE RESPONSE PATHWAY IN ARABIDOPSIS AND HAS MEASURABLE EFFECTS ON PLANT GROWTH INDEPENDENT OF ETHYLENE. THE INHIBITORY EFFECT OF THE PMR6 SUBSTRATE ON PLANT GROWTH HAS GIVEN AN OPPORTUNITY TO DEVELOP A BIOASSAY THAT CAN BE USED TO PURIFY THIS MOLECULE FOR CHARACTERIZATION OF AN OGA SIGNALING MOLECULE, WHICH TO DATE HAS BEEN ELUSIVE, EVEN THOUGH THEIR EXISTENCE HAS BEEN SPECULATED ABOUT FOR OVER 40 YEARS. ONCE ISOLATED, THE MOLECULE COULD BE SYNTHESIZED AND APPLIED TO WILD TYPE PLANTS TO PROVIDE POWDERY MILDEW RESISTANCE AND CONTROL ETHYLENE RESPONSE. ARABIDOPSIS HAS SEVERAL GENES INVOLVED IN THE PERCEPTION AND BIOSIGNALING PATHWAY OF ETHYLENE, INCLUDING THE ETR1 GENE. INVESTIGATION OF THE EFFECTS OF THE SUBSTRATE ON PLANT GROWTH WITH ETR1-1 MUTATIONS ALLOWS FOR UNDERSTANDING THE ROLE OF THE SUBSTRATE AS A SIGNALING MOLECULE, IN A NOVEL SIGNALING PATHWAY.

11:15 AM - 12:15 PM

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### **COURTNEY MOULTON, BIOLOGY**

FACULTY MENTOR: DAVID REZNICK, EVOLUTION, ECOLOGY AND ORGANISMAL BIOLOGY

#### **SEASONAL IMPACTS ON THE FAT AND POPULATION CYCLES OF INVASIVE GAMBUSIA AFFINIS (WESTERN MOSQUITOFISH)**

THE LIFECYCLES OF GAMBUSIA AFFINIS (MOSQUITOFISH) HAVE BEEN STUDIED IN THEIR NATIVE RANGE (EASTERN UNITED STATES), WHERE SEASONALITY IS PROMINENT, AND WINTERS ARE PRONOUNCED. POPULATIONS INTRODUCED TO SOUTHERN CALIFORNIA FACE SUBDUED



SEASONALITY, AND IT IS UNCLEAR HOW THEY HAVE ADAPTED. WE ARE STUDYING THE SEASONAL LIFECYCLE, INCLUDING THE FAT CYCLING, OF THE NONNATIVE POPULATION OF *G. AFFINIS* IN THE SANTA ANA RIVER. THE RESULTS CAN LEAD TO A BETTER ASSESSMENT OF HOW THIS INVASIVE POPULATION UTILIZES ITS RESOURCES AND IMPACTS THE RIVER'S ECOSYSTEM, AND THE NATIVE SPECIES IN IT. WE PREDICT THAT THIS POPULATION WILL HAVE A LONGER REPRODUCTIVE SEASON AND EITHER A REDUCED OR NO FAT CYCLE. OUR STUDY INVOLVES THE COLLECTION OF 30 MOSQUITOFISH EACH MONTH OVER THE SPAN OF A YEAR. UPON COLLECTION, THE FISH ARE EUTHANIZED, PRESERVED, AND BROUGHT TO THE LAB FOR PROCESSING. EACH SPECIMEN'S PERCENT OF BODY FAT IS ESTIMATED, AND THE PREGNANT FEMALES DISSECTED, AND THEIR EMBRYOS STAGED. THESE DATA ARE USED TO DETERMINE HOW NONNATIVE POPULATIONS HAVE ADJUSTED TO THE REGION'S MILD CLIMATE; THEIR FAT CYCLING WILL DISTINGUISH THE AMOUNT OF TIME THE POPULATION OVERWINTERS FOR AND HOW THIS HAS INFLUENCED THE SPAN OF THEIR REPRODUCTIVE SEASON. WE ARE ALSO STUDYING THE MALE ANNUAL CYCLE. IN NATIVE POPULATIONS, MALES DELAY MATURATION TO STORE FAT AND OVERWINTER, WHICH LEADS TO SEASONAL FLUCTUATIONS IN THE NUMBERS OF IMMATURE AND MATURE MALES. BY ESTIMATING THE NUMBERS OF MATURE AND IMMATURE MALES FROM EACH COLLECTION, WE WILL DETERMINE IF THIS TREND EXISTS IN SOUTHERN CALIFORNIA'S POPULATIONS.

11:15 AM - 12:15 PM

#### KEVAL PARIKH, CELL, MOLECULAR AND DEVELOPMENTAL BIOLOGY

FACULTY MENTOR: ERICA HEINRICH, BIOMEDICAL SCIENCES

#### INFLAMMATORY GENE EXPRESSION DURING ACUTE HIGH-ALTITUDE EXPOSURE

HIGH-ALTITUDE IS PHYSIOLOGICALLY STRESSFUL DUE TO LOW ATMOSPHERIC OXYGEN PRESSURE, WHICH LIMITS OXYGEN DELIVERY AND CAN LEAD TO LOW OXYGEN (HYPOXIA) IN TISSUES. HYPOXIA ALSO OCCURS DURING INFECTION OR INJURY, AND THE TRANSCRIPTIONAL RESPONSES TO HYPOXIA AND INFLAMMATION SHARE SIGNIFICANT CROSSTALK. IN FACT, CELLULAR HYPOXIA ALONE CAN ACTIVATE SEVERAL INFLAMMATORY RESPONSE PATHWAYS. WHILE THIS HYPOXIA-INDUCED INFLAMMATION CAN PROMOTE CELL SURVIVAL IN RESPONSE TO OXYGEN LIMITATION, IT MAY BECOME MALADAPTIVE IN CHRONIC OR SYSTEMIC HYPOXIA. ACUTE INFLAMMATORY EVENTS MAY STIMULATE STRESS ERYTHROPOIESIS, AN EXTRAMEDULLARY MECHANISM MARKED BY RAPID PRODUCTION OF A BURST OF NEW ERYTHROCYTES TO PROTECT FROM INFLAMMATION-INDUCED ANEMIA. HOWEVER, THIS MECHANISM MAY LEAD TO POLYCYTHEMIA IF CHRONICALLY ACTIVATED. SOME HIGH-ALTITUDE RESIDENTS SUFFER FROM EXCESSIVE ERYTHROCYTOSIS (EE; [Hb]  $\geq 21$  g/dL IN MEN AND [Hb]  $\geq 19$  g/dL IN WOMEN). THIS RESULTS IN INCREASED BLOOD VISCOSITY, PULMONARY HYPERTENSION, AND CONGESTIVE HEART FAILURE. I HYPOTHEZIZE THAT (1) SUSTAINED HYPOXIA EXPOSURE CREATES A SYSTEMIC INFLAMMATORY RESPONSE AND (2) CHRONIC HYPOXIA-INDUCED INFLAMMATION PRODUCES RECURRING STRESS ERYTHROPOIESIS AND LEADS TO EE DEVELOPMENT. TO TEST THIS HYPOTHESIS, I MEASURED INFLAMMATORY GENE EXPRESSION IN PERIPHERAL BLOOD FROM INDIVIDUALS AT SEA LEVEL AND OVER THREE DAYS OF HIGH ALTITUDE (3800 M) EXPOSURE. DIFFERENTIALLY EXPRESSED GENES AT HIGH ALTITUDE WERE ASSOCIATED WITH INFLAMMATORY PATHWAYS INCLUDING: TOLL-LIKE RECEPTOR SIGNALING ( $P < 0.0001$ ), INTERLEUKIN-1-MEDIATED SIGNALING ( $P = 0.003$ ), AND I-KAPPA B KINASE/NF-KAPPA B SIGNALING ( $P < 0.0001$ ). FUTURE WORK WILL INVESTIGATE IF HIGH-ALTITUDE RESIDENTS WITH EE HAVE A MORE SEVERE SYSTEMIC INFLAMMATORY STATUS AND HIGHER EXPRESSION OF STRESS ERYTHROPOIESIS BIOMARKERS.

11:15 AM - 12:15 PM

**TARA BOYER, BIOLOGY**

FACULTY MENTOR: ERIN RANKIN, ENTOMOLOGY

**THE EFFECTS OF IRRIGATION LEVELS ON FLORAL DISPLAY, NECTAR QUALITY AND IMIDACLOPRID UPTAKE IN SALVIA**

POLLINATING INSECTS, SUCH AS BEES, VISIT FLOWERING ORNAMENTAL PLANTS FOR POLLEN AND NECTAR. IRRIGATION AND PESTICIDE USE ARE BOTH COMMON MANAGEMENT PRACTICES IN HORTICULTURE, AND UNDERSTANDING HOW THESE PRACTICES INTERACT BY IMPACTING THE QUALITY OF A PLANT'S FLORAL RESOURCES IS VITAL FOR CONSERVING POLLINATORS. THE PROJECT EXAMINES HOW THE LEVEL OF IRRIGATION A PLANT RECEIVES IMPACTS THE NUTRITION OF FLORAL RESOURCES AS WELL AS THE UPTAKE OF IMIDACLOPRID, A BROADLY USED NEONICOTINOID INSECTICIDE (MARATHON® 1% GRANULAR). IN A GREENHOUSE, EACH OF 120 ONE-GALLON POTTED SAGE PLANTS (LAMIACEAE: SALVIA 'ALLEN CHICKERING') WAS RANDOMLY ASSIGNED TO ONE OF EIGHT TREATMENTS RESULTING FROM FOUR PESTICIDE CONCENTRATIONS (0, 0.05, 0.5, OR 5 MG IMIDACLOPRID PER POT) AND TWO WATER TREATMENTS, OPTIMAL AND REDUCED. PLANTS WERE CLOSELY MONITORED FOR THE CONCENTRATION OF IMIDACLOPRID IN NECTAR, POLLEN, AND LEAF TISSUE VIA ELISA (ENZYME-LINKED IMMUNOSORBENT ASSAY) TO STUDY THE INTERACTION WITH IRRIGATION AND TRANSLOCATION INTO FLORAL RESOURCES. AFTER DATA ANALYSIS, WE FOUND WATER AND PESTICIDE ALONE DID NOT SIGNIFICANTLY AFFECT MOST METRICS USED. IN FACT, PLANTS WERE MOSTLY AFFECTED BY PEST PRESENCE (SCALE AND THRIPS), ESPECIALLY WITH WATER INTERACTIONS INFLUENCING PESTS. MOREOVER, THRIPS AFFECTED EVERY PHENOLOGY STAGE (BUDS, INFLORESCENCES, FLORETS, NECTAR, AND BRUX) OF THE PLANT EXCEPT FOR BRUX. IN CONTRAST, SCALE ONLY AFFECTED THE NUMBER OF INFLORESCENCES, NUMBER OF FLORETS, AND AMOUNT OF NECTAR. KNOWLEDGE GAINED FROM THIS PROJECT WILL BE OF PRACTICAL USE TO HORTICULTURAL PRACTITIONERS AND INFORM MANAGEMENT STRATEGIES TO HELP SUPPORT POLLINATING INSECTS.

11:15 AM - 12:15 PM

**ANTHONY JUSTIN ZAFRA, PSYCHOLOGY**

FACULTY MENTOR: REBEKAH RICHERT, PSYCHOLOGY

**THE TRANSITION FROM THE SEMESTER TO THE QUARTER SYSTEM**

THIS STUDY EXAMINED THE EXPERIENCES OF TRANSFER STUDENTS WHO TRANSFERRED FROM A SEMESTER-BASED COLLEGIATE INSTITUTION TO THE UNIVERSITY OF CALIFORNIA, RIVERSIDE (UCR)'S QUARTER SYSTEM AND COMPARED THEM WITH FIRST YEAR STUDENTS THAT TRANSFERRED FROM HIGH SCHOOL EXCLUDING SUMMER SESSIONS. ABOUT HALF OF PARTICIPANTS WERE RECRUITED FROM PSYC001 AND PSYC002 VIA SONA (UCR PSYCHOLOGY SUBJECT POOL) AND GRANTED ONE RESEARCH CREDIT. TRANSFER STUDENTS WERE MOSTLY RECRUITED THROUGH UCR'S TRANSFERS F1RST PROGRAM. PARTICIPANTS WERE 18 YEARS OR OLDER, AND THEY WERE PROVIDED A LINK TO QUALTRICS (A SURVEY TOOL) MEASURING PARTICIPANTS' STUDY TIME, ACADEMIC MOTIVATION, AND STRESS. INDEPENDENT SAMPLES T-TESTS INDICATED THAT FRESHMEN STUDENTS HAD HIGHER LEVELS OF STRESS THAN TRANSFER STUDENTS [ $T(270) = 2.873, p = 0.004$ , COHEN'S  $D = 0.59$ ], YET NO SIGNIFICANT DIFFERENCES WERE FOUND FOR MOTIVATION [ $T(270) = -.256, p = 0.798$ , COHEN'S  $D = 0.30$ ] AND STUDY TIME [ $T(270) = -.424, p = 0.672$ , COHEN'S  $D = 0.44$ ]. PEARSON'S BIVARIATE CORRELATIONS INDICATED THAT FRESHMAN ENROLLED STUDENTS WHO REPORTED HIGHER LEVELS OF STUDY TIME EXPERIENCED HIGHER LEVELS OF STRESS [ $r = 0.710; p < 0.001$ ] AND MOTIVATION [ $r = 0.351; p < 0.001$ ] AND BETWEEN STRESS AND MOTIVATION [ $r = 0.274; p = 0.001$ ]. IN CONTRAST, TRANSFER STUDENTS WHO REPORTED HIGHER LEVELS OF STUDY TIME EXPERIENCED HIGHER LEVELS OF STRESS [ $r = 0.566; p < 0.000$ ], BUT STRESS AND STUDY

TIME WERE UNRELATED TO MOTIVATION. FINDINGS SUGGEST THAT EDUCATION EXPERIENCES DIFFERENTIATE ACROSS STUDENTS' SOCIAL ENVIRONMENT AND MAY SHED LIGHT FOR PREPARING CHALLENGES OF HIGHER EDUCATION.

1:00 PM - 2:00 PM

**GABRIELA MACIAS, PSYCHOLOGY**

FACULTY MENTOR: WEIWEI ZHANG, PSYCHOLOGY

**GETTING A GRIP ON IMPLICIT RACIAL BIAS**

RESEARCH INDICATES THAT HIGH INTENSITIES OF PHYSICAL EFFORT INTERACT WITH THE MIND TO IMPROVE SELF-CONTROL AND RESPONSE ACCURACY DURING COGNITIVE TASKS. TO ASSESS THESE FINDINGS IN A SOCIAL CONTEXT, WE EXAMINED THE EFFECTS OF EFFORTFUL PHYSICAL ACTION AND MOTIVATION ON OVERCOMING IMPLICIT RACIAL BIAS. IMPLICIT RACIAL BIAS IS DEFINED AS THE DEGREE TO WHICH THE TWO RACIAL GROUPS ARE AUTOMATICALLY ASSOCIATED WITH POSITIVE AND NEGATIVE EVALUATIONS. USING AN IMPLICIT ATTITUDE TEST (IAT) AND A HAND DYNAMOMETER, WE ASSESSED THIS MIND-BODY INTERACTION BY MEASURING DIFFERENCES IN IAT RESPONSE TIMING AND ACCURACY IN RESPONSE TO ALTERNATING LEVELS OF A PARTICIPANT'S MAXIMUM VOLUNTARY CONTRACTION (5% VS 45% OF MVC). IN TWO EXPERIMENTAL BLOCKS, WE USED A WHITE-GOOD/BLACK-BAD STIMULUS MAPPING IN WHICH EUROPEAN AMERICAN FACES AND PLEASANT WORDS WERE REPORTED USING THE SAME BUTTON, AND AFRICAN AMERICAN FACES AND UNPLEASANT WORDS WERE PAIRED. THIS STIMULUS-RESPONSE MAPPING WAS REVERSED IN TWO SUBSEQUENT BLOCKS (WHITE-BAD/BLACK-GOOD). TO ASSESS MOTIVATIONAL FACTORS TO OVERCOME BIAS, WE CHANGED THE ORDER OF THE STIMULUS-RESPONSE MAPPING, SO THE WHITE-BAD/BLACK-GOOD CONDITION APPEARED FIRST. LASTLY, WE WANTED TO ADDRESS THE PRESENCE OF IAT EFFECTS FOR OTHER RACES BY ADDRESSING ATTITUDES TOWARDS ASIAN POPULATIONS DURING THE COVID-19 PANDEMIC. WE FOUND THAT IAT RESPONSES WERE SIGNIFICANTLY LESS ACCURATE AND SLOWER IN THE WHITE-BAD/BLACK-GOOD CONDITION, REGARDLESS OF PRESENTATION ORDER, REPLICATING THE CLASSIC IMPLICIT RACIAL BIAS FINDING. IN ADDITION, HANDGRIP ACCURACY AND EXERTED FORCE WERE SIGNIFICANTLY HIGHER IN THE WHITE-BAD/BLACK-GOOD CONDITION, SUGGESTING INCREASED EFFORT. MORE INTERESTINGLY, THE EFFECTS ON GRIP AND IAT WERE SIGNIFICANTLY CORRELATED ACROSS PARTICIPANTS. THESE RESULTS SUGGEST THAT, WHILE IMPLICIT BIASES ARE SUBCONSCIOUS RESPONSES, OVERCOMING IMPLICIT RACIAL BIASES IS EFFORTFUL AND MOTIVATION TO OVERCOME SUCH BIASES MANIFESTS AS INCREASED PHYSICAL EFFORT.

1:00 PM - 2:00 PM

**JULIA LOPEZ-VERA, POLITICAL SCIENCE**

FACULTY MENTOR: JENNIFER MEROLLA, POLITICAL SCIENCE

**EXAMINING THE SOCIOPOLITICAL FACTORS THAT ENCOURAGE/DISCOURAGE POLITICAL PARTICIPATION AMONG YOUNG ETHNIC MINORITIES**

THE UNITED STATES IS THE MOST ETHNICALLY DIVERSE DEMOCRACY IN THE WORLD. THE 2016 U.S PRESIDENTIAL ELECTION, HOWEVER, DEMONSTRATED A LACK OF POLITICAL PARTICIPATION AMONG YOUNG ETHNIC MINORITIES, ACCORDING TO DATA FROM THE AMERICAN NATIONAL ELECTION STUDIES (ANES, 2016). WITH THE GROWING POPULATION OF RACIAL AND ETHNIC MINORITIES IN THE U.S., THERE IS A GROWING DEMAND TO REPRESENT ETHNIC MINORITIES IN THE AMERICAN POLITICAL SPHERE. ETHNIC POLITICAL PARTICIPATION HAS BEEN EXAMINED BY SCHOLARS IN THE LATE TWENTIETH CENTURY (FRIDKIN ET AL, UHLANER ET AL, CHONG ET AL, MILLER ET AL, BRADY ET AL,



TENDEN ET AL, AND GRILLO ET AL), AND IS CONSIDERED A NEW AND DEVELOPING AREA OF RESEARCH. THIS RESEARCH PROJECT WILL EXPLICATE THE SOCIOPOLITICAL FACTORS THAT ARE CONVENTIONALLY LINKED WITH POLITICAL PARTICIPATION AMONG YOUNG ETHNIC MINORITIES, WHICH WILL CONTRIBUTE TO WORK TOWARDS INCREASING PARTICIPATION OF MINORITY GROUPS IN THE FUTURE.

1:00 PM - 2:00 PM

### **HUGO ARCOS, GLOBAL STUDIES**

FACULTY MENTOR: JULIETTE LEVY, HISTORY

HUGO ARCOS: MY LIFE AS AN ESSENTIAL WORKER

THE COVID-19 PANDEMIC HAS BROUGHT TO ATTENTION THE ROLE OF THE ESSENTIAL WORKER. THIS PROJECT AIMS TO EXPLORE THE CONCEPT OF "ESSENTIAL WORKER," AND INVESTIGATE THE LIFE OF THE ESSENTIAL WORKER IN THE UNITED STATES THROUGH MY EXPERIENCE AT AN AMAZON FULFILLMENT CENTER IN REDLANDS, CALIFORNIA. THROUGH THE USE OF A JOURNAL THAT RUNS FOR TWO MONTHS AND JOURNALISTIC AND STATISTICAL DATA ABOUT ESSENTIAL WORK DURING THE PANDEMIC, I WILL CONTEXTUALIZE MY EXPERIENCE AS AN ESSENTIAL WORKER IN ONE OF THE WORLD'S LARGEST COMPANIES. THIS PROJECT WILL PROVIDE INSIGHT INTO THE COSTS OF BEING AN ESSENTIAL WORKER DURING AN INTERNATIONAL CRISIS FROM MY PERSPECTIVE AS A UCR STUDENT, AS WELL AS FROM THE PERSPECTIVE OF MY CO-WORKERS, WHO WERE ALSO JUGGLING MULTIPLE JOBS AND RESPONSIBILITIES.

1:00 PM - 2:00 PM

### **MARI HAYASHI, COMPUTER SCIENCE**

FACULTY MENTOR: AARON SEITZ, PSYCHOLOGY

RELATIONSHIPS BETWEEN BACKGROUND MUSIC AND COGNITIVE CONTROL

WHEN WE OBSERVE STUDENTS STUDYING AT A LIBRARY, WE SEE SOME STUDENTS STUDYING WITH THEIR EARBUDS PLUGGED IN AND OTHER STUDENTS WITHOUT ANY AUDIO. PEOPLE HAVE DIFFERENT PREFERENCES ON THE STUDYING ENVIRONMENT, BUT IT REMAINS UNCLEAR HOW LISTENING TO MUSIC AFFECTS COGNITIVE CONTROL, OR PEOPLE'S ABILITY TO ACQUIRE INFORMATION. PREVIOUS RESEARCH SUGGESTS THAT LISTENING TO MUSIC NEGATIVELY AFFECTS COGNITION BECAUSE AUDIO PREVENTS HUMANS FROM FOCUSING ON THEIR TASKS. OTHER RESEARCH PREDICTS, HOWEVER, THAT MUSIC WILL HELP INDIVIDUALS KEEP UP WITH THEIR TASK IN THE LONG TERM; HUMAN BRAINS GET EASILY BORED WITH PREDICTABLE AND REPETITIVE TASKS, BUT AUDIO GIVES A VARIATION TO THE ENVIRONMENT AND MAKES OUR BRAINS KEEP FOCUSED. OUR STUDY EXPLORED HOW THE PRESENCE OF BACKGROUND MUSIC AFFECTS STUDENTS' PERFORMANCE ON A VARIETY OF CHALLENGING TASKS. WE STUDIED THIS RELATIONSHIP BY DEVELOPING A GAME THAT GIVES A PLAYER THREE SIMPLE TASKS: MEMORIZATION, CALCULATION, AND ATTENTION. PARTICIPANTS PLAYED THE GAME WITH AND WITHOUT MUSIC IN MULTIPLE SESSIONS. BY COMPARING THEIR ACCURACY AND RESPONSE TIME FOR EACH SESSION, WE TESTED HOW THEIR ATTENTIVENESS CHANGED AS A FUNCTION OF CONDITION AND DETERMINED IF MUSIC HELPS STUDENTS PERFORM BETTER OR NOT. HOWEVER, THE RESULTS FAILED TO SHOW STATISTICALLY SIGNIFICANT RELATIONSHIPS BETWEEN MUSIC AND PERFORMANCE ON THESE TASKS. WHILE THE RESULTS OF THIS STUDY WERE NOT SIGNIFICANT, THE SMALL SAMPLE SIZE AND INABILITY TO ADDRESS INDIVIDUALIZED MUSIC PREFERENCE PRECLUDE STRONG CONCLUSIONS FROM THE DATA, AND



FUTURE RESEARCH IS NEEDED TO BETTER UNDERSTAND HOW MUSIC LISTENING MAY DIFFERENTIALLY IMPACT COGNITIVE CONTROL IN DIFFERENT PEOPLE.

1:00 PM - 2:00 PM

LUIS CHUN, ENGLISH

FACULTY MENTOR: JAMES TOBIAS, ENGLISH

#### GUIDELINES FOR ADDRESSING MISINFORMATION ON SOCIAL NETWORKS

WITH INCREASINGLY SOPHISTICATED DEVICES CONNECTED TO INCREASINGLY FASTER NETWORKS, THE CURRENT ITERATION OF THE DIGITAL AGE IS MORE ACCESSIBLE, PREVALENT, AND POWERFUL THAN EVER BEFORE. AS MODERN TECHNOLOGY BECOMES MORE UBIQUITOUS, THE HALLMARK TENSION OF THE SCIENCE FICTION GENRE, CHARACTER VERSUS TECHNOLOGY (WHEN TECHNOLOGY GROWS BEYOND ITS INTENDED USE), IS UNFOLDING ON A GRAND SCALE IN OUR WORLD. THREATENING TO DESTABILIZE DEMOCRACIES AROUND THE GLOBE, THE RAPID PROLIFERATION OF MISINFORMATION ON SOCIAL MEDIA PLATFORMS HAS CAUSED SERIOUS HARM. COMPREHENSIVE GUIDELINES CAN SEW THE INDIVIDUAL PATCHES OF GOVERNMENT REGULATION AND CORPORATE-LED MITIGATION EFFORTS TOGETHER. BUILDING ON LITERATURE FROM THE PHILOSOPHY OF TECHNOLOGY, MEDIA STUDIES, AND BUSINESS, THIS PAPER CRITICALLY ANALYZES POPULAR SOCIAL NETWORK PLATFORMS SUCH AS FACEBOOK (FB) AND YOUTUBE (YT) AND COMPARES THEM TO THE DIGITAL PRODUCTIONS OF FORENSIC ARCHITECTURE (FA), A RESEARCH AGENCY BASED AT GOLDSMITHS, UNIVERSITY OF LONDON. FA, IN PARTICULAR, EXEMPLIFIES A NEED FOR DIGITAL FORENSICS MOTIVATED IN PART BY MISINFORMATION CIRCULATED THROUGH SITES LIKE FB AND YT. THROUGH THIS CRITICAL ANALYSIS AND COMPARISON, THIS PAPER PROPOSES THE EVIDENCE-ORIENTED PLATFORM (EOP) AS A STARTING POINT FOR THE DEVELOPMENT OF COMPREHENSIVE GUIDELINES. THIS ANALYSIS REVEALS THE BENEFITS OF CRITICAL COMPONENTS THAT FORM EOPs AND HOW THESE ELEMENTS CAN HELP MITIGATE THE SPREAD OF MISINFORMATION ON SOCIAL NETWORKS.

1:00 PM - 2:00 PM

RITA F. TESFAI, ANTHROPOLOGY

FACULTY MENTOR: WORKU NIDA, ANTHROPOLOGY

#### THE MELODY OF REBELLION: SONIC AGENCY, CULTURAL MEMORY, AND THE MUSIC OF THE KEL TAMASHEQ

THE KEL TAMASHEQ OF MALI AND NIGER EMPLOYED MUSIC AS A MODALITY OF RESISTANCE AND MOBILIZATION DURING EPISODES OF DISPLACEMENT, EXILE, AND CULTURAL ERASURE. IN RESPONSE TO FORCED ASSIMILATION, INSTITUTIONAL EXCLUSION, AND THE DISINTEGRATION OF VARIOUS SOCIAL SYSTEMS, THE TAMASHEQ USED SOUND TO CRITIQUE AND CHALLENGE THE REGIMES OF VIOLENCE. THIS PROJECT EXPLORES HOW SOUND AND PERFORMANCE TAKE PART IN A DIALOGICAL EXCHANGE TETHERED TO POLITICAL STRUGGLE THROUGH AN ACOUSTICAL FRAMEWORK. FROM CONCERT FIELDWORK AT A TINARIWEN SHOW, I AM EXPLORING WAYS SOUND AND PERFORMANCE FUNCTION AS A MECHANISM FOR SOCIAL SOLIDARITY, CULTURAL REIMAGINATIONS, AND EXPRESSIONS OF EMANCIPATORY PRACTICES. I USE SONIC AGENCY AS A FRAMEWORK TO EXAMINE THE RELATIONSHIP BETWEEN SOUND AND LIBERATORY POLITICS. I EXPLORE THE PLURALITY OF TUAREG SONIC WORLDS, FOCUSING NOT ONLY ON ITS RESISTIVE ASPECTS BUT ALSO ON THE MANIFOLD WAYS IT MEMORIALIZES AND REANIMATES TUAREG CULTURE. FURTHERMORE, I INTERROGATE CONCEPTS OF POLITICAL FREEDOM AND REDEMPTION BY ANATOMIZING

TINARIWEN'S MOST RECENT ALBUM'S AMADJAR IN ORDER TO UNDERSTAND THE INTRICATE CHANGES IN TAMASHEQ CULTURAL PRODUCTION.

1:00 PM - 2:00 PM

**CATHY VO, POLITICAL SCIENCE/PUBLIC SERVICE**

FACULTY MENTOR: JENNIFER MEROLLA, POLITICAL SCIENCE

THE DIFFICULTIES OF ELECTING A FEMALE PRESIDENT IN MODERN DAY AMERICA

IN THE 2020 PRESIDENTIAL ELECTION, THERE WAS A RECORD BREAKING AMOUNT OF WOMEN WHO RAN FOR OFFICE. THIS INCLUDES THE DEMOCRATIC PARTY'S SENATOR ELIZABETH WARREN OF MASSACHUSETTS, SENATOR KAMALA HARRIS OF CALIFORNIA, SENATOR AMY KLOBUCHAR OF MINNESOTA, SENATOR KIRSTEN GILLIBRAND OF NEW YORK, REPRESENTATIVE TULSI GABBARD OF HAWAII, AND AUTHOR MARIANNE WILLIAMSON. ADDITIONALLY, THE LIBERTARIAN PARTY NOMINATED THEIR FIRST FEMALE CANDIDATE FOR THE 2020 ELECTIONS AS WELL, JO JORGENSEN. ALTHOUGH PEOPLE OF THE 21ST CENTURY HAVE OFTEN BOASTED ABOUT THEIR PROGRESSIVE SOCIETY, YET AMERICANS HAVE NOT SEEN A FEMALE PRESIDENT/ LEADER DESPITE OTHER COUNTRIES SUCH AS NEW ZEALAND, FINLAND, AND TAIWAN ALREADY HAVING FEMALES IN THE HIGHEST POSITION OF POWER. IT IS IMPORTANT TO ANALYZE AND UNDERSTAND WHY AMERICA HAS YET TO BE ABLE TO ELECT A FEMALE PRESIDENT. BY USING DATA AVAILABLE TO THE GENERAL PUBLIC IN PREVIOUS CAMPAIGNS OF AMERICAN FEMALE CANDIDATES, THE GOAL OF THIS RESEARCH IS TO BETTER UNDERSTAND "WHAT WENT WRONG" AND WHAT ARE THE LIMITATIONS OF BEING A FEMALE CAMPAIGNING FOR A HIGH POSITION OF POWER IN AMERICA. ADDITIONALLY, IT IS IMPORTANT TO LOOK AT SOCIETY AS A WHOLE IN AMERICA AND THEIR ATTITUDES TOWARDS MALE AND FEMALE CANDIDATES. BY FURTHER ANALYZING THE RESEARCH DATA THAT IS ALREADY AVAILABLE IN THE FIELD, MY GOAL IS TO COMPARE THE DIFFERENCES BETWEEN THE CAMPAIGNS AND ATTITUDES OF THE GENERAL PUBLIC TOWARDS FEMALE LEADERS IN AMERICA AND OTHER COUNTRIES THAT HAVE SUCCESSFULLY ELECTED A FEMALE LEADER.

2:15 PM - 3:15 PM

**JEREMY AQUINO, PSYCHOLOGY**

FACULTY MENTOR: CECILIA CHEUNG, PSYCHOLOGY

ACCULTURATION AND ITS IMPLICATIONS FOR THE ACADEMIC ACHIEVEMENT AND SUBJECTIVE WELL-BEING OF EAST ASIAN INTERNATIONAL STUDENTS

THE U.S. HIGHER EDUCATION SYSTEM HOSTS A WIDE RANGE OF INTERNATIONAL STUDENTS, WITH THE MAJORITY BEING FROM EAST ASIAN COUNTRIES (INSTITUTE OF INTERNATIONAL STUDENTS, 2020). EAST ASIAN INTERNATIONAL STUDENTS MAY HAVE PARTICULAR DIFFICULTY WITH ACCULTURATING INTO A NOVEL ENVIRONMENT GIVEN THEIR PREDOMINANT INTERDEPENDENT SELF-CONSTRUALS, WHICH CONTRASTS WITH THE LARGELY INDEPENDENT CULTURAL IMPERATIVE OF THE WEST. THE PRESENT STUDY INVESTIGATES THE POTENTIAL ASSOCIATIONS BETWEEN INTERNATIONAL STUDENTS' ACCULTURATION, SELF-CONSTRUAL (SC), AND THEIR ACADEMIC AND PSYCHOLOGICAL ADJUSTMENT (E.G., ACHIEVEMENT GOALS, ACADEMIC ACHIEVEMENT, SUBJECTIVE WELL-BEING) TO SHED LIGHT ON HOW EAST ASIAN INTERNATIONAL STUDENTS CAN BEST ADAPT TO A NEW CULTURE. PARTICIPANTS INCLUDED A TOTAL OF 24 EAST ASIAN INTERNATIONAL STUDENTS (9 MALE, 15 FEMALE; AGE RANGE: 18 TO 22). RESULTS FROM A SERIES OF CORRELATION ANALYSES INDICATED THAT THERE WERE SIGNIFICANT

CORRELATIONS BETWEEN TIME IN THE U.S. AND THE INTEGRATION STRATEGY, AND ASSIMILATION, SEPARATION, AND MARGINALIZATION WITH AVOIDANCE-BASED ACHIEVEMENT GOALS. ADDITIONALLY, BOTH TYPES OF SELF-CONSTRUAL WERE ASSOCIATED WITH PERFORMANCE-AVOIDANCE GOALS, WITH INDEPENDENT SC IN A NEGATIVE DIRECTION AND INTERDEPENDENT SC IN A POSITIVE DIRECTION. PERHAPS SURPRISINGLY, THERE WAS NO ASSOCIATION BETWEEN ACCULTURATION STRATEGIES AND STUDENTS' SELF-REPORTED WELL-BEING, AS WELL AS ACHIEVEMENT GOALS AND ACADEMIC ACHIEVEMENT. THE FINDINGS SUGGEST THAT ACCULTURATION STRATEGIES ARE NOT DIRECTLY LINKED TO ACADEMIC ACHIEVEMENT AND WELL-BEING AMONG EAST ASIAN INTERNATIONAL STUDENTS. FURTHER LONGITUDINAL RESEARCH MAY PROVIDE A MORE COMPREHENSIVE UNDERSTANDING OF THE ASSOCIATION BETWEEN ACCULTURATION AND ACHIEVEMENT GOALS IN THIS UNIQUE STUDENT POPULATION.

2:15 PM - 3:15 PM

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**LEANA RUDOLPH, ANTHROPOLOGY**

FACULTY MENTOR: MATTHEW KING, RELIGIOUS STUDIES

BUDDHISM, MEDITATION, AND THE NEGOTIATION OF THE PUBLIC SPHERE

THIS CAPSTONE SERVES TO MAP AND GATHER THE ORAL HISTORIES OF FORMERLY UNDOCUMENTED BUDDHIST COMMUNITIES PERTAINING TO THEIR LIVED EXPERIENCES IN THE INLAND EMPIRE. THE ETHNOGRAPHIC FIELDWORK CONDUCTED OF 10 SITES OVER THE PERIOD OF 12 MONTHS EXPLORED THE INTERSECTION OF DIASPORA, ECONOMY, AND RELIGIOUS AFFILIATION. THIS RESEARCH BEGINS TO EXPLORE THIS JUNCTION BY UNDERTAKING A QUALITATIVE AND QUANTITATIVE STUDY THAT WILL MAP BUDDHIST LIFE IN THE INLAND EMPIRE TODAY. IT WILL INCLUDE INTERVIEWS, PROVIDING ORAL HISTORIES, AND WILL BE ACCESSIBLE THROUGH A GIS MAP, HELPING RELIGIOUS STUDIES AND ANTHROPOLOGIST SCHOLARS TO LOCATE THESE SITES AND HAVE BACKGROUND INFORMATION ON THESE LOCATIONS. THE INLAND EMPIRE REPRESENTS MANY HEAVILY POPULATED, POST-AGRICULTURAL, AND MANUFACTURING AREAS IN AMERICA TODAY, WHICH SINCE THE 1970s AND ESPECIALLY SINCE 2008 HAS SUFFERED FROM MANY ECONOMIC AND SOCIAL CRISES RELATED TO SUBURBAN POVERTY, AS WELL AS WAVES OF DEMOGRAPHIC CHANGES. TAKING THE INLAND EMPIRE AS A PETRI DISH FOR BROADER TRENDS AT THE INTERSECTION OF RELIGION, ECONOMY, AND THE SOCIAL IN THE AMERICAN PUBLIC SPHERE TODAY, THIS CAPSTONE PROJECT HOPES TO DETERMINE HOW BUDDHISM FORMS AT THESE INTERSECTIONS, WHAT NEW STORIES ABOUT LIFE IN THE INLAND EMPIRE BUDDHIST SITES AND COMMUNITIES HELP TO ILLUMINATE, AND WHAT FORMS OF DIGITAL INTERFACING BEST BRINGS ANTHROPOLOGICAL ANALYSES TO THE PUBLICS IT EXAMINES.

2:15 PM - 3:15 PM

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**CHRISTINE CHAPMAN, BIOLOGY**

FACULTY MENTOR: LUIS A. LARA MALVACÍAS, DANCE

YOU CAN'T GROW A TREE BY STRETCHING IT: A COMPARISON BETWEEN COMPETITIVE DANCE AND SOMATIC TRAINING

IN MY PROJECT, I AM EXAMINING THE COMPETITIVE DANCERS' APPROACH TO STRETCHING AND COMPARING IT TO THE APPROACHES OF SOMATIC PRACTICES. DANCE TV SHOWS SUCH AS DANCE MOMS, SO YOU THINK YOU CAN DANCE, AND WORLD OF DANCE HAVE INFLUENCED THE COMPETITIVE DANCE CULTURE, PARTICULARLY IN THE WAY DANCERS ARE WORKING TO GAIN MORE FLEXIBILITY — AT THE RISK OF INJURY. THIS INFLUENCE HAS BECOME MORE NOTICEABLE IN THE LAST TWO YEARS, WITH DANCERS TRAINING TO BECOME AS FLEXIBLE AS

THE ONES PRESENTED ON THE TV SHOWS. CONVERSELY, SOMATIC TECHNIQUES INVOLVE A SENSORY ORIENTED PROCESS THAT REQUIRES DANCERS TO BE IN TUNE WITH THEIR BODIES FROM THE INSIDE OUT. IT IS A MUCH MORE GRADUAL, STEP-BY-STEP PROCESS FOR DANCERS TO ACCESS THEIR MAXIMUM RANGE OF MOTION. A DANCER WOULD NOT BE TOLD TO GO STRAIGHT TO THEIR END RANGE BUT WOULD BUILD UP SLOWLY TO THE POINT WHERE THEIR END RANGE IS MORE EASILY ACCESSIBLE WITH LITTLE OR NO DISCOMFORT. SOMATIC PRACTICES TAKE INTO CONSIDERATION THE INDIVIDUALIZATION OF OUR ANATOMICAL STRUCTURE AND HELP DEVELOP AWARENESS OF THE DANCER'S OWN PHYSICAL POTENTIAL AND LIMITATIONS. I AM LOOKING TO SEE IF THIS FAIRLY UNRESEARCHED REALM OF COMPETITIVE DANCE COULD BENEFIT FROM THE FIELD OF SOMATIC PRACTICES AND TECHNIQUES. I INTERVIEWED PHYSICAL THERAPISTS, COMPETITIVE DANCERS, AND DANCERS WHO HAVE TAKEN A SOMATIC COURSE TO COMPARE THE EXPERIENCES OF BOTH TRAINING METHODS. MY RESEARCH AIMS TO EDUCATE DANCERS AND TEACHERS OF BETTER WAYS TO TRAIN DANCERS TO PREVENT INJURY AND LONG-TERM DAMAGE TO THEIR BODIES.

2:15 PM - 3:15 PM

### **MIGUEL MUÑOZ, SPANISH AND EDUCATION**

FACULTY MENTOR: DR. COVADONGA LAMAR PRIETO, HISPANIC STUDIES DEPARTMENT

SAN BASILIO DE PALENQUE: SOCIAL MEDIA USAGE AND ATTITUDES

SAN BASILIO DE PALENQUE (COLOMBIA) IS A BILINGUAL COMMUNITY THAT SPEAKS SPANISH AND LENGUA, A SPANISH CREOLE WITH STRONG AFRICAN ROOTS WHICH THE ACADEMIC COMMUNITY REFERS TO THE LANGUAGE AS "PALENQUERO". DUE TO IN-GROUP AND OUT-GROUP NEGATIVE PERCEPTIONS TOWARDS LENGUA, THE NUMBER OF PALENQUERO SPEAKERS HAS GRADUALLY DWINDLED DOWN. IN RECENT YEARS THE PERCEPTION OF BEING A LENGUA SPEAKER HAS CHANGED FROM NEGATIVE TO POSITIVE DUE TO LOCAL ACTIVISTS AS WELL AS RESEARCHERS INTERESTED IN PRESERVING THE LANGUAGE.

ALTHOUGH PALENQUERO HAS BEEN EXTENSIVELY RESEARCHED BY LIPSKI ( 2005, 2015A, 2016), ARMIN (1996, 1998), AND MAGLIA (2015) FOCUSING ON LINGUISTIC, HISTORICAL, AND SOCIAL RESEARCH, EXPOSURE TO INTERNET PLATFORMS HAS ONLY RECENTLY BEEN INTRODUCED TO SAN BASILIO. THE GOAL OF THIS PROJECT DIFFERS IN THAT IT AIMS TO UNDERSTAND HOW A HISTORICALLY MARGINALIZED LANGUAGE AND COMMUNITY IS INTERACTING WITH ADVANCEMENTS IN TECHNOLOGY.

THIS FIELDWORK STUDY EXAMINES THE USE OF SOCIAL MEDIA AMONG RESIDENTS (N=65) OF SAN BASILIO DE PALENQUE. PARTICIPANTS WERE INTERVIEWED USING A SURVEY STYLE ONE ON ONE PROCESS ONSITE FOR THIS PROJECT. THE DATA FROM THIS PROJECT REVEALS THAT THERE IS A HIGH USE OF SOCIAL MEDIA PLATFORMS FROM YOUNGER MEMBERS OF THE COMMUNITY. FURTHERMORE, THERE IS ALSO A POSITIVE TREND OF USING SOCIAL MEDIA AS A REVITALIZATION TOOL AMONG LEADERS IN THE COMMUNITY.

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### **KEVIN ALDANA, MEDIA AND CULTURAL STUDIES**

FACULTY MENTORS: FREYA SCHIWY & SARITA SEE, MEDIA AND CULTURAL STUDIES

UNDERSTANDING THE "TRUE" CONTEXT: GUATEMALA AND WESTERN CONFUSION ON NON-WESTERN NARRATIVES



CENTRAL AMERICA MADE HISTORY IN THE WORLD OF CINEMA AT THE 2021 GOLDEN GLOBES WITH ITS FIRST EVER GOLDEN GLOBE NOMINATION OF THE GUATEMALAN FILM LA LLORONA, A REIMAGINING OF A COMMON LATIN AMERICAN FOLK TALE THAT IS INJECTED INTO A HORROR NARRATIVE ABOUT GUATEMALA'S DECADES LONG CIVIL WAR THAT RAGED FROM 1962 TO 1996. DESPITE THE INTERNATIONAL ACCLAIM, BUSTAMANTE'S FILMS ARE STILL HEAVILY MADE FOR AND FOCUS ON GUATEMALAN CULTURE, HISTORY, AND POLITICS; THEY ARE VIEWED, CONSUMED, AND INTERPRETED BY GUATEMALAN AUDIENCES AND CRITICS ALIKE BEFORE ANY OTHER DEMOGRAPHIC. CONSIDERING THIS RECENT INTERNATIONAL SUCCESS AND CRITICAL ACCLAIM OF BUSTAMANTE AND HIS FILMS, IXCANUL AND LA LLORONA, AND IN CLOSE REFERENCE TO PREVIOUS ANALYSIS BY GUATEMALAN AUTHOR ARTURO ARIAS IN HIS CRITIC OF AMERICAN ANTHROPOLOGIST DAVID STOLL AND HIS WESTERN-BASED INTERPRETATIONS OF A GUATEMALAN TEXT, RIGOBERTA MENCHU TUM'S I RIGOBERTA MENCHU, THAT REVEALED THE DANGERS OF MIS-INTERPRETING NON-WESTERN THEORIES AND IDEOLOGIES, THIS PROJECT WILL APPLY A SIMILAR SUBALTERN METHOD OF ANALYSIS TO CONTEMPORARY TEXTS LIKE BUSTAMANTE'S FILMS. THIS WILL OFFER A CONVERSATION ON THE DIFFERING WAYS OF INTERPRETING NON-WESTERN TEXTS BETWEEN WESTERN COUNTRIES LIKE THE U.S. AND LATIN AMERICAN COUNTRIES LIKE GUATEMALA AND EXPLAIN HOW EVEN THOUGH THESE FILMS CAN BE INTERPRETED FROM A WESTERN PERSPECTIVE OF ANALYSIS, IT IS MUCH MORE PRODUCTIVE TO INTERPRET THEM FROM A NON-WESTERN AND NON-EUROCENTRIC PERSPECTIVE THAT, FOR EXAMPLE, INCORPORATES MAYAN NOTIONS LIKE TXITZI'N INSTEAD OF WESTERN NOTIONS LIKE TRAUMA TO EXPRESS THE SOCIAL-POLITICAL AND CULTURAL CLIMATE OF GUATEMALA AND ITS WAR HISTORY.

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#### **BRITNEY OEUNG, BIOLOGY**

FACULTY MENTOR: ERICA C. HEINRICH, DIVISION OF BIOMEDICAL SCIENCES

#### **IMPROVEMENTS IN SLEEP DISORDERED BREATHING DURING ACCLIMATIZATION TO 3800 M AND THE IMPACT ON COGNITIVE FUNCTION**

SOJOURNERS TO HIGH ALTITUDE OFTEN EXPERIENCE POOR SLEEP QUALITY DUE TO SLEEP-DISORDERED BREATHING. ADDITIONALLY, MULTIPLE ASPECTS OF COGNITIVE FUNCTION ARE IMPAIRED AT HIGH ALTITUDE. HOWEVER, THE IMPACT OF ACCLIMATIZATION ON SLEEP-DISORDERED BREATHING AND WHETHER POOR SLEEP IS A MAJOR CONTRIBUTOR TO COGNITIVE IMPAIRMENTS AT HIGH ALTITUDE REMAINS UNCERTAIN. WE CONDUCTED POLYSOMNOGRAPHY AND COGNITIVE FUNCTION TESTS IN 15 PARTICIPANTS (33% WOMEN) AT SEA LEVEL AND OVER THREE DAYS OF PARTIAL ACCLIMATIZATION TO HIGH ALTITUDE (3,800 M) TO DETERMINE IF SLEEP-DISORDERED BREATHING IMPROVED OVER TIME AND IF SLEEP-DISORDERED BREATHING WAS ASSOCIATED WITH COGNITIVE FUNCTION. THE APNEA-HYPOPNEA INDEX AND OXYGEN DESATURATION INDEX INCREASED ON NIGHT 1 BUT BOTH IMPROVED OVER THE SUBSEQUENT TWO NIGHTS. THESE MEASURES WERE MATCHED BY POORER SELF-REPORTED SLEEP QUALITY ON THE STANFORD SLEEPINESS SCALE AND PROMIS QUESTIONNAIRES FOLLOWING ONE NIGHT AT HIGH ALTITUDE (ADJ.  $P=0.027$  AND ADJ.  $P=0.022$ , RESPECTIVELY). REACTION TIME ON THE PSYCHOMOTOR VIGILANCE TASK WAS SLOWER AT HIGH ALTITUDE AND DID NOT IMPROVE (SL:  $199\pm27$ , ALT1:  $224\pm33$ , ALT2:  $216\pm41$ , ALT3:  $212\pm27$  MS). REACTION TIMES ON THE BALLOON ANALOG RISK TASK DECREASED AT HIGH ALTITUDE (SL:  $474\pm235$ , ALT1:  $375\pm159$ , ALT2:  $291\pm102$ , ALT3:  $267\pm90$  MS), PERHAPS INDICATING INCREASED RISK-TAKING BEHAVIOR. FINALLY, MULTIPLE COGNITIVE FUNCTION MEASURES WERE ASSOCIATED WITH SLEEP-DISORDERED BREATHING, RATHER THAN LOW DAYTIME ARTERIAL OXYGEN SATURATION. THESE DATA INDICATE THAT SLEEP-DISORDERED BREATHING AT MODERATELY HIGH ALTITUDE IMPROVES WITH PARTIAL ACCLIMATIZATION AND THAT SOME ASPECTS OF COGNITIVE PERFORMANCE IN UNACCLIMATIZED SOJOURNERS MAY BE IMPACTED BY POOR SLEEP RATHER THAN HYPOXEMIA ALONE.

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**NICHOLAS ALEGRE, CELL, MOLECULAR, AND DEVELOPMENTAL BIOLOGY**

FACULTY MENTOR: KARINE LE ROCH, MOLECULAR, CELL & SYSTEMS BIOLOGY

PROJECT TITLE: OPTIMIZATION OF THE NUCLEI EXTRACTION OF PLASMODIUM FALCIPARUM FOR USE WITH SINGLE CELL ATAC-SEQ

MALARIA IS ONE OF THE MOST DEBILITATING INFECTIOUS DISEASES IN THE WORLD AND WAS RESPONSIBLE FOR MORE THAN 400,000 DEATHS IN 2018 ALONE (WORLD HEALTH ORGANIZATION REPORT). THIS DISEASE IS CAUSED BY PLASMODIUM FALCIPARUM, A UNICELLULAR PARASITE TRANSMITTED TO HUMANS BY MOSQUITOES. AS PART OF ITS LIFE CYCLE, THE PARASITE UNDERGOES SEVERAL DIFFERENT STAGES. THESE STAGES ARE HEAVILY INFLUENCED BY CHANGES IN GENE EXPRESSION THAT ARE REGULATED AT LEAST PARTIALLY BY CHANGES REORGANIZATION IN THE OVERALL ORGANIZATION OF THE GENOME STRUCTURE, ALSO KNOWN AS CHROMATIN, INSIDE THE NUCLEUS. ASSAY FOR TRANSPOSASE-ACCESSIBLE CHROMATIN SEQUENCING, OR ATAC-SEQ, IS A TECHNIQUE USED IN MOLECULAR BIOLOGY TO ASSESS GENOME-WIDE CHROMATIN ACCESSIBILITY AND REGION OF ACTIVE GENE EXPRESSION. RECENTLY THIS METHODOLOGY HAS BEEN ADAPTED TO IDENTIFY OPEN CHROMATIN AT A SINGLE CELL LEVEL (SCATAC-SEQ). COMPARED WITH TRADITIONAL BULK DNA SEQUENCING METHODS, SINGLE-CELL SEQUENCING HAS THE ADVANTAGES OF DETECTING HETEROGENEITY AMONG INDIVIDUAL CELLS. SCATAC-SEQ COULD BE AN IDEAL METHOD TO IDENTIFY ACTIVE GENES THROUGHOUT THE MALARIA PARASITE DEVELOPMENT AT SINGLE CELL RESOLUTION. THIS WILL BE IMPORTANT IF WE WANT TO UNDERSTAND THE COMPLEX MOLECULAR MECHANISMS REGULATING GENE EXPRESSION. IN ORDER TO UNDERSTAND THIS PROCESS BETTER, THIS HONOR'S CAPSTONE PRESENTATION WILL BE FOCUSING ON PERFORMING A LITERATURE REVIEW EXPLORING THE DIFFERENCES BETWEEN THE SINGLE CELLED VERSION OF ATAC-SEQ COMPARED TO BULK ATAC-SEQ.

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**DEV BHATT, BIOENGINEERING**

FACULTY MENTOR: WILLIAM GROVER, BIOENGINEERING

VASUDHARA-1: A BIOREACTOR DESIGN FOR IMPROVING THE ACCESSIBILITY OF BIOPROCESSING

BIOREACTORS ARE A SIMPLE YET IMPORTANT TECHNOLOGY IN MANY INDUSTRIES AND SERVE AS A RELIABLE DEVICE FOR THE MASS CULTIVATION OF MICROORGANISMS. SPECIFICALLY IN BIOENGINEERING AND BIOCHEMICAL ENGINEERING, BIOREACTORS HAVE BECOME STAPLES IN INDUSTRIAL BIOTECHNOLOGY, BIOMEDICINE AND DRUG MANUFACTURING. HOWEVER, THEIR COST AND COMPLEXITY LIMIT ACCESSIBILITY FOR GENERAL CONSUMER, COMMERCIAL, AND EDUCATIONAL PURPOSES. AS A RESULT, INNOVATION AND GROWTH IN THESE FIELDS ARE REDUCED. I AIM TO ADDRESS THIS ISSUE USING VASUDHARA-1, A NOVEL BIOREACTOR PROTOTYPE. VASUDHARA'S NAMESAKE COMES FROM SANSKRIT MEANING "STREAM OF GEMS", A NOD TO THE UNIQUE HELICAL STRUCTURE OF SPIRULINA. VASUDHARA-1 IS CREATED USING SIMPLE HOMEBREWING EQUIPMENT AND COMMON CIRCUIT PARTS POWERED BY AN ARDUINO MICROCONTROLLER. ITS FUNCTIONALITIES INCLUDE AN AGITATOR MADE FROM A DC MINI MOTOR AND 3-D PRINTED PROPELLER AS WELL AS A BASIC SPECTROPHOTOMETER THAT USES A MULTI-COLOR LED AND A PHOTORESISTOR TO MEASURE THE GROWTH RATE OF THE MICROORGANISM VIA THE SOLUTION'S ABSORBANCE. IT INCLUDES TWO VARIANTS, ONE WHICH SERVES AS A PHOTOBIOREACTOR THAT GROWS SPIRULINA (ARTHROSPIRA PLATENSIS) AND ANOTHER MORE TRADITIONAL BIOREACTOR THAT GROWS YEASTS AND LACTIC ACID BACTERIA FOUND IN NURUK, A FERMENTATION STARTER. AS A DEMONSTRATION OF THIS PROTOTYPE, I GREW A CULTURE OF BOTH ORGANISMS IN LARGE MASON JARS AND OBSERVED THE RESULTS OVER 2 WEEKS USING QUALITATIVE AND QUANTITATIVE MEANS. FUTURE VERSIONS WILL REFINE PREVIOUS

FUNCTIONALITIES AND ADD NEW ONES SUCH AS TEMPERATURE CONTROL AND ETHANOL DETECTION. WHILE STILL IN ITS INFANCY, VASUDHARA-1 HAS THE ABILITY TO DEMOCRATIZE SCIENTIFIC RESEARCH AND MAKE BIOREACTORS MORE ACCESSIBLE.

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**SPENCER PAK, BIOENGINEERING; HERAN BHAKTA**

FACULTY MENTOR: WILLIAM H. GROVER, BIOENGINEERING

USING TUNING FORKS TO ANALYZE BIOLOGICAL SAMPLES

TOOLS FOR MEASURING THE DENSITY OF A SAMPLE CAN PROVIDE VALUABLE INFORMATION ABOUT THE CHEMICAL COMPOSITION OR BIOLOGICAL STATE OF THE SAMPLE. HOWEVER, EXISTING TOOLS FOR DENSITY MEASUREMENT ARE COSTLY OR REQUIRE SIGNIFICANT SKILL TO BUILD OR USE. IN THIS WORK, WE ADAPTED A TYPE OF MUSICAL INSTRUMENT FOR USE AS A LOW-COST DENSITY SENSOR SUITABLE FOR USE IN RESOURCE-LIMITED SETTINGS. OUR SENSOR IS A TYPE OF TUNING FORK, WHICH GENERATES A SOUND WHEN PLUCKED. THE PITCH OR FREQUENCY OF THE SOUND PRODUCED DEPENDS ON THE FUNDAMENTAL PHYSICAL PROPERTIES OF THE TUNING FORK. WE USED COMPUTER ASSISTED DESIGN AND 3D PRINTING TO CREATE A HOLLOW TUNING FORK-LIKE SENSOR. WHEN THE SENSOR IS LOADED WITH A SAMPLE AND PLUCKED, IT MAKES A SOUND THAT IS INVERSELY PROPORTIONAL TO THE DENSITY OF THE SAMPLE. BY USING A SMARTPHONE TO RECORD THE SOUND OF THE SENSOR AND CUSTOM PYTHON SOFTWARE TO ANALYZE THE RECORDING, WE CAN DETERMINE THE DENSITY OF ANY SAMPLE WITH A RESOLUTION OF 0.0045 g/mL. THIS DEVICE CAN POTENTIALLY BE A SIMPLE AND INEXPENSIVE ALTERNATIVE TO CURRENT DEVICES THAT MEASURE DENSITY. IT HAS VARIOUS APPLICATIONS, SUCH AS IDENTIFYING ADULTERATED MEDICATIONS, ANALYZING CLINICAL SAMPLES LIKE MEASURING THE SPECIFIC GRAVITY OF URINE, AND DETECTING COUNTERFEIT FOODSTUFFS LIKE DILUTED MILK IN DEVELOPING REGIONS.

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**SUMANTH DARA, BIOENGINEERING**

FACULTY MENTOR: XIAOPING HU, BIOENGINEERING

STUDYING THE EFFECTS OF SUBSTANTIA NIGRA ON NEURODEGENERATIVE DISEASES VIA MAGNETIC RESONANCE IMAGING

THE SUBSTANTIA NIGRA, LOCATED IN THE MIDBRAIN, AND THE LOCUS COERULEUS, LOCATED IN THE PONS OF THE BRAINSTEM ARE TWO MAJOR NEUROTRANSMITTER PRODUCERS IN THE BRAIN, AND THE LOSS IN THESE STRUCTURES ARE HALLMARKS OF ALZHEIMER'S DISEASE OR PARKINSON'S DISEASE AS LOSS ALWAYS HAPPENS IN ONE OR BOTH STRUCTURES - DEPENDING ON THE DISEASE. THE FORMER IS STRUCTURED WITH DOPAMINERGIC NEURONS, SIGNIFICANTLY CONTRIBUTES TO MOTION AND LEARNING, WHILE THE LATTER PRODUCES THE MAJORITY OF THE BRAIN'S NOREPINEPHRINE, AND BOTH STRUCTURES COORDINATE IMPORTANT FUNCTIONS SUCH AS SLEEP, LEARNING, MEMORY, BEHAVIOR, BALANCE, AND MOVEMENT. AGING AFFECTS BOTH STRUCTURES. IN ORDER TO STUDY AND CHARACTERIZE THESE STRUCTURES IN DEMENTIA PATIENTS, RESEARCH, PRIMARILY VIA MAGNETIC RESONANCE IMAGING (MRI). THE MICROSTRUCTURE AND COMPOSITION OF THE STRUCTURES WOULD BE ANALYZED AND OBSERVED. IN ORDER TO MEASURE THESE, THE PARKINSON'S PROGRESSION MARKER INITIATIVE (PPMI) DATABASE WITH MRI IMAGES WOULD BE UTILIZED. PPMI HAS A POPULATION WITH SIGNIFICANT MEMORY CONCERN, AS IT IS A POPULATION AT RISK FOR DEVELOPING MEMORY DEFICITS, THAT CAN BE ANALYZED FOR EARLY MARKERS TO FIND EARLY CHANGES.



UNFORTUNATELY, PPMI DOES NOT HAVE IMAGES WITH A HIGH ENOUGH RESOLUTION FOR THE LOCUS COERULEUS, SO ONLY THE SUBSTANTIA NIGRA CAN BE OBSERVED. THE DATA WILL BE ANALYZED BY VARIOUS SIGNIFICANCE TESTS AND DATA ANALYSIS METHODS TO PROPERLY UNDERSTAND THE CORRELATION BETWEEN THE SUBSTANTIA NIGRA AND MEMORY/COGNITIVE FUNCTION. ADDITIONALLY, DEEP LEARNING IS APPLIED TO THE DATA TO BE ABLE TO DETECT AND BETTER UNDERSTAND THE PROGRESSION OF PARKINSON'S DISEASE.

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**PRESENTER: RONALD CHIA, BIOCHEMISTRY**

FACULTY MENTOR: MANUELA MARTINS-GREEN, DEPARTMENT OF MOLECULAR, CELL AND SYSTEMS BIOLOGY

**PRENATAL EXPOSURE TO THIRD-HAND SMOKE IS ACCOMPANIED BY LOWER BIRTHWEIGHTS AND LOWER LITTER SIZES**

SECOND-HAND SMOKE (SHS) IS WELL-DEFINED AS THE INHALATION OF CIGARETTE SMOKE IN THE AIR. AN ADDED DANGER IS WHEN SHS SETTLES ON FABRICS, RESULTING IN TOXINS ACCUMULATING ON THESE ITEMS. THIS IS CALLED THIRD-HAND SMOKE (THS) WHICH CAN IMPACT HUMAN HEALTH WHEN SOMEONE MAKES DERMAL CONTACT WITH THESE CONTAMINATED ITEMS. STUDIES HAVE SHOWN THE BIOLOGICAL IMPACT OF PROLONGED THS EXPOSURE INCLUDED DECREASE IN INSULIN RESPONSE AND RESPIRATORY DYSFUNCTION. HOWEVER, PREVIOUS INVESTIGATIONS HAVE NOT THOROUGHLY EXPLORED THE IMPACT OF PRENATAL THS THROUGH PREGNANT MOTHERS COMPARED TO SHS. THIS PROJECT EXPLORES THE EFFECTS OF PRENATAL THS EXPOSURE ON FETAL MICE. I HYPOTHEZIZED, THAT PRENATAL THS LEADS TO DECREASED BIRTHWEIGHTS AND LOWER LITTER SIZES. THIS WILL REQUIRE KEEPING THE NEWBORN MICE IN THEIR THS ENVIRONMENT UNTIL THEY ARE THREE WEEKS OLD SO THAT THE SEXES CAN BE DETERMINED. THE NEWBORN WEIGHTS OF MALE AND FEMALE MICE EXPOSED TO THS IN UTERO WERE FOUND TO BE SIGNIFICANTLY LOWER COMPARED TO MICE WERE BORN IN CLEAN AIR. HOWEVER, WEIGHT DIFFERENCES BETWEEN SEXES IN THS NOR CLEAN AIR WERE FOUND. THE AVERAGE NUMBER OF MICE BORN IN EACH LITTER WAS ALSO LOWER IN THS THAN IN CLEAN AIR. LOWER BIRTHWEIGHTS INDICATE THAT PRENATAL THS CAN LEAD IMPAIR DEVELOPMENT AND LOWER LITTER SIZES IMPLY THAT THE REPRODUCTIVE HEALTH OF THE PARENTAL MICE IS COMPROMISED.

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**DIONNE MARTIN, BIOLOGY**

FACULTY MENTOR: JASON STAJICH, DEPARTMENT OF MICROBIOLOGY

**SURF OR TURF: COMPARATIVE ANALYSIS OF CAROTENOID GENES FROM CYANOBACTERIA**

BIOLOGICAL SOIL CRUSTS (BSCs) ARE A CONSORTIUM OF DIFFERENT MICROORGANISMS, LIKE CYANOBACTERIA, FUNGI, AND BRYOPHYTES, THAT CAN WITHSTAND EXTREME TEMPERATURES AND SUN EXPOSURE. ONE IMPORTANT AND DOMINANT MEMBER OF BSCs ARE PHOTOSYNTHETIC CYANOBACTERIA THAT CAN PRODUCE A VARIETY OF DIFFERENT PIGMENTS. CAROTENOIDS ARE IMPORTANT LIGHT HARVESTING PIGMENTS THAT PREVENT THE PHOTOOXIDATION OF PHOTOSYNTHETIC REACTION CENTERS. THE CAROTENOID BIOSYNTHESIS PATHWAY HAS BEEN EXTENSIVELY STUDIED IN AQUATIC CYANOBACTERIA HOWEVER, LITTLE IS KNOWN ABOUT THE PATHWAY IN TERRESTRIAL CYANOBACTERIA. WE HYPOTHEZIZE THAT THE CAROTENOID BIOSYNTHESIS PATHWAY OF TERRESTRIAL CYANOBACTERIA HAS EVOLVED TO BECOME MORE ADAPTED TO THE EXTREME CONDITIONS OF THE DESERT. UNDERSTANDING DIFFERENCES BETWEEN THE CAROTENOID BIOSYNTHESIS PATHWAYS OF CYANOBACTERIA ISOLATED FROM DIFFERENT HABITATS COULD LEAD TO THE DISCOVERY OF NOVEL



CAROTENOIDS. WE EXTRACTED 42 CYANOBACTERIAL MAGs (METAGENOMIC ASSEMBLED GENOMES): 36 STRAINS FROM THE NMSU PIETRASIAK LAB DRYLAND ALGAE CULTURE COLLECTION AND 6 STRAINS ISOLATED FROM BSCs FROM THE MOJAVE DESERT. USING KBASE, A WEB ANALYSIS FROM LAWRENCE BERKELEY LAB AND DEPT OF ENERGY, WE COMPARED CAROTENOID BIOSYNTHESIS GENE COPY NUMBERS OF OUR 42 TERRESTRIAL MAG'S AND 53 AQUATIC AND TERRESTRIAL PUBLISHED CYANOBACTERIAL GENOMES. WITH NON-PARAMETRIC STATISTICAL ANALYSES WE FOUND SOME ASSOCIATION BETWEEN GENE COPY NUMBERS AND THE HABITATS OF OUR CYANOBACTERIA. GENE TREES WERE CREATED TO OBSERVE HOMOLOGOUS AND PARALOGOUS RELATIONSHIPS AMONG CYANOBACTERIAL STRAINS AND THEIR HABITAT. WE DISCOVERED AN ORTHOLOG OF A CAROTENOID BIOSYNTHESIS GENE, PHYTOENE DESATURASE (CRTI), IN SEVERAL TERRESTRIAL CYANOBACTERIA. PHYTOENE DESATURASE IS AN ESSENTIAL ENZYME FOR PHOTOSYNTHESIS AND THIS ORTHOLOG COULD HAVE FUNCTIONAL REDUNDANCY TO CREATE NOVEL CAROTENOIDS.

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### ALEXANDER MALTBY, HISTORY

FACULTY MENTOR: KYLE KHELLAF, COMPARATIVE LITERATURE AND LANGUAGES

THE WOMEN OF ANCIENT GREEK LITERATURE: AN EXAMINATION OF GRIEF OF RAGE

GRIEF IS, PERHAPS, ONE OF THE MOST VISCERAL—AND HUMAN—OF EMOTIONS. IT CAN MANIFEST ITSELF IN MANY DIFFERENT WAYS SINCE EVERY PERSON HANDLES THEIR GRIEF DIFFERENTLY. THE MYTHOLOGY AND LITERATURE OF ANCIENT GREECE ARE FILLED WITH MANY POWERFUL, COMPLEX, AND INTERESTING FEMALE CHARACTERS. RANGING FROM POWERFUL GODDESSES TO WIVES OF MORTAL HEROES. ONE COMMON THREAD, THROUGHOUT VIRTUALLY ALL OF THESE WOMEN'S STORIES, IS THAT OF GRIEF AND OF TRAUMA. SUCH GRIEF AND TRAUMA THAT THESE FIGURES EXPERIENCE SEEM TO REFLECT THAT OF THE REAL WOMEN WHO ACTUALLY LIVED DURING THE TIME PERIODS IN WHICH THESE STORIES WERE ORIGINALLY BEING TOLD. THIS PAPER EXAMINES SEVERAL PROMINENT FIGURES IN GREEK LITERATURE: DEMETER AND PERSEPHONE, CLYTEMNESTRA AND IPHIGENIA, MEDEA, HELEN, ANDROMACHE, AND PENELOPE. THE PRESENTATION FOR THIS SYMPOSIUM WILL FOCUS ON THE FIGURES OF DEMETER AND PERSEPHONE. THE AIM OF THIS PAPER AND THIS PRESENTATION IS TO EXAMINE THE HISTORICAL AND SOCIAL CONTEXT IN WHICH THESE VARIOUS STORIES WERE TOLD, AS WELL AS THE AUTHORS WHO WROTE THEM, IN ORDER TO UNDERSTAND NOT ONLY WHAT GRIEF AND TRAUMA MEANT TO THE ANCIENT GREEKS BUT ALSO HOW IT REFLECTS ONTO THEIR SOCIETY. FURTHERMORE, THE GOAL OF THIS PAPER IS TO DELVE INTO THE MOTIVATIONS OF THESE VARIOUS WOMEN AND LOOK AT THEM, NOT AS SPECIMENS UNDER A MICROSCOPE, BUT AS PEOPLE—PEOPLE WITH COMPLEX EMOTIONS, MOTIVATIONS, AND LIVES.

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### MARK HANIN, BIOLOGY

FACULTY MENTOR: KELECHI KALU, POLITICAL SCIENCE

AFRICA IN DEPTH: POLICY AND HEALTH

KNOWLEDGE OF A COUNTRY'S PUBLIC HEALTH POLICIES, POVERTY RATES, EDUCATION LEVEL, MORTALITY RATES, AND OTHER SOCIO-ECONOMIC FACTORS ARE IMPORTANT TO HELP EVALUATE A COUNTRY'S STANDARD OF LIVING. MY RESEARCH COMPARES BOTH NIGERIA'S AND SOUTH AFRICA'S STANDARDS OF LIVING AND EXPLAINS DIFFERENCES IN THEIR PUBLIC HEALTH POLICIES. PURCHASING POWER PARITY

DATA WILL HELP US TO COMPARE BOTH COUNTRY'S SES. AND TO INVESTIGATE THE PUBLIC HEALTH POLICY DECISIONS MADE BY NIGERIA COMPARED TO SOUTH AFRICA, TO EXPLAIN THE DIFFERENCES IN LIVING STANDARDS FOR BOTH COUNTRIES. BECAUSE OF ITS HISTORY, I EXPECT THAT SOUTH AFRICA HAS BETTER POLICIES COMPARED TO NIGERIA. LESSONS LEARNED FROM SOUTH AFRICA WILL BE USED TO MAKE RECOMMENDATIONS FOR IMPROVING NIGERIA'S HEALTH POLICIES. I ASSUME THAT IF PUBLIC POLICY AND PUBLIC HEALTH ARE ALIGNED, THE LIVING STANDARD OF SOCIETY WILL IMPROVE. MANY OF OUR HEALTH CRISES TODAY STEM FROM A LACK OF UNDERSTANDING OF HOW GOVERNMENT POLICIES ARE SUPPOSED TO HELP IMPROVE OUR HEALTH. CONSEQUENTLY, UNDERSTANDING THE RELATIONSHIP BETWEEN PUBLIC POLICY AND PUBLIC HEALTH IS IMPORTANT TO ENSURE THAT HEALTHCARE ESTABLISHMENTS PROVIDE BETTER SERVICES TO CITIZENS IN THE SHORT-RUN, AND IN THE LONG-RUN, IMPROVE THE HEALTH AND WELL-BEING OF SOCIETIES. IMPROVED HEALTH POLICIES AND CARE REQUIRE THAT HOSPITALS AND PATIENTS KNOW THE INTENT OF THE POLICY AND EXPECTED IMPACT ON PATIENTS. THIS CAN BE DONE THROUGH THE PROMOTION OF HEALTH-RELATED ISSUES AWARENESS BY PUBLIC HEALTH PROFESSIONALS IN ALL COMMUNITIES.

3:30 PM - 4:30 PM

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**ISABELLA GUERRERO, POLITICAL SCIENCE-PUBLIC SERVICE**

FACULTY MENTOR: PAUL D'ANIERI, POLITICAL SCIENCE

**SHIFTING MEDIA REPRESENTATION OF UKRAINE AFTER SEPTEMBER 18, 2019**

IN AUGUST OF 2019, A WHISTLEBLOWER COMPLAINT STATED THAT FORMER PRESIDENT TRUMP ATTEMPTED TO COERCE PRESIDENT ZELENSKY OF UKRAINE INTO INTERFERING WITH THE 2020 PRESIDENTIAL ELECTION. THIS STORY SURFACED VIA THE WASHINGTON POST ON SEPTEMBER 19, 2019, CREATING A MEDIA FRENZY. AMERICAN MEDIA WAS SATURATED WITH NEWS ABOUT THE TRUMP-UKRAINE SCANDAL AND UKRAINE MADE HEADLINES DAILY AFTER SPENDING FIVE YEARS IN THE PERIPHERAL VISION OF PUBLIC CONSCIOUSNESS. SUDDENLY, THERE WERE A LOT OF POLITICALLY CHARGED OPINIONS ABOUT UKRAINE BEING EXCHANGED AND PROLIFERATED. I AM INTERESTED IN OBSERVING HOW THE LANGUAGE THE MEDIA USED TO TALK ABOUT UKRAINE CHANGED FROM BEFORE SEPTEMBER 18, TO AFTER. WHAT WORDS WERE NEWS OUTLETS USING, AND HOW WERE THOSE CHOICES CONVEYING AN OPINION OF UKRAINE? DID OPINIONS AND WORD CHOICES DIFFER BETWEEN PUBLICATIONS WITH OPPOSITE POLITICAL LEANINGS? ANSWERING THESE QUESTIONS WILL LEAD TO A BETTER UNDERSTANDING OF BIASES IN AMERICAN MEDIA AND WILL CONTRIBUTE TO THE GROWING FIELD OF RESEARCH THAT STUDIES NEWS CONTENT TO DRAW CONCLUSIONS ABOUT CHANGING IN MEDIA REPRESENTATION. TO ANSWER THESE QUESTIONS, I COLLECTED 50 ARTICLES FROM BEFORE SEPTEMBER 19, 2019, AND 50 AFTER FROM THE NEW YORK TIMES AND THE NEW YORK POST FOR A TOTAL OF 200 ARTICLES. I CONDUCTED A WORD OCCURRENCE ANALYSIS FOR EACH ARTICLE, AND CREATED GRAPHICS TO ILLUSTRATE WORD FREQUENCY, PATTERNS, AND CHANGE OVER TIME. I CAME TO THE CONCLUSION THAT WHILE UKRAINE GARNERED A LOT OF MEDIA ATTENTION, IT PRIMARILY ACTED AS A BACKGROUND CHARACTER IN AN AMERICAN POLITICAL EVENT: TRUMP'S FIRST IMPEACHMENT.

3:30 PM - 4:30 PM

**JENNIFER HOANG, NEUROSCIENCE; RASNEEK SINGH**

FACULTY MENTOR: REBEKAH RICHERT, PSYCHOLOGY

THE EFFECT OF AGE, RELIGIOUS AFFILIATION, ETHNICITY, AND GENDER ON CHILDREN'S DEVELOPING MORAL REASONING

PAST RESEARCH INDICATES CHILDREN AGES 3 TO 5 YEARS OLD CONSIDER CONVENTIONAL TRANSGRESSIONS AS LESS SERIOUS THAN MORAL TRANSGRESSIONS (DAHL & KIM, 2014). CURRENT RESEARCH SUGGESTS THAT AS CHILDREN AGE THEIR MORAL UNDERSTANDING EXPANDS TO INCLUDE OBEDIENCE OF SOCIAL NORMS (HELWIG & CHANG, 2020). THE CURRENT STUDY EXAMINES THE RELATIONSHIP BETWEEN MORAL REASONING AND AGE, RELIGIOUS AFFILIATION, ETHNICITY, AND GENDER.

CHILDREN BETWEEN THE AGES OF 6 – 10 YEARS OLD ( $N = 79$ ; 53.7% FEMALE;  $M_{AGE} = 8.389$ ) COMPLETED AN INTERVIEW CONTAINING A MORAL AND CONVENTIONAL REASONING MEASURE WHERE THEY WERE ASKED WHETHER A CERTAIN ACTION WAS ALRIGHT AND RESPONDED WITH YES [1], NO [0]. CHILDREN WERE FROM DIVERSE ETHNIC BACKGROUNDS AND FOUR RELIGIOUS BACKGROUNDS: PROTESTANT ( $N = 30$ ), CATHOLIC ( $N = 15$ ), MUSLIM ( $N = 12$ ), AND NON-AFFILIATE ( $N = 19$ ).

RESULTS INDICATED THAT MORAL REASONING WAS NOT SIGNIFICANTLY RELATED TO AGE ( $F(1,75) = .307$ ,  $p = .581$ ), ETHNICITY ( $F(5,72) = .885$ ,  $p = .495$ ), OR GENDER ( $F(1,76) = 2.297$ ,  $p = .134$ ). SIMILARLY, CONVENTIONAL REASONING WAS NOT SIGNIFICANTLY RELATED TO AGE ( $F(4,71) = 1.699$ ,  $p = .160$ ), ETHNICITY ( $F(5,71) = .893$ ,  $p = .491$ ), OR GENDER ( $F(1,75) = .991$ ,  $p = .323$ ). HOWEVER, THERE WAS A SMALL SIGNIFICANT RELATION TO RELIGIOUS AFFILIATION AND MORAL REASONING ( $F(4,71) = 2.516$ ,  $p = .049$ ) BUT NOT CONVENTIONAL REASONING ( $F(4,70) = 1.274$ ,  $p = .289$ ). OVERALL, THE FINDINGS SUGGEST THAT OLDER CHILDREN ARE MORE LIKELY TO RATE CONVENTIONAL AND MORAL TRANSGRESSIONS AS SIMILARLY “NOT ALRIGHT”, HINTING AT A MORE COMPLEX MORAL UNDERSTANDING.

3:30 PM - 4:30 PM

**DURGA MAHAPATRA, SOCIOLOGY**

FACULTY MENTOR: ANDREA POLONIJO, DEPARTMENT OF SOCIAL MEDICINE, POPULATION, & PUBLIC HEALTH; BRANDON BROWN, DEPARTMENT OF SOCIAL MEDICINE, POPULATION, & PUBLIC HEALTH

KNOWLEDGE, ATTITUDES, AND BELIEFS ABOUT HPV VACCINATION AMONG ADULT WOMEN IN THE INLAND EMPIRE, CALIFORNIA

HUMAN PAPILLOMAVIRUS (HPV) VACCINATION IS AN EFFECTIVE PREVENTION MEASURE AGAINST HIGH-RISK, CANCER-CAUSING STRAINS OF HPV. INITIALLY APPROVED FOR USE IN ADOLESCENTS AND YOUNG ADULTS UP TO AGE 26, IN 2018 HPV VACCINE ELIGIBILITY EXPANDED TO INCLUDE INDIVIDUALS UP TO AGE 45. THIS STUDY INVESTIGATES THE SOCIAL FACTORS INFLUENCING VACCINE ACCEPTANCE AMONG UNVACCINATED WOMEN IN THE NEWLY EXPANDED AGE RANGE FOR VACCINATION. DEMOGRAPHIC SURVEYS AND VIRTUAL FOCUS GROUPS ( $N=8$  GROUPS) WERE CONDUCTED WITH A SOCIOECONOMICALLY AND RACIAL-ETHNICALLY DIVERSE SAMPLE OF 52 WOMEN AGED 27-45 LIVING IN THE INLAND EMPIRE, CALIFORNIA. EMERGENT THEMES RELATED TO WOMEN'S KNOWLEDGE, ATTITUDES, AND BELIEFS ABOUT HPV VACCINATION—AND THE SOCIAL FACTORS DRIVING THEM—WERE IDENTIFIED USING THE “RAPID AND RIGOROUS QUALITATIVE DATA ANALYSIS” TECHNIQUE. KEY THEMES CENTERED ON AWARENESS, TRUST, RISK, AND CONTROL, AND WERE SHAPED BY DEMOGRAPHIC CHARACTERISTICS SUCH AS RELIGION AND RACE/ETHNICITY. FEW WOMEN WERE AWARE HPV VACCINES WERE APPROVED FOR THEIR AGE GROUP. WHILE MOST TRUSTED VACCINES IN GENERAL, MANY PERCEIVED HPV VACCINATION AS RISKY DUE TO PERCEIVED NEWNESS AND

UNKNOWN SIDE EFFECTS FOR WOMEN IN THEIR AGE GROUP. MANY WOMEN WHO WERE WILLING TO RECEIVE THE HPV VACCINE NOTED DOING SO WAS A WAY TO EXERCISE CONTROL OVER THEIR BODIES IN A WORLD WHERE IT IS NOT ALWAYS POSSIBLE TO CONTROL THE ACTIONS OF THEIR SEXUAL CONTACTS. THIS STUDY PROVIDES REGIONALLY SPECIFIC INSIGHT TO KEY BARRIERS TO HPV VACCINE ACCEPTANCE AMONG WOMEN, WHICH MAY BE USEFUL FOR INFORMING VACCINE AWARENESS AND EDUCATION INITIATIVES.

3:30 PM - 4:30 PM

#### JOSE SOTO, BIOCHEMISTRY

FACULTY MENTOR: DR. MORRIS MADURO, MOLECULAR, CELL, AND SYSTEMS BIOLOGY

STUDYING METABOLISM IN A MODEL ANIMAL USING AN ATP SENSOR PROTEIN

THE NEMATODE *CAENORHABDITIS ELEGANS* IS A POWERFUL MODEL SYSTEM TO STUDY FUNDAMENTAL BIOCHEMICAL PROCESSES SUCH AS THOSE IN METABOLISM. THIS PROJECT INVOLVES IDENTIFYING DETERMINANTS OF METABOLIC RATES BY STUDYING THE FUNCTION OF THE INTESTINE IN WILD-TYPE AND MUTANT *C. ELEGANS* ANIMALS. A KEY COMPONENT OF METABOLISM IN ALL LIVING CELLS IS THE AVAILABILITY OF ADENOSINE TRIPHOSPHATE, OR ATP, THE MAIN SOURCE OF CHEMICAL ENERGY TRANSFER. THE MADURO LAB HAS FOUND THAT PARTIALLY COMPROMISED SPECIFICATION OF GUT IN THE EMBRYO LEADS TO INCREASED FAT STORAGE IN SURVIVING ADULTS. THEY PREVIOUSLY IDENTIFIED GENES WHOSE EXPRESSION CHANGES IN THE GUT OF THESE STRAINS. TWO OF THESE GENES ARE *FSTR-1* AND *FSTR-2*. IN WILD-TYPE ANIMALS *FSTR-2* IS EXPRESSED, AND IN SPECIFICATION- COMPROMISED ANIMALS (E.G. THE STRAIN *MS404*), IT IS *FSTR-1* THAT IS EXPRESSED. THE TWO GENES MAKE RELATED PROTEINS THAT MAY BE IMPORTANT FOR IMPORT OF FOOD INTO GUT CELLS. WE HYPOTHEZIZE THAT THESE STRAINS DIFFER IN THEIR METABOLISM, SUCH THAT THE CONCENTRATION OF ATP IN THE LIVING ANIMALS WOULD BE DIFFERENT. USING AN ENGINEERED PROTEIN THAT RESPONDS TO ENDOGENOUS ATP LEVELS IN LIVING CELLS THROUGH FÖRSTER RESONANCE ENERGY TRANSFER, OR FRET, WE WILL MEASURE STEADY-STATE LEVELS OF ATP IN THE LIVING ANIMALS. OUR RESULTS SUGGEST THAT THE ATP SENSOR PROTEIN PRODUCES DETECTABLE SIGNAL THAT SHOWS SIGNAL DIFFERENCES, AS EXPECTED, IN CONTROL AND GENETIC BACKGROUNDS THAT INFLUENCE ATP LEVELS. WE ARE NOW USING THIS SENSOR IN *C. ELEGANS* AND MEASURING ENERGY LEVELS IN THE VARIOUS MUTANT BACKGROUNDS.

3:30 PM - 4:30 PM

#### SHAIVA PATEL, BIOLOGY

FACULTY MENTOR: DR. TARA NORDGREN, BIOMEDICAL SCIENCES

PRO-INFLAMMATORY AGRICULTURAL DUST EXPOSURE INDUCES AIRWAY EPITHELIAL EXPRESSION OF THE OXIDATIVE STRESS-RESPONSIVE PRDX6 ENZYME

INDIVIDUALS IN RURAL AREAS THAT DEPEND ON AGRICULTURE AS THEIR MAIN SOURCE OF INCOME ARE AT AN INCREASED RISK FOR PULMONARY DISEASES DUE TO CONSTANT EXPOSURE TO ORGANIC DUSTS ASSOCIATED WITH THESE OCCUPATIONS. PAST STUDIES SHOW THAT STIMULI-INDUCED OXIDATIVE STRESS SIGNIFICANTLY IMPACTS THE PATHOGENESIS AND PROGRESSION OF AGRICULTURAL-RELATED DISEASES, WHILE RECENT DATA FROM OUR LAB HAVE IDENTIFIED THAT OMEGA-3 FATTY ACID-DERIVED MEDIATORS, INCLUDING MARESIN-1, MAY BE PROTECTIVE AGAINST SOME OF THESE INFLAMMATORY IMPACTS OF ORGANIC DUST EXPOSURE. TO FURTHER EXPLORE OXIDATIVE STRESS



REGULATION IN RESPONSE TO AGRICULTURAL DUST EXPOSURE, THIS STUDY FOCUSED ON PEROXIREDOXIN 6 (PRDX6), AN ANTIOXIDANT ENZYME. PRDX6 IS ALSO THE ONLY PEROXIDASE KNOWN TO REGULATE PHOSPHOLIPID TURNOVER. TO INVESTIGATE THE IMPACTS OF ORGANIC DUST EXPOSURE ON PRDX6, WE TREATED PRIMARY HUMAN BRONCHIAL EPITHELIAL CELLS WITH DUST EXTRACTS COLLECTED FROM SWINE CONFINEMENT FACILITIES. FOLLOWING EXPOSURE, WE PERFORMED SEQUENTIAL WINDOW ACQUISITION OF ALL THEORETICAL MASS SPECTRA (SWATH-MS) TO QUANTIFY AND IDENTIFY THE DIRECTION OF REGULATION IN PRDX6 EXPRESSION. THE DATA INDICATED A SIGNIFICANT UPREGULATION (P-VALUE: 1.14610-9) OF PRDX6 WITH DUST EXPOSURE. ADDITIONALLY, WHEN COMPARING DUST-TREATED CELLS WITH THOSE PRE-TREATED WITH MARESIN-1 PRIOR TO DUST EXPOSURE, THERE WAS AN UPREGULATION (P-VALUE: 2.80110-2) BETWEEN DUST EXPOSURE AND PRDX6 EXPRESSION. THROUGH THESE INVESTIGATIONS, WE HAVE FOUND THAT PRDX6 EXPRESSION IS INDUCED BY ORGANIC DUST STIMULI, LIKELY AS A RESPONSE TO OXIDATIVE STRESS IN THE CELLS, AND PRDX6 EXPRESSION IS ENHANCED WITH MARESIN-1 TREATMENT. THIS IMPLICATES TREATMENT POTENTIAL OF AGRICULTURAL DUST-INDUCED RESPIRATORY ILLNESSES VIA UPREGULATION OF PRDX6 EXPRESSION.

3:30 PM - 4:30 PM

#### **RANEEM ALARAJ, BIOCHEMISTRY**

FACULTY MENTOR: ANDREA POLONIJO, DEPARTMENT OF SOCIAL MEDICINE, POPULATION, & PUBLIC HEALTH; BRANDON BROWN, DEPARTMENT OF SOCIAL MEDICINE, POPULATION, & PUBLIC HEALTH

KNOWLEDGE, ATTITUDES, AND BELIEFS ABOUT HPV VACCINATION AMONG MEN IN THE INLAND EMPIRE, CALIFORNIA: A QUALITATIVE ANALYSIS

WITHOUT HUMAN PAPILLOMAVIRUS (HPV) VACCINATION, HIGH-RISK CANCER-CAUSING STRAINS OF HPV CAN BE SEXUALLY TRANSMITTED AMONG ADULTS. WHILE HPV VACCINATION HAS BEEN ROUTINELY RECOMMENDED FOR ALL ADOLESCENTS FOR MORE THAN 10 YEARS, ELIGIBILITY RECENTLY EXPANDED TO INCLUDE ADULTS AGED 27–45. YET LITTLE RESEARCH HAS BEEN CONDUCTED ON VACCINE ACCEPTANCE AND UPTAKE AMONG ADULTS IN THIS AGE GROUP—PARTICULARLY AMONG MEN. TO FILL THIS GAP, THIS STUDY EMPLOYED DEMOGRAPHIC SURVEYS AND VIRTUAL FOCUS GROUPS (N=6 GROUPS, 34 PARTICIPANTS) WITH A SOCIOECONOMICALLY AND RACIAL-ETHNICALLY DIVERSE SAMPLE OF UNVACCINATED MEN AGED 27– 45 LIVING IN THE INLAND EMPIRE, CALIFORNIA. USING THE "RIGOROUS AND ACCELERATED DATA REDUCTION" QUALITATIVE ANALYSIS TECHNIQUE, DATA ARE BEING ANALYZED TO IDENTIFY KEY THEMES RELATED TO MEN'S KNOWLEDGE, ATTITUDES, AND BELIEFS ABOUT HPV VACCINATION. AN EMERGING THEME IS A MISCONCEPTION THAT HPV IS A "WOMEN'S ONLY" DISEASE—MOST MEN LACKED AWARENESS THAT VACCINE-PREVENTABLE HPV-RELATED CANCERS AFFECT MEN. FOR EXAMPLE, A PARTICIPANT SHARED "I THOUGHT IT WAS MORE IMPORTANT FOR YOUNG LADIES TO GET VACCINATED AND DIDN'T REALIZE HOW IMPORTANT IT WAS FOR MEN AS WELL." THIS LACK OF AWARENESS WAS LIKELY DRIVEN, IN PART, BY A LACK OF HEALTH PROVIDER RECOMMENDATIONS TO VACCINATE—WITH ONLY 12% OF OUR SAMPLE REPORTING A PROVIDER HAD EVER RECOMMENDED THE VACCINE TO THEM. THEREFORE, IDENTIFICATION OF GENDER-SPECIFIC SOCIAL BARRIERS TO HPV VACCINATION IN THE INLAND EMPIRE IS IMPORTANT, AS IT MAY PROVIDE INFORMATION TO INFORM LOCAL VACCINATION INITIATIVES AND PROMOTE EQUITABLE VACCINE UPTAKE ACROSS SOCIOECONOMIC AND RACIAL-ETHNIC GROUPS.

3:30 PM - 4:30 PM

**BRYAN SHADDY, MECHANICAL ENGINEERING**

FACULTY MENTOR: BHARGAV RALLABANDI, MECHANICAL ENGINEERING

**SEA ICE DISPERSION DRIVEN BY FLUCTUATING WIND AND OCEAN CURRENTS**

THE MOTION OF SEA ICE IS DRIVEN BY WIND AND OCEAN CURRENTS AND COMPRISES BOTH A STEADY DRIFT AND A FLUCTUATING COMPONENT. HERE, WE SYSTEMATICALLY DESCRIBE THE RELATION BETWEEN SEA ICE DISPERSION AND ENVIRONMENTAL NOISE STARTING FROM A LAGRANGIAN DESCRIPTION OF NON-INTERACTING ICE FLOES. WE QUANTIFY THE NONLINEAR DYNAMICS OF SEA ICE THROUGH STOCHASTIC SIMULATIONS, ACCOUNTING FOR NOISE IN WIND AND OCEAN CURRENTS, IN ADDITION TO CORIOLIS FORCES. THE ICE FOLLOWS DISPERSIVE BEHAVIOR ON TIME SCALES ON THE ORDER OF DAYS, CONSISTENT WITH OBSERVATIONS. WE FIND THAT THE DISPERSION COEFFICIENT OF THE ICE DEPENDS STRONGLY ON THE WIND FLUCTUATION SIZE AND THE CORRELATION TIME OF FLUCTUATIONS. FINALLY, WE LOOK AT THE CROSS-STREAM VELOCITY FLUCTUATIONS OF THE ICE GATHERED FROM SIMULATIONS TO HIGHLIGHT THE NON-LINEARITIES IN THE SEA ICE SYSTEM. OUR RESULTS ARE USEFUL IN QUANTIFYING SEA ICE PROPERTIES UNDER KNOWN ENVIRONMENTAL CONDITIONS, OR ALTERNATIVELY AS A WAY TO USE WIND DATA AND SEA ICE IMAGES TO INFER OCEAN STATISTICS.

3:30 PM - 4:30 PM

**DWARAKNATH RAVICHANDRAN, ELECTRICAL ENGINEERING**

FACULTY MENTOR: MATTHEW BARTH, ELECTRICAL AND COMPUTER ENGINEERING

**TRAFFIC, AIR QUALITY, AND ENVIRONMENTAL JUSTICE IN THE SOUTH COAST AIR BASIN DURING CALIFORNIA'S COVID-19 SHUTDOWN**

WITHIN AMERICA, THE SOUTHERN CALIFORNIA AREA EXPERIENCES ONE OF THE WORST CONGESTION AND AIR QUALITY LEVELS IN THE COUNTRY. WITH THE PANDEMIC, WE HAVE OBSERVED MAJOR REDUCTION IN ECONOMIC AND SOCIAL ACTIVITIES WITHIN THE AREA, LEADING TO CHANGES IN ROADWAY TRAFFIC, AIR QUALITY POLLUTION LEVELS, AND THE ENVIRONMENT IN A VARIETY OF WAYS. WITHIN 6 WEEKS OF THE PANDEMIC INDUCED LOCKDOWNS, FREEWAY TRAFFIC WAS DOWN AS MUCH AS 50%, BUT SINCE THEN HAS BEEN GRADUALLY RECOVERING. THIS RECOVERY, HOWEVER, HAS BEEN AN IMBALANCE THROUGHOUT THE SOUTHERN CALIFORNIA REGION AMONG THE VARIOUS SOCIO-ECONOMIC POPULATION GROUPS THAT EXIST. THESE DISPARITIES HAVE BROUGHT UP ENVIRONMENTAL JUSTICE CONCERNS, ESPECIALLY FOR COMMUNITIES THAT LIVE NEAR MAJOR ROADWAYS AND WAREHOUSE CENTERS. THE COVID-19 PANDEMIC GIVES US AN OPPORTUNITY TO OBSERVE HOW THE CHANGES IN ROAD TRAFFIC IN SOUTHERN CALIFORNIA AFFECT CERTAIN COMMUNITIES, AND DEVELOP CORRELATIONS USING VARIOUS MITIGATION MEASURES, MAKING OUR OBSERVATIONS AT BOTH LOCAL AND REGIONAL LEVELS. WE GO BEYOND REGIONAL ANALYSIS AND GO OVER THE EFFECTS OF COVID-19 ON TRAFFIC AT A TRANSPORTATION CORRIDOR AND LOCAL LEVEL TO ADDRESS POSSIBLE EQUITY ISSUES, WHICH INCLUDES ENVIRONMENTAL JUSTICE FOR DISADVANTAGED COMMUNITIES. SOCIO-ECONOMIC INFORMATION WAS COLLECTED AT A CENSUS TRACT LEVEL AND COMPARED WITH TRAFFIC ACTIVITIES AND AIR QUALITY TO ANALYZE FOR CORRELATION. PRELIMINARY DATA SUGGEST THAT DISADVANTAGED COMMUNITIES HAVE EXPERIENCED A SLOWER RECOVERY IN TRAFFIC ACTIVITIES INDUCED FROM THE COVID-19 PANDEMIC THAN AREAS THAT ARE SOCIO-ECONOMICALLY ADVANTAGED, EVEN IF THESE AREAS WERE LOCATED RIGHT NEXT TO EACH OTHER.

3:30 PM - 4:30 PM

**DANG LE, CHEMICAL ENGINEERING**

FACULTY MENTOR: ROBERT JINKERSON, CHEMICAL AND ENVIRONMENTAL ENGINEERING

## PHOTOSYNTHETICALLY DECOUPLED GROWTH OF ALGAE

ALTHOUGH PHOTOSYNTHESIS SUSTAINS VIRTUALLY ALL LIFE ON EARTH AND IS NOT TO BE DISMISSED AS ANYTHING SHORT OF A MIRACLE, IT IS A HIGHLY INEFFICIENT PROCESS. IN MOST PHOTOSYNTHETIC ORGANISMS, ONLY 1% OF RADIANT ENERGY IS CONVERTED INTO BIOMASS, AND TYPICALLY 3 TO 4% FOR MICROALGAE. NATURALLY, ONE MIGHT CONSIDER ALTERNATIVE ENERGY PATHWAYS THAT UTILIZE TECHNOLOGY SUCH AS PHOTOVOLTAICS WHICH TYPICALLY BOAST AROUND 20% EFFICIENCY, WITH SOME LAB DEMONSTRATIONS APPROACHING 50% IN RECENT YEARS. RECENTLY, A NOVEL ELECTRO-CATALYTIC PROCESS HAS BEEN DEVELOPED THAT IS CAPABLE OF FIXING CO<sub>2</sub> AND CO INTO MULTI-CARBON SUBSTRATES SUCH AS ACETATE AT HIGH EFFICIENCY RATES (57% CARBON TO ACETATE). ACETATE IS HETEROTROPHICALLY VIABLE FOR ALGAL GROWTH BUT IS PRIMARILY PRODUCED THROUGH NON SUSTAINABLE PETROLEUM OR HIGH ENERGY INTENSIVE PROCESSES. THIS ELECTRO-CATALYTIC PROCESS, HOWEVER, IS COMPLETELY INDEPENDENT OF PHOTOSYNTHESIS, EFFICIENT, AND CAN BE DRIVEN WITH RENEWABLE ENERGY SOURCES SUCH AS PHOTOVOLTAIC ENERGY. THE EFFLUENT STREAM PRODUCED BY THIS PROCESS CONTAINED CYTOTOXIC COMPONENTS THAT WERE EXAMINED AND TREATED, RESULTING IN AN ACETATE CONTAINING MEDIA VIABLE FOR GROWTH OF CHLAMYDOMONAS REINHARDTII, A MODEL ALGA. THIS DEMONSTRATES THE FIRST GROWTH OF A PHOTOSYNTHETIC ORGANISM COMPLETELY INDEPENDENT OF BIOLOGICAL PHOTOSYNTHESIS OR PHOTOSYNTHETICALLY DERIVED SUBSTRATES.

3:30 PM - 4:30 PM

**ELIZABETH LIU, BIOCHEMISTRY; ANTHONY WONG**

FACULTY MENTOR: GARRET R. ANDERSON, MOLECULAR, CELL &amp; SYSTEMS BIOLOGY

## DEVELOPMENTAL LATROPHILIN-2 MEDIATED CONTROL OF NEURONAL MORPHOLOGY WITHIN THE ENTORHINAL CORTEX-HIPPOCAMPAL CIRCUIT

NEURONS ARE DIVERSE CELL TYPES THAT ARE ASSIGNABLE TO VARIOUS MORPHOLOGICAL CATEGORIES. A COMMON EXCITATORY NEURON TYPE IN THE CORTICAL AND HIPPOCAMPAL BRAIN REGIONS ARE KNOWN AS PYRAMIDAL CELLS. THE EXPRESSION OF A SYNAPTIC CELL-ADHESION MOLECULE, LATROPHILIN-2 (LPHN2), HAS BEEN PREVIOUSLY IMPLICATED AS A KEY MOLECULAR REGULATOR OF THE DEVELOPMENT OF SELECT HIPPOCAMPAL PYRAMIDAL NEURONS AND THEIR SYNAPTIC CONNECTIONS. HERE, THE ROLE OF LPHN2 WAS TESTED IN THE ADJACENT REGION OF THE HIPPOCAMPUS, THE MEDIAL ENTORHINAL CORTEX (MEC). TO ESTABLISH LPHN2'S PRESENCE IN THE MEC, LPHN2 PROTEIN EXPRESSION LEVELS WERE EXAMINED THROUGH QUANTIFICATION OF NORMALIZED SIGNAL INTENSITY. UPON ESTABLISHING LPHN2'S ENRICHMENT IN THE MEC, LPHN2 EXPRESSION LEVELS WERE ANALYZED AT DIFFERENT DEVELOPMENTAL STAGES TO DETERMINE CHANGES IN LOCALIZATION DURING DEVELOPMENT. FROM THE ANALYSIS, LPHN2 WAS FOUND TO BE MOST ENRICHED IN THE DORSAL MEC WHEN COMPARED TO THE VENTRAL MEC; ADDITIONALLY, EXPRESSION WAS HIGHEST AT EARLY POSTNATAL DEVELOPMENT. TO INVESTIGATE LPHN2'S ROLE IN NEURONAL MORPHOLOGIES, RECONSTRUCTED LPHN2 DEFICIENT AND NORMAL MEC PYRAMIDAL NEURONS WERE COMPARED TO IDENTIFY CHANGES IN SPINE TYPE DENSITIES ACROSS THE MEC LAYERS. USING A GENETICALLY ENGINEERED LPHN2 CONDITIONAL KNOCK-OUT MOUSE MODEL (LPHN2CKO) AND PERFORMING STEREOTAXIC INJECTIONS OF CRE-RECOMBINASE EXPRESSING ADENO-ASSOCIATED VIRUSES (CRE-AAV), TARGETED REGIONAL SPECIFIC DELETION OF LPHN2 EXPRESSION WAS ACHIEVED. CO-INJECTION OF A CRE-DEPENDENT TD TOMATO FLUORESCENT PROTEIN EXPRESSING VIRUS (DIO-TD TOMATO-AAV) WAS PERFORMED TO VISUALIZE



TD TOMATO LABELED NEURONS LACKING LPHN2 EXPRESSION. IN DOING SO, A MORPHOLOGICAL ANALYSIS OF LPHN2 PROTEIN'S ROLE IN CONTROLLING CELL-TYPE AND REGIONAL SPECIFIC SPINE PATTERNING IN DEFINABLE MEC PYRAMIDAL NEURONS IS PROVIDED.

3:30 PM - 4:30 PM

### **DARREN YOHONN, PHYSICS AND MATH**

FACULTY MENTOR: LAURA SALES, ASTRONOMY

#### **MORPHOLOGY OF GAS RICH RADIO GALAXIES**

RESIDING AT THE CENTER OF EVERY GALAXY, WE KNOW THERE TO BE A SUPERMASSIVE BLACK HOLE (SMBH) WHICH ACCRETES GAS AND DUST FROM WITHIN THE HOST. DURING THIS PROCESS, THE SMBH HEATS UP THE SURROUNDING STRUCTURES TO THE POINT AT WHICH TREMENDOUS AMOUNTS OF ENERGY ARE RELEASED THROUGHOUT THE ELECTROMAGNETIC SPECTRUM IN A SYSTEM KNOWN AS AN ACTIVE GALACTIC NUCLEUS (AGN). THIS STUDY INSPECTED THE TIDAL FEATURES OF HOST GALAXIES OF STAR-FORMING JET-MODE AGN INDICATING PAST OR CURRENT MERGER EVENTS. IT ALSO EXPLORED THE EFFECTS OF INCREASING DEPTH IN THE IMAGING OF THESE GALAXIES. IMAGES OF 24 GALAXIES FROM 5 DIFFERENT SURVEYS WERE CALIBRATED, CATALOGED, COMPARED WITH SDSS DATA, CO-ADDED, FITTED, AND FINALLY, OPTICALLY EXAMINED. IN ADDITION TO THIS, ZERO-POINT MAGNITUDES AND COMPLETENESS LIMITS WERE DETERMINED IN ORDER TO LEND THESE IMAGES TO A FAIR COMPARISON WITH EACH OTHER. AFTER COMPUTING THESE VALUES AND FILTERING OUR DATA THROUGH THE ABOVE PROCEDURE, RESULTS SUGGEST THAT APPROXIMATELY 37.5% OF GALAXIES CONTAINING STAR-FORMING JET-MODE AGN PRESENT TIDAL FEATURES INDICATING A MERGER EVENT. IT IS ALSO SHOWN THAT DEEPER IMAGES PRODUCE CONSIDERABLY MORE DETAIL IN THESE GALAXIES, GIVING THEM THE ABILITY TO BE ANALYZED WITH MORE CONFIDENCE AND TO A GREATER EXTENT. WITH THE CONCLUSION OF THIS PROJECT, WE NOW HAVE A LARGER DATA SET OF STAR-FORMING JET-MODE AGN GALAXIES WHICH CAN BE INVESTIGATED FURTHER IN FUTURE STUDIES.

3:30 PM - 4:30 PM

### **HANNAH HAPICH, ENVIRONMENTAL SCIENCES**

FACULTY MENTOR: ANDREW GRAY, PHYSICAL SCIENCES

#### **PLASTIC WASTE INPUTS IN THE ASI RIVER IN VARANASI, INDIA**

PLASTIC POLLUTION IS BECOMING AN INCREASINGLY LARGE THREAT TO OUR NATURAL ENVIRONMENT, ESPECIALLY IN AREAS WITH INSUFFICIENT WASTE MANAGEMENT SERVICES, SUCH AS NORTHERN INDIA. OVER THE SUMMER OF 2019, WE COLLABORATED WITH RENEW OCEANS, A NONPROFIT ORGANIZATION FOCUSED ON INTEGRATED SOLUTIONS FOR PLASTIC POLLUTION, TO BETTER UNDERSTAND RIVERINE TRASH FATE AND TRANSPORT PROCESSES. WE DID THIS IN ORDER TO AID IN THE DESIGN PROCESS FOR A TRASH CAPTURING DEVICE THAT WILL OPERATE ON THE SURFACE OF THE ASI RIVER, A TRIBUTARY OF THE GANGES. WE MEASURED DISCHARGE AND COLLECTED SAMPLES FROM ABOVE AND BENEATH THE SURFACE OF THE WATER AND COMPARED THE CONCENTRATIONS AND COMPOSITION OF PLASTIC WASTE, INCLUDING PARTICLE SIZE, ITEM TYPE, AND MATERIAL TYPE. WE ESTIMATED THAT AN AVERAGE OF 2,076 KG (OR 112,679 PIECES) OF TRASH ARE FLOWING THROUGH THE ASI EVERY DAY DURING BASEFLOW PERIODS. OF THIS, ONLY 8% OF THE SAMPLE FLOATED BY MASS (0.6% BY



SURFACE AREA), WHICH WAS UNEXPECTED AND LEAD TO SOME MAJOR DESIGN CHANGES. LASTLY, WE FOUND THAT 82.5% OF THE TRASH BENEATH THE SURFACE AND 94.1% OF THE TRASH ABOVE THE SURFACE WAS PLASTIC (BY COUNT). THIS INFORMATION IS VALUABLE AS THERE IS LITTLE HYDROLOGIC AND POLLUTION DATA AVAILABLE IN THE REGION, PARTICULARLY AT SUCH A DETAILED SCALE. OUR RESULTS WILL NOT ONLY BENEFIT THE RENEW OCEANS TEAM AND THE FUTURE DEVELOPMENT OF THEIR TRASH CAPTURING DEVICE, BUT WILL ALSO PROVIDE INSIGHTS INTO RIVERINE PLASTIC POLLUTION TRANSPORT PROCESSES THAT WILL INFORM WATERSHED LITTER MANAGEMENT ACROSS THE GLOBE.

3:30 PM - 4:30 PM

### AMBER MAK, HISTORY

FACULTY MENTOR: RANDOLPH HEAD, HISTORY

PATRIOTUTES, SAINTS, AND RED WOMEN: WOMEN'S SEXUALITY AS A TOOL AND DANGER WITHIN US MILITARY CULTURE IN WWII

THIS PORTION OF A LARGER HISTORICAL PROJECT WILL EXAMINE THE SEXUAL DEPICTION OF WOMEN WITHIN THE CONTEXT OF VENEREAL DISEASE BY THE US MILITARY TO AMERICAN G.I.S DURING WWII FOR THE PURPOSE OF STUDYING HOW WOMEN'S SEXUALITY WAS COMMODIFIED AND USED WITHIN AMERICAN MILITARY CULTURE FOR MILITARY GAIN. BY EXAMINING THE INTERACTIONS BETWEEN G.I.S AND WOMEN THROUGH ARTISTIC REPRESENTATIONS, WE CAN OBSERVE A DISCREPANCY IN HOW WOMEN OF DIFFERENT SOCIAL AND NATIONAL STATUSES WERE USED WITHIN MILITARY CULTURE. THE THREE-WAY CONFLICT OF PERCEPTION BETWEEN WOMEN AS THE TROPES OF VIRGIN, WHORE, AND ENEMY AGENT CAN BE MAPPED THROUGH THE EXAMINATION OF THE PHYSICAL COLOR RED IN ITS CONNECTIONS TO VENEREAL DISEASE. THE SOURCES FOR THIS RESEARCH SECTION CONSIST OF PROPAGANDA POSTERS ON VENEREAL DISEASES, TRAINING VIDEOS ON SEXUAL HEALTH FOR G.I.S, PUBLICATIONS IN JOURNALS SUCH AS THOSE PRODUCED BY THE AMERICAN SOCIAL HYGIENE ASSOCIATION THAT FOCUSED ON VENEREAL DISEASES AND SEX WORK, US MILITARY STATISTICS ON THE HEALTH OF THEIR SERVICEMEN, PHOTOGRAPHS, COURT RECORDS, AND NEWSPAPER REPORTS ABOUT SPECIFIC INCIDENTS OR INTERACTIONS DURING THE WAR. WOMEN WERE NOT THE AUDIENCE OF THIS MEDIA, BUT THEY NONETHELESS BECAME VICTIMS OF ITS INTERNALIZATION BY US SERVICEMEN IN THE PUBLIC AND PRIVATE SPHERES DURING AND AFTER WWII.

3:30 PM - 4:30 PM

### HART ST. CLAIRE, PHILOSOPHY

FACULTY MENTOR: ADAM HARMER, PHILOSOPHY

"WHAT DO YOU DO WITH THE MAD THAT YOU FEEL?": A PHILOSOPHICAL TAKE ON SELF-GOVERNANCE RATHER THAN SELF-DOMINANCE

THE PURPOSE OF MY HONORS RESEARCH CAPSTONE IS TO DELVE INTO THE CONCEPT OF SELF-CRITICISM AND WHAT REALLY LIES BEHIND OUR MENTAL PROCESSES WHEN WE SUBCONSCIOUSLY HARM OUR OWN SELF-ESTEEM. THIS NOTION OF SELF-DOMINATION, PHILOSOPHICALLY COINED AS "WILL TO POWER," PERTAINS TO PHILOSOPHER NIETZSCHE AND HIS WRITINGS, ON THE GENEALOGY OF MORALS, WHICH CONSISTS OF HIS THEORIZATION ON HOW OUR BASIC HUMAN NATURE IS TO DOMINATE. HOWEVER, BECAUSE OF SOCIETAL MORALS, OFTEN INTERLACED WITH RELIGIOUS UNDERTONES, WE TURN THIS DOMINATION ONTO OURSELVES. THROUGH PHILOSOPHICAL AND PSYCHOLOGICAL

INQUIRY, I WILL ARGUE THAT THIS IS IN FACT THE CASE. I WILL BE DISCUSSING THE CHRISTIAN IMPLICATIONS OF SELF-DEPRECATON AND THE PSYCHOLOGICAL DAMAGE IT PROVOKES, AS DISCUSSED BY PSYCHOLOGISTS BREITENBACH AND STOEBER ET AL AMONG OTHERS, AS WELL AS FROM MY OWN EXPERIENCE IN THE CHURCH. IN ADDITION TO THIS, AS WE LEARN FROM ANCIENT CHINESE PHILOSOPHER MENCIOUS, IT IS ALSO OUR HUMAN NATURE TO BE MORALLY GOOD. BY COMBINING THESE TWO CONTRADICTORY OUTLOOKS, I WILL MAKE THE CLAIM THAT AS LONG AS WE WATER THAT SEED OF GOODNESS WITHIN US, WE CAN REDIRECT THAT INSTINCT FOR DOMINANCE ONTO MORE ABSTRACT OBJECTS SUCH AS GOALS RATHER THAN PEOPLE. THIS FALLS IN ACCORDANCE WITH THE PHILOSOPHICAL SOLUTIONS I WILL OFFER TO COMBAT SELF-DOMINANCE: THOSE GIVEN BY KORSGAARD, JAWORSKA, AND ROGERS, WHO ADVOCATE FOR SELF-GOVERNING, CARING, AND SELF-LOVE, RESPECTIVELY. BY IMPLEMENTING MINDFULNESS EXERCISES THROUGH MEDITATION INTO OUR PRACTICES, WE CAN SELF-CULTIVATE AUTONOMY AND AGENCY AS PROMOTED BY DAOISM AND BUDDHISM THROUGH DISCOURSE BY PSYCHOLOGIST PARENT.

3:30 PM - 4:30 PM

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**JOANNARY ANN ESPERANZA, EDUCATION, SOCIETY, AND HUMAN DEVELOPMENT**

FACULTY MENTOR: JENNIFER, NAJERA; ETHNIC STUDIES

**"HOW DO WE PERCEIVE THE AMERICAN DREAM?" A CRITICAL ANALYSIS OF THE DIFFERENCES IN FILIPINO AMERICAN PERSPECTIVES OF THE AMERICAN DREAM**

IN THIS PROJECT, I WILL BE COMPARING AND ANALYZING THE DIFFERENCES IN PERSPECTIVES OF THE "AMERICAN DREAM" BETWEEN FIRST GENERATION AND FOLLOWING GENERATIONS OF FILIPINO-AMERICANS. IN ADDITION TO HIGHLIGHTING THE DIFFERENCES, I WILL ALSO RESEARCH THE DIFFERENT WAYS IN WHICH FILIPINO AMERICANS ARE ABLE TO MAINTAIN THEIR FILIPINO IDENTITY AS VARIOUS GENERATIONAL IMMIGRANTS. SOME ASPECTS THAT HELP MAINTAIN IDENTITY INCLUDE DIFFERENCES IN CULTURAL MORALS, RELIGIOUS BELIEFS, AND POLITICAL VALUES. I WILL BE CONDUCTING RESEARCH THROUGH PRIMARY SOURCES OF ORAL HISTORY PROJECTS AND BOOK MEMOIRS. SOME EXAMPLES OF SOURCES I HAVE FOUND INCLUDE ORAL HISTORY PROJECTS DONE IN MICHIGAN, AS WELL AS BOOK MEMOIRS BY FILIPINO-AMERICAN AUTHORS, CARLOS BULOSAN AND MALAKA GHARIB. SINCE FILIPINO AMERICAN STUDIES IS A GROWING FIELD, I AM HOPING TO USE THIS PROJECT TO BRING AWARENESS TO THE SUBJECT. THIS PROJECT ALSO INTERESTS ME SIGNIFICANTLY AS I CAN RELATE THESE FINDINGS TO MY OWN FAMILY, AS MY PARENTS ARE FIRST-GENERATION IMMIGRANTS.

3:30 PM - 4:30 PM

# Thank you to the campus community who make the symposium a great success each year!

## STUDENTS!

FACULTY MENTORS

FACULTY MODERATORS

PRESENTATION EVALUATORS

ELIZABETH WATKINS, PROVOST AND EXECUTIVE VICE CHANCELLOR

KIM WILCOX, CHANCELLOR

JENNIFER BROWN, VICE PROVOST AND DEAN OF UNDERGRADUATE EDUCATION

## COLLEGE DEANS

- CHRISTOPHER LYNCH, DEAN OF THE MARLAN AND ROSEMARY BOURNS COLLEGE OF ENGINEERING
- JULIET McMULLIN, INTERIM DEAN OF THE COLLEGE OF HUMANITIES, ARTS, AND SOCIAL SCIENCES
- KATHRYN UHRICH, DEAN OF THE COLLEGE OF NATURAL AND AGRICULTURAL SCIENCES
- LOUIE F. RODRIGUEZ, INTERIM DEAN OF THE GRADUATE SCHOOL OF EDUCATION
- YUNZENG WANG, DEAN OF THE SCHOOL OF BUSINESS
- DEBORAH DEAS, DEAN OF THE SCHOOL OF MEDICINE
- ANIL DEOLALIKAR, DEAN OF THE SCHOOL OF PUBLIC POLICY

## UNDERGRADUATE EDUCATION TEAM

- SUMMER SESSIONS
- ACADEMIC RESOURCE CENTER
- STUDENT ENGAGEMENT STAFF
- UNIVERSITY WRITING PROGRAMS
- XCITE: CENTER FOR TEACHING AND LEARNING
- ACADEMY OF DISTINGUISHED TEACHERS
- STUDENT ENGAGEMENT STUDENT WORKERS AND AMBASSADORS



# STUDENT ENGAGEMENT \\\

RESEARCH. SERVE. INTERN.



## INTERN //

Spend a quarter with students from other UC campuses at our locations in **Sacramento** or **Washington, DC**.

- Earn between 14 - 16 Academic Credits
- Gain real-world experience in a professional internship of your choosing
- Network with professionals in your field
- Travel and have fun with other UC students!



## COMPETE //

The Office of Student Engagement provides support and guidance for qualified students in applying for national **scholarships, fellowships** and **internships**.



## TEACH //

Are you passionate about a unique topic not being taught here at UCR? Why not teach your fellow students in one of our **R'Courses**.

- Student-led courses
- Original topics
- 1-unit
- Discussion-based, topped at 20 participants

Plan your next steps:

- 1st Quarter: Think of a topic, find a faculty mentor, submit your proposal
- 2nd Quarter: Take EDUC 102 and 1-unit independent study with your faculty mentor
- 3rd Quarter: Teach your course!!



## RESEARCH //

Students are encouraged to participate in multiple forms of research during their academic career at UCR. Some of the ways students can become involved in research are:

- **Research Portal** - Find the right research project to become involved with by searching through our Research Portal.
- **Mini-Grants** - Fund Research expenses or Conference Travel to present your research, up to \$1,000.
- **Research Symposium** - Present your research poster or oral presentation at our yearly spring symposium.
- **Research Journal** - Publish your research in our peer-reviewed journal, or join our editorial board.
- **Chancellor's Research Fellowship** - 14 students are awarded \$5,750.00 to engage in faculty mentored research and creative activity projects each summer.