



The Simmons University

Undergraduate Symposium

April 23, 2019

A celebration of undergraduate scholarship and creativity



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Welcome to the Simmons Undergraduate Symposium



I am very happy to welcome you to the Simmons University Undergraduate Symposium! On September 1, 2018, we launched Simmons University and our four new Colleges. So, I am even more excited to welcome you to the first Undergraduate Research Symposium at the newly designated Simmons University!

Now in its 15th year, the Undergraduate Symposium seeks to develop, showcase, and celebrate student scholarly and creative work. The Symposium elevates the thoughtful and creative work of our undergraduate students. It also celebrates

faculty cultivation and mentorship of students, which is a hallmark of undergraduate liberal education, and strength of Simmons University.

Undergraduate research is a “high-impact learning practice” focused on learning outside of the classroom and on the opportunity for intensive interactions among faculty and students. As Simmons University evolves, we will continue to develop innovative programs that provide immersive and experiential opportunities for students to develop and apply knowledge gained in their classrooms.

I hope you enjoy today’s panels, presentations, and performances!

A handwritten signature in black ink that reads "Katie Conboy". The signature is fluid and cursive, written in a professional yet personal style.

Katie Conboy
Provost & Senior Vice President

Undergraduate Symposium Program



Image: Kaylin Wu (Class of 2020), *Vignettes Under Two Suns, 1, 2 & 3*, mixed media collage

ALL DAY

CREATIVE LANDSCAPES | Studio Showcase
4th Floor, Main College Building

Morning Sessions

9:00am – 10:00 am

3D Award Panel:
Recognizing Outstanding 3D Projects
Room L-004

9:00am – 10:00 am

Mind Body Health Care
Room L-005

Maleeha Mohammed and Hannah Scott | Learning to Treat Yourself with Kindness: A Qualitative Analysis of Simmons Students' Beliefs About a Mindfulness and Self-Compassion Intervention

Audrey Edelman, Morgan Higgs, and Morgan Westine | Can Mindfulness Meditation Improve Heart Rate Variability?

Caroline McQuade | Assessing the Efficacy of Movement as a Healing Intervention for Trauma Populations

Mardoche Telusma | Trans, Queer, and Cis - Black Women and Mental Health: Dismantling the Ideology of the Strong Black Woman

9:00am – 10:00 am

Wellness and Disease Prevention

Room L-006

Celine Breton and Ari Robinson | Toxicology Effects of Perfluorooctanoic (PFOA) on *C. Elegans* and Mammalian Cells

Shea Buckley | Differentiations in HIV Preventive Care in Clinical Research and Primary Care Settings

Lindsey Sumpman | Assessing the Role of Physical Therapy in the Prevention, Detection, and Treatment of the Female Athlete Triad and Relative Energy Deficiency in Sport (RED-S)

Jaqueline Wolff | Functionalized Gold Nanorods as Contrast Agent for Optical Coherence Tomography Imaging of Molecular Retinal Biomarkers in Age-related Macular Degeneration

9:00am – 11:00 am

Econometrics Panel

Room L-007

Samantha Marinelli, Kristen Marquette, Alannah Shute, Isabel Lane, Merida Kepnes, Alex Daukas, Poppy Pan, and Charlotte Rivard

9:00am – 11:45 am

First Year Leadership Showcase

Kotzen Room

10:00am – 11:45am

Poster Exhibit | Sciences, Arts, & Humanities Graphic Design Showcase

Linda K. Paresky Conference Center & E-305

12:00pm – 1:00 pm

Keynote Session | Room C-103

Recognizing the outstanding research contributions of 7 graduating seniors

Lunch provided for attendees

Teriyana Cohens, Michelle Medici, Patrice Miller, Peizhu Qian | Digitizing Court Records: Creating an Interactive History of Enslaved People's Incarceration

Celina Fernando | Challenging Complacency: Asian American Narratives of Anti-Blackness

Continues on next page

Undergraduate Symposium Program (continued)

Madeline Karod | Synthesis and Characterization of ZnO-SiO₂
Nanocomposite in Elastomeric Foam for the Photodegradation
of Pharmaceutical Compounds

Alexandra Moleski | Uninhabited Wilderness, Repressed Peoples:
How the Establishment of the Yellowstone National Park Decimated
the Blackfeet and the Crow

Afternoon Sessions

1:15pm – 2:15 pm

Identities and Movements

Room L-006

Olivia Hart | The Earth On Screen: Intersections Between the
Environmental Movement and Science Fiction Film

Nichelle Gomez | Building A Better Community

Jessika Myers | Abolition in the Eyre: Studying the Influence of Emanci-
pation Movements on Charlotte Brontë's Jane Eyre

Audrey Saltarelli-Fayad | Native Women's Activism
in the 1970's and 1980's

1:15pm – 2:15 pm

Reading Systems, Signs, and Symbols

Room L-007

Georgia Harper | The Parisian Semiotic Landscape
During the Events of May 1968

Emerson Mouradian | Rey The Jedi: How Lacan's Mirror Malfunctions

Joanna O'Gorman | Adaptations of la Belle et la Bete
(presented in French)

1:15pm – 2:15 pm

Realism and Fantasy: Readings of Spanish Fiction

*Some presentations will be delivered in Spanish
Room L-008

Katherine Ashe | The Conflict Between Internal
and External Beliefs In "Doña Perfecta"

Colleen Miller | Defensa de la mujer en el
Quijote/Feminism in Don Quijote

Alice Najimy | The Importance of the House
in "Dona Perfecta"

Emma Weimer | The reader's perception of the Orbajosenses
in the context of realism (La percepción de los Orbajosenses
por el lector en el contexto del realismo)

1:15pm – 2:15 pm

Gender in Theory and Practice

Room L-004

Nicole Gauthier | Women's Education in the Early
National Period: Seduction Novels, Print Culture, and
Advocacy for Separatist Education

Mackenzie Farkus | Grounding the Ghosts:
On Finding Queer Archives

Zoe Reece Lefkowitz | "Third Gender" Recognition in the
United States: Examining Theory and its Practical Implications

Kaylin Wu | Sylvia Plath and Ted Hughes: Beyond the Paper

1:15pm – 2:45 pm

Honors 190: Talking in the 21st Century

Room L-005

3:00pm – 4:00 pm

SURPASSing the Torch!

The Fens Dining Hall

A celebration of SURPASs 18-19 scholars. Refreshments served.

Keynote Speaker Profiles



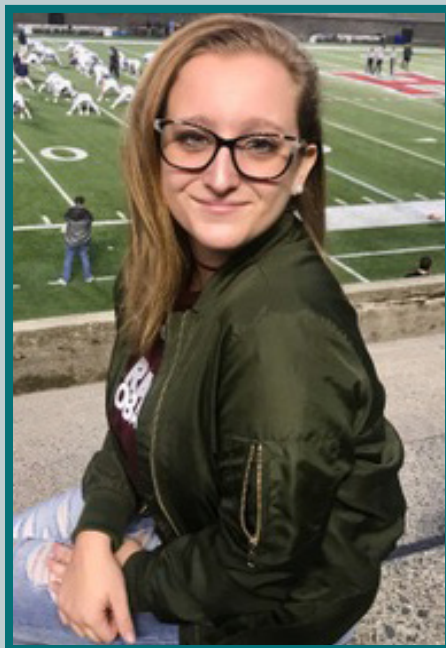
Alexandra Moleski

Alexandra Moleski is a senior history major with a specialization in public history and a personal fascination with Native American studies. Her work, entitled *Unsung Allies: The Penobscot's Relationship with Colonial Massachusetts*, appeared in a September 2017 issue of the Boston National Historical Park newsletter. Inspired by her admiration for both the National Park Service and Indigenous cultures, her current project interprets how these two entities have interacted with one another in the past. Alexandra plans to pursue an M.A. in either archives management or curatorial studies while continuing to weave the Native narrative into mainstream historical scholarship through presentation and publication.

Celina Fernando

Celina is a senior majoring in Sociology with an interest in critical race theory. Her work seeks to understand the 'Asian American' identity and experience and is influenced by the Boston-based Asian & Pacific Islander organizations to which she belongs. Her passions lie in photography, community building, and visual storytelling. She believes in the power and potential of young people, and hopes to pursue a career in youth development after graduation.





Maddie Karod

Maddie Karod is a senior Chemistry and Environmental Science double-major with minors in sustainability and physics. She has a passion for environmental chemistry research, specifically water quality and wastewater remediation. After graduation she will be pursuing a Ph.D in Environmental Engineering and hopes to make sustainable water filters. Her previous undergraduate work has included examining the use of the invasive species *Phragmites australis* from Boston's Muddy River in absorbing heavy metals from drinking water, conducted at Simmons University during the summer and fall of 2017 under the SURPASs program, and a spatial investigation of urban ammonia emissions in Providence, Rhode Island conducted at Brown University during the summer of 2018. Maddie will be presenting research from her senior chemistry thesis.

Michelle Medici

Michelle Medici is a senior majoring in Computer Science and Mathematics. She is currently working with the History department at Simmons to digitize jail records of enslaved people from 1841-1846 in Richmond, Virginia. After graduation she is going to work at Staples as a software engineer. Eventually she would like to go back to school to study animation. Her dream job is to become a 3D animator.



Keynote Speaker Profiles



Patrice Miller

Patrice is a senior at Simmons University, double majoring in Information Technology and Public Health. Patrice's interests include financial technology, decreasing health disparities in marginalized communities, cybersecurity, and the relationship between technology and accessibility. Currently, Patrice has been working on digitizing historical court records and creating a database that increases the representation of digitized Black history and data, and illustrates how Black history can relate to current events such as the Black Lives Matter Movement. Post-graduation, Patrice will be continuing her career with the intention of using her education and experience toward improving financial security and technology accessibility in low-income communities.

Peizhu Qian

Peizhu "Pam" Qian is an international student from Beijing, China, double majoring in Mathematics and Computer Science. Currently, she is working on a project with Prof. Amber Stubbs and three other CS students to digitize historical records related to the Black Lives Matter movement. Her past research has focused on data mining in rowing (of course she is on the Crew Team), intelligent tutoring systems, and social network analysis. In the future, Peizhu is interested in creating quality, accessible Ed-Tech tools for children from underserved communities worldwide. In Fall 2019, Peizhu will start her Ph.D program in CS at Rice University, Houston, TX.





Teriyana Cohens

Teriyana Cohens is a senior majoring in Computer Science and minoring in English. When she's not rambling about her love for dogs, you can find her organizing Simmons' 24 hour hackathon, SharkHack, or tutoring someone to help them with Java. Some of her current projects focus on learning how to build her own apps and learning how to show how nontechnical people can use APIs by working with the History department at Simmons to digitize records of enslaved peoples. After graduation, she aspires to be a loving dog mom and a Software Engineer.

Undergraduate Program | 3D Award

The Simmons 3D, which stands for “Design Across Diverse Disciplines,” is one of the signature initiatives of PLAN. It asks students to select courses from three different disciplines that are integrated around a common theme or idea. Through this inter-disciplinary integration, Simmons asks students to become more self-directed with their learning. The Undergraduate Program is delighted to present a \$250 award to two students with outstanding 3D proposals in each of the following four categories.

INCLUSIVE EXCELLENCE 3D AWARD

This award winner has a plan that centralizes inclusive excellence and equity. The 3D plan demonstrates a commitment to creating more just and equitable societies, whether that entails studying systems of oppression, creating plans for change, or learning from those who have made social justice a cornerstone of their life’s work.

Winners: Zoe Lefkowitz (Major: Philosophy and Sociology, Project: Understanding Gender Inequalities Through Ethics and Theory), Colleen Miller (Major: Spanish, Project: Language and Oppression)

MOST INNOVATIVE 3D AWARD

This award rewards 3D plans that think outside of the box, privileging originality, creativity, and risk-taking. Students applying for this award should consider what is new, different, or unexpected about their approach.

Winners: Yasmine Ebeed (Major: Communications - Graphic Design, Project: Means of Telling a Story), Sophia Streimer (Major: Chemistry, Project: Sustainable Cycle of Consumer Product Goods)

MOST COMMUNITY-ORIENTED 3D AWARD

This award seeks applicants whose 3Ds purposefully engage with specific communities or populations, and strive to better understand their workings. Classes included in these 3Ds may involve community-based learning, either formal or informal. Applicants should explain how real-world settings and issues inform their 3D plans.

Winners: Maura Coughlin (Major: Nursing, Project: Therapeutic Communication for Deaf Patients in Healthcare), Connie Cung (Major: Nursing, Project: Art as a Therapeutic Modality in Pediatric Patients)

MOST GLOBAL 3D AWARD

This award will be given to the student who demonstrates an ability to think in global terms about their chosen issue or topic. While the topic itself need not be global per se, the award will be given to a student who most effectively demonstrates that their approach takes international perspectives, attitudes, and systems into account.

Winners: Arielle Esteban (Major: International Relations, Project: Taiwan and Southeast Asia in Contemporary Geopolitics),
Hannah Green (Major: PR and Marketing, Project: Reporting South Africa)

Eligibility and Conditions

The 3D Award is open to juniors and seniors from all academic disciplines with completed 3D proposals. Awardees must present their project at the 2019 Simmons Undergraduate Symposium on April 23.

Graphic Design Showcase

Linda K. Paresky Conference Center, 10:00 am – 12:00 pm



Selected work of design students from

Comm 210 – Intro to Graphic Design

Comm 240 – Typography

Comm 248 – Type and Image

Comm 340 – Advanced Design

SAVE THE DATE

May 8, 2019

3 – 6 pm

East Wing of MCB

THE SHOW!

COMM

WORKS

GRAPHIC DESIGN JOURNALISM MEDIA ARTS

PR MARCOMM WEB DESIGN & DEVELOPMENT

Leadership Showcase

Kotzen Room, 9:00am – 11:45 am

Selected Works from First Year Leadership Classes

Law and Social Justice 9:00am - 9:20am

Presentation: A Portrait of Leadership in Law and Social Justice

Leading Quietly 9:25am - 9:35am

Leadership Lessons from Introverted Leaders (Tessa Sweeney, Alexis MacKay, Morisha Pierre, Sarah Mariski)

Women Leaders and Human Rights 9:40am - 9:50am

Samantha Powers' Road to Creating (Grace Fernandez)

Because Who is Perfect? 9:55am - 10:05am

Disability Accessibility and Stigma (Adrianna King, Brooke Catalano, Hannah Pandya, and Sofia Antonellis)

Love Calls: Leaders for Social Justice 10:10am - 10:35am

Interactive yoga and musical performance

Leading with Letters 10:40am - 10:50am

Op-Ed Reading of "Don't Forget" by MiAngela Ramos

Selected Posters 10:50am - 11:20am

Trisha Laughlin, Katie Cole, Jessica Cobb, Sophie Panagrossi, Megan Rice, Sophie Hytinen, Maude Elovitz, Chloe Jane, Caitlyn Bucci, Caitlin Toplin, Eva Amato Bauer, Hailey Tran, Colleen Ahearn, Serena Rizzo, Becca Schwartz, Gabby Cacia, Kaylie Terrell, Emma Campbell, Nazia Tabassum, Shania Louise Ambros, Paria Reich, Vicky Blyth-Wilk, Ellie Faith, Sofia Gulick, Caroline Crowley, Sierra Duggan, Maegan Neelon, Isabella Manzi, Kristin Meader, Alex Lallensack, Yuki Cheung, Taylor Barnes, Allyson Cunningham, Emily Longval, Shoshana Shanske, Phoebe Zhou, Nada Alaeddin, Afrah Naeem, Megan Willis, Victoria Alexander, Georgia Hansbury, Morgan Lowrey, Ayah Rahim

Leadership Showcase

Kotzen Room, 9:00am – 11:45 am

Selected Works from First Year Leadership Classes

Leadership through Writing 11:20am - 11:30am

Mary Oliver: A Legacy of Leadership through Poetry (Natalie Krieg, Amanda Perry, Emily Niemi, Clare Pasley)

Political Leadership through Film & TV 11:30am - 11:40am

Imagining a More Perfect Union (Emma Case, Emma Harrison, Kayla Safford, Corina Szabados)

Resisting Authority 11:40am - 11:50am

Successful Resisting (Kathryn Armour, Aya Evans, Darian Myers)

Women Writers as Leaders 11:50am - 12:00pm

Dolly Parton: Leadership Through Lyrics (Alice Najimy, Teddy Gibbs, Caroline Kragh)

Poster Participants

FOX MAASCH

POSTER 1 | Books: Form and Function

Major: Studio Arts

Faculty Mentor: Helen Popinchalk

JAMIE DALEY, KATELYN KALLIEL

POSTER 2 | Human Factors and the Threat of Cybersecurity

Major: Web Design & Development, History

Faculty Mentor: Lauren Provost

LEA HAEHNEL

POSTER 3 | Catching Shade

Major: Biochemistry

Faculty Mentor: Rich Gurney

EVELINA RAGUTSHTEYN

POSTER 4 | Zinc and Spinal Cord Injury

Major: Biochemistry

Faculty Mentor: Sheri Peterson and Rich Gurney

JENNA GUGLIELMO

POSTER 5 | Verifying the Claims of Efficacy of Cannabidiol (CBD) in Commercial Products

Major: Biochemistry

Faculty Mentor: Shreya Bhattacharya

TEMA FODJE

POSTER 6 | Association Between Stress and HbA1c Levels Among HIV-Infected and -Uninfected People in Uganda

Major: Biochemistry

Faculty Mentor: Rachel Daniels

MEHBOOBA TAMANNA

POSTER 7 | An Ultrasound Device for Guiding Catheter Placement in Ventriculostomies

Major: Biochemistry & Physics

Faculty Mentor: Jason White

NAOMI SUMINSKI

POSTER 8 | Library Development of D-enantiomer Trifunctional Chemical Probes to Assess the Effect of Probe Chirality on Protein Selectivity in MCF7 Breast Cancer Cells

Major: Biochemistry and Public Health

Faculty Mentor: Nancy Lee

SARAH ISLAM, LENA SYED, MEHBOODA TAMANNA

POSTER 9 | Analysis of Antibacterial Properties of Azadirachta Indica

Major: Biochemistry, Nutrition & Dietetics/Economics, Biochemistry/Physics

Faculty Mentor: Gina Mustata

HAYLEY MCMORROW

POSTER 10 | Anatomical Mapping of Descending Projections in Subpopulation Pet1 Neurons

Major: Biology

Faculty Mentor: Jane Lopilato

JOANNA PANTAZOPOULOS

POSTER 11 | The Effect of Virgin Coconut Oil on Wound Healing

Major: Biology

Faculty Mentor: Cassandra Saitow

JACQUELYN NOYES, CHRISTINE YU

POSTER 12 | Examining the Antibacterial Properties and Possible Toxicity to Mammalian Cells of Gold (I) Thiol Compounds

Major: Biology

Faculty Mentor: Cassandra Saitow

GRACIELA PORTILLO

POSTER 13 | Determining Mangifera Indica's Wound Healing abilities using Mouse Embryonic Fibroblast Cells

Major: Biology

Faculty Mentor: Cassandra Saitow

ELAINE BAULSIR

POSTER 14 | Antimicrobial VBT: TMQ: DMHDQ (1-(4-vinylbenzyl) thymine, vinylbenzyl trimethyl QUAT, and vinylbenzyl dimethylhexadecyl QUAT) Terpolymer Permanence and Performance on Hospital Scrubs

Major: Biology

Faculty Mentor: Rich Gurney

Poster Participants

ESRAH DU

POSTER 15 | Characterization of the Role of Striated Fiber Assembling Proteins in the Asexual Life Cycle of Plasmodium Falciparum

Major: Biology

Faculty Mentor: Cassandra Saitow

ASIA SHEEHAB

POSTER 16 | Non-Alcoholic Fatty Liver Disease in HIV

Major: Biology

Faculty Mentor: Jane Lopilato

TERESA EASTERBROOKS

POSTER 17 | A Novel F0 Screening Method for Congenital Cranial Dysinnervation Disorders in Zebrafish

Major: Biology

Faculty Mentor: Anna Aguilera

RENEE BEDARD

POSTER 18 | Decomposition of Biodegradable Straws

Major: Biology

Faculty Mentor: Anna Aguilera

MADISON SUMMERS

POSTER 19 | Understanding the Role of Rb in Metastatic Prostate Cancer

Major: Biology

Faculty Mentor: Eric Luth

JULIE PHAM

POSTER 20 | Testing for evidence of the olfaction-retinal circuit's role in antipredator behavior of larval zebrafish

Major: Biology

Faculty Mentor: Maria Abate

KATHLEEN CONLEY

POSTER 21 | How Speech-Language Therapy Can Benefit Children with Cochlear Implants: A Case Study

Major: Biology

Faculty Mentor: Rachel Daniels

HANNAH MALATZKY

POSTER 22 | Effects of Plastic and Plastic Alternatives on Earthworms and the Ecosystem

Major: Biology and Public Health

Faculty Mentor: Anna Aguilera

MACKENZIE TRAVIS

POSTER 23 | Collaborative Work at Massachusetts BioTechnology Council

Major: Public Health

Faculty Mentor: Valerie Leiter

KRISTEN DOUCETTE

POSTER 24 | A Novel Application of Focused Ultrasound for the Treatment of Port Wine Stain Birthmarks

Major: Chemistry

Faculty Mentor: Michael Jordan

SOPHIE STREIMER

POSTER 25 | Effect of Crystal Quality of Vanadosilicate AM-6 on the Photodegradation of 2,5-Dichlorophenol

Major: Chemistry

Faculty Mentor: Mariam Ismail

ELIANA RUBEN

POSTER 26 | Viability Assessment of Potassium Hydroxide-Treated Phragmites Australis as Potential Absorbent for Ciprofloxacin Hydrochloride in Aqueous Solutions

Major: Chemistry

Faculty Mentor: Michael Berger

ADRIENNE GARCIA, ELIZABETH SCOTT

POSTER 27 | Analysis of Air Contaminants at Various MBTA Stations

Major: Chemistry (Elizabeth), Health Informatics (Adrienne)

Faculty Mentor: Michael Berger

MEAGAN ELLEN WILBER

Poster Participants

POSTER 28 | Cross-Country Comparison of Universal Health Care System Effectiveness in Decreasing Health Disparities Affecting Children

Major: Economics and Sociology

Faculty Mentor: Elise Brenner

REBECCA WHELAN

POSTER 29 | Effects of Human Activity and Global Warming-Related Jellyfish Blooms on Fishing Industries

Major: Environmental Science

Faculty Mentor: Rachel Daniels

LOGAN (TAYLOR) SIMMONS

POSTER 30 | Vitality of Urban Tree Maintenance for Mitigating Climate Change in Boston

Major: Environmental Science

Faculty Mentor: Rachel Daniels

TANYA MONTEIRO

POSTER 32 | Immunohistochemistry reveals the activation of Merkel cells in mice glabrous skin

Major: Neuroscience and Behavior

Faculty Mentor: Eric Luth

GRACE WILSON

POSTER 33 | Music Therapy and Depression, the Use of Alternative Treatments for Mental Health Disorders: A Literature Review

Major: Neuroscience (Biopsych); Music History

Faculty Mentor: Amanda Carey

MALEEHA MOHAMMED, HANNAH SCOTT

POSTER 34 | Self-Compassion and Mindfulness Intervention Study

Major: Neuroscience & Behavior

Faculty Mentor: Elizabeth Donovan

LAURA ISARO, TAMIA HARGROVE

POSTER 35 | Improvements to Automatic Speech Synthesis Using Prosodic Features

Major: Neuroscience & Behavior

Faculty Mentor: Nanette Veilleux

BRIANNA DESHARNAIS

POSTER 36 | 3D Printed Shunts for the Hydrocephalus Cure

Major: Neuroscience & Behavior, Music

Faculty Mentor: Rich Gurney

EMMA CADMAN

POSTER 37 | Art Therapy Self Care

Major: Nursing

Faculty Mentor: Margaret Costello

JOHANNA YU

POSTER 38 | Feeding My Spiritual Wellbeing

Major: Nursing

Faculty Mentor: Professor Barron and Professor Costello

MEGAN PEREIRA

POSTER 39 | The Effects of Strength Training on Preventing Musculoskeletal Injury and Lowering Stress

Major: Nursing

Faculty Mentor: Margaret Costello and Anne-Marie Barron

COLLEEN O'CONNOR

POSTER 40 | Yoga and Stress: How a Regular Practice Helps Decrease Stress

Major: Nursing

Faculty Mentor: Margaret Costello and Anne Marie Barron

MAURA COUGHLIN

POSTER 41 | Student Nursing in Developing Countries: What I Learned on a Nursing Internship in Zambia

Major: Nursing

Faculty Mentor: Anne Marie Barron

JESSICA LEVINE

POSTER 42 | The Effect of Pre and Post Sleep Routines on Sleep Quality and Stress Reduction for Health Professionals

Major: Nursing

Poster Participants

Faculty Mentor: Margaret Costello

JESSICA POLITANO

POSTER 43 | The Self Care Process of Mindful Running

Major: Nursing

Faculty Mentor: Margaret Costello

LILIBETH PIMENTELI

POSTER 44 | Lifestyle Changes Through Meditation Practices

Major: Nursing- Direct Entry

Faculty Mentor: Margaret Costello

EMMA WHITED

POSTER 45 | Helping Patients Manage Weight Loss and Chronic Illness with Patient-Centered Strategies(PROPS) Study at Brigham and Women's Hospital

Major: Public Health

Faculty Mentor: Valerie Leiter

ANGEL STELLA WONG

POSTER 46 | Investigating the Relationship Between Clinical Exposure and Staphylococcus Aureus Colonization Using Multiple-Site Swabbing Method

Major: Public Health

Faculty Mentor: Elizabeth Scott

JASMINE VARGAS

POSTER 47 | Effects of Student Gentrification on Residents and the Fenway Community

Major: Public Health

Faculty Mentor: Valerie Leiter

RAISSA SILVA

POSTER 48 | Evaluating and Analyzing Market Approval Methods for Women's Health Medical Devices

Major: Public Health

Faculty Mentor: Valerie Leiter

MI LE

POSTER 49 | Mental Health in a Racial Justice Framework

Major: Public Health - Social Analysis

Faculty Mentor: Valerie Leiter

SYDNEY KATS

POSTER 50 | Outcomes of Youth Centered Community Development

Major: Public Health - Social Analysis Track

Faculty Mentor: Valerie Leiter

ABIGAIL CONLIN

POSTER 51 | The Ride: An Analysis of the MBTA's Door-to-Door, Shared-Ride, Paratransit Service

Major: Public Health & Gender Studies

Faculty Mentor: Val Leiter

EMMA WEIMER

POSTER 52 | The Improvement of Palliative Care Delivery through the Massachusetts General Hospital (MGH) Continuum Project

Major: Public Health & Spanish

Faculty Mentor: Valerie Leiter

MEGAN ROBBINS

POSTER 53 | Opioid Use and Community Violence: An Understanding of Best Practices Within Case Management

Major: Social Work

Faculty Mentor: Susan Yi-Millette

STEPHANIE ENDERSON

POSTER 54 | Elder Isolation in the City of Boston

Major: Social Work

Faculty Mentor: Susan Yi-Millette

LACI GONZALEZ

POSTER 55 | Aging Alone: A Spotlight on Elder Isolation

Major: Social Work

Faculty Mentor: Susan Yi-Millette

HANNAH TRAISTER

POSTER 56 | Effective Methods of Intervention to Improve Quality Life for Cancer Caregivers

Poster Participants

Major: Social Work
Faculty Mentor: Susan Yi-Millette

BRITTANEE JOHNSON

POSTER 57 | Problem Behaviors Seen in Adolescents in Residential Care
Major: Social Work
Faculty Mentor: Susan Yi-Millette

SARA CACHO

POSTER 58 | Intensive Support Program for Middle School Students with Behavioral Difficulty
Major: Social Work
Faculty Mentor: Susan Yi-Millette

JESSICA PLESKOWICZ

POSTER 59 | Physical Therapy Plan of Care for a Talar Dome Lesion: A Case Study
Major: Exercise Science
Faculty Mentor: Rachel Daniels

MARGARET HAMILTON

POSTER 60 | You Are What You Eat: Dietary Acculturation and the Embodiment of Inequality Among Latinx Immigrants
Major: Sociology
Faculty Mentor: Valerie Leiter

MALLORY COTTAM

POSTER 61 | The Impact of Emotional State and Positive Psychology on Patient Outcomes
Major: Exercise Science
Faculty Mentor: Rachel Daniels

PAOLA RIOS

POSTER 62 | Using the Functional Movement Screen to Improve Performance and Reduce Injury in Female Volleyball Players
Major: Nursing

Faculty Mentor: Rachel Daniels

KATHERINE HEPBURN

POSTER 63 | The Effects of Self-Compassion on Exercise Motivation & Adherence in Women

Major: Exercise Science

Faculty Mentor: Meghan Garvey

CAROLINE CODAIR

POSTER 64 | The Relationship of CTT# to HR and RPE as a Valid Method to Prescribe Exercise Intensity

Major: Exercise Science

Faculty Mentor: Joel Lombard

NICOLE LEE

POSTER 65 | The Effects of Dexamethasone Treatment and Weight Gain on the Outcomes of Cancer Patients: A Systematic Review

Major: Exercise Science

Faculty Mentor: Meg Garvey

ABIGAIL CRAINE

POSTER 66 | Effects of Stress on Injury Risk and Recovery in Division III Collegiate Female Softball Players

Major: Exercise Science

Faculty Mentor: Meghan Garvey

KATHERINE LABBAY

POSTER 67 | Analysis of ACL Rupture Risk Factors in Volleyball Players Using the Field Screening Tool

Major: Exercise Science

Faculty Mentor: Meghan Garvey

AMANDA THOMAS

POSTER 68 | Interventions to Decrease Fall Risk and Prevent Falls in the Geriatric Population: Patients and Residents of Skilled Nursing Facilities

Major: Exercise Science

Faculty Mentor: Randi Lite

LIZ TORRES

POSTER 69 | Physical Therapist Satisfaction and Patient Rate

Major: Exercise Science

Faculty Mentor: Rachel Daniels

Poster Participants

BRENDA ELIZABETH NGUYEN

POSTER 70 | The Feasibility of Motivational Interviewing on Exercise Adherence in Women enrolled in a Physician Exercise Referral Program at a Participating Gym

Major: Exercise Science

Faculty Mentor: Meghan Garvey

LAURA SIMPSON

POSTER 71 | How Does One's Risk and Percieved of Risk of Type 2 Diabetes Align?

Major: Exercise Science and Dietetics/Nutrition

Faculty Mentor: Meghan Garvey

ALEXA KEENAN

POSTER 72 | The Effects of Rehabilitative Therapy in Pediatric Cerebral Palsy: A Case Study

Major: Exercise Science

Faculty Mentor: Rachel Daniels

Presenter Abstracts

KATHERINE ASHE

The Conflict Between Internal and External Beliefs In "Doña Perfecta"

Major: Nursing

Faculty Mentor: Maria Dolores Pelaez Benitez

Abstract:

It is by human nature that we are drawn toward those with similar beliefs because we find comfort in reinforcing our own ideas. The same was true of people in Spain during the 19th-century, as is exemplified by Benito Pérez Galdós' realist novel, "Doña Perfecta". In "Doña Perfecta", Galdós addresses the conflict between the internal world of Orbajosa, a small, fictitious town in rural Spain, and the external world of Madrid. This conflict between the two worlds is developed through a variety of contemporary political and religious issues that correspond with those seen in 19th-century Spain. This animosity between Madrid and rural Spain ultimately contributed to the dawn of the Second Carlist War in Spain. The conflict is exemplified by the characters of "Doña Perfecta" through the citizens of Orbajosa and their inherent inability to accept Pepe Rey, a respectful young man visiting from Madrid. The war against young Pepe Rey, which ultimately results in his murder, emphasizes the importance of exposing oneself to diverse ideas by speaking with people who challenge personal beliefs. Doing so promotes a greater understanding of others and eradicates resentment toward the external world that can create conflict. This presentation will be conducted in Spanish.

ELAINE BAULSIR

Antimicrobial VBT: TMQ: DMHDQ (1-(4-vinylbenzyl) thymine, vinylbenzyl trimethyl QUAT, and vinylbenzyl dimethylhexadecyl QUAT) Terpolymer Permanence and Performance on Hospital Scrubs

Major: Biology

Faculty Mentor: Rich Gurney

Abstract:

Due to the prevalence of nosocomial infections, the need for enhanced precaution between health care provider and patient has increased. In attempt to eliminate scrubs as a transmission vector, this project focused on the methodology behind the integrity of known antibacterial terpolymers on scrub fabric. Terpolymer function of immobilization, water solubility, and antibacterial activity was tested through manipulation of the ratios of 1-(4-vinylbenzyl) thymine (VBT), vinylbenzyl trimethyl QUAT (TMQ), and vinylbenzyl dimethylhexadecyl QUAT (DMHDQ), respectively. To begin, solubility testing of varying ratios of VBT: TMQ: DMHDQ was conducted to assess polymeric ability to dissolve in solution for ease in polymer distribution during soaking. In addition to variation in monomer ratios, soaking and

pre-treatment mordants were examined. Variation in time the scrubs were soaked in the terpolymer was manipulated between one minute and twenty-four hours. All variants of polymers were coated and washed ten times to assess for permanence after laundering. Electrostatic attraction of an anionic dye, trypan blue, to the polymer on treated scrubs was used for quantification of terpolymer permanence. In a period of time that the toxicology of commercially available unbound quaternary ammonium compounds (QAC) is highly scrutinized, this method addresses the growing concerns associated with excess use of cleaning solutions in attempt to prevent infection. The permanence testing of this terpolymer will determine if this method may be used in application to prevent the spread and increased resistance of bacterium in healthcare settings.

RENEE BEDARD

Decomposition of Biodegradable Straws

Major: Biology

Faculty Mentor: Anna Aguilera

Abstract:

Plastics are polluting the environment now more than ever. Plastic straws make up 4% of plastic waste in the world. With straws making up such a huge percentage of plastic waste, many companies are now facing pressure to find an environmentally friendly alternative. Companies are now marketing straws made from other materials, such as PLA plastic (polyactic acid), and paper, as biodegradable. However, we have a poor understanding of just how biodegradable they are. For example, how quickly do they decompose compared to traditional plastic straws? How do temperature and rainfall affect their decomposition? To answer these questions, we compared decomposition rates of three types of straws (traditional plastic, PLA (polyactic acid), and paper), under three rainfall treatments (ambient rainfall, 50% of rainfall, and 25% of rainfall). Finally, we tested if the high temperatures of a compost heap will speed up the decomposition process. Our initial results have shown that while the paper straws' degradation rates increase with increased rainfall, there's little to no degradation in either the PLA or traditional plastic straws, in any of the precipitation treatments. These results imply that over short periods of time, the decomposition rate of compostable plastics may not vary significantly from those of traditional plastics.

SARA CACHO

Intensive Support Program for Middle School Students with Behavioral Difficulty

Major: Social Work

Faculty Mentor: Susan Yi-Millette

Abstract:

The school-to-prison pipeline refers to a path from the education system to the juvenile or adult criminal justice system. Students with behavioral and learning disabilities are being misunderstood throughout the school system and very often they are being ostracized which then is the root of criminal behavior. Students with emotional and behavioral disorders are in need of programs and

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systems to help them succeed. What happens when a school understands the relationship between a student and social environment? What happens when school educators and specialists understand how emotional and behavioral disorders affect a student's learning experience? The result of understanding students as part of a multi-dimensional system is a reward for students, families and educators. An Intensive Support Program in a Boston Public School was created to guarantee the success of students with emotional, behavioral disorders and learning disabilities. I will write about how the intensive support program is an essential asset to the school. This program consists of a group of educators, school faculty, learning and clinical specialists. These group of individuals work together to provide students with a support system to guide and encourage them in both their education and personal lives.

EMMA CADMAN

Art Therapy Self Care

Major: Nursing

Faculty Mentor: Margaret Costello

Abstract:

The American Holistic Nurses' Association (2018) asserts that self-care for nurses includes holistic self-assessment, working on personal growth and development, and being intentionally engaged in life. Self-care involves maintaining wellness, preventing illness, and reaching new health goals in all areas of health including diet, lifestyle, sleep, environment, social and economic factors. This definition fits well with the discussion of nursing students for whom life becomes chaotic when school, work, family, and social commitments become all consuming. When the signs of burnout and stress are not recognized there is little reason to set aside time for self-care. Not prioritizing self-care can affect a student's academic and professional life. It is important to take the time to recognize the need for self-care and understand methods for experiencing peace and relaxation away from the stresses of the academic and professional world. Self care strategies include a wide variety of self care activities such as meditation, prayer, healing arts and exercise. I plan to explore the literature on the use of art as a self care practice. I will review the research specifically to evaluate the role of creative art such as painting can play in reducing stress and anxiety. In order to become a successful nurse who advocates and provides quality care to patients, we must first advocate and care for ourselves.

CAROLINE CODAIR

The Relationship of CTT# to HR and RPE as a Valid Method to Prescribe Exercise Intensity

Major: Exercise Science

Faculty Mentor: Joel Lombard

Abstract:

Background: Heart Rate (HR) and Rate of Perceived Exertion (RPE) are accepted and reliable methods for prescribing exercise intensity. The Counting Talk Test (CTT) is a relatively new method for prescribing exercise intensity that is hands free and does not require equipment. To perform the CTT, an individual takes a deep breath and counts as high as they can before taking another breath. The CTT method however, is not widely accepted. In this study a correlation was done to determine the relationship between the CTT, HR, and RPE at various exercise intensities. Methods: Upon arrival to the lab, resting HR, RPE, and CTT max were recorded. Participants performed 2 exercise intensity protocol sets at 60, 50, 40, and 30% of their CTT max using an exercise bike. 3.5 minutes into each stage, the examiner collected the participant's RPE, HR and CTT#. This information was graphed to determine the relationship between the methods of measuring exercise intensity. Results: Two correlations were conducted: HR and CTT; and RPE and CTT. There was a significant, negative correlation between HR and CTT# ($r = -0.65$; $P < 0.05$), as well as RPE and CTT# ($r = -0.57$; $P < 0.05$) when exercise intensity increased. Conclusion: To explain these results, as HR and RPE increase in response to greater levels of exercise intensity, breathing frequency also increases. As breathing frequency increases the ability to count to high numbers declines. In conclusion, this information supports CTT as a reliable method for prescribing exercise intensity.

TERIYANA COHENS, MICHELLE MEDICI, PATRICE MILLER, PEIZHU QIAN

KEYNOTE | Digitizing Court Records: Creating an Interactive History of Enslaved Peoples' Incarceration

Major: Computer Science & Math (Michelle Medici), Computer Science (Teriyana Cohens), Computer Science & IT (Patrice Miller), Computer Science & Math (Peizhu Qian)

Faculty Mentor: Amber Stubbs

Abstract:

The Black Lives Matter movement brings to light the many injustices black people are subject to in today's society. Unjustified killings, discriminatory sentencing, and mass incarcerations of black people are not new, and historical prison records are a primary source for understanding how these same injustices have existed throughout American history. However, these records only exist on paper, so they cannot be explored using modern data processing tools. In this project, we are digitizing incarceration records of enslaved people from the 18th and 19th centuries and making the data available on an interactive website. By examining historical court records, we identified metadata categories such as dates, names, crimes, outcomes, etc. These categories allow us to systematically encode the data for digital processing. After each record is annotated, we enter the data into a MySQL database on the Simmons webserver. We will connect this database to our website, so that users can search the specified categories, and research them. We plan to have a interactive timeline which shows all of the entries as well as other visual components. In order to support all levels of research, we plan to make our website as accessible as possible to every level of user. Data presentation is a key component of human-computer interaction, and an active area of study in Computer Science. We hope that this project, which combines the fields of Computer Science and History, will serve as an example of how collaboration between academic disciplines

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can strengthen research in both fields.

KATHLEEN CONLEY

Benefits of Speech-Language Pathology and American Sign Language for Children with Cochlear Implants: A Case Study

Major: Biology

Faculty Mentor: Rachel Daniels

Abstract:

This is a case study looking to assess the importance of speech-language therapy and American Sign Language (ASL), for deaf children with cochlear implants. This case study is being conducted at Boston Children's Hospital Deaf and Hard of Hearing Program. The speech language therapy sessions of a 10-month-old child who has congenital severe to profound sensorineural hearing loss are being observed. The patient had surgery for bilateral cochlear implants on 2/22/18 and was activated 3/14/18. The main goal of the parents for this child is to be bi-lingual in both spoken English and American Sign Language (ASL). Progressions of language (both signed and verbal) are being recorded weekly in a chart. The chart is designed to keep track of the number of new signs, verbal words and connected signed utterances each week. There is also a space in the chart to add additional notes. The findings of this case study will be important toward educating the public about how to give deaf children that receive cochlear implants the best resources possible for success.

Abigail Conlin

The Ride: An Analysis of the MBTA's Door-to-Door, Shared-ride, Paratransit Service

Major: Public Health & Gender Studies

Faculty Mentor: Val Leiter

Abstract:

For people with disabilities, living independently is important, and the availability of reliable transportation is crucial for their independence. Without transportation, people cannot access higher education, employment, and health care. Accessible transportation for people with disabilities is required by The Americans with Disabilities Act (ADA): buses and subways must be wheelchair accessible or there must be a complementary paratransit system (wheelchair accessible, door-to-door, shared-ride systems) for those who cannot use the fixed route systems. The ADA, put into effect in 1990, was a large win for the Disability Rights movement. Paratransit was provided by not-for-profit human service agencies and public transit agencies in response to the first act, the Rehabilitation act of 1973, and now by the ADA. The Ride is Boston's ADA compliant, door-to-door, shared-ride paratransit system. This paper analyzes The Ride paratransit system, as portrayed in the media (in The

Boston Globe and The Boston Herald), and in users' experiences. This study uses a mixed methods approach, including a quantitative and qualitative content analysis of 55 newspaper articles, and the narratives of 12 users. Newspaper articles about The Ride portray it as a substandard system: financially draining on the larger MBTA public transit system, having contractor problems, and not meeting its users' needs. Users complain about tardiness of The Ride, which results in missed work and medical appointments, and the financial burden of The Ride on its users, forcing people to lower their use of it. The paper will conclude with users' suggestions for improvements.

MALLORY COTTAM

The Impact of Emotional State and Positive Psychology on Patient Outcomes

Major: Exercise Science

Faculty Mentor: Rachel Daniels

Abstract:

Mindset and attitude has been receiving increased attention in the medical field. The stress for medical professionals to practice evidence-based medicine has put a special importance on treating the whole patient, not just their diagnosis. With that idea in mind, this systematic review aims to draw attention to this new emphasis on physical and mental health. Throughout my research, I will keep track of the databases and word searches I use to find the most relevant articles and then choose the best articles by creating inclusion/exclusion criteria. After gathering my research from patients in variance settings, I will discuss the trends and effects of positive psychology and emotional state on the overall patient outcomes. As I gather more data, I will test my hypothesis that patients will receive better and quicker results when in positive interventions rather than their controls. The goal of this paper is to aide everyday but, more specifically, healthcare professionals on the important outcomes of positive psychology when treating or working with patients (which can lead to decreased healthcare costs) and hopefully draw greater attention to this subject so more focused research can be done.

MAURA COUGHLIN

Student Nursing in Developing Countries: What I Learned on a Nursing Internship in Zambia

Major: Nursing

Faculty Mentor: Anne Marie Barron

Abstract:

The purpose of this poster project is to share my experience from a six-week long nursing internship in Zambia and to show why global nursing education is important. I will also compare the nursing education in the United States to that in low resource countries with a focus on sub-Saharan Africa. I will analyze similarities and discrepancies between the literature and my experience within one Zambian hospital. Citing various qualitative and quantitative studies in addition to my personal experience from my internship, I will discuss the benefits of nursing internships abroad. A significant amount of data shows that study and internship abroad programs are highly beneficial for students, particularly nursing students. Nursing internships abroad increase students' self-confidence, self-ef-

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ficacy, and empathy. Moreover, international clinical experience makes students more culturally aware and more likely to recognize cultural disparities within their own practice. These skills are profoundly valuable for American nursing students to supplement the cultural competence education that American nursing programs are striving to improve. The nursing education in Zambia is comparable with that of other developing and sub-Saharan African countries. A major issue facing healthcare professionals in developing countries is a need to increase the number of experienced nurses, which has resulted in over-recruitment of nursing students. This large influx of students has resulted in too many students to accommodate. It was evident that Zambian nursing students have strong educational foundations, but were not always able to perform best nursing practices due to the significant lack of resources.

ABIGAIL CRAINE

Effects of Stress on Injury Risk and Recovery in Division III Collegiate Female Softball Players

Major: Exercise Science

Faculty Mentor: Meghan Garvey

Abstract:

Injury prevention in athletes is a common goal coaches and trainers, across all sports, strive to achieve. This study aims to examine the relationship between psychological stress and injury risk in division III university-aged female softball players. This study included 20 female softball athletes between the ages of 18-22. Three questionnaires, based on validated questionnaires, were given to the players at two time periods (T1 and T2) during their spring 2019 semester. The Kessler Psychological Distress Scale (K10), and the Sports Emotion Questionnaire (SEQ) measured perceived levels of stress, and the Functional Movement Screen (FMS) which assessed movement. A correlation coefficient was generated so determine if changes in FMS scores were significant to changes in psychological stress. Data collection occurring between March 10-25 for T1 and April 5-12 for T2. Based on current literature, increased levels of stress indicated by the K10 and the SEQ could have a negative effect on FMS scores, resulting in lowered mobility and possibly leading to high risk of injury in athletes.

JAMIE DALEY, KAITLIN KALLIEL

Human Factors and the Threat of Cybersecurity

Major: Web Design & Development, History

Faculty Mentor: Lauren Provost

Abstract:

The digital world remains more vulnerable than ever. Technology uses have shifted dramatically in the past ve years with new models, especially with cloud computing and mobility. Technology

is one factor in cybersecurity, yet security holes can be created by humans either accidentally, in negligence or maliciously. In fact, it is widely acknowledged that employees of an organization are often the weak link in the protection of its information assets. Although some attention has been given to the human factor in cybersecurity, we argue that current frameworks for research are limited in scope and unable to address the complexity of human factors. Through a review of research, this analysis includes the identification of human factors and how they relate to technical computer and information security vulnerabilities with a focus on social engineering. We then discuss the complexities surrounding these factors and propose a new framework that can encompass the vast array of complex and diverse human factors. The result is an improved framework (in progress) for research that encompasses a multitude of human factors and attributes of major attacks that threaten computer security; a more robust, integrative multi-layered framework embracing the complexity of cybersecurity ecosystems. These results are then used to discuss training and awareness options for organizations.

BRIANNA DESHARNAIS

3D Printed Shunts for the Hydrocephalus Cure

Major: Neuroscience & Behavior, Music

Faculty Mentor: Rich Gurney

Abstract:

Hydrocephalus is a condition where excess cerebrospinal fluid (CSF) over-fills the ventricles of the brain, causing it to be pushed against the sides of the skull. The condition causes severe learning problems in toddlers and children, and also causes headaches, loss of sensory motor functions, and seizures among teenagers and adults. The condition affects approximately 1 in every 1000 Americans (around 325,000 people), making it as common as Down's syndrome (source: Hydrocephalus Association). To help cure hydrocephalus, scientists have developed shunts, which are valves to help release CSF pressure in the brain. Hydrocephalus is very common in poorer parts of the world because it usually occurs in babies with malnourished mothers. In addition to this problem, the current shunts are very expensive, and those who cannot afford food also likely unable to afford medical treatment. To lessen the cost of the procedure and allow the shunt's dimensions to be customized to the needs of the patient, a 3D printed elliptical spring valve was designed. The valve contains a spring and stopper for regulating CSF pressure. High pressure allows excess fluid to be drained by depressing the spring, releasing CSF down the tubing. This allows the valve to regulate fluid and stop the drainage at a prescribed pressure threshold. This solution costs pennies compared to the hundreds of dollars it costs for a single factory-produced shunt.

KRISTEN DOUCETTE

A Novel Application of Focused Ultrasound for the Treatment of Port Wine Stain Birthmarks

Major: Chemistry

Faculty Mentor: Michael Jordan

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Abstract:

Annually, 0.3-0.5 percent of the population are born with a Port Wine Stain (PWS) birthmark. A PWS birthmark is a capillary malformation that results in a visible, localized vascular lesion. This lesion is characterized by an increased number of dilated capillaries that give the affected dermis its distinctive, red discoloration. The gold standard of PWS treatment is photothermolysis with Pulsed Dye Laser (PDL) emitting at a wavelength of 595 nm. The PDL selectively causes damage to the PWS by using the optimal wavelength at which hemoglobin absorbs light to thermally destroy the capillaries. Due to limitations of the laser's penetration depth, the deepest PWS capillaries are often left untreated. This can lead to the formation of seed locations where new capillaries can develop, causing the PWS birthmark to deepen in color over time after the treatment. Focused ultrasound therapies are new, non-invasive alternatives to treating tissue at depth. We investigated a novel application of therapeutic ultrasound to treat PWS birthmarks. We used a focused transducer operating at 1.47 and 4.42 MHz, along with an FDA-approved microbubble contrast agent, to induce cavitation as a non-thermal mechanism of damage to the PWS capillaries. An ultrasound phantom was created to mimic the vasculature of the PWS for determining the functional ultrasound parameters. We report on the ability of these parameters to selectively damage vasculature in phantoms and ex vivo animal tissues.

ESRAH DU

Characterization of the Role of Striated Fiber Assembling Proteins in the Asexual Life Cycle of Plasmodium Falciparum

Major: Biology

Faculty Mentor: Cassandra Saitow

Abstract:

Plasmodium falciparum is an obligate intracellular parasite and the causative agent of malaria, with the brunt of human disease experienced during the blood-stage of the parasite life cycle. During this stage, in a process that is not fully understood, a variety of factors ensure the proper replication and division of new daughter cells. Experiments done in a related apicomplexan parasite, Toxoplasma gondii, reveals a family of essential proteins which form a fiber necessary for temporal and spatial organization in parasite cell division, without which aberrant daughter cells with multiple nuclei form. This project aims to characterize the function of related striated fiber assembling proteins, SFA1 and SFA2, predicted to be essential in the proper formation of new daughter cells in Plasmodium falciparum. This entails the cloning of an inducible knockdown of these proteins using a translational repression system (10xTet/TetR-DOZI) in order to determine if the presence of these proteins is necessary for parasite replication. It is proposed that these proteins play a crucial role in the organization and direct compartmentalization of new cells which has important implications in the multiplication and release of parasites from old red blood cells into new surrounding cells,

known as parasite egress. Through this work we aim to gain a deeper understanding of parasite biology in hopes that one day, this knowledge will play a small role in the much larger goal of malaria eradication.

TERESA EASTERBROOKS

A Novel F0 Screening Method for Congenital Cranial Dysinnervation Disorders in Zebrafish

Major: Biology

Faculty Mentor: Anna Aguilera

Abstract:

Congenital cranial dysinnervation disorders (CCDDs) are rare disorders impacting cranial motor neuron development and affect 0.03-0.1% of individuals. In addition to clinical significance for patients with these disorders, CCDD research provides a window into ocular motor development. The genetic basis of only 20% of CCDDs is known, implying room for new gene discovery. Currently, functional validation of candidate CCDD genes can take months or years, limiting the rate of discovery. In order to surmount this limitation, we piloted a CRISPR/Cas9-mediated gene knockout method, leveraging simultaneous delivery of multiple guide RNAs to generate zebrafish with G0 homozygous knockout phenotypes (Wu et al., 2018). We tested this method by targeting MAFB (zebrafish orthologue: mafba), a known CCDD gene associated with Duane Retraction Syndrome (DRS). Mutations in MAFB lead to hypoplastic or absent abducens nerve (CN VI). We injected mafba guide RNA:Cas9 complexes into single-cell zebrafish embryos with an HGj4A transgenic reporter (Asakawa et al., 2012), which labels spinal and abducens motor neurons with green fluorescent protein. Two days after injection, we screened for the mutant phenotype using fluorescence. Preliminary results show absence of CN VI in 5/16 (31%) injected fish and 0 uninjected controls. This is promising for screening purposes but suggests further optimization is necessary. We are currently conducting additional experiments to replicate these results and test optimization strategies, including increasing guide RNA concentration and injection into the cytoplasm rather than yolk. We expect that this method, once optimized, will expedite screening and validating candidate CCDD genes.

STEPHANIE ENDERSON

Elder Isolation in the City of Boston

Major: Social Work

Faculty Mentor: Susan Yi-Millette

Abstract:

This project was designed to focus on the impacts of elder isolation in the Boston area. Elder isolation is a very prevalent issue in the geriatric community, and is a risk factor for many other health issues amongst the population. The focus of this presentation is what the general population can do to help. There will be an in depth look at various factors in Boston's community that can lead to elder isolation, as well as what strengths the area currently has to help diminish the problem. Lastly, this project will go over what this community can do to help its elder neighbors.

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MACKENZIE FARKUS

Grounding the Ghosts: On Finding Queer Archives

Major: Communications: Journalism

Faculty Mentor: Briana Martino

Abstract:

Almost a year ago, I set out to discover queer histories in the best way I knew how — by locating and visiting the archive. After encountering a narrow representation of race, gender, and class within queer archives, as well as a disorganization of artifacts, I searched for a new methodology. What I found was that accessing queer history calls for queer methods. In this paper, I apply methods of queer and feminist historiography (A. Cvetkovich, A.F. Gordon, S. Schulman, J. Scott, and others) in tracking my various “failures” to find and navigate the queer archive. Gordon suggests that trauma, such as what I knew was evident in the AIDS Crisis, manifests itself in history through the felt presence of absences that nonetheless continue to affect and implicate us. For example, upon going to the Interference Archive in Brooklyn, I found artifacts from the north and west U.S. and from far away as overseas but not from the U.S. south. Rather than having artifacts within the archives, the Austin History Center at the Austin Public Library asks people to locate queer artifacts that may or may not exist. I take up Gordon’s method of investigating subjects as “hauntings” in order to consider the archive’s function in suppressing and perpetuating such traumas of racism and sexism. I examine how such failures reflect the nature of traditional archival methods and the means of producing and accessing history. This paper considers emerging queer archival practices, such as Queering the Map and SheWolf’s Directory of Wimmin’s Lands, and searches for a “something-to-be-done” (Gordon, 1997).

CELINA FERNANDO

KEYNOTE | Challenging Complacency: Asian-American Narratives of Anti-Blackness

Major: Sociology

Faculty Mentor: Saher Selod

Abstract:

This research project aims to examine current perceptions of anti-Blackness within the Asian American community, specifically looking at Asian Americans between the ages of 18 through 28, self-identifying as activists and/or creatives in the New England region. 19 participants were interviewed on their experiences as Asian Americans and their exposure to anti-Blackness, including how these perceptions were formed and how anti-Blackness previously and/or presently manifests in their lives and interactions with their community. Participants comprised predominantly of East and South East Asians. Interviews are analyzed through theoretical frameworks such as Bonilla-Sil-

va's 'tri-racial stratification and colorblind racism', the lens of critical race theory, and Claire Jean Kim's 'racial triangulation of Asian Americans' -additionally examining the role of families and location of upbringing in both the learning and unlearning of anti-Blackness. In analyzing some of the interviews, certain results were observed such as the role of the presence of whiteness (eg: growing up in predominantly white neighborhoods or having a white parent), in shaping participants' understanding of anti-Blackness and engagement in it. An additional observation included some participants' ability to name and recognize racist / anti-Black behaviors and actions, paired with the unwillingness to directly name their family members or friends holding these views or carrying out these actions as racist / anti-Black.

TEMA FODJE

Association between stress and HbA1c levels among HIV-infected and uninfected people in Uganda

Major: Biochemistry

Faculty Mentor: Rachel Daniels

Abstract:

HIV-infected people in Sub-Saharan African are both growing and aging partly due to antiretroviral therapy (ART). As a result, this population is now encountering diseases commonly associated with older age such as diabetes. We sought to evaluate the association between stress and HbA1c in a low income setting with prevalent HIV in Uganda. We conducted a matched cross-sectional study of HIV-infected adults aged 40 years or greater matched by age (<5years), gender, and neighborhood to HIV-uninfected participants in Mbarara town, southwestern Uganda. The HIV-infected participants were those who were active in care. We abstracted HIV care information from the HIV clinic database. Participants had blood taken for HbA1c test, weight measured, filled out a perceived stress questionnaire, and two 24-hour dietary recalls. Multilevel Mixed effects models were used to estimate the participant-level association between perceived stress quintiles and HbA1c levels, adjusted participant matching and interviewer-related differences in measurement of subjective risk factors. 448 HIV-infected and 417 HIV-uninfected had complete data to be used for this analysis. We performed 2 models, the first adjusted for smoking and alcohol usage, Hypertension, BMI, and physical activity, showed that increasing stress was associated with high HbA1c (p for trend 0.016). In the second fully adjusted model that included food patterns, we found an association between perceived stress and HbA1c (p for trend 0.013). There was a U-shaped association between perceived stress and HbA1c levels. Healthcare providers in should incorporate stress coping mechanisms to reduce HbA1c levels and thereby risk of diabetes in HIV endemic populations.

ADRIENNE GARCIA, ELIZABETH SCOTT

Analysis of Air Contaminants at Various MBTA Stations

Major: Chemistry (Elizabeth Scot), Health Informatics (Adrienne Garcia)

Faculty Mentor: Michael Berger

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Abstract:

Using public transit reduces greenhouse gas emissions associated with personal vehicle use, however below-ground subway stations are a potential source of exposure to harmful pollutants. This objective of this project is to assess the nature and extent of air contaminants, specifically particulate matter (PM) and polycyclic aromatic hydrocarbons (PAHs) at various MBTA stations in the Greater Boston area. Both PM and PAHs have demonstrable negative human health effects, and could result from fuel emissions and steel dust, respectively. Data will be collected in the ambient air adjacent to the station as well as adjacent to the tracks to allow for direct comparison. For PM, the AirBeam 2 provides real-time quantitative measurements based on diameter size. Gravimetric analysis with pre-weighed filter papers will be used in conjunction to obtain PM masses per sampling period. For PAHs, sorbent tubes containing a hydrophobic resin will be used for collection followed by analysis with gas chromatography and mass spectrometry. This method will allow for concentration calculation of various compounds in the air. It is hypothesized that stations that lie deeper underground will demonstrate higher levels of PM and PAHs, implying that commuters and other regular subway users at these stations would face greater health risks as a result.

NICOLE GAUTHIER

Women's Education in the Early National Period: Seduction Novels, Print Culture, and Advocacy for Separatist Education

Major: History

Faculty Mentor: Laura Prieto

Abstract:

My research studies how sentimental novels like Susanna Rowson's *Charlotte Temple* influenced women's education between the end of the 18th century and the beginning of the 19th century. Women at that time were regarded as commodities in popular culture and literature, which created a conflicted view of the importance of women's education. Americans during the Early Republic period believed that women needed to be educated in order to educate their sons, but they thought at the same time that women should not be overly educated, or they would become pedantic and coquettish, traits considered undesirable to men. American and British Sentimental novels like *Charlotte Temple*, *Northanger Abbey*, and *The Power of Sympathy* reflected this duality regarding women's education. To answer this question, I am consulting archival sources by Susanna Rowson and Caleb Bingham, written in the 1790s and housed in the Massachusetts Historical Society, as well as the novels themselves, and relevant scholarship for context including Linda Kerber's *Women of the Republic* (1980).

NICHELLE GOMEZ**Building A Better Community****Major: Social Work****Faculty Mentor: Susan Yi-Millet**

The social services department can be a crucial resource for any community. The Salvation Army Boston Kroc Center has proven to be just that: a crucial resource for the residents of Dorchester. The social services department at the Kroc Center provides residents with many resources such as utility and rental assistance. TSA (The Salvation Army) also helps residents with clothing and furniture. The most essential resource TSA provides is the food pantry, where by appointment, residents are able to come in and get food for their household. Although, these are the main resources residents use there is a lot more that the social services and the Kroc Center has to offer. This project is about rebuilding a system that lost some of its value along the way. Alongside my supervisor, we are working together to implement new policy and procedures that are up to date, and would also be beneficial for oncoming members who would like to work or volunteer at TSA. Aside from policy and procedures we want to get more into the community. This will work by learning more about the demographics that we serve, and asking residents what areas of improvement in the neighborhood they would like to see. Building relationships with other non – profit agencies is another key factor to building a better community. This work that my supervisor and I are trying to achieve will not happen overnight. It will take days and month, but it will be rewarding work.

LACI GONZALEZ**Aging Alone: A Spotlight on Elder Isolation****Major: Social Work****Faculty Mentor: Susan Yi-Millette****Abstract:**

The aging process in America can be challenging and difficult to adjust to for many who are growing older. Older adults often endure prejudicial attitudes based solely on their age that can invoke fear and hesitation around actively participating in society. For those who are residing alone with little to no family or friends, they become even more vulnerable to these prejudices. Elder isolation is a growing trend that stems from lack of support and understanding around the aging process in America, and requires examination from a biological, psychological, and social lens in order to effectively combat the epidemic. In order for this to occur, those in helping professions, such as social work, must approach elder isolation care with a strengths-based approach and dismantle stereotypes and systems that promote and enforce ageism. This poster presentation will focus on a singular elder client who is impacted by elder isolation and how a strengths-based assessment, intervention, and evaluation of the client assisted in combating the isolation. The presentation will also showcase how the client's experience, as well as an extensive literature review, support the need for advocacy in the social work field in creating preventive measures towards isolation and ageism.

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JENNA GUGLIELMO

Verifying the Claims of Efficacy of Cannabidiol (CBD) in Commercial Products

Major: Biochemistry

Faculty Mentor: Shreya Bhattacharya

Abstract:

This project involves extraction and quantification of the cannabidiol (CBD), the naturally occurring, non-psychoactive ingredient in the hemp plant. The project would analyze the CBD components in commercial products by using Gas Chromatography/Mass Spectroscopy (GC/MS) to do a quantitative study. The main goal is to test and differentiate medically beneficial products from the placebos by testing a wide variety of products available on the market. The findings will then be compared to literature values and a control group, which will be a CBD sample from a laboratory distribution company. Understanding the compounds present in commercial products can potentially show trends to determine an accepted therapeutic level. Analyzing the physical behavior of the compound can lead to discoveries that can benefit many patients and potentially replace pharmaceuticals that have negative side effects due to the relatively low toxicity of CBD. Since this compound is so readily available on the market without high regulation, there is a large area for impurity in the products. People seeking CBD therapy for self-treatment may not necessarily be aware of what they are actually consuming.

LEA HAEHNEL

Catching Shade

Major: Biochemistry

Faculty Mentor: Rich Gurney

Abstract:

When Rihanna launched her Fenty Beauty line it was long overdue response to the outcry for a wide range of shades within makeup foundation lines. Proving their power as consumers, women of color responded to the Fenty offering and emptied Sephora shelves across the nation. Belying all of the excitement was the grim fact that less than 25% of personal care products sold to women of color have been proven to be safe for longer term use. Cosmetic companies use tactics like the fragrance loophole, a method used to get away with not publishing the full list of ingredients on labels and lobbying organizations whose missions are to create doubt and confusion in the public. Using these tactics and many more the cosmetics industry has created a false sense of security among consumers. Within this study a survey was constructed to determine what the top cosmetic foundation brands among the student population are, the shade details of the foundation and the students knowledge about the safety of the product. After identifying the most frequently used products, ingredient safety analysis was conducted using various apps, databases, and cosmetic

dictionaries. On a scale of 1-100 all survey participants rated their knowledge about the safety of their cosmetics as 35% or lower while over 95% were interested in knowing the information. Following the product review 50% of the identified products contained at least one ingredient that had been identified as a high health hazard. Some health concerns include cancer, reproductive toxicity, and immunotoxicity.

MARGARET HAMILTON

You Are What You Eat: Dietary Acculturation and the Embodiment of Inequality Among Latinx Immigrants

Major: Sociology

Faculty Mentor: Valerie Leiter

Abstract:

Dietary acculturation in the United States is the process in which immigrants adopt the cultural food and dietary habits of mainstream society. Immigrants who maintain and hold on to their own ethnic and cultural eating habits typically eat a more balanced diet of whole, and nutrient-dense foods. Those who have begun to integrate into American culture tend to change their dietary habits first; the U.S. is a consumerist society hyper-focused on food. Using the 2015-2016 National Health and Nutrition Examination Survey (NHANES) in addition to literary resources, this project focuses on the impact of acculturation in Latinx immigrants' diets and consequential health outcomes. Quantitative, statistical analysis of the NHANES data provided insight on acculturation levels (and other demographic data) and the relationship with chronic disease. Overall, the more English spoken at home, the better health outcomes were. Socioeconomic resources and the ratio of family income to poverty is also an indicator of eating habits, which had negative health outcomes, such as an increased rate of diabetes. Immigrants' diets change as they assimilate into American culture, and it is clear that food choices are not individual choices, but the consequences of larger social structures. Dietary habits predict health outcomes in many ways. This inequality therefore becomes embodied, and is reflected specifically by an increase in the rate of obesity and diabetes.

TAMIA HARGROVE, LAURA ISARO

Improvements to Automatic Speech Synthesis Using Prosodic Features

Major: Neuroscience & Behavior

Faculty Mentor: Nanette Veilleux

Abstract:

Despite the growth of language interpretation abilities for voice recognition programs such as Siri, Alexa, and Google search, computer-generated speech continues to sound stilted and artificial. In previous years, researchers on this project/topic created an experimental design which included human voice recordings to measure prosody in specific pragmatic contexts. A perceptual test was conducted using six comic book scenarios used to set the context to prompt subjects to slightly manipulate their tone of voice. The obtained voice recordings were then thoroughly scrutinized to isolate prosodic elements. Using the annotation system known as ToBI investigators labeled pitch

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tones that can be high, low, or a combination of the two. The objective of this year's project is to create synthetic speech to more naturally signal pragmatic intentions. In contrast to the previous research group, we will first repeat the perceptual experiment in person (vs. Mechanical Turk) to identify the situational context subjects believe best matches the prosody of the recordings. Having the participants evaluate the recordings in person will better eliminate prior confounds, and improve in validating the meaning-prosody mapping. The results of this experimentation will then be used to improve synthetic speech for a more natural result.

GEORGIA HARPER

The Parisian Semiotic Landscape During the Events of May 1968

Major: Political Science & Philosophy

Faculty Mentor: Abel Amado

Abstract:

In May 1968, students took to the streets of Paris to protest Gaullist policy and demand increased participatory democracy. These violent protests greatly affected the Parisian semiotic landscape, which is the diverse verbal and other nonverbal elements in a given area. Several groups, including communist and anarchist students, participated in the protests, and they all had different effects on the Parisian landscape. The paper applies a sociolinguistic approach by critically analyzing the changes in the semiotic landscape. I recreate the landscape by using historical, contemporary, and analytical accounts of the events. To explain the changes produced on the urban landscape, I examine the symbolic strategies of the protestors and the police, focusing on the revival of political posters by the Atelier populaire and the student-written slogans. The paper focuses on transgressive discourse or bottom-up and non-governmental signage that contradict what is customary in a society. The students created new venues for self-expression in spaces that traditionally would not have seen this kind of discourse. My paper begins with historical context for the events in order to build an image of what Paris and France, in general, were like before the disruption followed by an explanation of the elements of a semiotic landscape. Once I establish sufficient background, I begin my analysis of strategies the participants used as well as specific instances during the protests. I conclude that while the majority of the physical changes were temporary, the spirit of May 1968 lives on in violent and creative protest in France.

OLIVIA HART

The Earth On Screen: Intersections Between the Environmental Movement and Science Fiction Film

Major: Communications

Faculty Mentor: Kris Erickson

Popular science fiction films often reflect the deep-seated, unspoken fears of society at the time those movies are made. As of 2017, 70 percent of Americans believe that climate change is happening, and more than 58 percent of Americans believe it is caused by human activity (Yale, 2017). Dystopian film may have an overlooked role in this growth in public knowledge and the nature of governmental response, and my goal is to determine that role. I will point out common themes shared between environmental events and films of the past few decades, and determine which films most effectively convey the threat of climate change in order to enact global action.

KATHERINE HEPBURN

The Effects of Self-Compassion on Exercise Motivation & Adherence in Women

Major: Exercise Science

Faculty Mentor: Meghan Garvey

Abstract:

The objective of this study was to determine if women with higher levels of self-compassion show 1. Better exercise adherence than those with less self compassion, 2. More intrinsic motivation for exercise. 32 women ages 16-72 participated in this study. Self-Compassion was assessed using the 12-item Self Compassion Scale - Short Form. Exercise motivation was assessed using the Motives for Physical Activities Measure - Revised (MPAM-R) which contains five subscales (Interest/Enjoyment, Appearance, Competence, Fitness, Social). Exercise adherence was determined via an exercise questionnaire, with results being compared to the ACSM Guidelines for Physical Activity. The data was analyzed using Microsoft Excel 2016. The Student's t-test: Paired Two Sample for Means with $p < 0.05$ being statistically significant, and the Pearson Correlation Coefficient were used for data analysis. The results showed a positive correlation between Self Compassion Score (SCS) and Interest/Enjoyment score ($R=0.19$ $P=2.09E-09$), and SCS and Social Score ($R=0.12$ $P=0.53$). There was no correlation between SCS and Appearance score ($R=0$, $P=3.21E-06$). There was a negative correlation between SCS and Competence Score ($R= -0.22$ $P=1.31E-06$), SCS and Fitness Score ($R= -0.05$ $P=6.51E-16$), and SCS and Adherence score ($R= -0.05$, $P=0.01$). This data shows that women who are less self compassionate may exercise for more extrinsic reasons. These findings could advocate for group exercise instructors, personal trainers, gym members etc. to include self compassion as part of their health and fitness education.

SARAH ISLAM, LENA SYED, MEHBOOBA TAMANNA

Analysis of Antibacterial Properties of Azadirachta Indica

Major: Biochemistry (Sarah Islam), Nutrition & Dietetics/Economics (Lena Syed), Biochemistry/ Physics (Mehbooba Tamanna)

Faculty Mentor: Gina Mustata

Abstract:

There are alternative methods of maintaining oral health that reduce exposure to harmful chemicals. Commercial toothpastes contain chemicals which, although approved by the FDA, are not consumer safe. Triclosan, a common ingredient in toothpastes and mouthwashes, can be linked to cancer development (Dinwiddie et al., 2014). Azadirachta indica, commonly known

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as the Neem tree, is thought to have intrinsic antibacterial properties. Branches from this tree are fashioned into sticks that are used as an alternative to toothbrush and toothpaste in parts of Asia and Northern Africa. The purpose of this project is to investigate antibacterial properties of Neem extract. Our preliminary data proved that certain bacteria are sensitive to bristles of Neem sticks. We will analyze the main antibacterial organic components of Neem, and observe interactions between pure Neem extract and *Streptococcus mutans* (a plaque-forming bacteria found in the oral microbiome). We seek to understand the antibacterial properties of Neem chewing sticks by determining the concentrations of Azadirachtin, Nimbin, and Gedunin in conventional neem powder, and by observing untreated and treated *S. mutans* with different concentrations of Neem. We hypothesize that the Neem extract will affect the growth and viability of the bacteria due to its organic antibacterial components. This project is funded by the Simmons Grant for Research and will be completed by June 30, 2019.

BRITTANEE JOHNSON

Problem Behaviors Seen in Adolescents in Residential Care

Major: Social Work

Faculty Mentor: Susan Yi-Millette

Abstract:

The intentions of this work is to gain insight and understanding of various theory and frameworks that's application will help to best serve adolescents who present problem behaviors while in residential care. A compilation of such was developed through a literature review which focused toward empowerment while providing the best care possible. After being able to gain an understanding for these behaviors, as a social worker you will be better equipped to utilize such theories and frameworks. An emphasis is placed on understanding the Attachment, Regulation, and Competency (ARC) Model as a base for intervention with working with adolescents in residential care. Through literature the target behaviors for intervention include running away, suicidal ideation, and sexual exploitation. Empowerment comes into play through calling for use of empathy to promote positive encouragement for adolescents. Some of the collected literature provides potential causes for problem behaviors, prevention of problem behavior, past studies on sexual exploitation and the cause and effect it has on adolescent in residential care, interventions that promote healing among sexually exploited youth, a study that looks at running away behavior as an adolescent attempts to regain control and demonstrate how they are feeling, proactive approach to running away, the relationship between gender and suicide risks, and connectedness and suicidal ideation for youth that are in child welfare.

MADDIE KAROD

KEYNOTE | Synthesis and Characterization of ZnO-SiO₂ Nanocomposite in Elastomeric Foam for the Photodegradation of Pharmaceutical Compounds

Major: Chemistry, Environmental Science

Faculty Mentor: Mariam Ismail, Michael Berger

Abstract:

When disposed of improperly, antibiotics are introduced into municipal water systems, which may lead to bacterial resistance, ultimately causing drugs to lose efficacy. To combat this public health threat, pharmaceutical compounds are often removed from wastewater through photocatalytic degradation. Zinc oxide is a common photocatalyst that aids in the degradation of these hazardous compounds. Silica dioxide is a means of suspending zinc oxide to prevent likely aggregation that decreases the photocatalytic activity of zinc oxide. To synthesize a zinc oxide/silica dioxide nanocomposite, zinc chloride was injected into a hot sodium metasilicate solution in a green, one-pot synthesis. Analysis of the produced nanocomposite was performed using X-Ray Diffraction to determine phase and purity, and Scanning Electron Microscopy to examine morphology and size. The immobilization of the ZnO/SiO₂ nanocomposite in an elastomeric foam provided a novel method in the photodegradation of the antibiotic Ciprofloxacin. Immobilization by foam may increase photocatalytic activity of the nanocomposites, and aid in the retrieval of the nanocomposite after photodegradation occurs, ultimately providing ecological and financial benefits.

SYDNEY KATS

Outcomes of Youth Centered Community Development

Major: Public Health - Social Analysis Track

Faculty Mentor: Valerie Leiter

Abstract:

This poster is meant to analyze youth-centered community development, best practice youth programming, and the various mental health improvements that result from these types of programs. I will be analyzing my internship site as the location of my nonprofit casework study in order to observe how their focus on youth and leadership skills impact community development within Boston, MA on the community level, and create better mental health outcomes on the individual level. The nonprofit I will be interning at is called Sociedad Latina. Sociedad Latina uses a unique and innovative model in order to aid the people they are serving in the best way possible, this model is called the "Pathways to Success Model". The "Pathways to Success Model" "uses culturally and linguistically responsive practices to capitalize on our young people's strengths and assets, such as bilingualism, high-aspirations, resiliency, and strong family and community ties(Sociedad Latina)." Along with cultural competency, an ideal that is ingrained in all of their programming, Sociedad Latina practices this model with their free programs in order to best serve Latino youth. This model works to aid youth in the fields of education, civic engagement, workforce development, arts, and culture. In many cases, programs like these produce social capital for the participants, which is very important for developing youth in underserved or underdeveloped communities. "Holland et al.

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(2007) reported that the amount of social capital youth accrued through their community networks determined how well they bridged into new networks during times of transition, concluding that community is valuable to social capital debates(Hastings, et al.)." Sociedad Latina aims to provide a community in which youth are able to attain social capital, so that they are able to then use that social capital in their future endeavors, as well as create strong Latino communities.

ALEXA KEENAN

The Effects of Rehabilitative Therapy in Pediatric Cerebral Palsy: A Case Study

Major: Exercise Science

Faculty Mentor: Rachel Daniels

Abstract:

Cerebral Palsy (CP) is a neurological disorder that affects movement, motor skill, and muscle tone. As the leading motor disability in childhood, CP affects three in every one thousand children in the United States. The purpose of this case study is to analyze the effects of specific treatment decisions made by the treating clinician and to highlight the importance of physical therapy in the management of CP. The child I am observing is diagnosed with Athetoid CP, caused by damage of the basal ganglia in the brain. This area of the brain is responsible for the control and coordination of movement, resulting in uncontrollable muscle activity. An initial evaluation was conducted at the start of the child's treatment in April of 2018 and the test results, observations, and measures were used to develop a set of short term and long term goals. With all four extremities impacted by the condition, the child demonstrated generalized muscle weakness, lack of coordination and balance, decreased cardiovascular endurance, and impaired postural control and gait. Treatment notes are recorded following each session, indicating what was worked on and discussing performance. The case will discuss the plan of treatment for the child and how specific activities will guide progress. A thorough one year follow up evaluation will take place in April of 2019 where all of the tests, measures, and observations from the initial evaluation will be repeated. These observations and results will demonstrate how physical therapy plays a central role in the management of CP, increasing the child's functional mobility independence.

KATHERINE LABBAY

Analysis of ACL Rupture Risk Factors in Volleyball Players Using the Field Screening Tool

Major: Exercise Science

Faculty Mentor: Meghan Garvey

Abstract:

Research in the past decades has revealed multiple interrelated tear risk factors for female athletes. Despite the knowledge about ACL tear risk factors, few pre-screening programs are implemented for precautionary measure. This study aims to justify the Field Screening Tool (FST) as a pre-screen-

ing measure among athletes to determine modifiable ACL tear risk factors. Eleven Simmons University female volleyball players were interviewed about previous and current health status. Subjects were instructed on the tuck jump technique and were asked to perform 10 jumps while video was recorded from multiple angles. Analysis of body position and technique at peak, initial contact and full landing phases was conducted using QuickTime Player Software. Using the FST, instance of technique flaw was recorded for each jump. Movement dysfunction was indicated when a flaw appeared three or more times or one major instance occurred. Results of the tests were graphed using Google Sheets based on flaw to determine the most prevalent risk factors. The mean age was 19.18 years (+1.08 years). The most prevalent technique flaw was classified under Leg Dominance among the subcategory of thighs not equal/parallel with ground at peak height with a mean of 4.91 (+2.51). Ten participants displayed technique flaws that put them at high risk for ACL rupture. The FST to pre-screen female athletes is practical based on low cost and simplicity. Of the 10 athletes that present high risk for ACL tears, modifications to technique can be made through exercise to potentially prevent ACL tears.

MI LE

Mental Health in a Racial Justice Framework

Major: Public Health - Social Analysis

Faculty Mentor: Valerie Leiter

Abstract:

It is important to look at the impact of racism on mental health within communities of color to inform the ways in which organizations and practitioners address this issue. Research on racial discrimination and its links to mental health is a growing area of investigation (Williams, 2018). According to the National Alliance on Mental Illness (NAMI), African Americans are 20% more likely to experience serious mental health problems and often experience more severe forms of mental health conditions. Perceived racism is associated with adverse psychological and physical health outcomes. Structural and institutional mechanisms, in conjunction with personal experiences with racial discrimination, play a significant role in the impact of racism on mental health (Williams, 2018). In addition to an increased prevalence, racism also serves as a barrier against seeking mental health services, which perpetuates the severity of mental health conditions in communities of color. Organizations, practices, practitioners, and institutions who serve predominantly people of color must acknowledge and engage themselves with the pervasive influence of historic institutions of racial injustice in this country as a context to the mental health status of communities of color today. This case study looks at Community Health Network Area 17 (CHNA 17), a regional health coalition in Massachusetts, and its work to educate, inform, and start dialogue within the healthcare field using a Racial Justice framework to improve patient care and health outcomes.

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NICOLE LEE

**The Effects of Dexamethasone Treatment and Weight Gain on the Outcomes of Cancer Patients:
A Systematic Review**

Major: Exercise Science

Faculty Mentor: Meg Garvey

Abstract:

Dexamethasone is among one of the most popular corticosteroids used to control tumor growth and inflammation in cancer patients. However, data shows that inappropriate dosage and duration can cause acute obesity and other health complications due to weight gain. The purpose of this review is to examine the negative effects of Dexamethasone use in populations of cancer patients and find healthy ways to combat weight gain and metabolic syndrome. This research paper is a systematic review of more than 9 scholarly articles and publications reviewing the effects of cancer, dexamethasone use, and weight gain. Pubmed search engine was used. Studies were included if they included the terms: dexamethasone, cancer patients, weight gain, metabolic syndrome, type 2 diabetes, exercise, steroids, males and females, all ages. Exclusion criteria for this review includes the terms: healthy individuals, weight loss, single gender, no hormone therapy. Articles with similar and different inclusion criteria will be compared with a qualitative analysis table and discussed in this paper. This project is about 75% completed. Currently, 6 articles have been selected and placed in a comparison table. Of the studies that I have reviewed, the majority of them supported my hypothesis that dexamethasone in inappropriate doses causes acute obesity and metabolic syndrome. Discussion: Based on the current literature it is predicted that Dexamethasone can cause acute obesity and metabolic syndrome when prescribed in inappropriate doses to cancer patients. Regular exercise and healthy eating habits promoted by health professionals can help to combat the negative effects of weight gain.

ZOE REECE LEFKOWITZ

"Third Gender" Recognition in the United States: Examining Theory and its Practical Implications

Major: Sociology and Philosophy

Faculty Mentor: Diane Grossman

Abstract:

My double major (Sociology and Philosophy) thesis focuses on the recent additions of a "third gender" option on forms of government-issued identification in the United States. That policy first went into effect on January 1, 2018 with Oregon's implementation of House Bill 2673, which allowed non-binary people to opt for a "gender X" category. Since then, a number of states have followed suit. By conducting Content Analysis using Grounded Theory Method, I have coded the Bills of the approximately twelve states which have implemented, or are in the process of implementing, a third

gender policy. In addition to that coding, I am analyzing more than fifty news articles reporting on these new policies. As this topic is very recent, little-to-no scholarship exists that directly discusses these policies and their possible social implications. Thus, my project addresses a research gap. As a sociologist and philosopher, I am deeply concerned not only with the theoretical underpinnings of such policies but also with how these changes might structurally and personally impact the gender-nonconforming population. The central goals of my thesis are to examine this topic in the context of previous literature on legal gender/sex classification; to analyze the inclusivity and accessibility of the Bills; and to explore and critique how media frame this issue for the public. My hope is that this work might lay a foundation for future policy-making, including potentially policy at Simmons.

JESSICA LEVINE

The Effect of Pre and Post Sleep Routines on Sleep Quality and Stress Reduction for Health Professionals

Major: Nursing

Faculty Mentor: Margaret Costello

Abstract:

The establishment of both morning and nighttime routines can lead an individual to have improved sleep patterns, lower stress levels, improved emotion regulation and a greater ability to more effectively manage use of time. For nurses and other healthcare professionals, establishing a routine can be difficult due to changing shifts, long hours, and the struggle to create balance in one's life. However, creating and practicing a routine before going to sleep and immediately after waking can assist in better adaptation to schedule changes and being more attentive throughout the day or shift. For a period of 3 weeks, I have already collected data about my current sleep patterns and alertness. Throughout the next 5 weeks, I will follow morning and nighttime routines I have created in order to test their effectiveness on myself as a nursing student. In order to measure their effect, I will track the quality of sleep I get each night by measuring and rating the difficulty I have falling and staying asleep. I will track my overall feeling of alertness throughout the day, as well as my emotions and mood during that time. I will then compare my pre- and post-routine data to determine if there has been a positive change in my quality of sleep and overall alertness. I will compare my findings with the literature on the benefit of routines and report on the conclusions.

FOX MAASCH

Books: Form and Function

Major: Studio Arts

Faculty Mentor: Helen Popinchalk

Abstract:

This semester I have delved deeper into my practice as a bookbinder by harnessing various techniques and experimenting with my plethora of tools. I have a strong passion for bookbinding and applying techniques and skills of classic bookbinding to my art. I focus much of my visual language

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on the strictly visual and at times on themes in our society that interest me. Most of my work focuses on the "other" in our culture. I have pursued various ways of presenting how the "other" and the act of "othering" people plays out in our culture. We certainly are in a modern day dialogue about what it means to accept and respect difference. I attempt to convey how "othering" makes me feel: Isolated, freakish, hopeless, but also leaves me with a feeling of resolution, and even resilience. I ask people to see, to look, and to imagine themselves as "other," often creating dialogue with viewers on how they interpret my construal of the "other." Books make you think, the narrative makes you wonder, artists relay that thought and wonderment into visual means. Throughout this independent study I'll be marrying two courses that I'm taking this semester, Approaches in Contemporary Photography and Collage and Mixed Media, with bookbinding, allowing me to take inspiration from my other visual works and delve into a narrative that sprouts from my various media. At the end of the semester I'll have 10 artist's books and 10 blank notebooks that show the pure beauty of the craft.

HANNAH MALATZKY

Effects of Plastic and Plastic Alternatives on Earthworms and the Ecosystem

Major: Biology and Public Health

Faculty Mentor: Anna Aguilera

Abstract:

Plastic waste is a growing problem as worldwide plastic use is causing landfills to fill up, is contaminating oceans, and being found in the stomachs of marine animals whose diets do not include plastics. Plastics are threatening both land and marine ecosystems due to undergoing a slow decomposition of up to 1000 years. Newer biodegradable plastics such as Polylactic Acid (PLA) lessen the environmental effects as they have a lowered decomposition time when put into a compost environment. Using plastic and PLA straws we tested the extent to which earthworms digest the two types of plastic. To do this we created three treatments: worms in soil with traditional plastic, worms in soil with PLA, and worms in soil with no plastic. We recorded worm survival, analyzed stomach contents, and quantified the reduction in plastic or PLA content in the soil. We predicted that the earthworms will be able to digest PLA, and therefore we would see a reduction in the mass of plastic in the experimental worm habitats. In contrast, we expected the mass of plastic in worms will not be able to digest traditional plastics, and that there would be no decrease in plastic mass over time. While PLA seems to be a good alternative to traditional plastics, it is unknown whether PLA has detrimental effects on ecosystems. The results will be able to inform about whether plastic alternatives have environmental implications or if they make a suitable alternative when their waste methods are under consideration.

SAMANTHA MARINELLI

The Effects of Women's Marches on Sexual Assault Reporting

Major: Economics

Faculty Mentor: Niloufer Sohrabji

Abstract:

This paper looks at the factors of sexual assault reporting in the United States, including the effects of public organizing through Women's Marches in the United States. This paper uses cross-sectional data across all fifty states to see what factors influence sexual assault reporting and by how much. Factors besides the number of Women's Marches in each state include the number of undocumented immigrants, the number of people who identify as transgender, the per capita spending on protection services, the per capita spending on hospitals, the laws defining rape and sexual assault, the number of violent crimes, and the number of universities in each state. Results indicate that protests and public organizing, in this case in the form of Women's Marches, has been an effective way to increase reporting of sexual assault.

KRISTIN MARQUETTE

TRIPS Flexibilities and Effects on Affordability

Major: Economics

Faculty Mentor: Niloufer Sohrabji

Abstract:

This project examines if the flexibilities built into the TRIPS (Trade-Related Aspects of Intellectual Property Rights) agreement improve health access. The TRIPS agreement imposed uniform intellectual property rights across all member countries, increasing patent protection on pharmaceutical drugs. While the increased patent protection was meant to incentivize research and development, it hurt health access. To redress the concerns with health access, the TRIPS agreement included flexibilities, specifically compulsory licensing. While compulsory licensing helps to increase access and affordability of a drug, countries were required to have the capabilities to manufacture the drug. The Doha Declaration addressed issues with TRIPS in 2001 and issues of compulsory licensing in 2003 in hopes of improving public health access. This project quantifies the impact compulsory licensing has on improving health access by examining the number of people receiving treatment for HIV for five developing nations: Argentina, Brazil, India, South Africa, and Thailand, from 2000 to 2015 and using the Doha Declaration as a dummy variable. Results show that while the Doha Declaration had a negative impact on treatment for these five countries, it did increase spending on HIV expenditures per country after 2004.

Hayley Mcmorrow

Anatomical Mapping of Descending Projections in Subpopulation Pet1 Neurons

Major: Biology

Faculty Mentor: Jane Lopilato

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Abstract:

An important grouping of brainstem nuclei, known to modulate touch and pain, are serotonin (5-HT) producing cells. The Dymecki laboratory, at Harvard Medical School, has identified a sub-population of Pet1 serotonin-producing neurons named for the coexpression of Egr2, namely, Egr2-Pet1 neurons. Preliminary data indicate that these neurons project to the dorsal horn (DH) of the spinal cord (SC). We hypothesize that Egr2-Pet1 neurons are influencing SC processes as the DH is involved in sensory processing, including pain transmission. By manipulating this serotonergic subgroup, we can produce anatomical mapping of Egr2-Pet1 neuron descending projections along the rostrocaudal and dorsoventral axes of the SC. The results demonstrate that the greatest expression of Egr2-Pet1 projections is found in lamina III, IV, V and X of the dorsoventral axes of the SC. Furthermore, Egr2-Pet1 expression is found across all four spinal cord levels with the strongest expression in thoracic and lumbar levels. Our results indicate that the serotonergic subtype Egr2-Pet1 likely receives sensory information from afferent mechanoreceptor dorsal root ganglion such as responses to touch stimuli. Therefore, the data support our hypothesis that Egr2-Pet1 neurons are influencing SC processes. However, additional research must be carried out to the mechanisms by which Egr2-Pet1 neurons influence sensory processes.

COLLEEN MILLER

Defensa de la mujer en el Quijote/Feminism in Don Quijote

Major: Spanish

Faculty Mentor: Maria Dolores Pelaez-Benitez

This presentation, conducted in Spanish, argues that although there are several misogynistic characters in *Don Quijote de la Mancha* by Miguel de Cervantes, the novel has a feminist agenda. This argument takes place in a long-standing debate between misogyny and feminism in medieval Spanish literature, taking into account the conventions of courtly love found in the novel and the analysis of literary critic Carol Johnson. In this debate, misogynistic characters blame women for enamored men's suffering and feminist characters praise women for their intrinsic virtues. The novel narrates events from several different perspectives, so I discern the credibility of these perspectives to determine which one—sexism or feminism—reflects the stance of the novel as a whole. I analyze several episodes to show that the misogynist characters are not credible, that feminist characters are credible, that the tone of the novel is sympathetic to sixteenth century women, and that outside forces—not the female characters—cause male characters' suffering. The first and most important episode I analyze is that of Marcela, a shepherdess with many suitors who decides to live in the wilderness and stay single. By using logic to make a strong argument in her defense, Marcela sets the novel's feminist agenda early in the first part and paves the way for other female characters to prove their innocence in the face of misogyny. Even male characters, such as Don Quijote himself, defend the women's honor in word, although their ability to defend it in deed is questionable.

Maleeha Mohammed, Hannah Scott

Self-Compassion and Mindfulness Intervention Study

Major: Neuroscience & Behavior, Psychology

Faculty Mentor: Elizabeth Donovan

Abstract:

Stress is a significant problem among college students, associated with a range of negative health outcomes, including depression and anxiety. One approach to reducing stress and increasing quality of life is to increase self-compassion. Self-compassion has been described as a way of relating to oneself that involves being mindful; kind to oneself during times of distress; and aware that difficult feelings are a part of the human experience. "Making Friends with Yourself" is an eight-week intervention program designed to teach core self-compassion skills. This program has been shown to increase self-compassion and decrease depression in teens. Given the evidence that increasing self-compassion is associated with a range of positive outcomes, there is reason to believe that this intervention may be beneficial for college students, a population that has not previously completed this program. The goal of our research project is to conduct a pilot study examining the feasibility and acceptability of delivering the Making Friends with Yourself intervention to Simmons University students. Feasibility will be measured with attendance and retention data. Acceptability will be assessed through qualitative pilot study data, which will be analyzed for themes addressing student engagement in the content of the program, and participants' feedback on the program activities. Changes in psychosocial outcomes will be explored by comparing psychosocial measures administered pre-intervention to those administered immediately post intervention. Given the high rates of stress and anxiety among college students, there is reason to believe that those participating in this evidence-based intervention may find it helpful.

ALEXANDRA MOLESKI

KEYNOTE | Uninhabited Wilderness, Repressed Peoples: How the Establishment of the Yellowstone National Park Decimated the Blackfeet and the Crow

Major: History

Faculty Mentor: Stephen Berry

Abstract:

The United States' national parks are widely considered the pride of the nation, supposedly preserved for the enjoyment of all Americans and symbolic of the country's egalitarian principles. In 1983, historian Wallace Stegner praised the national parks as "absolutely American, absolutely democratic."¹ However, Stegner, along with much of mainstream historical scholarship, failed to recognize the immensely negative impact the establishment of the first national park, Yellowstone, has had on Native Americans. Using primary sources such as government documents and memoirs, and complementary secondary sources, I explore the United States government's displacement of the Blackfeet and the Crow for the park's creation. I have chosen to analyze these two tribes because of their dramatically different relationships with white Western pioneers and the establishment of Yellowstone, the former having maintained hostile relations, and the latter having

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enjoyed a comparatively amicable relationship. I argue that despite their contrasting experiences, the establishment of Yellowstone National Park decimated both the Blackfeet and the Crow populations, disrupted their cultures and economies, and perpetuated the repressive reservation system that continues to strip Indigenous peoples of their autonomy in the modern era. As a person with Native heritage—the Penobscot of Maine—I have both personal and academic connections to this project. I aim to use the education and voice with which I have been privileged to inspire readers to consider the impact that countless events in popular United States history have had on the Native American population.

TANYA MONTEIRO

Immunohistochemistry Reveals the Activation of Merkel Cells in Mice Glabrous Skin

Major: Neuroscience and Behavior

Faculty Mentor: Eric Luth

Abstract:

The sense of touch, mediated by mechanoreceptors in the skin, is crucial for our physiological and psychological well-being. Altered tactile sensitivity, such as touch hypersensitivity experienced in autism spectrum disorder and mechanical allodynia, can severely impact one's ability to communicate and interact with others. Merkel cells are low threshold mechanoreceptors that mediate the perception of gentle touch. Although previous studies have effectively labeled Merkel cells to perform specific functional studies in non-hairy skin, the same has not been done in the glabrous skin, a region of high tactile acuity. Here we describe the development and validation of a genetic tool used to label Merkel cells specifically in the mice glabrous skin. Results from immunohistochemistry revealed the specific expression of the light-activated ion channel channelrhodopsin only in the Merkel cells, which demonstrates the specificity of the developed tool. This tool that allows labeling and potentially manipulations of specific skin touch receptors will enable studies related to touch dysfunctionality involved in neurologic diseases.

EMERSON MOURADIAN

Rey The Jedi: How Lacan's Mirror Malfunctions

Major: English

Faculty Mentor: Briana Martino

Abstract:

At the turning point of Rian Johnson's Star Wars Episode VIII: The Last Jedi (2017), protagonist Rey is drawn to a cave under Ahch-To the ancient island sacred to the Jedi faith. Here, she faces her reflection in a mirror in search of her identity. Over the course of this video essay, I apply Lacan's "The Mirror Stage," to analyze what the Force reveals to Rey in the mirror. The Force is the energy

created by all living things in the Star Wars Universe. Prior to the cave scene, Rey's ego starts to develop in the Force during her first lesson with Luke. She is eager to learn the ways of the Jedi, but Rey still yearns for familial attachment. When Rey is drawn down to the mirror cave in the Force's final effort to persuade her to become a Jedi, it reveals to her that she has no familial attachments. Does the cave scene represent a malfunction of the mirror stage? How does the Jedi ego of the Force reject or embrace the Lacanian ego? Jedis, the users of the light side, are extinct in Episode VIII. The galaxy is unbalanced with Kylo Ren and Snoke as the only Force users, and both in the dark side of the Force. Rey's ego development is key to the continuation of the Jedi. If the cave showed her anything but herself, could she not develop her sense of identity in the Force? In this video essay, I argue that Rey must develop her ego within herself, within the Force, in order not to create any attachments and to become a Jedi.

JESSIKA MYERS

Abolition in the Eyre: Studying the Influence of Emancipation Movements on Charlotte Brontë's Jane Eyre

Major: English and History

Faculty Mentor: Kelly Hager

Abstract:

My thesis argues that Charlotte Brontë's *Jane Eyre* (1847) puts forth emancipationist rhetoric and politics and belongs to a transatlantic abolition era literary subgenre. To prove this claim, my work establishes *Jane Eyre's* connections to abolitionism by providing historical context for anti-slavery and abolition movements as well as biographical information for Charlotte Brontë. I then demonstrate how those connections to abolition appear in the text through a close read of the novel, an analysis of textual metaphors, and a historical allegory. Finally, my work explores common elements of abolition era literature and demonstrates how, just as they are present in the clearly abolitionist novels *Uncle Tom's Cabin* by Harriet Beecher Stowe (1852) and *Our Nig* by Harriet Wilson (1859), those same abolition era literary elements appear in Charlotte Brontë's *Jane Eyre*, thereby solidifying Brontë's work as an emancipationist, abolition era novel.

ALICE NAJIMY

The Importance of the House in "Dona Perfecta"

Major: Nursing

Faculty Mentor: Maria Dolores Pelaez-Benitez

Benito Pérez Galdós is one of Spain's most well-known 19th century realist novelists. Providing commentary on the relationship between Madrid and the provinces at this time, the novel uses a fake town by the name of Orbajosa and a prominent family house in order to do so. My presentation, which will be conducted in Spanish, focuses on the house as the object in the novel that drives all plot and action. Broken up into four sections, the house as a physical space, the house as a symbol, the house as a source of irony, and the house and its power, I provide a critical analysis of the text in order to show how the influence of *Doña Perfecta* is shaped completely by the house as

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its central figure.

BRENDA ELIZABETH NGUYEN

A Method of Using Motivational Interviewing to Promote Exercise Adherence for Gym Members Enrolled in a Physician Referral Program

Major: Exercise Science

Faculty Mentor: Meghan Garvey

Abstract:

There is strong evidence suggesting the use of motivational interviewing will promote exercise adherence. However, there are numerous methods in applying motivational interviewing within a Physician Referral Program. Therefore, the study aims to create a method that can be implemented within an established program at a participating gym. Over a period of three months, a total of three interviews will be conducted by an exercise specialist. For the interview, five principles of motivational interviewing will be addressed. The five principles require the interviewer to avoid confrontation, express empathy through reflective listening, support the participant's self-efficacy, develop the participant's awareness of how their current behaviors align with their goals, and allow the participants to resolve their own resistance. Topics that will be discussed in the interview are goals, attitudes towards exercise, readiness for change, exercise history, and barriers. The interviewer is also encouraged to provide social support and redirect the participant's resistance to change. Exercise adherence will be measured by the participant's number of gym visits. This will be recorded by the gym's main operational system, DataTrak. Based on the current literature, it is expected that members from the program that underwent motivational interviewing should be more engaged in exercise. Additionally, the study hopes that the proposal to readdress the current program will be adopted at the participating gym.

JACQUELYN NOYES, CHRISTINE YU

Toxicity of Gold (I) Thiol Compounds Against Bacterial and Mammalian Cells

Major: Biology

Faculty Mentor: Cassandra Saitow

Abstract:

A pressing and widespread medical issue is the rapid increase in antibiotic-resistant bacteria, especially in hospital environments. This occurrence has created an opportunity for the repurposing of pre-existing pharmaceuticals for antimicrobial use. Auranofin, which is an FDA-approved anti-inflammatory drug previously used to treat rheumatoid arthritis, was screened to examine its possible use as an antibiotic and was found effective in inhibiting Gram-positive bacterial cell growth. Although the mechanism involved in the observed growth inhibition is unknown, there is

data to suggest that the gold (I) atom causes bacterial cell death by interrupting metabolic pathways in the cells. In this study, five different gold (I) thiol compounds have been synthesized using rational drug design to determine if they might also prove effective against bacteria. The compounds fall into two groups: (A) diphenyl-2-pyridyl phosphino gold (I) chloride (PPh₂PyAuCl), triphenylphosphine gold(I) thiocyanate (PPh₃AuSCN), triphenylphosphine gold(I) chloride (PPh₃AuCl); (B) cis and trans isomers of 1,2-bis(diphenylphosphinoethylene) gold (I) chloride (DPPE). Comparing the efficacy of these compounds will allow us to determine a chemical structure-function relationship. To determine their ability to inhibit bacterial cell growth, the compounds were tested against two Gram-positive strains of bacteria, *S. aureus* and *E. faecalis*. These compounds are also being tested with mammalian cell cultures, in order to observe whether or not the compounds would be toxic within the human body. We hypothesize that the gold (I) thiol compounds would exhibit differential antibacterial properties, due to structural variations. Preliminary results suggest that toxicity varies within subgroups. Interestingly, each of the tested compounds exhibits reduced mammalian cell toxicity as compared to Auranofin. These data suggest potential avenues for improved antimicrobial development.

COLLEEN O'CONNOR

Yoga and Stress: How a Regular Practice Helps Decrease Stress

Major: Nursing

Faculty Mentor: Margaret Costello and Anne Marie Barron

Abstract:

I will analyze the ways in which yoga can help decrease stress levels in nursing students in particular. Nursing students learn useful information to treat their future patients in nursing school; however, they rarely learn ways to treat themselves and decrease the rising levels of stress they experience both during exam times and in the clinical setting. Oftentimes, nursing students report more stress than the average college student and have one of the highest rates of burnout when trying to meet the demands of their job. I plan to examine the relationship between a daily yoga practice and level of stress. One way I plan on doing this involves incorporating a yoga practice into my daily life. I will begin with at least a sun salutation every morning, with organized classes two to three times a week. I will continue this practice for six weeks and will evaluate the effect this practice has on reducing my stress. In addition, I will review the literature on the impact of yoga on reducing stress levels and plan to report and compare my findings to the effect of my practice on my stress levels.

JOANNA O'GORMAN

Adaptations of *la Belle et la Bete*

Major: Public Health and French

Faculty Mentor: Eduardo Febles

This project will concentrate on film adaptations of classic French stories. First, I will present a theoretical framework to understand adaptations. I will then illustrate how an adaptation can be beneficial and enhance a story and then describe ways stories can ultimately be lost. Then the project will

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work through the multiple adaptations of the classic French fairy tale Beauty and the Beast (La Belle et la Bête). I will study the original story by Gabrielle-Suzanne Barbot de Villeneuve and then move to the 1946 Jean Cocteau film adaptation, and finish with the 1991 and 2017 Disney adaptations. The presentation should give an overview of how adaptations can alter an original story and provide a glimpse in how they either benefit or take away from the nuance and details of the classic.

YAO (POPPY) PAN

Impact of China's One-child policy (OCP) on Economic Development from 1979 to 2015

Major: Economics

Faculty Mentor: Niloufer Sohrabji

This paper seeks to explain whether One-child policy (OCP) contributed to China's economic development between 1979 and 2015. It highlights the statistical irrelevance of OCP, as well as the statistical significance of consumption, government expenditure, investment, and trade on China's real GDP per capita growth. This paper questions the effectiveness of OCP as a way of targeting economic development and offers alternative policies based on population theory and women's empowerment.

JOANNA PANTAZOPOULOS

Anatomical Mapping of Descending Projections in Subpopulation Pet1 Neurons

Major: Biology

Faculty Mentor: Cassandra Saitow

Abstract:

Coconut oil has been shown to possess antioxidant, antibacterial, and antiviral properties and has been demonstrated to enhance wound healing in animal models; however, the cellular mechanisms driving this ability are not yet known. The purpose of this study is to identify the effects of virgin coconut oil (VCO) on cell scratch wounds in order to detect any potential effects in cell migration and/or cell proliferation. This study uses mouse embryonic fibroblasts (MEF) applied with varying concentrations of VCO dissolved in DMSO compared to control conditions to determine its effects. Preliminary data shows that scratch wounds applied with a 9:1 concentration of VCO to DMSO shows greatest amounts of cell proliferation and migration, relative to controls. Once the effects of coconut oil have been fully characterized, silk broin constructs will be developed to control the release of coconut oil over time in the wound healing model. The varying concentrations of coconut oil will also be encapsulated in silk broin constructs and placed on MEF cells to control the release of oil. The amount of VCO released will be quantified using Oil Red O dye, and cellular behavior will be characterized using immunofluorescence and PCR. The anticipated outcome of this study is to find a real world application of VCO to treat dermal wounds using silk broin constructs.

MEGAN PEREIRA

Implementation of Strength Training to Prevent Musculoskeletal Injuries Among Nurses

Major: Nursing

Faculty Mentor: Margaret Costello and Anne-Marie Barron

Abstract:

As part of a project for Nursing: Caring at the End of Life, I am participating in a self-care project in which I adopt a new self care strategy for seven weeks and evaluate the results. I am choosing to engage in a regular exercise program with a focus on strength training in order to prevent musculoskeletal now and in the future. Nurses as professionals are prone to musculoskeletal injury, specifically lower back injury, from lifting patients. As I am nearing the end of my nursing education and getting closer to beginning my career after graduation in December, I feel that this is perfect time to inform myself and begin taking care of my body in order to protect myself from injury in my current clinical setting as well as future injury working as a registered nurse. I will also be exploring the literature to learn more about the prevalence of musculoskeletal injury among nurses, methods of prevention, and the specific exercises that are beneficial to nurses. It is my hope that this project will provide me with the resources and knowledge to protect myself and others from injury.

JULIE PHAM

Testing for Evidence of the Olfaction-Retinal Circuit's Role in Antipredator Behavior of Larval Zebrafish

Major: Biology

Faculty Mentor: Maria Abate

Abstract:

Animals require keen senses to perceive threats in order to avoid danger. However, it is unknown if different senses crosstalk or work independently of one another when responding to predation threats. Zebrafish (*Danio rerio*) possess the olfacto-retinal circuit (ORC) which is a neural connection between the visual and olfactory systems that is located on the contralateral side of the retina. Olfactory detection of amino acids is known to enhance immediate visual responses via the ORC in some fishes. However, it is unknown whether or not the ORC functions in response to predatory odors, and if the ORC functions in this way during early fish development. This study uses 7-10 dpf (days post fertilization) zebrafish larvae exposed to conspecific alarm substance (CAS) released from broken zebrafish skin to determine if this olfactory predation cue immediately enhances visual responses. Larvae will be exposed to CAS or DI water (control) and placed for imaging in 6-well plates on a preferred blue background for a 1-min acclimation period. Following this brief acclimation the background will be switched to red to test for a change in movement (e.g., location, swimming behavior). It is predicted that the CAS exposed fish switched to the red background will exhibit the greatest change in behavior and so support the role of the ORC. Additional treatments using longer blue acclimation periods (e.g., 1 hour) should help reveal how an ORC reaction for an immediate enhanced threat response compares to a serotonergic olfactory driven anxiety reaction that promotes vigilance.

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LILIBETH PIMENTELI

Lifestyle Changes Through Meditation Practices

Major: Nursing- Direct Entry

Faculty Mentor: Margaret Costello

Abstract:

Mental stability for college students is important for their success. Many students describe feeling stressed, overwhelmed, and unmotivated to complete course work and easily distracted during stressful times. Little research has been done on the holistic practice of mindful meditation and its effects on the body. Meditation decreases stress levels, improve attitudes, increase self-acceptance, and improve depressive symptoms. Other benefits of meditation that are imperative for student success include the following: improves functioning of the brain, helps with a good night's sleep, and increases attention span. A popular excuse for lack of lifestyle changes is having little time or motivation. Mornings are tough but practicing mindful meditation for 10-minutes before getting your day started will improve your outlook and functionality throughout the day. It is free, convenient, and does not require a lot of effort; therefore, students should incorporate a few minutes of meditation daily to enrich their lives and become connected with themselves. Implications that can be drawn from this short study is mindful meditation is beneficial for all to relax their mind, body, and spirit while promoting increased confidence. It should especially be practiced among college students to help with concentration and effectiveness before a class or exam. Mindful meditation is good practice for all; therefore, I will review the literature on the benefits of mindful meditation.

JESSICA PLESKOWICZ

Physical Therapy Plan of Care for a Talar Dome Lesion: A Case Study

Major: Exercise Science

Faculty Mentor: Rachel Daniels

Abstract:

A talar dome lesion is an injury that occurs in the ankle joint on the cartilage and underlying bone of the talus. This injury is often caused by trauma to the ankle joint or in multiple micro-traumas to the ankle joint. Treatment can either be surgical or non-surgical depending on intensity of symptoms, age of the patient, and if normal function can be regained with non-surgical treatment. A referral for physical therapy is often prescribed to a patient who has recently undergone surgery to repair a talar dome lesion. However, there is a lack of literature for identifying the most effective physical therapy treatment plan for a talar dome lesion. Talar dome lesions are often underdiagnosed, which could relate to why there is a lack of research. The purpose of this case study is to follow a 21-year-old white male who has been diagnosed with a talar dome lesion, underwent a repair surgery, and is currently receiving physical therapy. From observing and documenting this patient's

plan of care prescribed by the certified physical therapist, strategies for treatment that were effective can be identified. Effective treatment will be determined based on normal ranges of motion in the ankle and patient reports. These findings will be compared to known research of physical therapy treatment for a talar dome lesion and novel ideas found during documentation of the current case will be identified.

JESSICA POLITANO

The Self Care Process of Mindful Running

Major: Nursing

Faculty Mentor: Margaret Costello

Abstract:

Dorothea Orem, a nursing theorist, has defined self-care as a process that includes "activities that individuals personally initiate and perform on their own behalf in maintaining life, health, and well being". Finding time to shut off the ever racing mind of a busy yet dedicated student is a challenge in itself. Following a self care plan amidst the chaos of a hectic schedule leads to dwindling motivation and ultimately becomes more of a job or chore than something one would consider to be self-care. Mindful running is a self-care method that allows for the complete presence of the mind while enhancing a meditative state with repetitive physical and aerobic movement to provide the perfectly rounded self care activity. Humanity has built a history of combining meditation and running, possibly because it allows for body and mind results that are enjoyable. I first plan to review the literature on the relationship between mindful running and stress. As an avid runner myself, I will be introducing the practice of mindful meditation into my biweekly runs and observe the effects it has on my running performance. I will try multiple methods, a few being listening to a guided meditation while running, running without a watch in order to be fully present, and journaling the ways the run had benefited me physically and mental post run. I hypothesize that my runs will be more fulfilling and produce positive mental and physical results with. Providing an authentic healing presence to others requires that the nurse themselves nurture and provide the utmost care for their own mental and physical well-being.

Graciela Portillo

Determining Mangifera Indica's Wound Healing abilities using Mouse Embryonic Fibroblast Cells

Major: Biology

Faculty Mentor: Cassandra Saitow

Abstract:

Mango is reported to contain antioxidant, anti-inflammatory, and antibacterial properties that strengthen the human immune system response. Even though much research has been conducted on the byproducts of the mango fruit, little is known about the bioactive compounds found in mango flesh/pulp and their potential wound healing abilities. This study is focused on in vitro testing using mouse embryonic fibroblast cells (MEF) and scratch wound assays in order to investigate the efficacy of mango pulp extract (MPE) on wound healing, in relation to cell proliferation and migra-

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tion. MEF cells were plated with different concentrations of MPE dissolved in water, and preliminary results showed that 15 and 20 L of MPE had the highest percentage of cell migration in comparison to its corresponding control at 24 hrs. post scratch. Further analysis of the mechanistic role of MPE on the eukaryotic cell migration and proliferation will be determined using PCR and immunofluorescence methods for gene expression, and ELISA for the presence of growth factor in treated cells. The use of effective natural products, such as plant extracts, serve as an interesting and beneficial alternative to current therapeutic methods for healing wounds.

EVELINA RAGUTSHEYN

Zinc and Spinal Cord Injury

Major: Biochemistry

Faculty Mentor: Sheri Peterson and Rich Gurney

Abstract:

Spinal cord injury (SCI) is a serious condition for which there is no current treatment. Once spinal cord axons are severed, they fail to regenerate and leave patients with loss of sensory and motor function. A recent publication from the Benowitz laboratory (Li et al., 2017) demonstrated that accumulation of mobile zinc inhibits axon regeneration in the optic nerve after mouse optic nerve injury, and intraocular injection of zinc chelators promotes substantial axon regeneration in that injury model. The aim of this project was to characterize mobile zinc levels in mouse spinal cords and dorsal root ganglia (DRGs) after SCI. Spinal cord tissues were analyzed at 6 hours, 1 day, 3 days, and 7 days post SCI. Sham (laminectomy only, no SCI) mice were used as controls. Dr. Peterson performed the thoracic dorsal hemisection SCI, perfused the mice, harvested and cryosectioned the spinal cords and DRG. To visualize mobile zinc, I performed autometallography (AMG) staining on multiple sets of spinal cord and DRG tissues and captured microscope images. To quantify mobile zinc, I measured AMG pixel intensity in images of the spinal cord and DRG cell bodies, and counted the number of darkened (zinc positive) cells and puncta in DRG tissues. All quantification methods were performed using Fiji software (NIH). Since AMG is a zinc specific silver stain, the intensity in the tissues corresponds to the zinc level in the tissue. Preliminary results from spinal cord tissues suggest that there is a small decrease in zinc levels in the gray matter at all post-injury timepoints. While the overall levels of zinc in DRGs were not affected by SCI, we observed an increase in zinc puncta and dynamic changes in zinc positive cell density, which may indicate biologically significant changes in zinc location or activity following SCI.

PAOLA RIOS

Using the Functional Movement Screen to Improve Performance and Reduce Injury in Female Volleyball Players

Major: Nursing

Faculty Mentor: Rachel Daniels

Abstract:

The Functional Movement Screen (FMS) is a system created to improve fitness, strength and conditioning, and to identify movement dysfunction. This system was created for active individuals as a way to detect potential injury and to create an intervention as early as possible. The FMS consists of seven movement tests that all require balance, mobility, and stabilization. The names of these tests are: Deep Squat, Hurdle Step, Inline Lunge, Shoulder Mobility, Active Straight-Leg Raise, Trunk Stability Push-Up, and Rotary Stability. Each test is scored from 0-3, which are then added up to a final score. This study includes eleven healthy non-injured female volleyball players from Simmons University, ranging from ages 18-21. Their scores from these tests were analyzed and used to create a training program for their intervention. These athletes will be assessed again after their intervention. We will also be conducting the vertical jump test on these athletes, this examines how high each athlete can jump in the vertical direction. We anticipate that the results for these examinations show improvement of strength and athletic ability based on the scores from each of the FMS test. The experimenters anticipate that these results will assist in establishing the FMS as a standard for evaluating athletes in the hopes that they can improve their performance while reducing their potential for injury.

CHARLOTTE RIVARD

The Determinants of Recycling Output in Massachusetts Municipalities

Major: Economics

Faculty Mentor: Niloufer Sohrabji

This project analyzes the recycling output of single-stream programs in Massachusetts municipalities. By understanding what factors are associated with higher rates of recycling, we can better optimize the recovery of recyclable materials. This is essential for limiting the accumulation of waste, which pollutes our environment, and for saving energy that would otherwise go towards creating new products from virgin materials. While various recycling programs—both those that improve convenience and those that impose penalties—improve recycling rates, Pay-As-You-Throw / Save-Money-And-Reduce-Trash (PAYT/SMART) programs, which charge residents for the waste they produce, are associated with the highest recycling rates.

MEGAN ROBBINS

Opioid Use and Community Violence: An Understanding of Best Practices Within Case Management

Major: Social Work

Faculty Mentor: Susan Yi-Millette

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Abstract:

Children become involved with the child welfare system for many different reasons. Recently, however, there has been an increase in children entering the child welfare system because of opioid use and exposure. When this occurs, children have often experienced opioid and community violence. When children experience violence and trauma they experience physical and emotional distress. This distress can lead to life long injury. Research has found that trauma affects people of all ages. From birth, an individual can experience childhood trauma. As I continue to research, I would like to understand what the best practices would be when working with a case that has a substance using parent. Currently I am working with an organization that uses the two generation model. It focuses on serving the needs children while also serving the needs of the parents. The clinicians use strengths based case management to allow the parents to guide their case. Throughout this project I would like to figure out if these models work well when working with parents and children of opioid and substance abuse.

ELIANA RUBEN

Viability Assessment of Potassium Hydroxide Treated Phragmites Australis as Potential Absorbent for Ciprofloxacin Hydrochloride in Aqueous Solutions

Major: Chemistry

Faculty Mentor: Michael Berger

Abstract:

The presence of pharmaceuticals in waste and drinking water is becoming an ever growing problem, both nationally and internationally. Trace amounts of these medications are getting through water treatment plants and can lead to antibacterial resistance among humans, animals, and poses a threat to the environment. This research aimed to characterize and examine an invasive species of reeds known as *Phragmites australis* as a potential biosorbent for ciprofloxacin hydrochloride in aqueous solution. Ciprofloxacin hydrochloride is a popular antibiotic used in personal care as well as in agribusinesses and has been detected in groundwater, raw wastewater, treated wastewater, surface and drinking water from concentrations between 30-1000 ng/L in the United States. A portion of reeds were treated with KOH and were tested alongside untreated samples. Reeds were characterized by Infrared Spectroscopy and Scanning Electron Microscope and underwent kinetic studies that utilized UV-Vis Spectroscopy.

AUDREY SALTARELLI-FAYAD

Native Women's Activism in the 1970's and 1980's

Major: Philosophy and Gender Studies

Faculty Mentor: Laura Prieto

Abstract:

This paper provides a historical analysis of Native American Women's activism during the 1970's and 1980's. Starting with the rise of AIM (American Indian Movement), this paper will look at the role of Indigenous women in that activism. These women had a unique and often untold role to play in the fight for their right to historical and sacred land. When the fight for Indigenous civil liberties reached its apex in 1973, Native women were there beside the men as equals struggling for their rights. This paper will tell their story. I will examine the work done by these women in AIM and later some of the women went on to create WARN, or Women of All Red Nations to address issues that specifically related to indigenous women. I will explore the issues of conflict that arose between the women that chose to stay with AIM and the women the created WARN and how the goals of the women in each group differed. By looking at their response to topics like water rights, motherhood, health disparities, and preservation of culture, I will examine the differences in ideologies and the different routes each group took in history. Women are the backbone of indigenous communities but historically their stories are not as celebrated or told. The goal of this paper is to celebrate the activist work of the Native women during the 1970's and 1980's and show how incredibly dedicated they were to bettering the lives of their people.

ASIA SHEEHAB

Non-Alcoholic Fatty Liver Disease in HIV

Major: Biology

Faculty Mentor: Jane Lopilato

Abstract:

People infected with HIV are prone to lipodystrophy, or an abnormal distribution of fat in the body. Excess hepatic adipose, or fat in the liver, has been a major cause of non-alcoholic fatty liver disease (NAFLD) in this at-risk population. Changes in body composition that lead to NAFLD in HIV is not quite understood, despite how prevalent NAFLD has become in recent years. Along with hepatitis B and C, NAFLD is a leading cause of cirrhosis, or scarring of liver tissue, that ultimately requires liver transplantation. The global epidemics of obesity and diabetes have exacerbated the risk and diagnosis of NAFLD in the general population as well. NAFLD is exceptionally common among people living with HIV due to this population's risk of metabolic syndrome as a result of the immunosuppressive virus and possibly antiretroviral therapy (ART) side effects. Furthermore, NAFLD has been associated with insulin resistance, dyslipidemia, and coronary artery disease. There are no current medications or treatments for NAFLD. In order to prevent NAFLD or at least create a treatment option, we must understand why NAFLD occurs in HIV. This study seeks to utilize a database of previously recruited HIV positive patients on whom endocrine and inflammatory markers are available, as well as a measure of hepatic fat obtained from cardiac computed tomography (CT) called liver-spleen ratio. Information on nutrient intake will also be analyzed to find out if there is an association with NAFLD in HIV. This research will hopefully draw attention to the issue of NAFLD and make new associations between NAFLD and certain factors that have not yet been observed before.

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RAISSA SILVA

Evaluating and Analyzing Market Approval Methods for Women's Health Medical Devices

Major: Public Health

Faculty Mentor: Valerie Leiter

Abstract:

As of 1976, the Food and Drug Administration has regulated the medical device market in the United States. Since then, hundreds of thousands of new medical devices have entered the market through two pathways; Premarket Approval (PMA) and premarket notification (510(k)) (Center for Devices and Radiological Health, 2018). Although this legislation is intended to protect consumers of medical devices, there are loopholes medical device manufacturers can get through to bypass the need to test their devices in clinical trials. This means that if manufacturers can argue that there is a similar device that performs the same functions on the market, their device can be produced and sold to consumers. Without proper testing of medical devices, consumers are at a higher risk of developing health complications due to poor regulation of devices that are approved onto the market through the 510(k) route. Women are at a higher risk of developing health complications due to medical devices because of the discriminatory history towards women during the testing of medical devices in clinical trials. When women are not a part of clinical trials, it is significantly more difficult to determine how devices impact consumers' health on the basis of sex (Zusterzeel et al, 2016). Using a mixed methods approach, we have analyzed quantitative and qualitative data from the FDA's PMA and 510(k) databases to determine what kinds of medical devices are currently on the market for obstetrics and gynecology as of 1975. Analysis of the PMA database focused on determining what supplement counts of devices inferred, with a particular focus on devices with high supplement counts. Analysis of the 510(k) database focused on categorizing devices by its purpose, location used on the body, and type of device. The purpose of this study is to indicate how effective the current system is at approving safe OB/GYN devices onto the market for patient consumption.

LOGAN (TAYLOR) SIMMONS

Vitality of Urban Tree Maintenance for Mitigating Climate Change in Boston

Major: Environmental Science

Faculty Mentor: Rachel Daniels

Abstract:

Climate change is a global issue that has created environmental concerns around the world for decades. As global temperatures continue to rise the state of earth's natural environment reaches a critical point. Urban areas and cities are especially vulnerable to the effects of climate change due to their dense populations and industries. Urban forests provide an important cushion for cities against warming climates, as well as provide vital ecosystem services like oxygen, water filtration

and shade. In order to understand how Boston's trees assist the city's environment, we must know their location and health. Tree inventories allow city officials, as well as the public, to see where urban forests are thriving or lacking and identify areas in need of assistance. The urban tree canopy of Boston has grown over the last few decades, but there are still neighborhoods left underserved in terms of greenery. By comparing the previous comprehensive tree inventory conducted by the Urban Ecology Institute to current neighborhood based inventories, we hope to observe the progress Boston has made over the past 10 years and identify areas in need of improvement.

LAURA SIMPSON

How Does One's Risk and Perceived of Risk of Type 2 Diabetes Align?

Major: Exercise Science and Dietetics/Nutrition

Faculty Mentor: Meghan Garvey

Abstract:

The objective of this study is to determine how people's risk factors of type two diabetes correlate with their perceived risk of type 2 diabetes. A questionnaire will be used to assess someone's risk of type two diabetes. The factors that will be considered include; diet, physical activity and non-modifiable risk factors like age, sex, and race/ethnicity. Another set of questions will seek to collect subjects' perceived risk of type 2 diabetes based on their lifestyle. It has been shown that only 3% of people follow the recommended lifestyle to prevent type 2 diabetes. For this reason it is anticipated that people will have a lower perceived risk of disease than an actual risk of the disease. Those who have a higher perceived risk will modify their lives to reduce their risk of the disease. Very few people follow a lifestyle that will decrease their chances of developing Type 2 diabetes. If there is greater education on the modifiable risk factors of type 2 diabetes, the likelihood that behavior will change is more likely.

SOPHIE STREIMER

Effect of Crystal Quality of Vanadosilicate AM-6 on the Photodegradation of 2,5-Dichlorophenol

Major: Chemistry

Faculty Mentor: Mariam Ismail

Abstract:

Vanadosilicate AM-6 is a large-pore microporous photocatalyst comprised of semiconducting monatomic ...V-O-V-O-V... chains embedded in a silica matrix. The inherent microporosity of AM-6 makes it ideal for shape-selective photocatalysis to degrade and transform organic compounds. In the present work, two different types of AM-6 crystals were analyzed to determine the effect of crystal quality on the rate of photodegradation of a selected organic compound, 2,5-dichlorophenol, which is toxic to aquatic organisms and hazardous to the environment. The rate of degradation was found to be higher for the porous crystals as compared to the non-porous. This variance was likely attributed to differences in crystal quality. The crystals were characterized by means of combined, SEM, XRD, Raman and UV-Vis in order to analyze the bulk and surface properties. The analyses displayed variation in the degree of disorder along the oxovanadium chains between the

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two materials. The interruptions along the –V–O–V–O– chains may modify the semiconductors properties and has been shown to influence photocatalytic performance. Understanding the effects of crystal quality on the photoactivity of AM-6 allows for the potential to be used for a diverse range of applications including environmental remediation and a means for organic synthesis.

NAOMI SUMINSKI

Library Development of D-enantiomer Trifunctional Chemical Probes to Assess the Effect of Probe Chirality on Protein Selectivity in MCF7 Breast Cancer Cells

Major: Biochemistry and Public Health

Faculty Mentor: Nancy Lee

Abstract:

With the overwhelming rates of breast cancer and improved therapeutics needed, the development of small molecule chemical probes to use as tools to better understand the biology behind disease manifestation and the protein activities implicated in oncogenesis is essential. The goal of this project was to synthesize a probe library of D-enantiomer trifunctional chemical probes to study cysteine-mediated protein activities of estrogen receptor (ER) and progesterone receptor (PR) positive breast cancer cells. Distinct functional groups were installed onto the three sites of the probe scaffold, including an amino acid side chain directing group to target specific proteins in MCF7 ER/PR positive breast cancer cells. Specifically, focus was given to the incorporation of D-amino acid, a stereoisomeric form not innate to human proteins, to reveal the effect of chirality on probe design and protein specificity. At this time, the three synthesis steps in the development of these probes have been characterized for tyrosine and phenylalanine amino acid methyl esters, and multiple other amino acid probes are currently being synthesized. Techniques and protocols used for analysis of the probes-protein target interaction and activity have also been explored, with plans in the coming months to screen our synthesized probe library. This analysis could reveal unique insight into the mechanisms of breast cancer and may lead to future drug development for disease treatment.

MADISON SUMMERS

Understanding the Role of Rb in Metastatic Prostate Cancer

Major: Biology

Faculty Mentor: Eric Luth

Abstract:

Prostate cancer is one of the most common cancers found in men and yet once it becomes metastatic, there is no treatment to stop its growth or spread. Androgen deprivation therapy has been shown to be effective against benign cancer cells but not metastatic cells. One of the main differences between benign and metastatic cell lines is that metastatic cells have mutations in the

Rb gene, a known tumor suppressor, in addition to mutations in the Pten gene that are found in benign cancer cells. However, we are unsure as to how this loss of Rb function contributes to the resistance of metastatic cells to androgen deprivation therapy. To address this question, we compared the cellular changes that take place when Pten alone or Pten and Rb are deleted from the metastatic cell line. Assays that we will run include Rb-knockout model validations, proliferation assays and varying drug dosages in order to understand how the cells that lack Rb perform, react and proliferate differently. Since our models have been validated for the specific gene knockouts to model each cancer cell line, ongoing studies will focus on systematically testing drug dosages and combination treatments to make the metastatic cell line more susceptible to treatment based on the found genetic differences. This project will guide future research in the direction to find a specific treatment plan in order to stop the proliferation of metastatic prostate cancer by having a better understanding of the role of Rb in prostate cancer.

MEHBOOBA TAMANNA

An Ultrasound Device for Guiding Catheter Placement in Ventriculostomies

Major: Biochemistry & Physics

Faculty Mentor: Jason White

Abstract:

Hydrocephalus is characterized by the accumulation of water in the ventricles of the brain. If left untreated, hydrocephalus can be fatal and can lead to intracranial hemorrhaging, resulting in irreversible brain damage. Ventriculostomies are neurosurgical procedures performed to emergently treat acute hydrocephalus. As it stands now, this procedure is done freehand. Successful targeting of the ventricle is difficult due to variations of the normal brain anatomy, and multiple attempts of the catheter are often required to drain the ventricle. This has negative implications; each time the neurosurgeon attempts and fails at locating the ventricle with a catheter, they are poking through brain matter. For this project, I will investigate the use of transcranial ultrasound as a guidance modality for the neurosurgeons and as a way to provide real-time imaging of the ventricle as the ventriculostomy is being performed. I will design and build an experimental setup in order to collect backscatter data using ex vivo human skull fragments and skullcaps. The data will be collected using specific codes written on MATLAB. I will statistically analyze the data acquired to determine if targeting error stemming from skull-based distortion can be mediated to allow for the use of ultrasound in performing ventriculostomies. Using ultrasound as a guide will remove the repercussions of the multiple attempts that are often required in draining the ventricle. This will result in a decrease in the morbidity rate that is associated with hydrocephalus; ultimately, this will result in improving and impacting patient care in a positive manner.

AMANDA THOMAS

Interventions to Decrease Fall Risk and Prevent Falls in the Geriatric Population: Patients and Residents of Skilled Nursing Facilities

Major: Exercise Science

Faculty Mentor: Randi Lite

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Abstract:

The geriatric population, also known as the elderly fall frequently and repeatedly each year. Falls can occur in many settings, but the most pertinent to non-community dwelling elderly is in skilled nursing facilities (SNFs). Although, only a small number of adults aged 65 years and older live in skilled nursing facilities, this population accounts for many fall-related deaths in this age group. Therefore, fall prevention is an ongoing focus to improve the quality of patient safety. The purpose of this study is to collect data on short term and long term resident falls residing at Longmeadow of Taunton; a skilled nursing facility. The data collected will include patient/resident age, comorbidities, number of falls per day, location, time of day and cause of the fall. This data will be analyzed for possible trends, i.e. location or time of day. A literature review will be performed to determine successful interventions utilized in SNFs to help reduce the incidence of falls. Through analysis of this data and consideration of other important factors, an intervention to help decrease fall risk will be implemented at Longmeadow of Taunton.

LIZ TORRES

Physical Therapist Satisfaction and Patient Rate

Major: Exercise Science

Faculty Mentor: Rachel Daniels

Abstract:

This study sought to discover a relationship between physical therapist/physical therapist assistant (PT/PTA) satisfaction with their treatments of patients based on the number of patients they see. Many different variables can affect a PT/PTA satisfaction with how they treat patients, including PT setting, how many staff are present, the variety of staff, how much time they spend with each patient, which is related to how many patients are seen per hour. This study asked PT/PTA's to share their opinions through a one-time survey. The survey entailed asking PT/PTA's to rate their average satisfaction after treating their patients on a scale from 1-10, as well as nine open-ended questions related to how their work experiences impact their satisfaction in treatment. The information gathered from the ten questions in the survey given to the PT/PTA will be analyzed both quantitatively and qualitatively in order to deduce whether there is a relationship between PT/PTA satisfaction and the rate of patients they treat an hour. Together, these findings may suggest that there is significance between the numbers of satisfaction that PT/PTA rate with the number of patients they see an hour. While patient satisfaction with their treatment has been highly researched, PT/PTA perception work experiences treatment, results, and even patient turnover. The results of this study will shed light on PT/PTA experiences and may lead to improvements in the PT appointment for both patients and the providers.

HANNAH TRAISTER

Effective Methods of Intervention to Improve Quality Life for Cancer Caregivers

Major: Social Work

Faculty Mentor: Susan Yi-Millette

Abstract:

In a time where cancer research and treatments are increasing, a lack of attention is being placed on the caregivers who support those patients experiencing a cancer diagnosis. Cancer caregivers are facing a higher demand of burden, along with shocking rates of anxiety and depression. This affects the quality of care received by the patients in question. In this analysis, various methods of interventions are evaluated regarding the stress related to caregiving for a cancer patient. To evaluate factors of caregiver stress, paired-intervention of various forms of self-care and forming interpersonal connections is found to be effective in improving quality of life in cancer caregivers, and therefore also improving the quality of care received by cancer patients. Studies show that increased caregiver demand burden is associated with decreased patient survival (Dionne-Odom et al., 2016). Additionally, rates of depression and anxiety are greater in cancer caregivers than in cancer patients themselves (Fu, Zhao, Tong, & Chi, 2017). The decreased quality of life in caregivers is dependent on the patient's illness trajectory, which induces a negative-feedback loop in accordance to patient wellbeing (Kim & Given, 2008). This fragmented system affects both those in the healthcare environment and those in treatment. Increased intervention methods for caretakers such as psychoeducation, therapeutic counseling, and medical skills training have been proven to improve cancer caregiver wellness (Northouse, Katapodi, Song, Zhang, & Mood, 2010). This review analyzes the relationship between caregiver quality of life and discusses statistical analyses to compensate for cancer caregiver stressors.

MACKENZIE TRAVIS

Collaborative Work at Massachusetts BioTechnology Council

Major: Public Health

Faculty Mentor: Valerie Leiter

Abstract:

Massachusetts is one of the critical hubs of life sciences in the world. With the State carrying a \$1 billion Life Sciences Initiative to make financial investments in public and private institutions and focus on development and commercialization, combined with a highly educated workforce, it is no wonder why. This work looks at the importance of collaboration in an ever-evolving field, that has a lot of ethical concerns, as well as financial, legislative, and social pressures. Massachusetts Biotechnology Council was formed to provide a platform for companies in the Boston area to collaborate in this ever-growing field. At MassBio we give guidance to companies, providing them with resources and real estate, allowing them to grow as fast as the discipline is. Through membership, information can be shared by companies to a database, enabling the sharing of case studies, white papers. Through the organization of events, mentorship programs, funding opportunities, and

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company partnerships, we set a standard of collaboration in the Biotech sector. Through the use of these resources, companies can reach their goals with fewer barriers, allowing the Massachusetts scientific community to flourish without hindrance. These efforts to form a single task-force to target research enables the removal of politics from science.

JASMINE VARGAS

Effects of Student Gentrification on Residents and the Fenway Community

Major: Public Health

Faculty Mentor: Valerie Leiter

Abstract:

Using a case study approach, I will analyze how student gentrification affects the communities and long-term residency in Boston. The issues that cause students to move off campus in order to find an affordable place to live while finishing their studies, results in the displacement of residents and communities who have been in these areas for years. The Fenway Community Development Corporation tries to combat the themes of gentrification, capitalism, racism, age discrimination, and displacement through peer-reviewed articles, Boston housing development reports and case studies. The Fenway Community Development Corporation addresses a multitude of public health issues ranging from affordable housing to building community within the Fenway area. Their mission is to build a community that is diverse in socio-economic status, race, and ethnicity to promote equity. They are currently researching Our Lady's Guild House, a ministry of the Daughters of Mary of the Immaculate Conception, who have housed long-term residents who are mostly middle-aged and elderly, for decades in single room occupancies (SRO). With over 130 units, they are now terminating the residents' contracts at no-fault evictions. Today, Our Lady's Guild House only allows short-term rentals to students and young professionals between 18 and 40 years of age. This is the result of student gentrification moving people out of the city. Budrys framework analyzes nonprofits and will help address this organization's efforts to delay the process of gentrification in Boston by researching their history, structure, and mission (Budrys, 2017).

EMMA WEIMER

The reader's perception of the Orbajosenses in the context of realism (La percepción de los Orbajosenses por el lector en el contexto del realismo)

Major: Public Health & Spanish

Faculty Mentor: Maria Dolores Pelaez-Benitez

Abstract:

This presentation, conducted in Spanish, critically analyzes Pérez Galdós' work Doña Perfecta. Spe-

cifically, I argue that Galdós utilizes various literary tactics throughout the novel to achieve his greater purpose of promoting realism among his audience while simultaneously criticizing romanticism. He does this by negatively portraying characters who represent romanticism, the Orbajosenses, and positively portraying those from Madrid, who represent realism. Realism, the idea of progress, science, and rationalism had risen in popularity in 19th century Spain when this novel was written. The ideals of realism grew in opposition to romanticism, which is based in subjectivity and emotion, and is viewed by realists as being harmful to the progress of Spanish society. My presentation will focus first on the internal perspective versus the external perspective of both realism and romanticism that is presented in the novel. Next, I will analyze the use of irony and hypocrisy throughout the work that is consistently used to make the Orbajosenses seem delusional and baselessly self-centered. Then, I will talk about the contradictory representation of light and darkness; that light is associated with Madrid and realism while darkness is associated with the Orbajosenses and romanticism. Finally, I will explain that the third person omniscient style of narration progressively loses objectivity and favors the ideals of Madrid in the way certain events are portrayed towards the end of the work. Ultimately, I conclude that Galdós intentionally guides the opinion of the reader negatively towards the Orbajosenses with the sole objective of promoting his personal ideals.

EMMA WEIMER

The Improvement of Palliative Care Delivery through the Massachusetts General Hospital (MGH) Continuum Project

Major: Public Health & Spanish

Faculty Mentor: Val Leiter

Abstract:

This poster provides insight into the vision, mission, goals, and results of the Massachusetts General Hospital (MGH) Continuum Project, where I have been interning since January 2019. The MGH Continuum Project was formed in 2015 by the president of the hospital out of an initiative to improve palliative care, or end-of-life care, throughout MGH. This work is important because improved palliative care is linked to improved quality of life for the patient and fewer hospitalizations, among other benefits. My poster will describe the goals of the Continuum Project as well as the research that supports these goals. The goal of the Continuum Project is to improve the quality of end-of-life conversations with the Serious Illness Conversation (SIC) guide and to increase the number of conversations that healthcare providers document in the hospital's database, EPIC. The SIC guide is valuable because it encourages the healthcare provider to treat the whole patient, not simply the illness. It also helps the clinician and patient align their goals and end-of-life wishes. Through the results of the data I explore, I will explain the efficacy of the SIC guide, demonstrate that the SIC guide improves doctor-patient communication, and show that the documentation of Serious Illness Conversations in EPIC has risen since the Continuum Project was founded. Ultimately, I conclude that the MGH Continuum Project is improving the quality and quantity of Serious Illness Conversations throughout the hospital, bettering the lives of palliative care patients and improving the communication between the patients' healthcare providers.

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REBECCA WHELAN

Effects of Human Activity and Global Warming-Related Jellyfish Blooms on Fishing Industries

Major: Environmental Science

Faculty Mentor: Rachel Daniels

Abstract:

Global warming impacts marine biodiversity in ways that are not yet well-understood or quantified. Fisheries rely on much of the biodiversity affected by climate change. Understanding which fish species are affected is key to making informed decisions about climate and fishery policy in the future. Excess nitrogen and elevated sea surface temperatures are associated with blooms – sudden increases in the number of individuals in a population of plankton. Jellyfish are large, gelatinous zooplankton that feed on other zooplankton including larval fish, but the effects of these blooms on fish stocks and catches are poorly-understood. The purpose of this paper is to review literature that examines how jelly blooms impact fish stocks, assess whether this impact is substantial, and determine what actions are necessary to control jelly populations. For methodology, search terms used thus far include “algal blooms,” “jelly blooms,” “jelly blooms climate change,” “jelly blooms fish stocks,” “jelly blooms larval fish,” “jelly blooms global warming,” “jelly blooms eutrophication,” and “jelly blooms fisheries.” Non-English language papers were excluded. One study included details about episodic gelatinous zooplankton blooms over 10-15 years, benthic scavenger abundance increased after jellyfish blooms, and warming of sea surface temperatures was positively related to the blooms. Jelly blooms had potential to significantly impact ecosystems in some specific geographical areas. Another paper discusses challenges that unexpected jelly blooms present during fishing and suggests new technology to filter out the animals. Most of the studies suggest monitoring this phenomenon in the future to assess the need for mitigation.

EMMA WHITED

Helping Patients Manage Weight Loss and Chronic Illness with Patient-Centered Strategies

Major: Public Health

Faculty Mentor: Valerie Leiter

Abstract:

The Partnerships for Reducing Overweight and Obesity with Patient-Centered Strategies (PROPS) study, conducted at Brigham and Women’s Hospital in the Division of General Internal Medicine under principal investigator Dr. Heather Baer, is a clinical research study comparing the effectiveness of three weight management strategies for overweight and obese patients with hypertension and/or type 2 diabetes. Type 2 diabetes and hypertension are highly prevalent and preventable chronic illnesses that many individuals face today. This poster explores daily tasks as a clinical research assis-

tant for the PROPS Study as well as what interventions the researcher team utilized to help patients with hypertension and/or type 2 diabetes manage weight loss and chronic illness. Furthermore, this poster discusses other research being conducted on the topic of obesity related illnesses and best practices for helping patients manage chronic illness and weight loss. This poster also discusses skills learned as a clinical research assistant for the PROPS Study at Brigham and Women's Hospital. These skills include various clinical research skills such as data management and patient outreach and greater knowledge about the clinical research process.

MEAGAN ELLEN WILBER

Cross-Country Comparison of Universal Health Care System Effectiveness in Decreasing Health Disparities Affecting Children

Major: Economics and Sociology

Faculty Mentor: Elise Brenner

Abstract:

This project compared and analyzed the effectiveness of the universal healthcare systems in Mexico, Thailand, and Rwanda at reducing health disparities faced by low-income individuals in their countries. Data analysis was completed through multivariate statistical analysis, using data from the United Nations and affiliated organizations, the European Union, and other organizations, with a special focus on statistics about health outcomes for infants, as they are the most vulnerable members of society and therefore highlight inequalities the most distinctly. Outcomes were compared between wealth quintiles, countries, and 3 health variables. The results of the statistical analysis was used to direct my research into the health care policies and initiatives implemented in these countries to discover what methods are most effective at reducing health disparities. These findings will be beneficial to stakeholders who may wish to implement effective health care policies and initiatives directed at low-income communities in other middle-income, developing nations.

GRACE WILSON

Music Therapy and Depression, the Use of Alternative Treatments for Mental Health Disorders: A Literature Review

Major: Neuroscience (biopsych); Music History

Faculty Mentor: Amanda Carey

Abstract:

Over the last several years, there has been an increased interest in research surrounding mental health disorders, particularly related to various treatments for anxiety and depression through therapy and drug-related treatments. However, college students do not have as much access to drug treatments for symptoms of anxiety and depression due to a variety of factors, but are the population with the highest rates due to increased stress. Alternative treatments for a variety of different neurological conditions have been researched more and more frequently in the last 10-15 years, including Music Therapy. This field is dedicated to using a variety of music-related activities to engage different regions of the brain, and could become readily accessible to groups that have limited

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access to other treatments yet cause a similar effect. Using previous research to establish what can be pursued further on this topic showed that music therapy could relieve symptoms of anxiety and depression by increasing serotonin release at regions of the brain where activity is diminished under increased stress. Anxiety and depression symptoms are typically heightened “fight or flight” responses in the limbic system and relieved by SSRI’s (Selective Serotonin Reuptake Inhibitors), which allow for the increased stimulation of serotonin receptors. Music stimulates the amygdala, a region of the limbic system that often shows deficits in serotonin functioning, in a similar way. Therefore, my conclusion is that music has the potential to assist treatments for anxiety and depression by increasing serotonin stimulation of the postsynaptic cells in this region.

ANGEL STELLA WONG

Investigating the Relationship between Clinical Exposure and Staphylococcus Aureus Colonization Using Multiple-Site Swabbing Method

Major: Public Health

Faculty Mentor: Elizabeth Scott

Abstract:

Staphylococcus aureus (Staph) can cause serious infections in immunocompromised individuals and must therefore be carefully monitored in hospital settings. Patients often receive a nasal swab test to determine the presence of Staph as they are admitted to hospitals. Medical professionals are also known to have a higher carriage rate, meaning they are colonized but not infected; however, the exact linkage between Staph carriage rate and environmental exposures are not well studied. Moreover, recent studies suggest that because Staph can be found in body sites other than just the nose, it may be important to sample sites other than the nose. To test for the significance of multiple-site swabbing and examine the relationship between carriage rate and clinical experiences, 249 healthy college students were swabbed in their nose, throat and axilla (armpit) to test for presence of Staph. A survey was also given to examine the potential exposure factors. Using the McNemar’s statistical test, it is expected that additional swabbing of the throat and axilla will significantly increase the detection rate of Staph. It is also expected that students with clinical experiences will have a significantly higher Staph carriage rate than students with no clinical experiences. In conclusion, a multiple-site swabbing procedure is likely to detect more Staph aureus when compared to a nasal-only swabbing procedure. Clinical experiences are also likely to be associated with higher Staph carriage. These analyses may provide implications for medical staff and could lead to more accurate testing for Staph among admitted patients.

KAYLIN WU

Sylvia Plath and Ted Hughes: Beyond the Paper

Major: English

Faculty Mentor: Lydia Fash

Abstract:

Sylvia Plath's most notable works were published posthumously by her estranged husband Ted Hughes. Critics and scholars have debated the ethics behind Hughes becoming the proprietor of her estate since the 1970's, many arguing the edits made to her work by Hughes and the construction of the narrative of her life would not have been what Plath would have wanted. A conversation in the manuscripts of Plath's final poems reveals a layer to the relationship between Plath and Hughes that is often neglected by scholars. In these drafts and manuscripts, Plath is writing on the back of work produced by Hughes, and often there are parallels between their respective works. These thematic similarities imply Plath is alluding to Hughes' work, even in the months before her suicide when she and Hughes were separated. Focusing on four poems, "Contusion," "Edge," "Kindness," and "The Fearful," published in *Observer* six days after her death, compared to the original drafts, this paper reveals how a conversation between Plath and Hughes exists in these drafts and how the specific posthumous publication of these poems by A. Alvarez, a friend of Plath's, began the complicated narrative around Plath's suicide.

JOHANNA YU

Feeding my Spiritual Wellbeing

Major: Nursing

Faculty Mentor: Professor Barron and Professor Costello

Abstract:

In this self-care project, I will be focusing on ways to practice my spiritual wellbeing (SWB). In reference to Gomez and Fisher (2003), SWB is defined as, "a state of being, reflecting positive feelings, behaviors, and cognitions of relationships with oneself, others, the transcendent and nature, that in turn provide the individual with a sense of identity, wholeness, satisfaction, joy, contentment, beauty, love, respect, positive attitudes, inner peace and harmony, and purpose and direction in life." (p. 176). On an oncology perspective, when some patients are given the opportunity to practice their SWB this leads to a decrease in their spiritual distress and an increase in their ways of coping (Bahrami, Mehdipoorkorani, & Mosavizade). To practice my SWB, I will be reading daily scripture from the New International Version Bible phone application. For the next six weeks, starting on February 12, 2019, every night I will read one chapter from the bible and keep a spiritual journal to write my thoughts on the passages. At the end of each daily reflection, I will keep a section where I write my prayer requests and blessings for the day. Lastly, I will close each reading and reflection with either a prayer or a worship song. There is significant evidence that the power of prayer has the effect of healing. It initiates the immune, hormonal, and cardiovascular system and is shown to decrease heart rate and blood pressure in several studies (Narayanasamy & Narayanasamy, 2008). While there are several types of worship music, the music that I have chosen has one intended purpose, which

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is to enlighten the body of followers and bring glory and honor to God. I will keep a record of the level of stress I have each day before and after I start the self-care intervention using a scale from 0 to 10, 0 being no stress at all to 10 being the most stressed. Through learning and applying scripture to my daily life, I will become more aware of my spirituality and grow in my spiritual walk.

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