77th Annual Eastern Colleges Science Conference

April 1, 2023

The 77th Annual Eastern Colleges Science Conference

Sacred Heart University

1 April 2023

Program Book

Welcome to ECSC 2023

Dear participants, mentors, and guests,

We are excited to welcome you to the 77th Eastern Colleges Science Conference at Sacred Heart University - and to continue ECSC's tradition of fostering the development of scientists and critically engaged citizens. Similar to past meetings, we aimed to provide an open and inclusive environment in which undergraduate research students could present their research methodologies and conclusions and to network with peers and colleagues from other institutions.

We look forward to celebrating with you the successes of our undergraduate students as both researchers and communicators of scientific research.

LaTina Steele, Ph.D.,
Co-Chair

Ashley Stoehr, Ph.D.,
Co-Chair

Suzanne Deschenes, Ph.D.

Nicole Roy, Ph.D.

Julia Bates, Ph.D.

Dawn Melzer, Ph.D.

Elliott Bertrand, Ph.D.

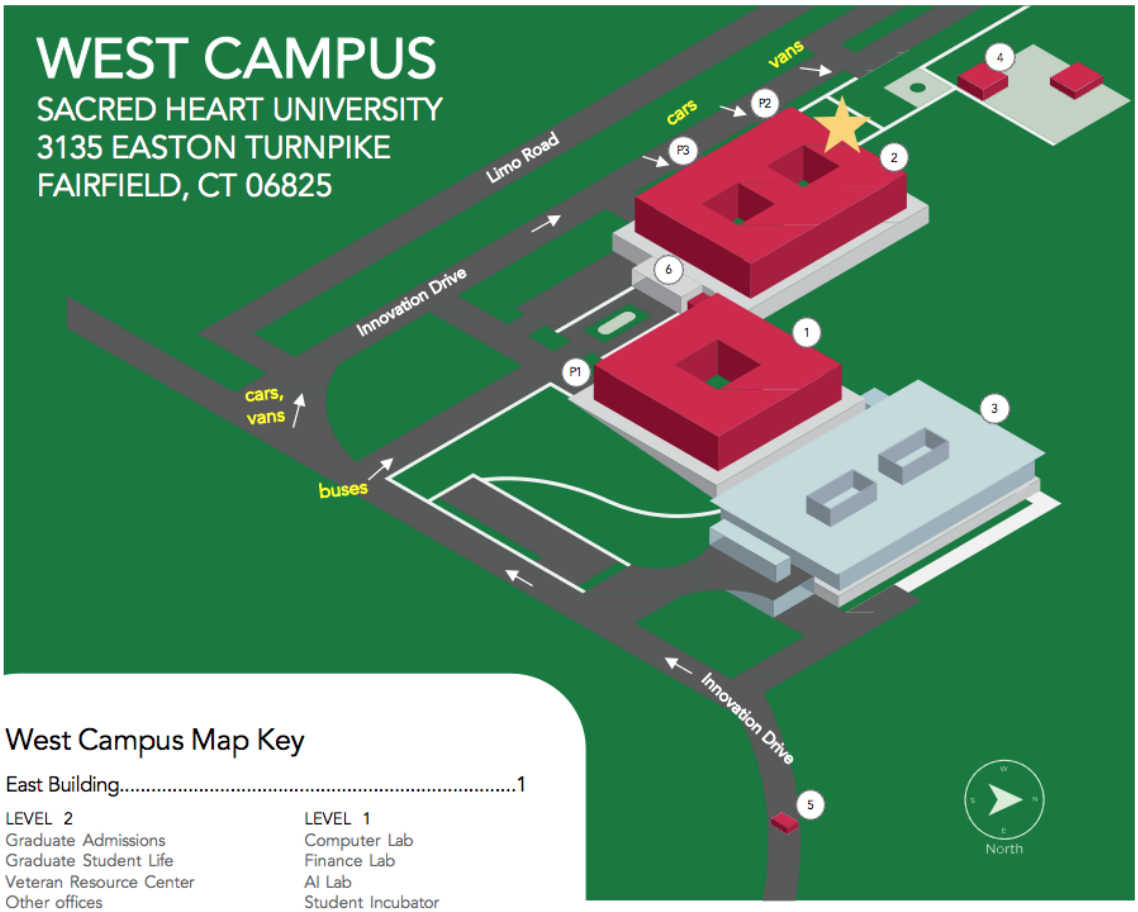
Penny Snetsinger, Ph.D.

Parking Information

Instructions:

- **Car**s can park in the Yellow Garage (P2 on map below). If that fills, cars can park in the Green Garage (P3 on map below).
- **Vans** should drop off passengers in the shuttle circle (marked 6 on the map below) in front of the atrium lobby, leave campus, and park on Innovation Drive or Limo Road.
- **Buses** should drop off passengers in the shuttle circle (marked 6 on the map below) in front of the atrium lobby, leave campus, and park in the commuter lot on Jefferson Street.

  Please note: The shuttle circle in front of the atrium lobby should be the drop off location for the buses and the vans because it is the only place large vehicles can safely turn around on West Campus.



West Campus Map Key

East Building.....1

LEVEL 2
Graduate Admissions
Graduate Student Life
Veteran Resource Center
Other offices

LEVEL 1
Computer Lab
Finance Lab
AI Lab
Student Incubator

West Building.....2

LEVEL 3
Farrington College of Education & Human Development
School of Social Work

LEVEL 2
Classrooms
Labs
iHub Powered by Verizon
University Advancement

LEVEL 1
Classrooms
Dance Studio
IDEA Lab
Registrar & Student Accounts
The Factory

LEVEL S
SHU Fit
Film, Television & Media Arts (FTMA) Lab

Martire Family Arena.....3

Guest House.....4

Information Booth.....5

Atrium at West Campus.....6
LOBBY
Cafe at East

Parking
P1 EAST BUILDING PARKING GARAGE
P2 WEST BUILDING UPPER PARKING
P3 WEST BUILDING LOWER PARKING

Directions to ECSC 2023 & Parking

- Upon entering West Campus, please stop at the Information Booth and inform them that you are attending ECSC 2023.
- **Cars:** Follow Innovation Drive all the way to the Yellow Parking Garage (P2 on map). If that fills, park in the Green Garage (P3 on map). Attendees exit garage, turn right, and proceed to Lobby entrance (star on map).
- **Buses and passenger vans:** Follow Innovation Drive to the first stop sign, turn right. Drop off attendees in the shuttle circle (6 on map) in front of atrium, the only safe place to turn around. Attendees enter the West Building (2 on map) and proceed to far West Bldg entrance (star on map).

  Buses: To park, return to entrance, continue straight through light onto Jefferson St., continue past northbound Parkway (Rte. 15) entrance on left, and turn left into the commuter lot.

  Passenger vans: Park on Innovation Drive or up on Limo Road.

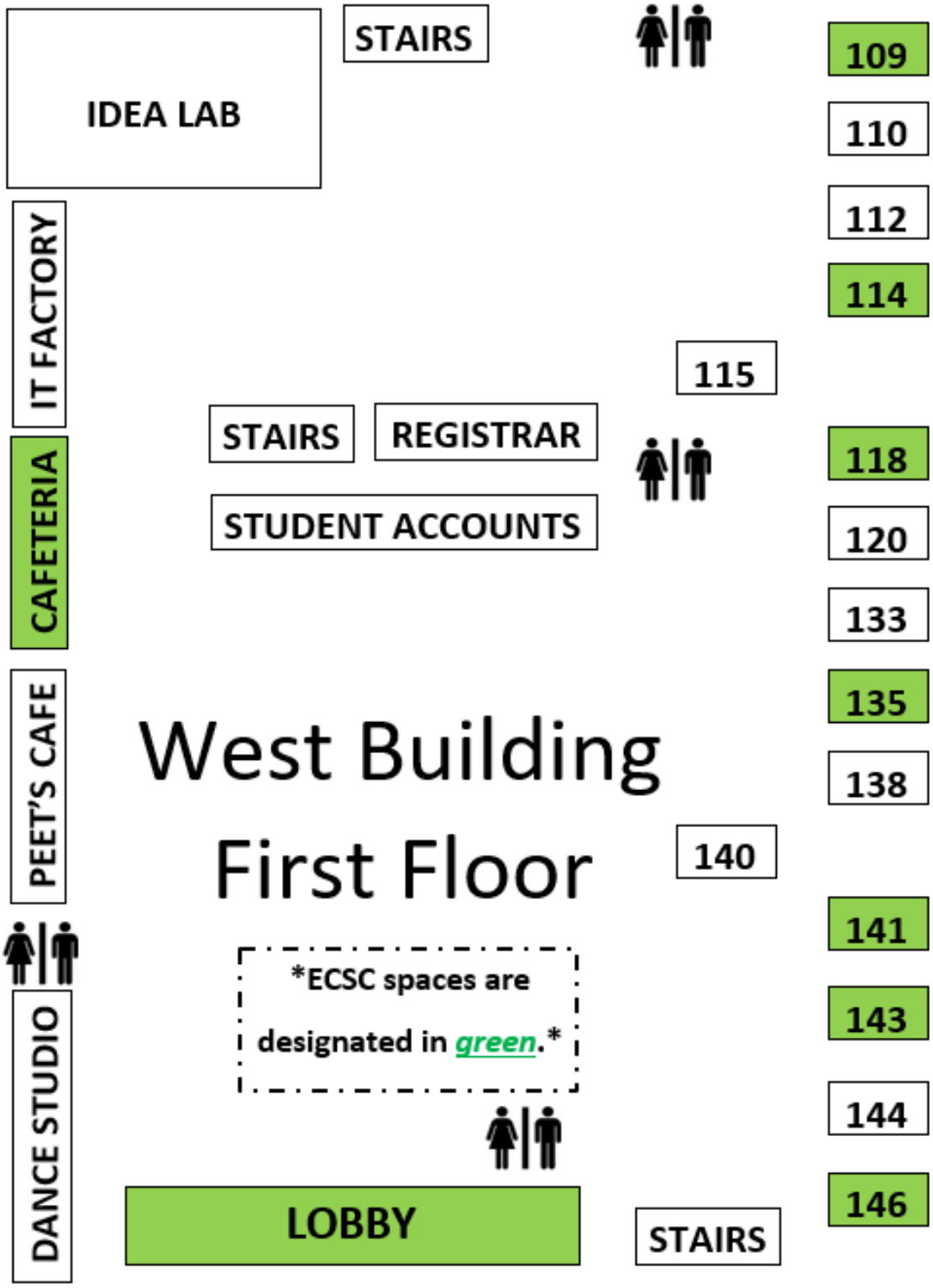
Sacred Heart UNIVERSITY

Schedule of Events

Time	Event	Location
7:30-8:30 a.m.	Check-in & Continental Breakfast	West Building, Pios Kitchen
8:30-8:45 a.m.	Welcoming remarks - Dean Mark Beekey (College of Arts and Sciences)	West Building, Pios Kitchen
8:45-9:30 a.m.	Plenary Speaker: Justin “Mr. Fascinate” Shaifer	West Building, Pios Kitchen
9:45-11:15 a.m.	Poster Session 1	West Building, 1st Floor
11:15-11:30 a.m.	Break	
11:30-12:30 p.m.	Platform Session I A. Biochemistry and Health B. Genetics C. Psychology Part I D. Biochemistry and Molecular Biology Part I	West Building, 1st Floor A. W109 B. W146 C. W141 D. W114
12:30-1:45 p.m.	Lunch	West Building, Pios Kitchen
12:30-1:45 p.m.	ECSC Board Meeting & Lunch	West Building, W143
2:00-3:15 p.m.	Platform Session II A. Ecology B. Chemistry C. Molecular Biology and Health D. Psychology Part II E. Biochemistry and Molecular Biology Part II	West Building, 1st Floor A. W146 B. W118 C. W109 D. W141 E. W114
3:15-3:30 p.m.	Coffee Break	West Building, 1st Floor
3:30-5:00 p.m.	Poster Session II	West Building, 1st Floor
5:00-6:00 p.m.	Break	
6:00-8:00 p.m.	Dinner & Awards Ceremony	West Building, Pios Kitchen

The judges’ room will be in W135 on the 1st floor of the West Building.

Map of the 1st Floor in West Building



HISTORY OF THE EASTERN COLLEGES SCIENCE CONFERENCE

The first Eastern Colleges Science Conference (ECSC) was organized in 1947 by undergraduate Pauline Newman and Vassar College in Poughkeepsie, New York. The aim then, as now, was to stimulate interest in undergraduate research in the sciences and related fields and to provide a lively forum for the presentation of research papers. Pauline Newman received her bachelor's degree in chemistry and went on to receive a Ph.D. in chemistry from Yale. About 22 schools attended the first conference, and the theme was "Science, Philosophy and Society."

The constitution of the ECSC was ratified on April 24, 1948 at Union College in Schenectady NY, making the conference a self-sustaining body.

In 1972 the Pennsylvania State University was named the repository for all official documents of the ECSC. Professor Stanley Shepherd was named the permanent secretary of ECSC. In 1980 Professor Shepherd stepped down and Professor Gerard O'Leary from Providence College was elected to the post. At the 35th annual conference a steering committee was established to assist in directing the activities of the ECSC.

In 1983 the ECSC was incorporated in Rhode Island and now operates with a Board of Directors, elected from faculty of the participating colleges and universities. In 1986 Professor Gerard O'Leary stepped down, and Professor Edward Gabriel of Lycoming College was elected Chair of ECSC.

In 1995, Professor Lance S. Evans of Manhattan College was elected chair of the board. In 2007, Dr. Michael Kotarski of Niagara University was elected to Chair of the Board of Directors, and in 2011 was succeeded by Dr. Donald Stearns of Wagner University. In 2020, Lance S. Evans of the New York Botanical Garden was elected to Chair of the Board of Directors.

Interest has increased in the conference and over our 72-year history, 50 colleges and universities have attended this annual event. Over time the range of subject matter has also expanded and now covers computer science and behavioral and social sciences, as well as the original areas of biology, chemistry, mathematics, physics, and engineering.

EASTERN COLLEGES SCIENCE CONFERENCE MEETINGS

1947: Vassar College, Poughkeepsie, NY
1948: Union College, Schenectady, NY
1949: Adelphi College, Garden City, NY
1950: Bernard College, New York, NY
1951: Yale University, New Haven, CT
1952: PA college for Women, Pittsburgh, PA
1953: N.Y. State Col. for Teachers, Albany, NY
1954: Brooklyn College, Brooklyn, NY
1955: Seton Hall Univ.,, South Orange, NJ
1956: Temple University, Philadelphia, PA
1957: Georgetown Univ., Washington, DC
1958: Wilkes College, Wilkes-Barre, PA
1959: Suffolk University, Boston, MA
1960: Hunter College, New York, NY
1961: SUNY College of Forestry, Syracuse, NY
1962: NC State College, Raleigh, NC
1963: Boston College, Chestnut Hill, MA
1964: Jersey City State College, Jersey City, NJ
1965: Danbury State College, Danbury, CT
1966: D.C. Teacher's College, Washington, DC
1967: Fordham University, New York, NY
1968: Yale University, New Haven, CT
1969: Yale University, New Haven, CT
1970: Wilkes College, Wilkes-Barre, PA
1971: Rosary Hill College, Buffalo, NY
1972: U.S. Military Academy, West Point, NY
1973: Pennsylvania State Univ., Univ. Park, PA
1974: Worcester Polytech. Inst., Worcester, MA
1975: Widener College, Chester, PA
1976: Rhode Island College, Providence, RI
1977: Fairleigh Dickenson Univ., Rutherford, NJ
1978: Union College, Schenectady, NY
1979: Wilson College, Chambersburg, PA
1980: SUNY at Cortland, Cortland, NY
1981: Jersey City State College, Jersey City, NJ
1982: Lycoming College, Williamsport, PA
1983: Wilkes College, Wilkes-Barre, PA
1984: Providence College, Providence, RI
1985: SUNY and Fredonia, Fredonia, NY
1986: Duquesne University, Pittsburgh, PA
1987: Lycoming College, Williamsport, PA
1988: Ithaca College, Ithaca, NY
1989: U.S. Military Acad., West Point, NY
1990: Manhattan College, New York, NY
1991: SUNY at Fredonia, Fredonia, NY
1992: U.S. Naval Academy, Annapolis, MD
1993: Central CT State Univ., New Britain, CT
1994: Duquesne University, Pittsburgh, PA
1995: Ithaca College, Ithaca, NY
1996: Lycoming College, Williamsport, PA
1997: Central CT State Univ., New Britain, CT
1998: Niagara University, Lewiston, NY
1999: Sacred Hearth University, Fairfield, CT
2000: Wagner College, Staten Island, NY
2001: Wilkes University, Wilkes-Barre, PA
2002: Niagara University, Lewiston, NY
2003: Ithaca College, Ithaca, NY
2004: Manhattan College, Bronx, NY
2005: Central CT State Univ., New Britain, CT
2006: St. Joseph's University, Philadelphia, PA
2007: College of Mount St. Vincent, Bronx, NY
2008: Niagara University, Lewiston, NY
2009: Wagner College, Staten Island, NY
2010: Pace University, Pleasantville, NY
2011: Sacred Heart University, Fairfield, CT
2012: William Paterson University, Wayne, NY
2013: Providence College, Providence, RI
2014: Marist College, Poughkeepsie, NY
2015: Niagara University, Lewiston, NY
2016: Western NE Univ., Springfield, MA
2017: Wilkes University, Wilkes-Barre, PA
2018: Ithaca College, Ithaca, NY
2019: Manhattan College, Bronx, NY
2020: Cancelled due to COVID-19
2021: Virtual
2022: Iona College, New Rochelle, NY
2023: **Sacred Heart University, Fairfield, CT**

ACKNOWLEDGEMENTS

The ECSC Planning Committee would like to thank the Department of Psychology at Sacred Heart University for graciously sponsoring the ECSC 2023 lanyards.

SPEAKER FOR THE 2023 ECSC CONFERENCE

Justin “Mr. Fascinate” Shaifer

“Step aside Bill Nye and Neil deGrasse Tyson. Justin J. Shaifer is the emerging STEM personality we need to hear.” *–Forbes*

Growing up in a single-parent home on the south side of Chicago, Justin Shaifer spent his days goofing off, acting up and excelling as the class clown. Although secretly fascinated with science, he never had the opportunity to express that excitement—it just wasn’t cool. That was until his mom made him sign a contract at 14 years old promising he would figure out a way to pay for college.

While searching for scholarships, Shaifer quickly realized there were pools of money around STEM (Science, Technology, Engineering, Math) Education. And he made good on that contract. Shaifer earned scholarships from NASA and NOAA that covered 100% of his tuition and room and board at Hampton University. He graduated with a degree in marine and environmental science, earning the department’s highest GPA while also serving as student body president.

Today, Shaifer is so much more than cool. An entrepreneur, speaker, top voice in technology and STEM advocate, he travels the country as the role model he never had, making STEM dope, he says. Inspired to pay his success forward, Shaifer co-founded the STEM Success Summit, a large-scale conference for diverse STEM students that secured sponsorships from Best Buy and General Motors. He also co-founded Beyond: A gamified platform that helps diverse students learn tech skills while earning prizes from their favorite brands. Shaifer has hosted science TV shows with WGBH, the Travel Channel and Al Roker Entertainment.

Known as “Mr. Fascinate,” Shaifer has made it his life’s work to bring his passion for STEM disciplines to the next generation, especially kids who are typically underrepresented in elite science-based careers. From his viral TEDx talk, "How to Speak Generation Z," to his body of curriculum development work, Shaifer is a leading figure in STEM education and diversity. His energy never fails to get audiences interested in hearing what he has to say.

MANUSCRIPTS SUBMITTED FOR EXCELLENT AWARDS - 2023

Investigating the Role of NF-kB Inhibition on Müller Glia Proliferation Following Injury in the Zebrafish Retina - Danielle Baffa, Neuroscience Program, John Carroll University - Molecular Biology

Effect of *eys* Knockout on Retinal Degeneration in Zebrafish - Karen Chu, Neuroscience Program, John Carroll University - Health Sciences

The Role of the Endothelin-1 Pathway in Experimental Autoimmune Encephalomylitis - Mark Rizk, Neuroscience Program, John Carroll University - Physiology

Sessions and Presentation Information

Platform Presentations

Platform Presentions Session I

Biochemistry and Health

Moderator: Dika Kuljis, Ph.D., Sacred Heart University

Presentation Number:

1. A candidate compartment where the misprocessing of amyloid precursor protein occurs
Roberts, Sophia and Cluett, Edward B
Ithaca College, Ithaca NY 14850

2. A role of phospholipase A2 in the development of Alzheimer's disease
Chopra, Shreya and Cluett, Edward B.
Ithaca College, Ithaca NY 14850

3. Light and Immunogold transmission electron microscopy analysis of mast cells in adult zebrafish optic tectum upon traumatic brain injury
Tipaldi, Robert J.; Bimbo-Szuhai, Andras; Massaro, Ian T.; Peguero, Ricardo L.; Ruiz, Tatyanna M.; Mashensky, Alice P.; Gerena, Renato J.
Wagner College, Staten Island NY 10301

Genetics

Moderator: Walter Steiner, Ph.D. (Niagra University)

Presentation Number:

4. Assigning a specific gene defect to the 'lightning bolt tail' (Bolt) mutation in mice
Low, Lacie E.; Girard, Jon P.; and Renzi, Anthony V.
Central Connecticut State University; New Britain CT 06050

5. Phenotypic characterization, identification of mutations and mRNA expression analysis of flavonoid pigmentation mutants in the model legume plant Medicago truncatula
Piechowicz, Megan; Arildsen, Kate; Le, Anne; and Veerappan, Vijaykumar
Eastern Connecticut State University; Willimantic CT 06226

6. The spontaneous squig mutation is associated with a deletion in the Meox1 gene in mice
Girard, Jon P.
Central Connecticut State University; New Britain CT 06050

Psychology Part I

Moderator: Helen Murphy, Ph.D. (John Carroll University)

Presentation Number:

7. Depression and Anxiety Over COVID: The Role of Personality?
Wheeler, Nicole; Moone, Nathan; and Chen, Lin
Ithaca College; Ithaca NY 14850

8. Coping Among Older Adults During COVID-19 Pandemic: A qualitative research study
Owino, Jonix; Sperling, Nicole; Siddhartha, Vaibhavi; Barakat, Rebecca; and Gorski, Emily
Sacred Heart University; Fairfield CT 06825

Biochemistry and Molecular Biology Part I

Moderator: David Gondek, Ph.D. Ithaca College

Presentation Number:

9. Metal sensitivity and magnetic susceptibility in Saccharomyces cerevisiae
Gunsalus, Kristian; Pinti, John; Schrier, Chloe; Morrow, Janet; and Stoj, Christopher
Niagara University, Lewiston NY 14109

10. **The effects of therapeutic iron chelators on iron oxidation**
Deschamps, Isabel; Militello, Elaine; Michienzi, Matthew; Bailey, Danielle; Kosman, Daniel; and Stoj, Christopher
Niagra University, Lewiston NY 14109

11. A mutational approach to determine the main protein filament used for Fe(III) oxide reduction by Geobacter sulfurreducens
Alsaqri, Baha; Schwarz Ingrid; Gorman, Sydney; Dion, Laura; Real, Lauren; Henry, Kathryn; Holmes, Dawn; and Smith, Jessica
Central Connecticut State University, New Britain CT 06050

12. Uncovering the role of two transcriptional regulators involved in extracellular electron transfer by Geobacter sulfurreducens
Schwarz, Ingrid; Alsaqri, Baha; and Real, Lauren
Central Connecticut State University, New Britain CT 06050

Platform Presentations Session II

Ecology

Moderator: Barbara Pierce, Ph.D. (Sacred Heart University)

Presentation Number:

13. Regional Acoustic Differences in the Black-Capped Chickadee (Poecile atricapillus)
Smith, Kamille
Ithaca College; Ithaca NY 14850

14. Hybridization and analysis of vocalizations in Barred Owls and Spotted Owls
Panora, Nathali
Ithaca College; Ithaca NY 14850

15. Central Asia Turned Shrubbier in the Past 20 years
Uebelacker, Maxine; Fang, Wei; Saraf, Sakshi
Pace University; New York NY 10038

16. Effects of snake predatory cues and salamander distress signals on activity and site fidelity of the Eastern Red-backed salamander, Plethodon cinereus
Yoder, John
Eastern Connecticut State University; Willimantic CT 06226

Chemistry

Moderator: Penny Snetsinger, Ph.D. (Sacred Heart University)

Presentation Number:

17. Removal of the Pharmaceutical Molecule Promethazine from Simulated Wastewater by Functionalized Cellulose Nanocrystals
Williams, Malik ; Pinto, Alexandre; and Choudhury Mahbuboor
Manhattan College; Bronx NY 10471

18. Removal of High Phosphate Levels Using the Ion Exchange Resins Amberlite® and MP-Carbonate® and Determination of Its Concentration by UV/visible Spectrophotometry
Gindhart, Marisol and Fan, Jianwei
Manhattan College; Bronx NY 10471

Molecular Biology and Health

Moderator: Christopher Marra, Ph.D. (Wagner College)

Presentation Number:

19. Exploring the effect of respiratory syncytial virus (RSV) infection on mRNA and protein expression of calnexin (CANX) and integrin alpha V (ITGAV)
Huntley, Emily
University of Saint Joseph; West Hartford CT 06117

20. Integration of In-silico Research with In-vivo and In-vitro Studies to Reveal Therapeutic Targets and Mechanisms Underlying COVID-19 Augmentation of Parkinson's Disease Progression
Zhang, Jonathan
Seton Hall University; South Orange NJ 07079

21. Investigation of the role of deregulated miR-654 and miR-4454 in melanoma pathogenesis and progress.
Maffia, Michael and Babapoor, Sankhiros
Sacred Heart University; Fairfield CT 06825

Psychology Part II

Moderator: Jonix Owino, Ph.D. (Sacred Heart University)

Presentation Number:

22. Do Looks Really Matter? A Content Analysis of Gender Differences in Character Portrayals in Children's Activity Books
Tamis, Alexa and Wolf, Daphne
Ithaca College; Ithaca NY 14850

23. Infidelity; Mood and Family Structure
DenDanto, Isidora; Berkowitz, Jolie; Daley, Sophie; and O'Leary, Camryn
Ithaca College; Ithaca NY 14850

24. Romantic Beliefs; Impacts of Family Structure and Relationship Satisfaction
Thompson, Claire; Carney, Cecelia; and Paulino, Johanna
Ithaca College; Ithaca NY 14850

Biochemistry and Molecular Biology Part II

Moderator: Martin Kapper, Ph.D. (Central Connecticut State University)

Presentation Number:

25. Calcium-mediated Modulation of Fibroblast Growth Factor Homologous Factor Induced Voltage-gated Sodium Channel Long-term Inactivation
Goldschmidt, Gabriella; Mohammad, Nomon; Marra, Christopher; and Goldfarb, Mitchell
Wagner College; Staten Island NY 10301

26. Design, Synthesis and Exploration of Binding Interactions of Peptide Drug Conjugates with EGFR and FGFR receptors – A Computational and In Vitro Study
Hunt, Hannah; Rico, Mia; Goncalves, Beatriz; Murray, Molly; Lebedenko, Charlotta; and Banerjee, Ipsita
Fordham University; Bronx NY 10458

27. Developing Bioengineered Tissue Scaffolds with Collagen Mimics
Goncalves, Beatriz G; Heise, Ryan M; Hunt, Hannah L; and Banerjee, Ipsita A.
Fordham University; Bronx NY 10458

28. Developing Bio-organic Peptide Amphiphiles for Drug Delivery
Murray, Molly E; Goncalves, Beatriz G; Lebedenko, Charlotta G; and Banerjee, Ipsita A.
Fordham University; Bronx NY 10458

Poster Presentation Sessions

Session I

Poster Number:

29. Design of Marine organism derived peptide conjugates for tumor targeting
Biggs, Mary; Goncalves, Beatriz; Murray, Molly; Banerjee Ipsita A
Fordham University; The Bronx NY 10458

30. Using Protein Crosslinking To Investigate Rsc 1 and Rsc 2 in Chromatin Remodeler RSC
Coady, John
Manhattan College; The Bronx NY 10471

31. Approaches to Increased Spatiotemporal Resolution of Chromatin Immunoprecipitation Techniques through the Employment of Nonconical Amino Acid Histones
Moleri, Pamela; Wilkins, Bryan J.
Manhattan College; The Bronx NY 10471

32. Targeting the EGFR Receptor Mutant through Natural Products
Mahabadi, Vida; Goncalves, Beatriz G; Banerjee, Ipsita A.
Fordham University; The Bronx NY 10458

33. Encapsulation and release of iron contrast agents from liposomes
Thompson, Brayden; Kleiner, Corinne; Pinti, John; Chowdhury, Saiful; Morrow, Janet; Stoj, Christopher;
Niagara University; Lewiston NY 14109

34. Analysis of how small metabolic molecules affect B. subtilis biofilm formation
Jihaan, Taeef; Wacker Sarah
Manhattan College; The Bronx NY 10471

35. "Water Lifetime within the Topoisomerase IA Active Site is Affected by Ethacridine"
Strahs, Daniel
Pace University ; New York NY 10038

36. A method to analyze electrostatic interactions between Ethacridine and Topoisomerase IA in E. Coli
Aayla, Noor
Pace University; New York NY 10038

37. Impacts of Natural Product-Peptide Conjugates in Aging Research through Molecular Dynamics and Docking Studies
Mukhit, Aigerim; Biggs, Mary; Banerjee, Ipsita A.
Fordham University; The Bronx NY 10458

38. Small Molecules for Modulation of Interactions with Opioid and SOD receptors
Phan, Emma; Murray, Molly E; Banerjee, Ipsita A.
Fordham University; The Bronx NY 10458

39. Synthesis and biological evaluation of multivalent glyco-peptoid inhibitors against bacterial adhesion
Moquete, Jack; Tattersall, Julie; Abu, Macmillan; Dehigaspitiya, Dilani
Central Connecticut State University; New Britain CT 06050

40. Thiophene adsorption in simulated fuels using reduced graphene oxide-titanium dioxide (rGO/TiO2) heterostructures as adsorbents
Ali Ahmad Sabri, Santunu Barua, Connor Smith, Mahbuboor R. Choudhury, Alexandre H. Pinto
Manhattan College; The Bronx NY 10471

41. An Intramolecular Friedel-Crafts Alkylation of N-Benzylaziridines: A Novel Synthetic Method with an Application Toward the Total Synthesis of (±)–Pancratistatin
Dressner, Andrew; Di Grandi, Martin
Fordham University; The Bronx NY 10458

42. Exploring the Diastereoselectivity of the NaBH4 Reduction of (±) Benzoin and its Derivatives
Massa, Nicole; Qian, Jin; Di Grandi, Martin
Fordham University; The Bronx NY 10458

43. Developing novel gels for environmental remediation: properties and gelation abilities of quaternary ammonium salts
Nettgen, Maria; Milczanowski, Julia; Zarankov, Olivia
Fordham University; The Bronx NY 10458

44. Preparation of the reduced graphene oxide-titanium dioxide (rGO/TiO2) heterostructures by hydrothermal heating
Whyte, Dominique; Kola, Isabella; Smith, Connor; Vincent Jr., Donovan; Cho, Dylan; Choudhury, Mahbuboor; Pinto, Alexandre
Manhattan College; The Bronx NY 10471

45. Automated computer-vision analysis pipeline for calcium imaging of neuronal network activity

Oluigbo, David; Hemberg, Erik; Feord, Rachael; Shwatal, Nathan; Ding, Wenqi; Yuan, Yin; Mierau, Susanna
Massachusetts Institute of Technology; Cambridge MA 02139

46. Entity sentiment analysis for labeling a jesus novel data set
Stish, Daniel; Kapolka, Anthony; Weynand, Sarah
Wilkes University; Wilkes-Barre PA 18766

47. Wave Generation Machine
Calabrese, Luke; Wing, Luke; Bolarinho, Logan; Duross, Lauren; Bertone, Alexander; Aldrich, Patrick
Roger Williams University; Bristol RI 02809

48. Bike Trailerable Multi-Passenger Boat
Barry, Quentin; Fasolino, David; Noonan, Max; Pratt, Tyler; Pino, Bianca; Keskin, Irem
Roger Williams University; Bristol RI 02809

49. Sailboat Mast-Mounted Wind Turbine
Higham, George; Robbins, Callum; Cerro, Raymond; Haner, Kyle; Leary, Kieran; Larssen, Victor
Roger Williams University; Bristol RI 02809

50. Phenotypic characterization and Analysis of Tnt1 insertion mutations in mutants defective in symbiotic nitrogen fixation in the model legume plant Medicago truncatula
Le, Anne; Veerappan, Vijaykumar
Eastern Connecticut State University; Willimantic CT 06226

51. Using CRISPR/Cas9 gene editing to test the hotspot hypothesis
Navarro, Alexis; Tucci, Mikayla; Daley, Mariah; Coreno, Joanna; Kiontke, Karin; Fitch, David; Woronik, Alyssa
Sacred Heart University; Fairfield CT 06825

52. Identification of Shark Species through DNA Barcoding Show Evidence of Mislabeling and Prohibited Species Sale in New York City Fish Markets
Singh, Nirvana, "DeySarkar, Trishita", "Saniei, Shayan", "Lu, Kelly"
Pace University; New York NY 10038

53. Effect of eys Knockout on Retinal Degeneration in Zebrafish
Chu, Karen
John Carroll University; University Heights OH 44118

54. Assessment of human anthropometry with a markerless motion capture system
Riccitelli, Christopher; Mowad, Jenna; Moore, James
Sacred Heart University; Fairfield CT 06825

55. Characterization and Antimicrobial Testing of an Unknown, Purple Pigment-Producing, Gram-Negative Rod-Shaped Bacterium
McCracken, Michael; Wagner, Haley; Solomons, James; Glazier, Virginia
Niagara University; Lewiston NY 14109

56. Di-butyl Phthalate Disrupts Muscle, Motor and Sensory Neuron Development in Embryonic Zebrafish
Paquette, Evelyn; Rodrigues, Alyssa; Giacolone, John Paul; Fumo, Michael
Sacred Heart University; Fairfield CT 06825

57. Examining the Binding Interactions of Epidermal Growth Factor Receptor and its Mutants
Rico, Mia I; Goncalves, Beatriz G; Hunt, Hannah L; Banerjee Ipsita A.
Fordham University; The Bronx NY 10458

58. Exploring Gene Regions: ITS and mat-K for identifying Brassica varieties via DNA Barcoding
Egan, Mary; Manelis, Jacqueline; Driza, Eden
Fordham University; The Bronx NY 10458

59. Investigating the Role of NF-kB Inhibition on Müller Glia Proliferation Following Injury in the Zebrafish Retina
Baffa, Danielle
John Carroll University; University Heights OH 44118

60. Using Planarian Flatworms to Model Acetaminophen Toxicity During Regeneration
Tangney, Connor
Central Connecticut State University; New Britain CT 06050

61. Effect of capsaicin analogs on proliferation and differentiation of mouse skeletal myoblasts
Decker, Kendall; Regan, Brenna; Felix, Alana; Deschenes, Suzanne
Sacred Heart University; Fairfield CT 06825

62. Investigation of the rule of deregulated miR-654 in melanoma pathogenesis and progress.
Dunay, Rebecca; Ricciardella, Gisella; Kavanagh, Julia; Babapoor, S
Sacred Heart University; Fairfield CT 06825

63. Studies on the Voltage Dependence of Activation and Inactivation of Two Voltage Gated Calcium Channel β Subunit Mutations Associated with Epilepsy
Brown, Emma; Allam, Salma; Suppa, Gabriella; Hanson, Paris; Buraei, Zafir
Pace University; New York NY 10038

64. Oxytocin and Inhibitory Synaptic Function in Zebrafish
Padmore, Talia; Caluza, Isaia; Du Rand, Jonathan; Murphy-Wilson, Eveline; Rodenas-Ruano, Alma (PhD)
Fordham University; The Bronx NY 10458

65. The Role of the Endothelin-1 Pathway in Experimental Autoimmune Encephalomyelitis
Rizk; Mark
John Carroll University; University Heights OH 44118

66. Parvalbumin and perineuronal net distribution across neocortex
Hamilton, Sydney; Victoria, Kayla; Belaire, Samantha
Sacred Heart University; Fairfield CT 06825

67. Cell Senescence in WS1, BJ, CCD-1070SK and IMR-90 Skin and Lung Fibroblasts
Adjmi, Matthew; Lomtadze, Lizi; Molina, Lizet; Bednarz, Justyna; Luckett, Deborah
Fordham University; The Bronx NY 10458

68. Isolation and Characterization of Staphylococcal Bacteriophages
Cordani, Jenna; Horvath, Gianna; Vu, Kevin
Niagara University; Lewiston NY 14109

69. Isolation and Expression of Glycosyl Hydrolases From Paenibacillus sp. JDR-2
Tompkins, Katherine; Brusino, Donovan
Niagara Univesity; Lewiston NY 14109

70. Examining the Morphological Effects of bacM Mutations in Myxococcus xanthus
Romero, Kevin K.; Gains, Benjamin; Zuckerman, David M.
Iona University; New Rochelle NY 10801

71. Developing a Bacterial Two-Hybrid system to determine BacM interactions in Myxococcus xanthus
Forbes, Maryann; Zuckerman, David M.
Iona University; New Rochelle NY 10801

72. Identification and Isolation of glycosyl hydrolases from the thermophilic bacterium Geobacillus stearothermophilus
Brockman, Bianca; Bouali, Ferielle
Niagara University; Lewiston NY 14109

73. Characterization of a strain of Geobacter sulfurreducens deficient in the major outer cell surface cytochromes

Gorman, Sydney; Henry, Kathryn; Real, Lauren; Dion, Laura; Schwarz, Ingrid; Alsaqri, Baha; Smith, Jessica; Holmes Dawn
Western New England University; Springfield MA 01119

74. Microbiome Depletion Impacts Pathogen Burden and Chlamydia Specific T-Cell Immune Responses
Metzger, Lily; Sinclair, Anna; Gondek, David
Ithaca College; Ithaca NY 14850

75. Holin proteins contribute to fruiting body formation in Myxococcus xanthus
Casper, Makenna S.; Hoxhaj, Ela; Kinlen, Kelli; Zuckerman, David M.
Iona University; New Rochelle NY 10801

76. Impact of BBP and Acetone Exposure on Fundulus heteroclitus Gut Flora
Ciancio, Ariana; Bocanegra, Alicia; Patel, Priyal; Goldman, Matthew; Vorbau, Jonas; Kaplan, Lisa
Quinnipiac University; Hamden CT 06518

77. Bacteriophage therapy as a treatment for acne and its interaction with antibiotics
Schwarz, Ingrid
Central Connecticut State University; New Britain CT 06050

78. Engineering a minimal extracellular electron transport pathway in Geobacter metallireducens
Dion, Laura; Rogers, Adam; Maia, Dina; Smith, Jessica; Holmes, Dawn
Central Connecticut State University; New Britain CT 06050

79. Newport Cliff Walk Collapse
Caliri, Dean; Flynn, Christopher; Howe, Jason; Liseo, Caterina; Montminy, Donald.
Roger Williams University; Bristol RI 02809

80. Is the mouse Bolt mutation an embryonic lethal allele of Axin2?
Renzi, Anthony V.; Mike J. Hastings
Central Connecticut State University; New Britain CT 06050

81. Optimization of a DNA Extraction Protocol for Meiofaunal Identification
Bove, Lilly; Coreno, Joanna; Piastuch, Lisa; Stoehr, Ashley; Woronik, Alyssa
Sacred Heart University; Fairfield CT 06825

82. Measuring the Capacity for Endothermy in Open-Ocean Fishes
Moore, James; Stoehr, Ashley
Sacred Heart University; Fairfield CT 06825

83. Isolation and characterization of Staphylococci from an exotic animal park.

Werner, Ciara.
Niagara University; Lewiston NY 14109

84. Discovery of aerobic anoxygenic phototroph, Sphingomonas, in Devil's Bathtub

Mangioni, Bethany; Kiedrowski, Alexandra; Wrobel, Samantha; Edwards, William; Marnocha, Cassandra.
Niagara University; Lewiston NY 14109

Session II

Poster Number:

85. The effects of light deprivation on aggression in crayfish
Cox, Rachel; Abbas, Syed
Central Connecticut State University; New Britain CT 06050

86. Associations of Cannabis, Cocaine and Ecstacy (MDMA) use on Mental Distress
Bonventre, Samantha; Scott, Nicole; Patrissy, Cara; Dwyer, Emily.
Binghamton University; Binghamton NY 13902

87. Behavioral Response of the Zooplankter Daphnia magna to the Chemical Presence of a Visual Predator (the Zebrafish Danio rerio)
Damon, Bridget
Wagner College; Staten Island NY 10301

88.  **Use of remote field recorders to document gibbon vocalizations**
Bernstein, Olivia; Skalski, Christopher; Terleph, Thomas
Sacred Heart University; Fairfield CT 06825

89. Investigating the life cycle and dominance hierarchy of the subsocial small carpenter bee, Ceratina calcarata
Miller, Riya
Quinnipiac University; Hamden CT 06518

90. The Effects of Chronic Ethanol Exposure on Seizure Susceptibility in Planaria
Hasan Ibrahim and Sara Guariglia
Wagner College; Staten Island NY 10301

91. Tail autotomy and territoriality in Plethodon cinereus
Didero-Mullen, Juliana; Epp, Kristen
Eastern Connecticut State University; Willimantic CT 06226

92. BBP Toxicity in Blue Mussel (Mytilus edulis) Locomotion in the Presence and Absence of Tidal Waves
Lorenzo Bafumi, Jamie Songco, and Lisa A. E. Kaplan, Ph.D.
Quinnipiac University; Hamden CT 06518

93. Benzyl Butyl Phthalate (BBP) Induction of Hyalella Azteca Morbidity and Mortality
Cherneskie, Thomas; Nicholas, Theodora; Kaplan, Lisa
Quinnipiac University; Hamden CT 06518

94. Effect of Benzyl Butyl Phthalate (BBP) on Behavior, Obesogenicity, and Anxiogenicity of Fundulus heteroclitus
Crowley, Maeve; Kaplan, Lisa
Quinnipiac University; Hamden CT 06518

95. Effect of Benzyl Butyl Phthalate (BBP) and Ethanol on Morbidity and Mortality in Hyalella azteca
Frier, Kelly; Amiti, Elsa; Kaplan, Lisa A. E.
Quinnipiac University; Hamden CT 06518

96. Impact of Social Isolation on Gromphadorhina portentosa (Madagascar Hissing Cockroach) Exoskeleton Luster
Perrotta, Reagan; Kaplan, Lisa
Quinnipiac University; Hamden CT 06518

97. Impact of Chemical Vehicle Choice and Size Class on BBP Toxicity in Blue Mussels (Mytilus edulis)
Fieramosca, Tessa; Mack, Gretchen; Kaplan, Lisa
Quinnipiac University; Hamden CT 06518

98. Effects of BBP and Acetone on Fuldulus heteroclitus Foraging Behavior
Ortiz, Brian;Belotti, Todd;Kaplan, Lisa
Quinnipiac University; Hamden CT 06518

99. Allelopathic Influence of Eucalyptus Leaves on Growth and Development of Common Brazilian Agricultural Plants
Jafri, Shuja Hassan; Annon, Oshane; Garrett Kluthe, Brandy
Saint Peter's University; Jersey City NJ 07306

100. Baseline macroinvertebrate and infauna communities in an eroding salt marsh prior to restoration
Eaton, Madison
Sacred Heart University; Fairfield CT 06825

101. Patterns of snail herbivory and phenolics in restored and natural Spartina alterniflora populations in Long Island Sound
Kailher, Amanda; Steele, LaTinaa
Sacred Heart University; Fairfield CT 06825

102. Native and Invasive Aquatic Plant Responses to Amphipod and Snail Grazing
Robinson, Xanthe; Steele, LaTina
Sacred Heart University; Fairfield CT 06825

103. Nesting site variability of The American horseshoe crab (Limulus polyphemus) and implications egg development within Long Island sound
Templeman, Graham B; Kasinak, Jo-Marie; Mattei Jennifer
Sacred Heart University; Fairfield CT 06825

104. Asian shore crab population decline at a marsh restoration site in Stratford, Connecticut
Foito, Leah; Steele, LaTina
Sacred Heart University; Fairfield CT 06825

105. Environmental factors may drive plant size differences between a restored and a natural marsh in the Housatonic River Estuary
Steele, LaTina, Scarpello, Angelina
Sacred Heart University; Fairfield CT 06825

106. Observing the Color Preference of Native Pollinators
Bacon, Louise; Metzler, Kristen; Lawson, Sarah
Quinnipiac University; Hamden CT 0651

107. Impact of pollinator gardens on pollinator diversity and populations
Filandro, Alina; Lawson, Sarah
Quinnipiac University; Hamden CT 06518

108. METHOD DEVELOPMENT: Fragmentation and effective population size in populations of Eastern redback salamander, Plethodon cinereus.
Wrobel, Samantha; vanLieshout, Clare; Edwards, William
Niagara University; Lewiston NY 14109

109. Diet analysis of Daphnia magna using the 16S gene and next generation sequencing
Wojtas, Sarah; Wrobel, Samantha; Edwards, Ciaran; Marnocha, Cassandra; Edwards, William; Edwards, Coleen
Niagara University; Lewiston NY 14109

110. A symbiotic trifecta: the world's largest parasitic flowers, their host plant, and the microbes that live within
Diaz, Denia; Kirdiianova, Anastasiia; Molina, Jeanmaire
Pace University; New York NY 10038

111. Is It Raining Over the Hill? Microclimate on the Dingle Peninsula
Ribaudo, Charlotte; Farkas, Ilona
Sacred Heart University; Fairfield CT 06825

112. Excavation of the Lower Blue Licks Paleoindian Site, Kentucky: 19th Century Deposits Overlie Mammoth and Mastodon Remains.

Fantulin, Katarina; Yorke, Alexander L.; Robinson, Guy.
Fordham University; The Bronx NY 10458

113. Environmental Change in Southern New York Since the Last Ice Age
Trzeciak, Grace; Collins, Isabella; Griffin, Jennifer; Robinson, Guy
Fordham University; The Bronx NY 10458

114. Population growth and carrying capacity of Lemna minor in spring water using varying concentrations of nitrate and phosphate under higher intentsity light
Wang, Oscar
Wagner College; Staten Island NY 10301

115. Comparing Urban and Rural Microparticle Deposition
Conklin, Jesse ; Warner, Nicholas ; Urban-Rich, Juanita
Fordham University; The Bronx NY 10458

116. The Impact of Ionic Liquids on Limulus polyphemus
Miguel Pereira; Maria Nettgen; Alma Rodenas-Ruano (Ph.D); Marie Thomas (Ph.D); Mark Botton (Ph.D)
Fordham University; The Bronx NY 10458

117. Relationship between nicotine, mental distress and psychoactive substances
Dwyer, Emily; Patrissy, Cara; Scott, Nicole; Bonventre, Samantha
Binghamton University; Binghamton NY 13902

118. Academic Persistence Among First Generation Community College Students: An exploration of social and cultural capitals
Platero, Stephany; Resko, Jody
Queensborough Community College; Queens NY 11364

119. Understanding the Relationship Between Hardiness and Academic Performance During COVID
Chen, Clarence Zhi Xin
Queensborough Community College; Queens NY 11364

120. Through Their Eyes: How Students View Growth Mindset Teaching in Middle and High Schools
Simak, Lauren; Brown, Katrina; Wilk, Abigail
Sacred Heart University; Fairfield CT 06825

121. Low-dose drinking water bisphenol-A does not alter anxiety or cognitive functioning in adolescent male rats
Alvira, Nicole; Andre, Abigail; Berni, Teresina; Maiolo, Lauren; Piasecki, Alexandra
Sacred Heart University ; Fairfield CT 06825

122. Remain Calm: How Emotional Responses Influence Perception of Women Confronting Sexism
Rogers, Sophia*; Piney, Ashley*; Kroeper, Katie; (*first authorship is shared)
Sacred Heart University; Fairfield CT 06825

123. How Context Shapes our Concerns: Investigating the Causal Effects of Social Identity Threat Concerns using the SITC Inventory
Debrot, Noelle; Millien-Faustin,Fabiola; Granja, Nicholas; Kroeper, Kathryn.
Sacred Heart University.; Fairfield CT 06825

124. Recreational Drugs: Relationships with Negative Mood States
Meldrim, Carol Ann; Perez, Isaac
Ithaca College; Ithaca NY 14850

125. Clustering Effects in Free Recall by Emotion and Content
Ephault, Ciara; Castro, Kendra; Ramos, Inkaira
Ithaca College; Ithaca NY 14850

126. Object Play in Bottlenose Dolphins
Alvia, Kayla; Giuffra, Alexandra; Sheehan, Erin; Williams, Carlie
Sacred Heart University; Fairfield CT 06825

127. Be Kind to Yourself: Examining How Self-Compassion Mediates the Relationship between Minority Stress and Health
Cavalea, Samantha
Sacred Heart University; Fairfield CT 06825

128. The Effect of Self-Affirmation on Memory for Negative Images
Cavalea, Samantha; Del Pino, Grace; Gutierrez, Rosalyn; Michel, Abbygail
Sacred Heart University; Fairfield CT 06825

129. Online vs In-Person Learning: Self-Efficacy, Self-Regulation, and Motivation in College Students
Pecorella, Gia; England, Jessica W
Wagner College; Staten Island NY 10301

130. The Impact of Brief Animal Assisted Therapy Dog Interactions on College Student Stress and Self-Efficacy Levels
Vaillancourt, Victoria;Kutka, Paige;Percoco, Julian;Giordano, Savannah;Melzer, Dawn;Yeater, Deirdre;Pierce, Barbara
Sacred Heart University; Fairfield CT 06825

131. Emotion Regulation Strategies and Youth Mental Health During COVID-19: Examining Longitudinal Associations and the Role of Socioeconomic Status

Joshi, Soumyaa; Lopez, Marla; Nelson, Timothy
Ithaca College; Ithaca NY 14850

132. Can Dogs Detect a Surprising Event?
Faeth, Samantha; Higley, Emma; Alvira, Nicole; Borg, Kaitlyn; Colloca, Marissa; Esposito, Gabrielle; Yeater, Deirdre; Melzer, Dawn.
Sacred Heart University; Fairfield CT 06825

133. Men Work, Women Smile and Pose: A Content Analysis of Gender Stereotypes Reflected in the Characters Portrayed in Children's Activity Books
Kleynerman, Elizabeth; Onah, Ehikowoicho
Ithaca College; Ithaca NY 14850

134. Psychological and Emotional Effects Caused By Cataract and Cataract Surgery
Fattakhov, Gabriel
Queens College; Queens NY 11367

135. Student engagement in a traditional versus flipped classrom
Hopkins, Jennifer; Unetich, Greta
Ithaca College; Ithaca NY 14850

136. Climate change in the Mediterranean Basin
Then, Nathali
Pace University; New York NY 10038

137. Visual Assessment of a Meiofaunal Community
Guglielmi, Ashley; Bove, Lilly; Moore, James; Piastuch, Lisa; Stoehr, Ashley
Sacred Heart University; Fairfield CT 06825

138. It's a Bad Week to be a Seal/Woman: Shark Week's Portrayal of Women Scientists
deHaven, Morgan; Stoehr, Ashley
Sacred Heart University; Fairfield CT 06825

139. How will the installation of a pollinator garden impact pollinator communities?
Smart; Dwane
Quinnipiac University; Hamden CT 06518

140. Associations between Frequency of Cannabis Usage and Mental Distress
Cara Patrissy, Samantha Bonventre, Nicole Scott, Emily Dwyer, Lina Begdache
Binghamton University; Binghamton NY 13902

Abstracts

Platform Presentations

1. A candidate compartment where the misprocessing of amyloid precursor protein occurs

Roberts, Sophia
Faculty mentor: Cluett, Edward B.
Ithaca College

The cause of late onset Alzheimer's disease (AD) is not well understood. The current model, the "endosomal traffic jam" hypothesis, suggests that disruption of trafficking in the endosomal system leads to the misprocessing of Amyloid Precursor Protein (APP), which creates the small protein, Aβ42, that may initiate AD. Cholesterol has also been implicated in AD, but its role is not clear. Our lab found that disrupting cholesterol trafficking of LDL-derived cholesterol caused APP and cholesterol to accumulate in the recycling endosome, but the enzyme responsible for misprocessing, BACE, was excluded. Surprisingly, APP and BACE did colocalize in a small compartment next to the nucleus when the cell was synthesizing cholesterol. The goal of this project is to identify this compartment. Several membrane compartments, including endosomes, are found in the region around the nucleus. Our hypothesis is that one of these compartments, the pericentriolar intermediate compartment (pcIC), is where APP meets BACE. To investigate this, we used immunofluorescence confocal microscopy to follow marker proteins for the pcIC and neighboring compartments under normal and disrupted trafficking. Our results suggest that the pcIC plays a role in the misprocessing of APP.

2. A role of phospholipase A2 in the development of Alzheimer's disease

Chopra, Shreya
Faculty mentor: Cluett, Edward B.
Ithaca College

Phospholipase A2 (PLA2) proteins are found throughout the membrane transport system where they play a role in the formation of transport structures and organization of organelles. PLA2s cleave one acyl chain from phospholipids, which alters the integrity of the lipid bilayer and induces membrane curvature. In cells that obtain most of their cholesterol from the internalization of LDL, inhibition of PLA2s causes cholesterol to accumulate in the recycling endosome. Amyloid Precursor Protein (APP), which can lead to Alzheimer's disease (AD), also accumulates in this compartment under these conditions, but the enzyme that causes its misprocessing does not. However, when cells synthesize cholesterol instead of internalizing it, APP does meet the enzyme that causes its misprocessing but in a different, but unidentified, location. However, inhibition of PLA2s appears to prevent this colocalization. Our hypothesis is that alteration of membrane trafficking by PLA2s influences the misprocessing of APP, which would increase the risk of late onset AD. Confocal immunofluorescence microscopy was used to identify the cellular location of PLA2G6, which controls Golgi and endosome structure and function, compared to APP and marker proteins. Our results indicate that PLA2G6 may be found in the same compartment as APP.

3. LIGHT AND IMMUNOGOLD TRANSMISSION ELECTRON MICROSCOPY ANALYSIS OF MAST CELLS IN ADULT ZEBRAFISH OPTIC TECTUM UPON TRAUMATIC BRAIN INJURY

Tipaldi, Robert J.
Faculty mentor: Corbo, Christopher P.; Briffa-Mirabella, Susan
Wagner College

Previous light and scanning electron microscopy analyses of injured adult zebrafish optic tectum revealed a high abundance of cells with mast cell-like morphology in proximity to highly organized regenerative structures. Here, we employ immunogold transmission electron microscopy of tectal explants labeled with the mast cell-specific marker carboxypeptidase A5 to attempt to confirm these cells as mast cells. To assess the reliability and specificity of the selected mast cell marker, both light and transmission electron microscopy analyses were performed on the adult zebrafish liver, where the presence of mast cells have been previously established.

4. Assigning a specific gene defect to the 'lightning bolt tail' (Bolt) mutation in mice

Low, Lacie E.
Faculty mentor:
Central Connecticut State University

Our project aims to discover the gene defect responsible for the dominantly-inherited lightning bolt tail mutation (Bolt) that arose spontaneously on distal mouse Chromosome (Chr) 11. Bolt carriers can be recognized by their shortened and kinky tails, but this phenotype can range from obvious kinking to where a Bolt/+ subject might appear normal. We have genetically mapped Bolt based on 500 progeny from a backcross of hybrid Bolt/+ mice to +/+. These mice were typed for tail kinking, and DNA samples isolated from each were characterized for various PCR-scorable genetic markers on distal Chr 11. This analysis (which frequently included progeny testing to identify non-penetrant Bolt carriers) located Bolt between markers D11Mit258 and D11Mit180. For higher resolution mapping within this region, additional PCR-scorable markers were developed in our lab and Bolt has now been restricted between markers D11Csu18 and D11Csu20. Only 4 protein-coding genes co-localize to this interval and one of them, Axin2, is our primary candidate. We are currently sequencing all coding regions of Axin2 in both mutant and wild type mice in search of a Bolt-specific DNA defect.

5. Phenotypic characterization, identification of mutations and mRNA expression analysis of flavonoid pigmentation mutants in the model legume plant Medicago truncatula

Piechowicz, Megan
Faculty mentor: Veerappan, Vijaykumar
Eastern Connecticut State University

Anthocyanins and proanthocyanidins (PAs) are flavonoid compounds produced by plants, responsible for their bright colors, and have numerous health benefits. We are using a forward genetics approach in the model legume plant Medicago truncatula to discover genes that control anthocyanin and PA pigmentation. Phenotypic characterization of two white seed (NFxxx43 and NFxxx06-W) and two black seed (NFxxx47 and NFxxx06-B) mutants were performed. NFxxx43, NFxxx06-W and NFxxx47 mutants show complete loss of anthocyanin whereas NFxxx47 shows decreased anthocyanin pigmentation in vegetative organs. In seeds, NFxxx43 and NFxxx06-W mutants show complete loss of PA whereas NFxxx47 and NFxxx06-B mutants show decreased PA. Furthermore, NFxxx47 and NFxxx06-B mutants display decreased mucilage in seeds. To associate causative mutations, Tnt1 insertions were identified and mapped to M. truncatula genome. Using a database, mRNA expression of candidate genes was analyzed for seed specific expression. In addition, mRNA expression analysis of genes in a novel deregulated anthocyanin pigmentation1 (dap1) mutant was performed using real time quantitative PCR. Understanding molecular mechanisms of how anthocyanin and PA pigmentation is regulated in plants will help us to develop agricultural crops with modified flavonoid content, through genetic manipulation for medicinal and nutritional benefits.

6. The spontaneous squig mutation is associated with a deletion in the Meox1 gene in mice

Girard, Jon P.
Faculty mentor: King, Thomas R.
Central Connecticut State University

The squiggle tail mouse mutation (abbreviated squig) arose spontaneously in the inbred BALB/c strain at The Jackson Laboratory (Bar Harbor, ME). This recessive mutation causes a shortened, curly tail and has been previously reported to map on Chromosome (Chr) 11. In order to identify the gene disrupted by squig, we mapped squig to high genetic resolution by characterizing DNAs isolated from a large mouse backcross. This limited potential candidates to two genes that co-localized with squig: Meox1 (for mesenchyme homeobox 1) and Gm11551 (which encodes a lncRNA located within Intron 1-2 of Meox1). These candidates were sequenced and a 3195 bp deletion was found in the Meox1 gene that includes all of Exon 1 but does not disrupt Gm11551. A 3-primer test was developed and used to screen 28 mouse strains for the squig-associated deletion. No other mouse strain showed this Meox1 deletion, so it appears to be specific to squig and is likely to be causative.

7. Depression and Anxiety Over COVID: The Role of Personality?
Wheeler, Nicole; Moone, Nathan; Chen, Lin
Faculty mentor:
Ithaca College

There is extensive literature on the relationships between personality variables and anxiety and depression. Many studies have identified the impact of COVID on anxiety and depression (Nikčević, Ana V. et al., 2021). The current research explored the relationship between personality variables, including the Big 5, and anxiety and depression. It also explored changes in depression and anxiety over the course of COVID, and the role of personality in those changes. The sample included 432 students at a northeastern liberal arts college. Participants completed an anonymous online survey using Qualtrics, and completed the Zung Self-Rating Anxiety Scale, Zung Self-Rating Depression Scale, and the Big Five Inventory. Results demonstrated that conscientiousness and neuroticism were predictors of both anxiety and depression. Interestingly, in this sample there were no reported changes in depression or anxiety over the course of COVID, and personality variables did not appear to play a role in susceptibility to anxiety or depression over the course of COVID. The limitations of the study are discussed, and suggestions for future research are made.

8. Coping Among Older Adults During COVID-19 Pandemic: A qualitative research study
Sperling, Nicole; Siddhartha, Vaibhavi; Barakat, Rebecca
Faculty mentor: Owino, Jonix
Sacred Heart University

Across societies, aging has traditionally been associated with decline, due to factors such as increased susceptibility to diseases, declines in level of physical functioning and engagement, and death with advancing age. The implications of COVID-19 raised concerns on well-being particularly among older adults. To explore experiences of older adults during the pandemic, the present qualitative research was conduct among adults, aged 60-74 years in the Northeast coast region of the US. A total of 41 participants were interviewed with and interview sessions ranging from 15-30 minutes. The interviews were recorded and transcribed verbatim. Thematic content analysis was used for analysis. Results showed that participants used emotion-focused strategies of coping such as increased communication particularly with infrequent social contacts. Participants also discussed having a positive mindset e.g., being optimistic as a coping strategy. Moreover, participants reported experiencing a compelled need to embrace new technology such as telehealth due to social distancing measures. These findings raise the question on how societies can bridge the gap in the use of technology among older adults to enhance effectiveness as well as the importance for communities to augment activities that promote social engagement among older adults.

9. Metal sensitivity and magnetic susceptibility in Saccharomyces cerevisiae

Gunsalus, Kristian
Faculty mentor: Morrow, Janet; Stoj, Christopher
Niagara University

Metal ions are involved in all aspects of the major chemical transformations required of living organisms, often serving as essential cofactors for cellular processes including growth and division, respiration, genome replication, and a multitude of enzyme catalyzed chemical reactions. Iron in particular is essential for life and yet the over accumulation or improper storage of iron may leave organisms susceptible to the pro-oxidant characteristics of iron in aqueous solution. As well as being a baking ingredient, the yeast strain, Saccharomyces cerevisiae, has long been utilized as a model system to study metal ion uptake, storage, and mobilization in eukaryotes. This project examines the toxicity, spectroscopy, and magnetism of paramagnetic iron solutions and Fe(maltol)3, a novel paramagnetic complex currently in clinical studies for treating iron deficiency in humans. Fe(maltol)3 is a complex with three bidentate anionic maltol ligands bound to high spin Fe(III). Yeast cells exposed to Fe(maltol)3 display reduced cellular toxicity in comparison to free Fe(II), enhanced magnetic susceptibility, and interesting cell surface interactions. Iron exposure to yeast strains containing mutations and deletions of key iron uptake machinery are also being investigated.

10. The effects of therapeutic iron chelators on iron oxidation

Deschamps, Isabel
Faculty mentor: Bailey, Danielle; Kosman, Daniel; Stoj, Christopher
Niagara University

Iron metabolism in eukaryotes involves careful redox cycling between bioactive, yet pro-oxidant, Fe(II) and bio-unavailable, yet redox stable, Fe(III). The mechanisms by which biological systems modulate the redox status of iron are central to a creating a comprehensive view of metallobiochemistry and the role of this essential biological cofactor. Several disease states involve the overaccumulation iron and it is thought that improper uptake, storage, and mobilization of iron result in the observed disease pathologies. For example, iron is involved in α-synuclein mediated Lewy Body formation, a hallmark of Parkinsonism, and iron accumulation and deposition in the brains of Parkinson's Disease patients is well documented. Iron oxidation is thought to produce radicals leading to lipid peroxidation and neurodegeneration. The clinical use of iron chelators to scavenge excess iron is currently underway. This project investigates the solution chemistry of several biological and therapeutic iron chelators by examining the rate of oxygen consumption, an indicator of the ability of the chelators to bind iron well and perturb the oxidation status of iron. Our assays attempt to select for novel therapeutic iron chelators that exhibit good affinity for iron while reducing the negative oxidation events involved in disease progression.

11. A mutational approach to determine the main protein filament used for Fe(III) oxide reduction by Geobacter sulfurreducens

Alsaqri, Baha
Faculty mentor: Holmes, Dawn; Smith, Jessica
Central Connecticut State University

Fe(III) oxide reduction is a form of respiration used by some anaerobic microorganisms that involves the transfer of electrons on the outer cell surface via electron carrying proteins. Geobacter sulfurreducens, a model species for studying the mechanism of Fe(III) reduction, uses conductive filaments for long-range direct electron transport outside of the cell. Recently, several hypotheses have emerged as to which protein(s) make up these filaments. Some researchers speculate these filaments are comprised of c-type cytochromes including OmcS, OmcZ, or OmcE, while other studies suggest that PilA-pilin monomers assemble into conductive nanowires that transport electrons from the cell surface. In this study, several deletion mutant strains were constructed that lack one or a combination of the proposed cytochrome filaments. Culturing of each of these cytochrome-deficient strains in Fe(III) oxide medium revealed that all of the mutants were still capable of reducing Fe(III). However, a strain in which the wild-type PilA-pili was replaced with a non-conductive pili prevented G. sulfurreducens from reducing Fe(III) to Fe(II). The results from this study demonstrate that PilA-pili rather than c-type cytochromes are the main conduits for Fe(III) oxide reduction by G. sulfurreducens.

12. Uncovering the role of two transcriptional regulators involved in extracellular electron transfer by Geobacter sulfurreducens

Schwarz, Ingrid
Faculty mentor: Smith, Jessica; Holmes, Dawn
Central Connecticut State University

Geobacter sulfurreducens transfers electrons to insoluble electron acceptors via a mechanism known as extracellular electron transfer (EET). During this process, a series of electron transport proteins and conductive filaments carry electrons from the inside of the cell onto the extracellular electron acceptor. The major pilin protein PilA and the outer surface cytochrome OmcS are two major components necessary for EET, however which of these proteins carries out the final step of the electron transport pathway has been under debate. In this study, we found an OmcS-deficient mutant of G. sulfurreducens was surprisingly able to adapt to reduce Fe(III) oxide after an extended lag period. The adapted strain expressed pilA nearly 200-fold that of the wild-type, while expression of other key c-type cytochrome proteins remained unchanged. Whole genome resequencing of the evolved strain revealed mutations in two transcriptional regulators. These transcriptional regulators were further characterized with mutational and gene expression analyses, which provided insight into the regulatory mechanisms involved in EET by conductive pili.

13. Regional Acoustic Differences in the Black-Capped Chickadee (Poecile atricapillus)
Smith, Kamille
Faculty mentor: Cortes-Rodriguez, Nandadevi
Ithaca College

Acoustic differences of vocalizations between populations of several mammal and bird species have been previously observed, resembling dialectal differences observed in human communities. The ability of vocal learning in birds may hold insight into the role vocal communication plays in the speciation process. Bird vocalizations can be functionally differentiated into songs and calls, with calls typically being the shorter and briefer vocalization. Differences in the vocalizations of the Black-capped Chickadee (Poecile atricapillus) have been previously observed in island populations of Martha's Vineyard and Nantucket (MA). The Black-capped Chickadee's call is especially interesting in its bioacoustic complexity compared to its song. In this poster (or paper) we analyzed different populations of Black-capped Chickadees covering much of its geographic distribution to understand their acoustic signals and to learn if there are changes due to geographic isolation between these populations. We obtained 43 song recordings from Xeno-Canto and from the Macaulay Library (Cornell, Lab of Ornithology) and measured their amplitude and frequency using Raven Pro. In addition, we recorded six calls from Black-capped Chickadees from Ithaca, New York, which shown differences in its vocal components compared to averaged measurements of the call found in North America.

14. Hybridization and analysis of vocalizations in Barred Owls and Spotted Owls
Panora, Nathali
Faculty mentor: Sturge, Rachel; Cortes, Nandadevi
Ithaca College

Invasive species have been widely study because of how they compete with native species. The case of the Spotted Owl (Strix Occidentalis)is an interesting one. They inhabit west old growth forests mostly; however, due to deforestation, their habitat has been invaded by the Barred Owls (Strix Varia) whose historical distribution has been west of the Great Plains in the USA. Barred Owls are larger in size and are very territorial which drove Spotted Owls away from their habitat and pushed them even more to the west. The presence of Barred Owls has suppressed the calling behavior of Spotted Owls which is why their population continues to decline. There has also been evidence of hybridization of Spotted and Barred Owls. The main objective of this paper is to evaluate if there are differences in songs between these two species and their hybrids. To answer these questions, we obtained songs from Barred Owls and Spotted Owls from the Macaulay Library and analyzed their frequency and amplitude using Raven Pro. We found that the Barred Owl calls from the west are very similar to Spotted Owl calls. The only hybrid call found and analyzed was very similar to Barred Owl calls.

15. Central Asia Turned Shrubbier in the Past 20 years

Uebelacker, Maxine
Faculty mentor: Fang, Wei
Pace University

Central Asia is an arid and semi-arid region that is highly vulnerable to climate change and population growth. However, studies are lacking in the area on the landcover changes in response to climate drivers and socio-economic drivers. In this study, we analyzed the spatial and temporal dynamics of 7 vegetation types (forests, shrublands, open woodlands, grasslands, permanent wetlands, croplands, and urban land) in Central Asia (including Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan) based on MODIS landcover product (with 500 m resolution) during 2001-2020. Over the past 20 years, Central Asia lost 4.8% of forests, 1.3% of grasslands, 10.5% of croplands, while gained 30.8% shrublands, 50.9% open woodland, 11.6% wetlands, 2.2% urban land. Overall vegetation types shifted from drought vulnerable ones like forest to drought resilient ones like shrublands and open woodland. Copernicus Annual 300 m Land Cover data supported similar patterns. One puzzling result is that the snow and ice cover almost tripled based on MODIS data against observed reduction due to warming and droughts. The study will not only shed new light on shifts of land cover and ecosystem services under climate change and urbanization, but also provide guidance to local policy makers and resource managers.

16. Effects of snake predatory cues and salamander distress signals on activity and site fidelity of the Eastern Red-backed salamander, Plethodon cinereus

Yoder, John
Faculty mentor: Epp, Kristen
Eastern Connecticut State University

Prey animals must detect and avoid predators while minimizing the costs associated with avoidance. Plethodon cinereus, a terrestrial salamander, uses chemical cues for intraspecies communication and detection of predators and prey. It shelters under rocks and logs, and exhibits site fidelity to cover objects. Thamnophis sirtalis is a common snake predator of P. cinereus. When stimulated with predator cue from T. sirtalis and distress cue from conspecifics, P. cinereus exhibits avoidance in laboratory conditions. We examined whether these behaviors would be observed under field conditions. I tested the avoidance response of P. cinereus in relation to site fidelity over 24 h by introducing predator odor beneath salamander-occupied cover objects. When compared to a water control, predator cue did not significantly decrease site fidelity. We also tested whether predator cue prompted the avoidance of soiled substrate under field conditions. When paired against a water control, salamanders avoided predator cues. These data suggest that P. cinereus avoids odor from predators and distressed salamanders when access to cover objects is not available. This is the first study to establish behavioral avoidance of predator cue by P. cinereus under field conditions and lends insights about the importance of cover objects for predator avoidance.

17. Removal of the Pharmaceutical Molecule Promethazine from Simulated Wastewater by Functionalized Cellulose Nanocrystals

Williams Malik
Faculty mentor: Pinto, Alexandre; Choudhury Mahbuboor
Manhattan College

This presentation will highlight the potential use of cellulose nanocrystals as an adsorbent for removing Promethazine from water. Promethazine is an emerging contaminant used as a sedative for pre and post-surgery treatments. It is expected that the results presented in this study can offer insights and resources for further studies aiming to scale up the application of cellulose nanocrystals as adsorbents for mitigating different pollutants from wastewater.

18. Removal of High Phosphate Levels Using the Ion Exchange Resins Amberlite® and MP-Carbonate® and Determination of Its Concentration by UV/visible Spectrophotometry

Gindhart, Marisol
Faculty mentor: Fan, Jianwei
Manhattan College

Phosphorus is a common constituent of agricultural fertilizers, manure, and organic wastes in sewage and industrial effluent. It is an essential element for plant life, but when there is too much of it in water, it can speed up the reduction in dissolved oxygen, which, in turn, can cause fish kills and harm other aquatic life. Therefore, the Environmental Protection Agency (EPA) established the recommended criteria for phosphorus to be no more than 0.1 ppm for streams not emptying into reservoirs and less than 0.05 ppm for streams discharging into reservoirs. The EPA has also established 0.05 ppm as a safe level in drinking water since too much phosphate can cause health problems, such as kidney damage and osteoporosis. We report here on removing high phosphate levels using the tri alkylammonium-containing ion exchange resins Amberlite® and MP-Carbonate®. The capacities of adsorption (mgPO4/g beads) were calculated at different pHs and different initial concentrations of phosphate. An absorption calibration curve was established to monitor the concentration of phosphate in the solution by forming an ammonium phosphomolybdate complex.

19. Exploring the effect of respiratory syncytial virus (RSV) infection on mRNA and protein expression of calnexin (CANX) and integrin alpha V (ITGAV)

Huntley, Emily
Faculty mentor: Tremaglio, Chadene
University of Saint Joseph

Respiratory syncytial virus (RSV) causes 3.2 million pediatric hospitalizations due to respiratory distress, and 118,200 deaths, annually. There are currently no vaccines or therapeutics, therefore studies of the basic biology of RSV may uncover new targets for treatment. This study explores the relationship between RSV and cellular mRNAs, calnexin (CANX), and integrin alpha chain V (ITGAV). CANX encodes an ER-associated protein involved in the stress response to infection, while ITGAV encodes an integrin that may play a role in RSV cell entry. Recently, it was shown that a viral protein, M2-1, binds these mRNAs during infection, but it is unknown whether this binding event alters their expression. Cells were infected with RSV and protein lysates were harvested and subjected to Western blot to determine ITGAV and CANX protein levels in mock and RSV infected cells. Preliminary results suggest that CANX is downregulated during RSV infection. Results for ITGAV were inconclusive. Quantitative RT-PCR will be performed to determine whether CANX and ITGAV mRNA levels are affected by RSV. If it is confirmed that RSV infection alters the expression of CANX and ITGAV, this may be a mechanism for how the virus evades the immune response and gains entry into cells.

20. Integration of In-silico Research with In-vivo and In-vitro Studies to Reveal Therapeutic Targets and Mechanisms Underlying COVID-19 Augmentation of Parkinson’s Disease Progression

Zhang, Jonathan
Faculty mentor: Sulie L Chang
Seton Hall University

Severe acute respiratory syndrome-coronavirus-2 (SARS-CoV-2) infection causes Coronavirus Disease-19 (COVID-19). SARS-CoV-2 internalizes via angiotensin-converting enzyme-2 (ACE2) leading to systemic inflammation. Preliminary studies using Ingenuity Pathway Analysis (IPA) revealed COVID-19 mechanisms contributing to the neuroinflammation signaling pathway (NISP) leading to neurodegenerative diseases like Parkinson's disease (PD). The present study integrates in-silico, in-vivo, and in-vitro studies revealing Telmisartan’s potential therapeutic approach to COVID-19 augmentation of PD. GSE159812, an in-vivo study, identified differentially expressed genes (DEG) in postmortem brains of the COVID-19 patients. In-silico IPA core analysis identified enriched canonical pathways, and diseases & functions associated with the DEGs. In-vitro PC-12 cells treated with 1-methyl-4-phenylpyridinium (MPP+) and 6-hydroxydopamine (6-OHDA) serve as PD models and Lipopolysaccharide (LPS) inducing inflammation mimics COVID-19. Cells were treated with telmisartan (10 μM) for 24 hours followed by viability assessment. Overlaying GSE159812 on the COVID-19 PD network increased the expression of NISP and PD. IPA identified potential therapeutic drugs to counterbalance the NISP and ACE2 expression: Telmisartan. Telmisartan significantly increased viability treated with LPS and 6-OHDA in PC-12 cells. Our integration of in-silico, in-vivo, and in-vitro studies suggested the involvement of NISP and ACE2 in COVID-19-triggered PD pathology. Telmisartan treatment serves as a potential therapeutic strategy to COVID-19-induced neurodegeneration.

21. Investigation of the role of deregulated miR-654 and miR-4454 in melanoma pathogenesis and progress.

Maffia, Michael
Faculty mentor: Babapoor, Sankhiros
Sacred Heart University

The incidence of melanoma has continually increased mortality rates over the past decade in the United States. In 2013, it was estimated that 76,690 individuals (both male and female) were diagnosed with new cases of cutaneous melanoma, and out of those cases, 9,480 resulted in death. MicroRNA(miRNA)s are endogenous, 22 nucleotide non-coding small RNAs, which can regulate gene expression in animals and plants by complementary base-pairing to the mRNAs of target genes- which specifies mRNA cleavage or translation repression. We have established a distinct set of miRNAs associated with invasive and aggressive melanoma phenotypes. For the past several years, we have been investigating their (including but not limited to miR-4454) role in the invasion and migration of malignant melanoma cell lines including A375P. Recently Liu et al. 2022 reported a tumor-suppressing function for miR-654-5p in colorectal cancer. This microRNA was one of the highlighted microRNAs in our previous study. We obtained the SK-MEL-26 human melanoma cell line from Memorial Salon Kettering Cancer Center to study miR-654. This cell line expresses mutant B-Raf (V600E) and wildtype N-Ras. After seeding the cells and transfecting them with miR-654 and a control scrambled sequence upon reaching 60%-70% confluency, cells in each well were subjected to a scratch and were imaged at different time points. Image J (NIH website) was used to measure the area between the edges of the scratched monolayer from at least three locations per well at different time points. These results were compared against the control wells, which were transfected with a scrambled sequence that did not generate any miRNA. The results indicated that the upregulation of miR-4454 significantly increased (P-value= 0.01) the migration rate of A-375P and Sk-Mel-26 cells (P-value= 0.018) after 48h. In contrast, the migration of transfected Sk-Mel-26 cells with miR-654 significantly decreased after 24h and 48h (P-value= 0.0008 and 1.58867E-05 respectively). These results indicate that miR-4453 acts as an oncomiR where its upregulation is associated with an increase in melanoma cell proliferation and migration. In contrast, miR-654 acts as a tumor suppressor where its upregulation is associated with a decrease in melanoma cell proliferation and migration.

22. Do Looks Really Matter? A Content Analysis of Gender Differences in Character Portrayals in Children's Activity Books

Tamis, Alexa; Wolf, Daphne
Faculty mentor:
Ithaca College

Research on gender portrayals in print and audiovisual media shows that girls and women are often portrayed in a stereotypical manner (Hamilton et al., 2006; Matthes et al., 2016), Edelstein & Richardson (2022) found this in children's activity books with respect to differences in color schemes, types of activity, and themes in books targeted to boys vs. girls. The current study focused specifically on the characters shown in 11 children's activity books. A total of 3018 characters were analyzed by pairs of trained coders, coding each character's skin and hair color, hair style, facial expression, body type, and relationships with other characters. The results showed significant gender-typing in the way characters were portrayed. Female characters were more likely to be portrayed as thin, smiling, with happy or neutral facial expressions, and to be in relationships with other characters (especially as family members and friends). In contrast, male characters exhibited a wider range of emotions (e.g., anger, fear, concentration, pride) and were shown to be in work and sports relationships or no relationship at all. Hair and skin color reflected a character's possible race and ethnicity, with complex findings that may influence the extent to which children "see themselves" in these books.

23. Infidelity; Mood and Family Structure

DenDanto, Isidora; Berkowitz, Jolie; Daley, Sophie
Faculty mentor:
Ithaca College

Infidelity can be reflected as either physical or emotional intimacy with someone outside a committed relationship (Hertlein et al., 2006). The current study explores the relationships between infidelity, mood, and family structure, among other variables. It expands on previous research conducted on physical and emotional infidelity and the relationship with personality traits, specifically extraversion and openness, as well as impulsivity (Daley et al., 2022). For the current study, the hypotheses that are being proposed are: A sample of 417 students enrolled at a liberal arts college completed an anonymous online survey using Qualtrics. Participants responded to survey items and completed scales using Zung self-rating anxiety scale and Zung self-rating depression scale. The results demonstrated that people who have been physically cheated on are significantly more anxious than those not. This effect was not seen for depression. Family structure was associated with reports of having cheated on a partner. These and additional findings are discussed, and limitations of the study are outlined.

24. Romantic Beliefs; Impacts of Family Structure and Relationship Satisfaction
Thompson, Claire; Carney, Cecelia; Paulino, Johanna
Faculty mentor:
Ithaca College

Romanticism is the general ideology someone holds in regard to intimate relationships and has been operationalized as four distinct beliefs: “Love finds a way”, “One and only”, “Idealization”, and “Love at first sight” (Sprecher & Metts, 1989). Prior research has found that the quality and structure of relationships in a person's family of origin impact their romantic world view (Zagefka et al., 2021). Research has also found that romantic beliefs impact current relationship satisfaction (Zagefka & Bahul, 2020). The current study explores the relationship between romanticism, relationship satisfaction, and family structure. A population of 463 Ithaca college students completed an anonymous online survey using Qualtrics. Participants responded to survey items and completed scales including the Romantic Belief Scale and Relationship Assessment Scale. Romanticism was positively associated with current relationship satisfaction, though there was wide variability in the predictive value of romantic belief type. However, a more complex pattern of relationships between family structure and romantic beliefs was observed when accounting for gender. These and other findings are discussed along with recommendations for future research.

25. Calcium-mediated Modulation of Fibroblast Growth Factor Homologous Factor Induced Voltage-gated Sodium Channel Long-term Inactivation
Goldschmidt, Gabriella
Faculty mentor: Mohammad, Nomon; Marra, Christopher; Goldfarb, Mitchell
Wagner College

Fibroblast growth factor homologous factors (FHFs) are accessory proteins expressed throughout the central nervous system (CNS). FHFs bind directly to the c-terminal domain of voltage-gated sodium channels (Nav) and modulate gating properties. There are four FHFs and each has an a-type isoform (AFHFs). AFHFs can induce what is called long-term inactivation (LTI). In hippocampal pyramidal CA1 neurons (HipN), LTI alters the cell's firing pattern described as spike frequency accommodation/adaptation (SFA). SFA is presumed to play a role in learning and memory, but there are other LTI influencers outside of AFHF-induced LTI and the degree of SFA in cells varies. AFHFs have a calmodulin binding site. We seek to determine if this site serves in calcium-dependent modulation of AFHF induced LTI, suggesting that calcium levels modulate firing properties. We aim to determine if LTI is altered in CA1 HipN via whole-cell patch clamp via extracellular chelation of calcium. Overall, calcium chelation by extracellular addition of EGTA significantly increased observable LTI in CA1HipN, exhibiting a potential modulatory mechanism of LTI and SFA. The blockade of calcium channels via cadmium showed significant modulation of LTI. Therefore, calcium-mediated modulation of LTI could be a product of calcium influx through partially calcium permeable Nav.

26. Design, Synthesis and Exploration of Binding Interactions of Peptide Drug Conjugates with EGFR and FGFR receptors – A Computational and In Vitro Study

Hunt, Hannah L.
Faculty mentor: Banerjee Ipsita A.
Fordham University

Peptide based therapeutics has been gaining importance due to their targeting abilities, particularly for targeting receptors over expressed in tumor cells. Bioactive peptides obtained from natural resources are of particular interest, as such peptides can enhance targeting and biocompatibility. In this work, we have designed new peptide conjugates of drug moieties with anticancer abilities to examine if the targeting ability toward EGFR and FGFR2 receptors is enhanced. In addition, we also explored the binding abilities of the conjugates with mutated receptors, which lead to chemoresistance. Because pyrimidine and purine derivatives display anti-tumor activity, we designed new conjugates that were covalently attached with newly designed purine and pyrimidine derivatives as drug candidates. We first conducted computational studies to determine binding affinities and the stability of the receptor bound complexes using docking and molecular dynamics simulations. To further validate our results, we conducted SPR analysis with the optimal conjugates. Furthermore, cytotoxicity studies and apoptosis assays were then conducted with tumor cell-lines that are known to express these receptors. Our results indicated that the conjugates were found to be significantly more effective against the tumor cells compared to the neat peptides. Such conjugates may be potentially developed for targeting tumors.

27. Developing Bioengineered Tissue Scaffolds with Collagen Mimics

Goncalves, Beatriz G.
Faculty mentor: Banerjee, Ipsita A.
Fordham University

Developing bioengineered scaffolds can revolutionize treatment and provide patient-specific therapeutic options. In this work, we first synthesized a new peptide bolaamphiphile by conjugating a derivative of galactose with cardiac protective peptides to develop a functional biomaterial that can effectively assimilate with the extracellular matrix. The biomaterial was integrated with a novel collagen mimetic peptide that was developed in our laboratory. To prepare the scaffold, we utilized bioprinting using a 22-gauge needle, to form a porous biomaterial with precise dimensions. The biological compatibility of the scaffold and its ability to promote growth and proliferation of mammalian cells was examined. Specific biomarkers for growth of tissue and actin polymerization were also explored. Mechanical properties examined indicated that the scaffold obtained displayed elastic properties. Thus, we have developed a novel hybrid peptide-based scaffold that may have potential applications in tissue regeneration.

28. Developing Bio-organic Peptide Amphiphiles for Drug Delivery

Murray, Molly E.
Faculty mentor: Banerjee, Ipsita A.
Fordham University

In this work, we have developed a hybrid bio-organic biomaterial and explored its capability as a drug delivery vehicle into glioblastoma cell models. The delivery was tested at varying pH values (pH 7.2 to mimic physiological pH and at pH 5.8 to mimic the tumor microenvironment). Results showed that a burst release followed by sustained release was observed under in vitro physiological conditions, while a step-wise release was observed under acidic conditions. Furthermore, the release was found to be concentration dependent. We then grew 3D tumoroids to mimic the three-dimensional environment tumors. Results revealed that the drug delivery vehicles released the drug into the tumoroids, causing cytotoxicity and were found to be well distributed throughout the tumoroids. Overall such biomaterials may be developed for targeted delivery.

Poster Presentations

29. Design of Marine organism derived peptide conjugates for tumor targeting
Biggs, Mary; Goncalves, Beatriz; Murray, Molly
Faculty mentor: Banerjee, Ipsita A
Fordham University

Mammalian fibroblast growth factor receptors (FGFR) are a family of tyrosine kinase receptors which result in dimerization upon binding to its ligands followed by phosphorylation, and activation of downstream signaling pathways, including Ras-MAPK and PI3K pathways. However, unregulated FGF/FGFR signaling is associated with aggressive cancer phenotypes and chemotherapy resistance. In addition, in some cases, FGFR2 has been found to mutate. One such mutation is the V564F mutation. In this work, we have developed new peptide conjugates derived from marine sponge and explored the interactions of ten conjugates and peptides with the wild type and mutant FGFR2 receptors using computational methods, specifically through docking studies and molecular dynamics simulations. Based on the results obtained, we then examined the binding interactions of the most optimal peptides with both wild type FGFR2 and its mutated form FGFR V564F using surface plasmon resonance method. Through this study, we have designed a series of new peptides or peptide conjugates that can selectively bind to the mutated form or to the wild type FGFR2. Some of these peptides may be potentially developed for targeting overexpressed receptors in tumor cells.

30. Using Protein Crosslinking To Investigate Rsc 1 and Rsc 2 in Chromatin Remodeler RSC
Coady, John
Faculty mentor:
Manhattan College

Genetic code expansion was used which allowed us to introduce an unnatural amino acid chemical crosslinker into a histone protein and trap protein-protein interactions at the chromatin surface, in a living cell. The goal of this research was to investigate how histones interact with two chromatin remodeling proteins, Rsc1 and Rsc2. These proteins are members in larger remodeling complexes in yeast and are isoforms that do not coexist in RSC remodelers. It is unclear how these two RSC subunit proteins alter the function of the remodeler complex and why there are two separate isoforms. We aimed to identify potential functional differences and similarities in these proteins by monitoring their contacts to histone proteins under different cellular processes. We probed several different positions along the histone H3 tail, which is a well known docking site for numerous protein-nucleosome interactions. This work concluded that position L20 on the H3 subunit was a potential binding site for Rsc 2.

31. Approaches to Increased Spatiotemporal Resolution of Chromatin Immunoprecipitation Techniques through the Employment of Nonconical Amino Acid Histones

Moleri, Pamela
Faculty mentor: Wilkins, Bryan J.
Manhattan College

Our lab utilizes an in vivo crosslinking technique to examine histone-protein interactions in the living nucleus of yeast. Most recently, we mapped the contacts through which the RSC remodeler ATPase motor subunit, Sth1, interfaces with nucleosomes, and detailed the binding regulation via histone acetylation and SUMOylation. Our approach provided temporospatial details from the view of the histone protein encoded with the crosslinking probe (p¬-benzoylphenylalanine, pBPA), however, while we can provide a clear map of Sth1 binding to the nucleosome we cannot assess details of where along the chromatin fiber this binding is occurring. One important aspect of our research is that we do not remove genomic copies of endogenous histone genes and crosslinking histones compete for nucleosomal occupancy. Because of this, it is difficult to evaluate where along the chromosomal fiber the crosslinked remodeler is acting. To address this issue, we are utilizing chromatin immunoprecipitation (ChIP) and developing a double crosslinking and double immunoprecipitation technique. Prey proteins of interest are expressed from a genetic background producing Myc-tagged variants (Sth1-myc), while the crosslinking bait histones are HA-tagged. Following histone-Sth1 crosslink capture, standard ChIP protocols are used. An initial HA-precipitation of histone associated DNA fragments allows for purification of the crosslinking histone and isolation of DNA in these fragments. A secondary IP from the Myc-tag on the Sth1 clarifies the original pool to identify the bridging interaction. We have successfully managed to perform the double IP and generate a pool of DNA that is associated with Sth1-histone protein-protein interactions. These were verified by following fractions of protein via western blotting. We are currently identifying appropriate qPCR targets to assess the efficacy of our double-ChIP protocol. Understanding the global incorporation of the pBPA-histones alone would be of great importance to this work. Additionally, this approach could be a powerful tool to assess nucleosome occupancy of proteins that interact at the nucleosome more transiently and are difficult to pull down in normal coprecipitation reactions.

32. Targeting the EGFR Receptor Mutant through Natural Products
Mahabadi, Vida; Goncalves, Beatriz G
Faculty mentor: Banerjee, Ipsita A.
Fordham University

The L858R mutant form of the epidermal growth factor receptor (EGFR) has been found to be over-expressed and active in various cancers. We created various iridoid derivatives and computationally explored and compared their interactions with EGFR wild type and the EGFR mutant receptors. We first conducted docking studies to determine the binding affinities. We then analyzed the hydrogen bond donor/ acceptor capability of the derivatives using Turbomole and subsequently Cosmotherm. Particularly sigma profiles were generated which showed clear distinctions in the hydrophobicities. Molecular dynamics simulations revealed the stability of the receptor-ligand complexes and in most cases showed that the incorporation of a peptide moiety enhanced binding. MMGBSA calculations were done from the trajectories to determine the binding energies, and the contribution of the different types of energies. Finally, we tested the derivates using ADMETlab 2.0, which revealed the physiochemical properties of each derivative. Results indicated that the components were not hERG blockers, and did not form Pgp-substrates. MDCK permeability values were also determined.

33. Encapsulation and release of iron contrast agents from liposomes
Thompson, Brayden; Kleiner, Corinne; Pinti, John
Faculty mentor: Chowdhury, Saiful; Morrow, Janet; Stoj, Christopher
Niagara University

Magnetic resonance imaging (MRI) is one of the most widely utilized diagnostic technologies in clinical medicine and biomedical research. Lanthanide complexes, particularly gadolinium (III) based complexes, are used to enhance MRI signal contrast and intensity. However, due to concerns about gadolinium induced toxicity, we have explored paramagnetic transition metal complexes as contrast agents. High spin iron(III) is a preferred alternative given the abundance of iron in the human body. The paramagnetic effect of contrast agents on the surrounding water molecules produces changes in proton relaxivity within certain organs and lesions or tumors in the body. Various nanoparticle vehicles such as liposomes have been developed that allow for increased bio-absorption and greater tissue selectivity of drugs as tracked by MRI contrast agents. This project investigates pH, temperature, and ultrasound sensitive liposome preparations for the potential controlled release of contrast agents for theranostic MRI applications in mouse tumor models.

34. Analysis of how small metabolic molecules affect B. subtilis biofilm formation
Jihaan, Taeef
Faculty mentor: Wacker, Sarah
Manhattan College

Biofilms are communities of bacteria that are attached to a surface and held together by a self-produced matrix. The molecular mechanisms that trigger bacteria to form a biofilm are not well understood, but the process requires bacteria to recognize signals from their environment. This research uses the model bacterium Bacillus to investigate whether metabolic compounds including acetate, propionate, and pyruvate have a role in triggering biofilm formation. We were particularly interested in whether these molecules triggered the kinase KinD which is known to have a role in biofilm formation. As a quantitative readout of biofilm formation, we used transcriptional reporter assays in which luciferase was under the control of promoters for tapA, eps, or sdpA. We measured the change in activity of these reporters in the presence and absence of KinD. We determined that acetate, propionate, and pyruvate were able to increase the activity of the reporters, but that they worked in different ways. Propionate and acetate had larger effects on the direct reporters of biofilm (tapA and eps) than pyruvate did. Of the three molecules, only pyruvate required KinD for its activity. Further research will be conducted to determine whether these molecules work through other kinases.

35. Water Lifetime within the Topoisomerase IA Active Site is Affected by Ethacridine
Strahs, Daniel
Faculty mentor:
Pace University (NYC)

Topoisomerase is a class of enzymes responsible for DNA maintenance. The enzyme cleaves and re-ligates either a single or double strand of DNA, depending on the topoisomerase type, to alleviate supercoiling. The reduction of supercoiling allows for other enzymes to interact with DNA to carry out their respective function(s). The structural differences between type 1A (prokaryotic) and type 1B (eukaryotic) topoisomerases suggests that inhibiting one type would not affect the other. This has implicated type 1A topoisomerase as a viable drug target to treat antibiotic resistant bacteria and potentially certain types of cancers.

Ethacridine is a known type 1A topoisomerase inhibitor, yet the mechanism of inhibition is not well understood. However, experimental results have suggested that ethacridine does not intercalate the base pair stack. Preliminary results from previous experiments have shown that ethacridine exhibits sequence-specific inhibition. Simulations of topoisomerase 1A with a cleaved single-strand substrate suggests that there may be specific water molecules within the active site that are affected by ethacridine binding. Our examination of residential lifetime of water molecules within the active site has identified different structures that are altered by ethacridine binding. The implications of water on ethacridine-based inhibition will be discussed.

36. A method to analyze electrostatic interactions between Ethacridine and Topoisomerase IA in E. Coli

Aayla, Noor
Faculty mentor:
Pace University

Topoisomerases are a class of enzymes that are responsible for the modifications of DNA by prioritizing the cleaving and supercoiling method of single or double stranded DNA. Topoisomerase I remains in two distinct functional classes, being type IA topoisomerase (present in prokaryotes) and type IB (present in eukaryotes). Ethacridine is an established type IA topoisomerase inhibitor and does not inhibit type II enzymes, yet the mechanistic behavior of its properties are not clear. Previous experiments have identified that ethacridine exhibits sequence-dependent inhibition. Simulations of six-different topoisomerase IA-DNA complexes with and without ethacridine have revealed complex behavior. We have developed a protocol to examine the evolving electrostatics by assigning the electrostatic potential contributions to the nearest atoms, and monitoring the changes between pairs of structures at varying timesteps. Results will be presented, illustrating the method and discussing the analysis of simulations and electrostatic contributions to ethacridine's sequence-specific behavior.

37. Impacts of Natural Product-Peptide Conjugates in Aging Research through Molecular Dynamics and Docking Studies

Mukhit, Aigerim; Biggs, Mary
Faculty mentor: Banerjee Ipsita A.
Fordham University

The receptor TGF-β Type II (transforming growth factor receptor beta) shows strong growth inhibitory activity in multiple cell types ensuing in cellular senescence. Furthermore, dysfunction of TGF-β signaling has also been connected with aging-related diseases such as Alzheimer’s disease, tissue fibrosis and inflammation. On the other hand, the overexpression of the delta-opioid receptor in keratinocytes causes dysfunction of several proteins essential for maintenance of the integrity of skin. In this work, we have developed a series of antioxidant-peptide conjugates with critical endogenous peptides and examined the binding interactions with these receptors. The goal is to gain insights into the role of these conjugates in binding to these receptor systems and modulating skin regeneration and ageing, and possibly developing therapeutics for aging related diseases.

38. Small Molecules for Modulation of Interactions with Opioid and SOD receptors

Phan, Emma; Murray, Molly E
Faculty mentor: Banerjee, Ipsita A.
Fordham University

The sigma1 receptor has been shown to be implicated in depression, addiction, neuropathic pain and in the modulation of cardiovascular diseases. Lately it has also been shown to be involved in amyotrophic lateral sclerosis (ALS) due to a single point mutation (E102Q) in this receptor. While the sigma1 receptor was once considered to belong to the opioid receptor family, studies have revealed that it is relatively different compared to the delta, mu and kappa opioid receptors. In a recent study, it was discovered that the binding cavity of the receptor is highly hydrophobic. In this work, we have designed new peptide-tri-terpene conjugates to examine the binding interactions with the Sigma1 receptor and compared the results with those of that of superoxide dismutase (SOD1) receptor and the delta opioid receptors. The goal is to develop novel therapeutics with potential applications to mitigate ALS.

39. Synthesis and biological evaluation of multivalent glyco-peptoid inhibitors against bacterial adhesion

Moquete, Jack; Tattersall, Julie; Abu, Macmillan
Faculty mentor: Dehigaspitiya, Dilani
Central Connecticut State University

Increasing rates of uropathogenic Escherichia coli (UPEC) resistance to antimicrobials require the development of new series of antibiotics that are effective against resistant strains. For this purpose, antiadhesive therapy is a potential approach where you block the attachment of the bacteria onto its host cell. Herein we describe the design, synthesis, and evaluation of multivalent antiadhesive agents against UPEC.

40. Thiophene adsorption in simulated fuels using reduced graphene oxide-titanium dioxide (rGO/TiO2) heterostructures as adsorbents
Authors: Ali Ahmad Sabri, Santunu Barua, Connor Smith
Faculty mentor: Mahbuboor R. Choudhury, Alexandre H. Pinto
Manhattan College

The primary objective of this study was to fabricate heterostructures composed of reduced graphene oxide (rGO) and titanium dioxide (TiO2) at varying mass ratios through hydrothermal synthesis. The reaction mixture was subjected to different pH values before being introduced into the hydrothermal reactor. Specifically, the pH values of 2, 8, and 11 were employed for the preparation of the rGO/TiO2 heterostructures. The resulting samples were subsequently characterized using XRD and IR spectroscopy. Adsorption experiments were conducted to evaluate the efficacy of the heterostructures as adsorbents using solutions of thiophene in octane with an initial concentration of 5.0 x 10 -5 mol.L -1. Notably, heterostructures comprising 50% rGO and 50% TiO2 demonstrated the highest removal percentage at a fixed pH preparation value. These discrepancies may be attributed to differences in the heterostructures' morphology or specific surface area.

41. An Intramolecular Friedel-Crafts Alkylation of N-Benzylaziridines: A Novel Synthetic Method with an Application Toward the Total Synthesis of (±)–Pancratistatin
Dressner, Andrew
Faculty mentor: Di Grandi, Martin
Fordham University

Background. Pancratistatin (5, equation 2 below), a member of the Amaryllidaceae family of natural products, was originally isolated from a Hawaiian spider lily and subsequently found to have unique anti-cancer properties. While several published syntheses of this compound have been reported, this research explores the potential use of N-benzyl aziridines as precursors to 1,2,3,4-tetrahydroisoquinolines, part of the core ring system of this natural product (equation 1).

Results. Earlier we demonstrated that subjecting N-benzylaziridines to either TsCl/AgOTf or triflic acid was sufficient to effect a rearrangement that afforded 1,2,3,4-tetrahydroisoquinolines. We have expanded this chemistry to include more highly functionalized starting materials, which as expected permitted the use of weaker acids for activating the rearrangement. Additionally, this modification has the potential to render the sequence enantioselective when effected with chiral sulfonic acids.

Conclusions. Application of this ring expansion methodology to more highly functionalized N-benzylaziridines has defined milder reactions conditions, which can potentially render the reaction enantioselective.

42. Exploring the Diastereoselectivity of the NaBH4 Reduction of (±) Benzoin and its Derivatives

Massa, Nicole; Qian, Jin
Faculty mentor: Di Grandi, Martin
Fordham University

Background: Second semester Organic Chemistry undergraduates perform the reduction of racemic benzoin using sodium borohydride (NaBH4). This reaction is completely diastereoselective, yielding only one of two possible reduction products, as determined by the NMR spectroscopy for the corresponding acetonide derivative 2 (shown below). We previously developed a three-step procedure for altering the diastereoselectivity of this reduction to produce predominantly 3. However, this reaction is not nearly as selective as the original (~1:4 for 1b to 2/3 vs 49:1 for 1a to 2/3 respectively), which led us to question why.

Methods: We anticipated that solvent as well as choice of reducing reagent would impact of the diastereoselectivity of this reaction, and we therefore began our studies by exploring these two variables. The reduction products were subsequently converted to the acetonide using established procedures (importantly, this does not affect product distribution), which makes diastereoselectivity easily measurable.

Results: Preliminary data suggest the reduction is sensitive to both solvent and reducing agent. This implies that although the Felkin-Anh model is sufficient for predicting the major product in most instances, the situation is clearly more complicated, and requires a more detailed analysis that should account for the reducing reagent and solvent.

43. Developing novel gels for environmental remediation: properties and gelation abilities of quaternary ammonium salts

Nettgen, Maria; Milczanowski, Julia; Zarankov, Olivia
Faculty mentor: Thomas, Marie
Fordham University

We present the synthesis and properties of amphiphilic quaternary ammonium salts based on the tertiary amine 1,4-diazobicyclo[2.2.2]octane (DABCO) along with the synthesis of various ionic liquids as part of a larger scheme to develop ion gels that may be useful for environmental remediation, specifically in the area of purifying petroleum products of nitrogen and sulfur contaminants.
The compounds proposed were tested for their ability to gel water, ethanol, and room temperature ionic liquids.
Nearly all proposed DABCO derivatives have been synthesized, melting points have been obtained for a few of the derivatives with differential scanning calorimetry (DSC), and thus far, di-cationic DABCO derivatives appear to be better gelators than the mono-cationic derivatives.

44. Preparation of the reduced graphene oxide-titanium dioxide (rGO/TiO2) heterostructures by hydrothermal heating

Whyte, Dominique; Kola, Isabella; Smith, Connor; Vincent Jr., Donovan; Cho, Dylan
Faculty mentor: Choudhury, Mahbuboor; Pinto, Alexandre
Manhattan College

This project aimed to prepare heterostructures made up of titanium dioxide (TiO2) and graphene oxide (GO) combined in different proportions. The GO was prepared using a modified Hummer's method, starting with graphite dispersed in a mixture of H2SO4 and H3PO4, followed by the addition of potassium permanganate (KMnO4) as the oxidizing agent, and then stirred for 72 h at room temperature. The TiO2 was prepared by reacting metallic Ti with H2O2 and NH4OH to produce a soluble peroxo complex. This reaction produces an amorphous Ti precursor. Both the Ti precursor and the GO were combined dispersed in deionized water in different mass ratios and heated in a hydrothermal reactor at 220 C for 24 h. In the end of the crystallization process, a heterostructure of reduced graphene oxide (rGO) and TiO2 was produced. The TiO2/rGO heterostructures were characterized using X-ray diffraction and infrared spectroscopy, and transmission electron microscopy. The X-ray diffraction results indicated that the TiO2 was mainly composed by the anatase phase. The infrared spectroscopy indicated the presence of different O-containing functional groups associated with the rGO.

45. Automated computer-vision analysis pipeline for calcium imaging of neuronal network activity

Oluigbo, David; Shwatal, Nathan; Ding, Wenqi; Yuan, Yin.
Faculty mentor: Hemberg, Erik; Feord, Rachael; Mierau, Susanna.
Massachusetts Institute of Technology

Mouse or human-derived neurons form synaptic connections in vitro and show spontaneous network activity, which can be visualized using calcium imaging. Bursts of action potentials lead to transient increases in intracellular calcium, which increases the fluorescent signal from neuronal cell bodies. Identification of these cell bodies, in order to extract the fluorescent signal, can take experts 2-5 minutes per calcium imaging recording. Our automated pipeline aims to accelerate the analysis of spontaneous cellular-scale network activity in cultured neurons. We created a Python-based pipeline that (1) detects neuronal cell body contours using computer vision, (2) extracts the mean fluorescence within these contours, and (3) identifies transient fluorescence changes due to action potentials. We validated this pipeline by comparing our outputs from calcium imaging recordings from murine dissociated cortical cultures (n=10) with labeled data generated by an expert neuroscientist. Our automated pipeline efficiently detects neuronal cell body contours in approximately 30 seconds per recording, and its run time from the cell body identification to neuronal activity detection is approximately 2 minutes per recording. Our next step is to integrate this pipeline with our downstream cellular-scale network analysis to facilitate our investigation of cellular-scale network development in cultured neuronal networks.

46. Entity sentiment analysis for labeling a jesus novel data set
Stish, Daniel; Weynand, Sarah
Faculty mentor: Kapolka, Anthony
Wilkes University

Beginning with 75 pericopes of Jesus' baptism narrative, each located in one of Stanzel's narrative hextants and assigned to one of four purpose categories: mythologizing, traditional, demythologizing, and deconstructing, we asked whether entity sentiment analysis alone was sufficient for a machine learner to perform correct classification. We attributed each sentence in the text to an entity (actor) using the AllenNLP library to perform coreference resolution and dependency parsing, and then performed sentiment analysis on the text associated with each actor.

47. Wave Generation Machine
Calabrese, Luke; Wing, Luke; Bolarinho, Logan; Duross, Lauren; Bertone, Alexander; Aldrich, Patrick
Faculty mentor: Thomas, Charles
Roger Williams University

Coastal erosion is an extremely pressing issue in the 21st century. As oceans rise, and weather becomes more violent, ocean conditions tend to follow suit, which in turn leads to increasing erosion rates in vulnerable areas. Erosion in these areas can lead to large amounts of property damage and even total loss if severe enough. The Wave Generator Machine serves as an instrumental tool in coastal erosion research conducted by Roger Williams professor Dr. Pamela Judge and the gathered data will also be used for her engineering students in future courses. Also ideally it will be available for the entire engineering department and be used for a multitude of classes. The Wave Tank will allow various biopolymeric soil compounds to be tested for their validity in reducing the severity and impact of coastal erosion. A senior group of engineering majors have fabricated the wave generation machine as part of their year-long design course. This was completed with iterative 3D modeling via SolidWorks, creating working groups to design and create different aspects of the machine, and changes to the design after encountering unforeseen challenges. All which were done via weekly meetings throughout the 2022-2023 academic year at Roger Williams University.

48. Bike Trailerable Multi-Passenger Boat

Barry, Quentin; Fasolino, David; Noonan, Max; Pratt, Tyler; Pino, Bianca; Keskin, Irem
Faculty mentor:
Roger Williams University

Several watercraft options, including kayaks and canoes, that are towable by bikes with trailers are available on the market. However, these options do not allow more than two people to access the water with ease. The team designed a four-passenger boat and trailer system, which can be towed by a bike, to fill this void in the market. By following the engineering design process, multiple cost effective, easy to use, and durable boat concepts were proposed. These initial designs were put through a series of tests including stress and strain simulations, as well as buoyancy calculations to review each concept for its advantages and disadvantages. By doing so, pieces from each design were taken to achieve an alpha-prototype of a boat and trailer system. Further testing and a customer needs analysis led to an adaptable design with rain barrels and a space for netting for users to sit which allowed the product to be robust and cost effective. Rain barrels are tapered in the front to provide stability, maneuverability, and a more hydrodynamic design. The completion of this project will provide a market-competitive boat to customers to launch directly from their bike, negating mooring fees and gasoline.

49. Sailboat Mast-Mounted Wind Turbine

Higham, George; Robbins, Callum; Cerro, Raymond; Haner, Kyle; Leary, Kieran; Larssen, Victor
Faculty mentor: Stewart, Gordon
Roger Williams University

Cruising sailboats use small wind turbines to recharge batteries that are used to power ship systems. These turbines are often located at the stern of the vessel. This location has many drawbacks. The purpose of this project is to develop a device which can mount a wind turbine to the top of a sailboat mast. This location allows for the turbine to interact with higher, more consistent wind velocities, which in turn will generate more power. Design guidelines were constructed using actual boater feedback and needs. Analyses were performed to further specify design necessities and narrow potential solutions. A concept of the device's function and general means of operation was agreed upon. The device features a sled/base plate, which can be hoisted up the mast using the halyard. Once the desired height is reached, the sled can securely attach to the mast and the turbine will rotate into place using the specially designed pivot arm. Ideally, the sled will be fixed to the mast and the turbine will pivot into place simultaneously using mechanical linkages. This project is still in its development stage with no working prototypes, only theorized methods and preliminary CAD models.

50. Phenotypic characterization and Analysis of Tnt1 insertion mutations in mutants defective in symbiotic nitrogen fixation in the model legume plant Medicago truncatula
Le, Anne
Faculty mentor: Veerappan, Vijaykumar
Eastern Connecticut State University

Legume plants form a symbiosis with the soil bacteria rhizobia and convert atmospheric nitrogen into biologically available ammonia by symbiotic nitrogen fixation (SNF). This is important because agriculture depends on synthetic fertilizers as a major source of nitrogen. Synthetic fertilizer production depends on fossil fuels which is expensive and not sustainable. To discover novel genes that control SNF, I am characterizing four Medicago truncatula Tnt1 retrotransposon insertion mutants defective in SNF including NFxxx44, NFxxx18, NFxxx06 and NFxxx39. Wild-type and mutant plants were grown on aeroponic system in the absence of nitrogen and phenotypes were characterized. WT shoots are green with roots containing large ovoid pink nodules indicating efficient nitrogen fixation. All the SNF mutant plants display reddish-purple shoots with roots showing small spherical white/light pink nodules indicating deficient nitrogen fixation. Tnt1 insertions in each mutant will be identified using the Medicago Mutant Database. Genomic DNA sequences flanking Tnt1 insertions will be aligned to the Medicago genome to identify the exact locations of Tnt1 insertion mutations. Discovery of genes involved in SNF will help agriculture because farmers would use less artificial nitrogen fertilizers to grow important non-legume crops such as wheat and corn.

51. Using CRISPR/Cas9 gene editing to test the hotspot hypothesis
Navarro, Alexis; Tucci, Mikayla; Daley, Mariah; Coreno, Joanna; Kiontke, Karin; Fitch, David
Faculty mentor: Kiontke, Karin; Fitch, David; Woronik, Alyssa
Sacred Heart University

Morphogenesis, or the development of form, is a universal process during development of multicellular organisms and is regulated by the precise spatiotemporal expression of genes within gene regulatory networks (GRNs). While advances have been made in mapping GRNs that control embryonic development in model organisms, we lack an understanding of how GRNs evolve and regulate post-embryonic morphogenesis. A theory for GRN evolution, known as the hotspot hypothesis, predicts that GRN architectures bias GRN evolution, such that the same genes will be repeatedly co-opted during convergent evolutionary events (i.e. the independent evolution of the same phenotype in multiple lineages). These genes are predicted targets because they are key regulators that occupy central positions within the GRN and are responsible for coordinating multiple gene modules that govern cellular events. This work aims to test the hotspot hypothesis using a post-embryonic morphogenic process, known as Tail Tip Morphogenesis (TTM), which evolved multiple times independently in Caenorhabditis elegans and related nematode lineages. In C. elegans a DM-domain transcription factor, known as DMD-3, is required and sufficient for TTM and is therefore the key regulator. Here we test the prediction that DMD-3 has been co-opted as the key regulator during an independent evolution of TTM within the related nematode Oscheius tipulae.

52. Identification of Shark Species through DNA Barcoding Show Evidence of Mislabeling and Prohibited Species Sale in New York City Fish Markets

Singh, Nirvana, DeySarkar, Trishita, Saniei, Shayan, Lu, Kelly
Faculty mentor: Crispo, Erika
Pace University

With the steady decline in shark populations, preventative measures have been put in place with the goal to preserve the species. Three species are classified as prohibited for recreational fisheries by the New York State Department of Environmental Conservation, with an additional 19 species prohibited for commercial fishing in the USA. To determine which species are being sold in markets around New York City, DNA barcoding was used to identify species of 39 meat specimens. The predominant species identified were Dusky smooth hound (Mustelus canis) and Atlantic sharpnose (Rhizoprionodon terraenovae). There was an apparent theme of vague labeling when it came to the advertising of the meat, with many being advertised simply as ‘shark.’ Labeling such as this allows for the potential sale of prohibited species. We did identify two specimens belonging to a prohibited species, sandbar shark (Carcharhinus plumbeus). Three specimens labelled as mako, both species of which are endangered, were actually revealed to be Dusky smooth hound via DNA barcoding. Overall, our results indicate that consumers may be unaware of what shark species they are purchasing at New York City seafood markets and that they might be purchasing prohibited species

53. Effect of eys Knockout on Retinal Degeneration in Zebrafish

Chu, Karen
Faculty mentor:
John Carroll University

Retinitis pigmentosa is a vision disorder affecting approximately 1 in 4,000 people.
One of the mutations producing this retinal degenerative disease is a protein eye shut homolog (EYS) knockout in humans. Few vertebrate animals possess this gene; thus, little is known regarding the mechanisms through which this mutation operates. Zebrafish (Danio rerio) have the eys gene in their genome and their retina shares many similarities with the human retina. These animals also can regenerate damaged photoreceptors in the eye. Based on the similarities in morphology and regenerative abilities of zebrafish, they were utilized in the current experiment to characterize the mutation. Eyes from 12 months post fertilization (mpf) and 6 mpf were used to characterize degeneration over time. The mutations, bbs2, and cep290 have been previously characterized in zebrafish and, when compared to subjects with an eys mutation, have been shown to elicit similar responses in the retina. Based on this information, it was hypothesized that effects of an eys mutation would be very similar to those caused by a bbs2 or a cep290 mutation. Results indicate that zebrafish with an eys knockout mutation have progressive retinal degeneration, increased proliferation among photoreceptors, and an activated inflammation response in retinal cells.

54. Assessment of human anthropometry with a markerless motion capture system
Riccitelli, Christopher; Mowad, Jenna; Moore, James
Faculty mentor: Savell, Kristen
Sacred Heart University

In this methodological study, we evaluate the accuracy and repeatability of the Theia markerless motion capture system for determining accurate anthropometric measurements. We will assess the correlation between linear measurements from a sample of human subjects (limb, torso, shoulder, limb segment lengths, bi-illiac breadth, body height, etc) as measured by the markerless system to those same measurements as assessed by hand. We will also calculate the intra-observer error of the markerless system's measurements by repeating measurement sessions for each subject multiple times over several days.

We hypothesize that the markerless system will demonstrate low intra-observer error and a high correlation with hand-measured anthropometric measurements. If our results support this hypothesis, the markerless system will be used for our project investigating the relationship between anthropometry and the biomechanics of ascending steep inclines. Being able to use the markerless system in our slope-walking project would not only allow for more consistent data collection, it would remove the risk of introducing inter-observer by having multiple individuals collect anthropometric measurements by hand. In assessing the accuracy and repeatability of the Theia markerless system for anthropometric measurements, we can determine if it is a useful method of data collection for our lab's larger biomechanics project.

55. Characterization and Antimicrobial Testing of an Unknown, Purple Pigment-Producing, Gram-Negative Rod-Shaped Bacterium
McCracken, Michael; Wagner, Haley
Faculty mentor: Solomons, James; Glazier, Virginia
Niagara University

This study aims to characterize and understand the antimicrobial capabilities of an unknown, gram-negative, rod-shaped bacterial species that was isolated from soil on the campus of Niagara University. Purple pigmentation, thought to be due to the tryptophan derivative violacein, was observed on both agar media and in liquid culture. Violacein possesses antimicrobial activity against a number of different organisms. In amphibians, violacein is produced by the bacteria Janthinobacterium lividum living on their skin in a mutualistic relationship with its host, which then inhibits the growth of Batrachochytrium dendrobatidis, the causative organism of the fungal disease chytridiomycosis in amphibians. Our study seeks to identify the bacteria producing this purple compound and test whether the compound elicits similar antimicrobial activity against common human fungal and bacterial pathogens, such as Cryptococcus neoformans, Candida albicans, Staphylococcus aureus, Streptococcus pyogenes and Salmonella spp. We aim to determine ideal growing conditions for our unknown species and characterize its metabolic properties.

56. Di-butyl Phthalate Disrupts Muscle, Motor and Sensory Neuron Development in Embryonic Zebrafish

Paquette, Evelyn; Rodrigues, Alyssa; Giacolone, John Paul; Fumo, Michael
Faculty mentor: Roy, Nicole
Sacred Heart University

Phthalates are added to plastics to enhance its flexibility, durability and transparency. Phthalates are found in a wide range of goods including household, agricultural and medical products as well as building and industrial materials. Phthalates are not covalently bound to plastics and leach into the environment. Phthalates are now pervasive and ubiquitously present in the atmosphere, soil and sediment, surface and wastewater. Phthalates are known endocrine disruptors and their effects on male and female reproduction are well noted. However, studies on the developmental effects of di-butyl phthalate (DBP) are limited. Here we investigate the developmental toxicity of DBP on motor and sensory neuron populations and the muscle structures motor neurons innervate using the zebrafish vertebrate model system. We investigate these effects during the time window of development spanning the period where embryonic patterning determines adult structures. We find that treatment with DBP induces loss and disorganization of primary motor neuron innervation of the somatic tissue with concomitant disruptions to muscle fiber organization. Furthermore, we find disruptions to sensory motor neuron development including defects in dorsal root ganglion and their peripherally extending axons. Rohon-Beard sensory neurons were also disrupted showing loss of the bilateral soma positioning along the length of the spinal cord and their afferent axonal projections to the epithelium. Thus, we conclude that DBP is toxic to developing motor and sensory neurons during embryonic development.

57. Examining the Binding Interactions of Epidermal Growth Factor Receptor and its Mutants

Rico, Mia I; Goncalves, Beatriz G; Hunt, Hannah L
Faculty mentor: Banerjee, Ipsita A.
Fordham University

Over-expression of the epidermal growth factor receptor (EGFR) can lead to detrimental health consequences and has been implicated in several types of cancers. In addition, mutations in EGFR have been linked to poor prognosis and chemo-resistance. We hypothesized that developing new targeted peptide conjugates of terpenes with inherent tumor suppressive ability may lead to suppression and mitigation of growth of tumor cells that express these receptors. Thus, we have designed several conjugates with natural terpenes and examined their interactions with EGFR and its mutant EGFRT790M. After carrying out initial docking and molecular dynamics studies, we then synthesized the optimal conjugates and examined their impact on the cellular activity of tumor cells over-expressing these receptors. Our results from molecular dynamics initially indicated that some of the conjugates showed more efficient binding with the mutant receptor, which was validated through laboratory studies. We also conducted flow cytometry and fluorescence imaging to determine if the conjugates induced apoptosis.

58. Exploring Gene Regions: ITS and mat-K for identifying Brassica varieties via DNA Barcoding

Manelis, Jacqueline; Driza, Eden
Faculty mentor: Egan, Mary
Fordham University

Typically, gene regions such as rbcL are used to amplify plant DNA, however it is not as successful in identifying to the species level or below (such as for identifying varieties of Brassica). Gene regions like mat-K have been shown to be informative, but mat-K may not always yield PCR results. For identifying plants, a multiple gene region barcode would be needed. We therefore examined multiple gene regions (rbcL, mat-K and ITS) for their utility in identifying plant species from DNA extracted from pollen collected by bees. In addition, we wanted to compare plant diversity between a commercial hive that is moved to different locations to pollinate crops and a stationary hive. Finally we wanted to see if we would be able to use the DNA we extracted from pollen pellets to identify the pollinators. We sorted pollen pellets collected by bees according to color (as a proxy for species) and then used molecular methods to identify the plants and their pollinators based on DNA sequences.

59. Investigating the Role of NF-kB Inhibition on Müller Glia Proliferation Following Injury in the Zebrafish Retina

Baffa, Danielle
Faculty mentor:
John Carroll University

Although the mammalian species possess a limited capacity for regeneration of retinal cells after cell ablation, understanding the underlying mechanisms of photoreceptor regeneration in model organisms may provide a therapeutic link for the future. Previous research has shown that teleosts such as Danio rario (zebrafish) are able to reprogram their Müller glia after injury to acquire characteristics similar to stem cells that allow them to regenerate their photoreceptors. Studies have suggested that the nuclear factor kappa B pathway (NF-κB) may influence this regeneration process by increasing the number of proliferating cells after injury to the retina. To determine if the NF-κB pathway plays a role in Müller glia progenitor cell production, proliferating cells in the inner and outer nuclear layers were quantified. A control group treated with DMSO was compared to a group treated with metronidazole and NF-κB Activation Inhibitor (NAI), a group treated with only metronidazole, and a group only treated with NAI to see if inflammation would impact the amount of proliferating Müller glia cells. Quantification results of the inner nuclear layer indicate that inhibiting the NF-κB pathway has no statistically significant effect on the number of proliferating cells in the zebrafish retina.

60. Using Planarian Flatworms to Model Acetaminophen Toxicity During Regeneration
Tangney, Connor
Faculty mentor:
Central Connecticut State University

Planarian flatworms serve as an effective model system to study tissue regeneration due to neoblasts distributed throughout most of their body. These are the only dividing cells in planaria and have the capacity to replace any cell type in the body. Planaria are also emerging as a toxicological model system. Here we are validating use of planaria to study acetaminophen toxicity. Acetaminophen (APAP) is a commonly used analgesic that, when metabolized, produces the NAPQI metabolite as a byproduct. In high concentrations, NAPQI can disrupt mitochondrial function ultimately leading to oxidative stress. Worms treated with 0.6 mM APAP during head regeneration failed to regenerate pigment cells in their optic cups. This is consistent with published findings in vertebrates that APAP inhibits melanin synthesis. To further elucidate the roll of APAP toxicity on regeneration, we are using phosphohistone H3 (PH3) antibody to specifically bind mitotic cells. Addition of a fluorophore-linked secondary antibody allows dividing cells to be visualized through fluorescent microscopy. We hypothesize that accumulation of NAPQI is causing cell death in neoblasts, thereby decreasing the rate of cell proliferation. It's expected that APAP-treated worms will have a lower density of fluorescent neoblasts than the untreated control.

61. Effect of capsaicin analogs on proliferation and differentiation of mouse skeletal myoblasts
Decker, Kendall; Regan, Brenna; Felix, Alana
Faculty mentor: Deschenes, Suzanne
Sacred Heart University

Myogenesis, the development of muscle tissue, is required for maintaining muscle mass and regeneration of muscle lost to injury or chronic illnesses such as muscle dystrophy. Therefore, there has been long-standing interest in defining conditions that promote myogenesis. Capsaicin, the active component of chili peppers, acts on the transient receptor potential cation channel vanilloid 1 (TRPV1) pathway, to stimulate myogenesis of myoblasts both in vitro and in vivo (Kurosaka et al. 2016). Our research aims to investigate the effects of capsaicin analogs on the proliferation and differentiation of C2C12 mouse myoblasts. We treated myoblasts with ethanol (negative control), capsaicin (positive control), 6-gingerol, and piperine, and assessed proliferation by counting the number of cells in each treatment group after 24 and 48 hours. We found no significant effect by capsaicin and its analogs on cellular proliferation. Preliminary results will be presented on current experiments focusing on capsaicin analog effects on differentiation of myoblasts into myotubes. Differentiation will be measured by the assessment of 1) myotube diameter, 2) number of nuclei per myotube, and 3) the fusion index (% nuclei in myotubes). The results of our differentiation studies will inform the future direction of our research, including exploring additional capsaicin analogs and other candidate compounds.

62. Investigation of the rule of deregulated miR-654 in melanoma pathogenesis and progress.

Dunay, Rebecca; Ricciardella, Gisella; Kavanagh, Julia
Faculty mentor: Sankhiros Babapoor
Sacred Heart University

The incidence of melanoma has continually increased mortality rates over the past decade in the United States. In 2013, it was estimated that 76,690 individuals (both male and female) were diagnosed with new cases of cutaneous melanoma, and out of those cases, 9,480 resulted in death. MicroRNA(miRNA)s are endogenous, 22 nucleotide non-coding small RNAs, which can regulate gene expression in animals and plants by complementary base-pairing to the mRNAs of target genes- which specifies mRNA cleavage or translation repression. We have established a distinct set of miRNAs associated with invasive and aggressive melanoma phenotypes and investigated their role in the invasion and migration of a malignant melanoma cell line A375P. Recently Liu et al. 2022 reported a tumor-suppressing function for miR654-5p in colorectal cancer. This microRNA was one of the highlighted microRNAs in our previous study. We obtained the SK-MEL-26 human melanoma cell line from Memorial Salon Kettering Cancer Center to study miR-654. This cell line expresses mutant B-Raf (V600E) and wildtype N-Ras. After seeding the cells and transfecting them with miR-654 and a control scrambled sequence upon reaching 60%-70% confluency, cells were well subjected to a scratch and were imaged at different time points. Image J (NIH website) was used to measure the area between the edges of the scratched monolayer from at least three locations per well at different time points. These results were compared against a control cell, which was then transfected with a scrambled sequence but did not generate any miRNA. The migration of transfected cells with miR-654 significantly increased after 24h and 48h (P-value= 0.0008 and 1.58867E-05 respectively). These results indicate that miR-654 acts as a tumor suppressor where their upregulation is associated with a decrease in melanoma cell proliferation and migration.

63. Studies on the Voltage Dependence of Activation and Inactivation of Two Voltage Gated Calcium Channel β Subunit Mutations Associated with Epilepsy

Brown, Emma; Allam, Salma; Suppa, Gabriella; Hanson, Paris
Faculty mentor: Zafir, Buraei
Pace University

Voltage-gated calcium channels (VGCC) are protein complexes expressed throughout the nervous system. VGCC are present on the membranes of excitable cells where they control membrane excitability and the release of neurotransmitters. The principal component of VGCC complexes is the α1 pore-forming subunit. The α1 subunit is known to contain the channel pore and the gating machinery. In addition, VGCC complexes contain an intracellular ß subunit responsible for regulation of channel expression and gating properties. Mutations in both subunits have been linked to neurological and cardiovascular diseases. Genome-wide association studies previously identified mutations associated with epilepsy in all four genes that can encode the VGCC ß subunit (ß1 – ß4). We studied two mutations found in ß3: E53K and Q131L. These mutations were first introduced into WT ß3 using site-directed mutagenesis, then functionally analyzed using two-electrode voltage clamp recordings to compare the electrical currents from Xenopus oocytes expressing VGCC with either mutant or wild-type ß3 subunits. Our results showed a significant reduction in VGCC current amplitude with E53K, but not Q131L mutants when compared to wild-type channel complexes. In addition, activation and inactivation with E53K mutants were significantly right-shifted, but not with Q131L. These results suggest possible mechanisms for the channelopathy.

64. Oxytocin and Inhibitory Synaptic Function in Zebrafish

Padmore, Talia; Caluza, Isaia; Du Rand, Jonathan; Murphy-Wilson, Eveline
Faculty mentor: Rodenas-Ruano, Alma
Fordham University

Excitation within the nervous system increases the likelihood that a neuron fires an action potential, which is crucial to the functioning of the nervous system. At early stages of human development, all synapses are excitatory, but later in development, some synapses become inhibitory. This is mediated by the GABA switch, where chloride ion currents are reversed, leading to inhibitory synaptic transmissions, and reduced neuronal excitability. Impairment of this switch can lead to abnormal brain development and cause several disorders such as epilepsy, schizophrenia, ASD, and more. What triggers this GABA switch is the KCC2 protein, which promotes hyperpolarization of the neuron by encouraging inward diffusion of chloride ions. Studies show that kcc2 gene expression, which encodes for KCC2, is triggered at late embryonic/early postnatal periods, but the mechanisms that lead to this increased expression are not fully understood. The purpose of our research was to investigate the mechanisms that regulate KCC2 protein expression. More specifically, our focus was on the role of oxytocin and its potential influence on the regulation of the KCC2 expression.

65. The Role of the Endothelin-1 Pathway in Experimental Autoimmune Encephalomyelitis

Mark Rizk
Faculty mentor:
John Carroll University

Multiple Sclerosis (MS) and other neuroinflammatory diseases are a major problem for the central nervous system. A wide spectrum of pathologies occurs because of MS disease. Endothelin-1 (ET-1) has recently become established as a possible biomarker for inflammatory pathologies in neural diseases and has been linked to the pathology of MS and experimental autoimmune encephalomyelitis (EAE). ET-1 has been found to be released to the cerebral circulation in greater levels in patients suffering from MS compared to healthy individuals. However, it is not clear how the ET-1 pathway affects the demyelination progression in MS. To examine the effects of ET-1 in demyelination, EAE mice were treated with the ET-1 receptor antagonist Tracleer (bosentan), an FDA approved drug for hypertension implicated in studies of neuroinflammation, and their outcomes were compared to control EAE and healthy mice in the current study by examining the spinal cord sections from all mice were studied. It was found that EAE mice treated with bosentan had significantly less spinal cord white matter demyelination compared to vehicle treated EAE mice. The vehicle EAE mice also had significantly greater demyelination compared to healthy mice. The bosentan treated EAE mice showed reduced demyelination, suggesting that bosentan protects against EAE.

66. Parvalbumin and perineuronal net distribution across neocortex

Hamilton, Sydney; Victoria, Kayla; Belaire, Samantha
Faculty mentor: Kuljis, Dika
Sacred Heart University

The neocortical microcircuit is composed of diverse cell types, whose distribution across cortical layers and regions is not uniform. Parvalbumin (PV) neurons are one subtype of GABAergic neurons found in most cortical layers that play a powerful role in regulating cortical activity through their soma-enriched synapses. Perineuronal nets are extracellular matrix structures that surround neuronal somas and are thought to control plasticity of underlying synapses. Previous studies have shown there is a high rate of colocalization between parvalbumin and WFA-positive perineuronal nets (PNNs) in multiple cortical regions. The current study uses immunohistochemical staining and fluorescence imaging to examine the correlation between PV neurons and PNNs in superficial and deep cortical layers across regions in male and female C57Bl6J mice.

67. Cell Senescence in WS1, BJ, CCD-1070SK and IMR-90 Skin and Lung Fibroblasts
Adjmi, Matthew; Lomtadze, Lizi; Molina, Lizet
Faculty mentor: Bednarz, Justyna; Luckett, Deborah;
Fordham University

This study investigated the senescence and morphology changes at different passage numbers in WS1, BJ, CCD-1070Sk and IMR-90 skin and lung fibroblast cells. This is valuable information for researchers who are doing studies on fibroblast cells. Each cell line was cultured in Eagle's Minimum Essential Medium(EMEM) and supplemented with 10% Fetal Bovine Serum, 1% penicillin-streptomycin, and 1% Non-Essential Amino Acid (NEAA) using T25 and T-75 flasks. The cells were subcultured at 75% confluence with 0.25% trypsin and 0.53mM EDTA. The Senescence-associated β-Galactosidase (SAβ-gal) assay was performed at various passage numbers using Lab-Tek 2-well and 4-well chamber slides. Senescent cells were indicated by a blue color in the cytoplasm. The senescence and morphologies of the cell lines were observed at various passages. In both the skin and lung fibroblasts, senescent cells were found in both lower and higher passage numbers in addition to the morphological changes.

68. Isolation and Characterization of Staphylococcal Bacteriophages
Cordani, Jenna; Horvath, Gianna; Vu, Kevin
Faculty mentor: Gallo, Mark A.
Niagara University

Staphylococcus aureus, and especially methicillin-resistant S. aureus, are becoming increasingly resistant to antibiotics. Bacteriophages are an alternative treatment option for Staph infections. Bacteriophages were isolated from the white-tailed deer Odocoileus virginianus. This work is a continuation of past research as new phages have been isolated. The current work involves the characterization of these phage and their applicability for killing a number of type strains of S. aureus.

69. Isolation and Expression of Glycosyl Hydrolases From Paenibacillus sp. JDR-2
Tompkins, Katherine; Brusino, Donovan
Faculty mentor: Gallo, Mark
Niagara Univesity

Glycosyl hydrolases are enzymes that are critical for the cleavage and degradation of sugars. This project aims to utilize this ability to remove sugars found on the surface of red blood cells to make what is essentially a universal blood. The bacterium Paenibacillus sp. JDR-2, was utilized as a source of genes that could conceivably carry out this function. Genes were identified based on sequence comparisons to known hydrolases and were cloned into pET28-TEV. Expression was carried out in E. coli BL21(DE3). The resultant proteins were shown to be present in high levels through SDS-PAGE. Analysis of their activity is an ongoing area of research.

70. Examining the Morphological Effects of bacM Mutations in Myxococcus xanthus
Romero, Kevin K.
Faculty mentor: Gains, Benjamin; Zuckerman, David M.
Iona University

Bactofilins are a class of bacterial cytoskeletal proteins that have been shown to be both highly conserved and contribute significantly to the morphology of cells. In Myxococcus xanthus, BacM is responsible for maintenance of wild-type cell shape and resistance to cell-wall targeting antibiotics. BacM is expressed as large and small isoforms, and a deletion of both leads to the cells adopting a crooked morphology that largely differs from their typical rod-shape. For the purposes of this study, we set out to determine whether both isoforms of BacM are required for the function of the protein. To accomplish this, we quantified the morphological effects of different bacM mutants. We compared morphology from the bacM deletion and wild-type cells to two mutants that each expressed only one isoform. This was conducted via microscopy and image analysis followed by performing linear discriminate analysis and principal component analysis on the data extracted from the images.

71. Developing a Bacterial Two-Hybrid system to determine BacM interactions in Myxococcus xanthus

Forbes, Maryann
Faculty mentor: Zuckerman, David M.
Iona University

Myxococcus xanthus - a bacterium found in soil environments - expresses BacM, a cytoskeleton protein that contributes to the rod-shaped morphology of the cell. The bactofilin domain of BacM has N- and C-terminal faces that contribute to polymerization. The bactofilin domains are predicted to form homodimers by stacking the subunits end-to-end with contributions from hydrophobic residues. The two competing hypotheses have been considered: that the polymerization of BacM is polar through the interactions of the N- and C-terminal faces of the bactofilin domain, and the other is that polymerization is non-polar, through N- to N-terminal and the C- to C-terminal face interactions. We designed and used a bacterial two-hybrid system that uses split luciferase, but failed to detect any signals from our controls. We are currently developing an adenyl cyclase-based bacterial-two hybrid system, which will allow us to quantify the strength of interactions between BacM-BacM dimers and test the contributions of specific residues. If the bacterial two-hybrid is successful in allowing us to measure BacM homodimerization, we will be able to test BacM interactions using different plasmids and determine if BacM polymerization is polar or non-polar.

72. Identification and Isolation of glycosyl hydrolases from the thermophilic bacterium Geobacillus stearothermophilus

Brockman, Bianca; Bouali, Ferielle
Faculty mentor: Gallo, Mark
Niagara University

Glycosyl hydrolases are important enzymes capable of cleaving sugar residues. There is particular interest in the removal of sugars from the surface of erythrocytes with the goal being the production of universal blood. Geobacillus thermophilus was determined to be a likely candidate for the discovery of such enzymes as they are known to contain glycosyl hydrolase genes and have the additional characteristic of being a thermophilic organism. Five strains have been investigated for gene isolation through the use of PCR and degenerate primers. The resultant PCR products were cloned into pET28TEV vector. The expressed proteins will be analyzed for their properties, especially as they relate to hydrolysis of the sugar backbone on red blood cells.

73. Characterization of a strain of Geobacter sulfurreducens deficient in the major outer cell surface cytochromes

Gorman, Sydney; Henry, Kathryn; Real, Lauren; Dion, Laura; Schwarz, Ingrid; Alsaqri, Baha
Faculty mentor: Smith, Jessica; Holmes, Dawn
Western New England University

Fe(III) oxide reduction is a form of respiration used by some anaerobic microorganisms that involves the transfer of electrons on the outer cell surface via electron carrying proteins. Geobacter sulfurreducens, a model species for studying the mechanism of Fe(III) reduction, uses conductive filaments for long-range direct electron transport outside of the cell. Recently, several hypotheses have emerged as to which protein(s) make up these filaments. Some researchers have speculated these filaments are comprised of c-type cytochromes including OmcS, OmcZ, or OmcE, while other studies suggest that PilA-pilin monomers assemble into conductive nanowires that transport electrons from the cell surface. In this study, several deletion mutant strains were constructed that lack one or a combination of the proposed cytochrome filaments. Culturing of each of these cytochrome-deficient strains in Fe(III) oxide medium revealed that all of the mutants were still capable of reducing Fe(III). However, a strain in which the wild-type PilA-pili was replaced with a non-conductive pili prevented G. sulfurreducens from reducing Fe(III) to Fe(II). The results from this study demonstrate that PilA-pili rather than c-type cytochromes are the main conduits for Fe(III) oxide reduction by G. sulfurreducens.

74. Microbiome Depletion Impacts Pathogen Burden and Chlamydia Specific T-Cell Immune Responses

Metzger, Lily; Sinclair, Anna
Faculty mentor: Gondek, David
Ithaca College

Chlamydia infections are the number one bacterial sexually transmitted infection and the leading cause of preventable blindness in the world. Chlamydia infections are usually asymptomatic but can cause inflammation in the reproductive organs. The main immune cells that fight against Chlamydia infections are CD4+ T-cells. Infections are typically treated with antibiotics, however individuals often become reinfected from their partner shortly after those antibiotics wane. We hypothesize that commensal microbiome plays a critical role in both pathogen susceptibility and development of subsequent immune response. To test this, we pre-depleted the microbiomes of mice, allowed those microbiomes to reconstitute, and then challenged mice with Chlamydia. We examined the pathogen load and development of T Cell specific immunity in these altered microbial environments. We show that a depleted microbiome increases pathogen burden and alters adaptive immunity. These data are critical because a vaccine for this pathogen does not yet exist, and we have established that the commensal microbiome will affect mucosal vaccine responses.

75. Holin proteins contribute to fruiting body formation in Myxococcus xanthus
Casper, Makenna S.; Hoxhaj, Ela; Kinlen, Kelli
Faculty mentor: Zuckerman, David M.
Iona University

Myxococcus xanthus is a gram-negative, rod-shaped bacterium that is commonly found in soil. The M. xanthus genome contains two genes (mxan_rs13160 and mxan_rs33480) that resemble holins, phage genes that contribute to host cell lysis. In the phage infection cycle, the Holin proteins cut holes in the host cell's cytoplasm, causing the contents of the cell, including the progeny phase, to disperse from the cell. Under starvation conditions, M. xanthus undergoes a process in which cells aggregate to form a fruiting body, which generates starvation-tolerant spores, but results in the death of a majority of the cells in the fruiting body. An explanation for the cell death has led to competing hypotheses, namely, whether the cell deaths are altruistic or fratricidal. To test for contributions of the Holin proteins to altruistic cell death during fruiting body formation, mutants were generated, each with one of the holin genes deleted. When subjected to starvation, neither deletion mutant formed fruiting bodies similar to wildtype cells. Current research is examining the ability of the mutants to form spores when mixed with wildtype cells, or when subjected to chemical stimulation.

76. Impact of BBP and Acetone Exposure on Fundulus heteroclitus Gut Flora
Ciancio, Ariana; Bocanegra, Alicia; Patel, Priyal; Goldman, Matthew; Vorbau, Jonas
Faculty mentor: Kaplan, Lisa
Quinnipiac University

Gut flora was isolated from Fundulus heteroclitus following a 28-day exposure to water, 0.1 ppm acetone, or 0.1 ppm benzyl butyl phthalate (BBP). Acetone and BBP had no impact on the prevalence of the most common colony colors (white, cream, tan, and translucent). While acetone selected against pink and peach and in favor of a novel isolate color (brown), BBP selected against pumpkin isolates, and in favor of a novel colony color (orange) as well as mustard and peach colonies (present in control but missing from acetone). Most colony margins were 'entire' (control-89%; acetone-81%; BBP-73%). Undulate doubled in the acetone group (15%), as compared to control (7%), but was reduced among BBP isolates (1.1%). Lobate forms decreased within the BBP group (1.1%) as compared to control (4%) and acetone (3.3%), with even margins (24%) appearing only among colonies isolated from the BBP group. Opaque appearance was dominant among all groups, followed by shiny and dull. Among BBP isolates, however, opaque (80%) were approximately 1.5-fold more prevalent, shiny 2 to 2.8-fold less prevalent, and dull 2-fold less prevalent as compared to control and acetone groups. 16S ribosomal sequencing will taxonomically identify genus and species leading to calculation of ecological metrics.

77. Bacteriophage therapy as a treatment for acne and its interaction with antibiotics
Schwarz, Ingrid
Faculty mentor: Davis, Michael
Central Connecticut State University

Bacteriophage therapy has been proposed recently as a method of treating bacterial infections caused by antibiotic resistant bacteria. Bacteriophage (phage) are a kind of virus that only attack specific strains of bacteria. They kill the bacterial cells during phage reproduction, so the number of phage would increase during treatment. Although the idea of phage therapy has been proposed for a variety of infections, it has not yet been used for treating the bacterial skin disease acne, caused by the bacterium Propionibacterium acnes. In this project the use of combination therapy is being investigated, pairing phage and antibiotics. It is important to understand the relationship the two have because if they work synergistically, we would want to use this method of treatment. Preliminary results suggest that subclinical doses of antibiotic (erythromycin) have a greater effect on phage reproduction (and cell killing) than on the growth of the bacteria themselves. This potentially indicates an antagonistic relationship when the two treatments are combined. Antibiotics with different mechanisms of action are being investigated to see if the same relationship is observed.

78. Engineering a minimal extracellular electron transport pathway in Geobacter metallireducens
Dion, Laura; Rogers, Adam; Maia, Dina
Faculty mentor: Holmes, Dawn; Smith, Jessica
Central Connecticut State University

Geobacter metallireducens is a model species for studying extracellular electron transfer (EET), which can be applied for bioremediation, bioenergy production, and metal corrosion. Uncovering proteins involved in the EET pathway is essential for creating genetically engineered strains that will be useful for larger scale applications. The biggest limitation in creating these strains is that G. metallireducens contains many redundant proteins involved in the transport of electrons from the inside of the cell to the outer cell surface. For example, G. metallireducens has six different cytochrome bc complexes (Cbc). Cbc's are needed to carry electrons from the inner membrane to proteins in the periplasm. Of these six, the cbc3 gene complex was the only set found to have higher transcript abundance in G. metallireducens cells grown with Fe(III) oxide as the electron acceptor. In this study, we are determining if only one Cbc complex is sufficient for EET by disrupting genes for the other five Cbc complexes using a scarless genome editing approach. After each mutant is successfully constructed the rate of Fe(III) reduction is measured. The results of this study will also provide insight into the evolution of EET pathways.

79. Newport Cliff Walk Collapse

Caliri, Dean; Flynn, Christopher; Howe, Jason; Liseo, Caterina; Montminy, Donald.
Faculty mentor: Judge, Pamela
Roger Williams University

An initial collapse of the Newport Cliff Walk in Newport, Rhode Island occurred In Spring 2022, between Narragansett Ave and Webster Street near the popular tourism location known as The Forty Steps. Our senior design team performed an initial site investigation which included drone video recording to safely observe the failed slope. The stability of the observatory deck has decreased significantly and requires stabilization measures. Based on our observations, and subsequent analyses, we have developed recommended short-term and long-term solutions to the actively collapsing Newport Cliff Walk. The short-term design recommendations include micropile installation and grout injection for the existing observatory deck. The collapsed section is subject to natural erosion the surrounding land is becoming more susceptible to further collapses and destabilization. Therefore, we also recommend shotcrete over the collapsed section. The shotcrete design will effectively stabilize the current collapsed slope and minimize further erosion. A long-term slope monitoring plan for the Cliff Walk was also developed to limit the chances of catastrophe to pedestrians and tourists. With the increase of collapsed sections along the entirety of the Cliff Walk, it is imperative that a slope monitoring system is established to ensure public safety.

80. Is the mouse Bolt mutation an embryonic lethal allele of Axin2?

Renzi, Anthony V.; Mike J. Hastings
Faculty mentor: King, Thomas R.
Central Connecticut State University

We have developed a new, partial consomic line in standard C57BL/6 mice that is homozygous for at least the distal two thirds of Chromosome 11 from the wild-derived CAST strain. This line (named B6.Chr11CAST) offers numerous microsatellite and single-nucleotide (SNP) differences versus standard inbred mouse strains while being more manageable (docile, fertile, and vigorous) than inbred CAST mice. This new line has already proven useful for high-resolution genetic mapping of the spontaneous lightning bolt tail (Bolt) mutation on Chromosome 11 and for validating the hypothesis that the dominant Bolt defect also encodes recessive embryonic lethality.
Genetic mapping facilitated by our Chr11CAST line has suggested that Axin2 is the likely genetic basis of the Bolt mutation (see abstract by Low, Girard & Renzi, this conference). The Axin2-mGFP knock-in mouse (available from The Jackson Laboratory, Bar Harbor ME) has a membrane-targeted green fluorescent protein (mGFP) sequence inserted downstream of Exon 2. Additionally, Axin2-mGFP homozygotes die as embryos. We now propose to cross fully marked Bolt/Chr11CAST mice with Axin2-mGFP/+ carriers to determine whether these recessive lethal defects can complement one another. A significant deficit of the Bolt/Axin2-mGFP genotype among the live-born progeny would suggest that Bolt is a mutant allele of Axin2.

81. Optimization of a DNA Extraction Protocol for Meiofaunal Identification
Bove, Lilly; Coreno, Joanna
Faculty mentor: Piastuch, Lisa; Stoehr, Ashley; Woronik, Alyssa
Sacred Heart University

Meiofauna are a diverse group of benthic invertebrates that range between 0.04 mm and 1mm in size. They represent 24 of the 35 animal phyla and are ideal for biomonitoring. Their fast population turnover means that community composition can indicate anthropogenic influence and environmental health. The long-term goal of this project is to determine if visual identification of meiofauna at the level of phyla is sufficient to investigate community changes along a disturbed shoreline (Seaside Park; Bridgeport, CT); or if it is necessary to identify lower taxonomic levels via DNA metabarcoding. The latter would allow for the identification of taxa at genus or species levels based on a short variable region in the DNA. At present, this study aimed to optimize the DNA extraction protocol from samples containing meiofauna and sediment using the Qiagen DNeasy PowerSoil Pro Kit. Specific areas investigated included methods of sample storage (-80C vs. ethanol) and cell lysis (vortex vs. Mini BeadBeater-8). The combined use of frozen samples and the Mini BeadBeater-8 yielded more concentrated and purer samples of DNA. However, PCR was still necessary to visualize any DNA fragments following gel electrophoresis. Future work will include continued optimization of protocols, sequencing, and analysis.

82. Measuring the Capacity for Endothermy in Open-Ocean Fishes
Moore, James
Faculty mentor: Stoehr, Ashley
Sacred Heart University

This study uses the heterothermic index, which was previously developed to assess tissue temperature changes in small mammals and birds, to better classify open-ocean fishes along a continuum of ectothermy to endothermy. The body temperature of an ectotherm changes with the surrounding water, while endotherms maintain a somewhat consistent body temperature regardless of the surroundings. Most open-ocean fishes experience water temperature fluctuations when searching for food at different latitudes and depths, but only a few species are considered endothermic. Endothermic fishes cannot maintain as constant a body temperature as large, endothermic mammals, and while the temperature of some tissues varies little with water temperature, the temperature of other tissues increases or decreases with water temperature. For these reasons, it may be insufficient to analyze the capacity for endothermy in fishes dichotomously (i.e., yes or no). This study calculated and compared the heterothermic index for the swimming muscles of endothermic and ectothermic fishes, as well as the water temperature during vertical movement (i.e., true ectotherm). Preliminary results suggest that there is a relationship between the heterothermic index and the known capacity for endothermy in the swimming muscles.

83. Isolation and characterization of Staphylococci from an exotic animal park.
Werner, Ciara.
Faculty mentor: Gallo, Mark, Ph.D.
Niagara University

Staphylococci are gram-positive, low G+C, cocci-shaped bacteria that can be found in many environments. They are often found associated with animals, and are of particular interest due to their relationship with mammals. Certain species and strains are pathogenic, and many are resistant to numerous antibiotics. Methicillin-resistant S. aureus (MRSA) is of particular concern as certain members are resistant to nearly all antibiotics. The following study has isolated a number of Staph from an exotic animal park. Their properties, especially their antibiotic resistance profiles, were examined to determine if there is much overlap in organisms and/or antibiotic resistance genes in this population of animals.

84. Discovery of aerobic anoxygenic phototroph, Sphingomonas, in Devil's Bathtub
Mangioni, Bethany; Kiedrowski, Alexandra; Wrobel, Samantha
Faculty mentor: Edwards, William; Marnocha, Cassandra.
Niagara University

Vertical variability in light intensity, oxygen, and redox potential in meromictic lakes influence the distribution, abundance, and photosynthetic activity of phototrophs. We study phototrophic activity in Devil's Bathtub (DBT), Rochester, NY, a small meromictic lake with anoxic and iron-rich monimolimnion. We isolated a pink pigmented aerobic anoxygenic phototroph (AAP) from DBT and found it to be closely related to Sphingomonas glacialis using 16S sequencing. S. glacialis is a photoheterotroph that uses multiple pigments and photosystems to handle extreme light and temperature variation in oligotrophic conditions. We hypothesize our isolate may have similar adaptations to S. glacialis. However, while DBT is highly eutrophic relative to the alpine lakes where S. glacialis is found, it has similar extreme variability in light and temperature due to the unique geomorphology of the lake. To test this hypothesis, we will grow our isolate under different light intensities and nutrient conditions. We will also characterize the isolate's pigment profile and compare 16S sequences with similar taxa. We hypothesize these adaptations may allow it to endure extremes in vertical and seasonal variation. In addition, this isolate suggests these versatile AAP may be more widespread than previously known, now described in different nutrient regimes than before.

85. The effects of light deprivation on aggression in crayfish

Cox, Rachel
Faculty mentor: Abbas, Syed
Central Connecticut State University

Human beings operate in an environment where they are exposed to approximately 12-hour cycles of light and darkness. Over the years, there has been a departure from basking in sunlight to spending more time indoors under the comfort of dim lights. There is now an "indoor generation" which remains less exposed to sunlight. Given that exposure to light is healthy for mood and important for production of Vitamin-D in skin, how does the lack of exposure to light affect behaviors, specifically aggression? To answer this, a well-established behavioral test was used to evaluate whether crayfish become aggressive or subdued after light deprivation. One group of crayfish was exposed to 12 hours of dim white light (10 Lux intensity) and 12 hours of darkness (0 lux). The second group was kept in dark for 24 hours a day for 5 days. Two contenders from the same treatment group were placed inside a featureless aquarium. The following four parameters were assessed for each crayfish involved in a battle: number of attacks, approaches, retreats, and escapes. The results show that light deprivation can affect crayfish behavior.

86. Associations of Cannabis, Cocaine and Ecstacy (MDMA) use on Mental Distress

Bonventre, Samantha; Scott, Nicole; Patrissy, Cara; Dwyer, Emily.
Faculty mentor: Begdache, Lina.
Binghamton University

Mental distress is a major issue among the undergraduate student population. To combat mental distress, many students resort to psychoactive substances. The abuse of cannabis, cocaine, ecstasy (3,4-methylenedioxy-methamphetamine or MDMA) and other psychoactive substances has become a prevalent issue. The consequences of using psychoactive substances on the mental distress of students is not well known and the purpose of the study was to address this. The study gathered 702 responses from students of various colleges and included self-reported data on psychoactive drugs use and individuals' experience with mental distress. The anonymous survey was created on Google Forms. Mental distress was assessed using The Kessler Psychological Distress Scale (K6+) and analyzed in SPSS, Version 25.0, using Pearson's Correlation Coefficient. A negative correlation exists between nervousness and past cannabis use over 12 months ago. Cocaine usage, low (6-9 times) and high (40 or more times) within the past 12 months, was positively correlated with feeling so depressed that nothing could cheer you up and hopelessness. A positive correlation between ecstasy usage and feeling so depressed that nothing could cheer you up. Our results suggest that students who abuse psychoactive substances are more likely to experience symptoms of mental distress.

87. Behavioral Response of the Zooplankter Daphnia magna to the Chemical Presence of a Visual Predator (the Zebrafish Danio rerio)

Damon, Bridget
Faculty mentor: Stearns, Donald
Wagner College

Diel vertical migration (DVM) is a behavioral mechanism used by fish-food organisms to avoid visual detection by predatory fish by remaining in deeper water during daylight hours, then rising to feed on phytoplankton at night, when visual detection is minimized. Diel et al. (2020) showed that the freshwater crustacean Daphnia magna displays DVM in lakes and ponds when fish predators are present but not when visual predators are removed, indicating predator detection and behavioral response in real time. To test for chemical detection of fish and behavioral response, 46 D. magna were pipetted individually into the middle sections of 50-ml test tubes containing store-bought spring water. In contrast, 44 were similarly tested using aquarium water from a holding tank containing several freshwater zebrafish. The tubes were positioned under fluorescent lights (≈ 0.55 µEm-2s-1) and vertically divided into four equally-sized sections. Every three minutes for 15 minutes, the vertical location of each zooplankter was recorded. Chi-square analysis showed Daphnia vertical distribution to be highly significantly ($p < 0.005$) skewed towards the bottom in the presence of fish chemicals compared with those tested in their absence. Results indicate that D. magna can chemodetect fish presence and behaviorally respond quickly.

88. Use of remote field recorders to document gibbon vocalizations

Bernstein, Olivia; Skalski, Christopher
Faculty mentor: Terleph, Thomas
Sacred Heart University

Autonomous recorders for passive acoustic monitoring (PAM) are often used in studies of birdsong and marine mammal behavior, but much less in primate studies. Most primate studies that use PAM do so to detect whether animals are present, but not to monitor singing patterns or specific song types. Gibbons are Asian ape species that, like many cetaceans and songbirds, engage in extended singing bouts. These include solo songs and duets broadcast by mated pairs, often one or more times a day, and within earshot of neighboring groups. We used autonomous recorders to initiate a long-term study of singing behavior in white-handed gibbons (Hylobates lar), in relation to social and environmental variables. Here we report the length and timing of all song bouts taken over 10-day periods in the rainy versus the dry season, from a remote field recording location in Khao Yai National Park, Thailand.

89. Investigating the life cycle and dominance hierarchy of the subsocial small carpenter bee, Ceratina calcarata

Miller, Riya
Faculty mentor: Lawson, Sarah
Quinnipiac University

Biogenic amines are organic bases that aid in regulating the mechanisms which underlie most behavior, and are a contributor for aggression and dominance hierarchy within social and subsocial species. It has been previously observed that within small carpenter bee, Ceratina calcarata there is a unique dominant-submissive relationship between the mother and eldest daughter. When the mother bee first lays her eggs, she gives her first brood cell a pollen ball that contains significantly less nutrients than compared to her other offspring. This results in the daughter being significantly smaller and more submissive than the mother dubbing her the ‘dwarf eldest daughter.’ It is hypothesized that the dominant-submissive relationship and differences in aggressive behaviors between the mother and dwarf eldest daughter is attributed to the different levels of biogenic amines within the organisms. The mother and dwarf eldest daughter will have their level of octopamine and dopamine manipulated through topical application and circle tube assays will be used to observe and determine any significant change in aggression.

90. The Effects of Chronic Ethanol Exposure on Seizure Susceptibility in Planaria

Hasan Ibrahim
Faculty mentor: Guariglia, Sara
Wagner College

Alcohol use disorder is a widespread and significant public health problem associated with various physical and mental health complications. In particular, chronic alcohol exposure has been linked to an increased risk for seizures. Exposure to ethanol (EtOH) in animal models has been widely used as a model for studying the effects of alcoholism in humans. Chronic EtOH exposure has been shown to produce several changes in the brain and behavior of animals. For example, chronic EtOH exposure has been shown to alter the function of various neurotransmitter systems, including the glutamatergic, GABAergic, dopaminergic, and serotonergic systems. For these studies, we selected to determine if chronic alcohol exposure would induce enhanced seizure susceptibility using bicuculine, an inhibitor of the GABAa receptor. Inhibition of GABAa results in a shift in excitatory/inhibitory balance; the brain is less inhibited and more excited since activation of the GABAa receptor initiates inhibitor activity. To test for seizure susceptibility, we were chronically exposed to 0.1% EtOH for seven days and then tracked their movements when exposed to a range of bicuculine concentrations to determine if and when the animal developed epileptic-like activity. We found that chronic EtOH exposure did not cause any increased susceptibility to seizure-like movements in the planarians, which suggests that the chronic alcoholism mechanism of susceptibility to seizures is likely driven by other means, such as glutamatergic neurotransmission.

91. Tail autotomy and territoriality in Plethodon cinereus
Didero-Mullen, Juliana
Faculty mentor: Epp; Kristen
Eastern Connecticut State University

The Red-backed Salamander, Plethodon cinereus, will sever the end of its tail to evade predators. This process is quick, and the salamander can recover; however, the tail is an important fat storage organ and its regrowth requires significant energetic investment. We hypothesized that this energetic expenditure might influence territorial behavior because a salamander that has autotomized its tail may be disadvantaged in contests against a tailed individual. To test this hypothesis, we used data collected during surveys of artificial coverboard arrays each spring and fall over six years. During surveys, salamander size and coverboard location were recorded, and individuals were uniquely marked with Visible Implant Elastomers™ so that they could be identified in subsequent surveys. We identified individuals that were re-captured within a 6-month period and used logistic regression to determine if tail loss influenced the probability that salamanders were recaptured under the same board. We found that individuals with autotomized tails were more likely to be found under the same board while individuals with higher tail-to-body ratios were found under different boards. Given these results, we suggest that salamanders may be less likely to explore new areas and risk territorial encounters while in physically vulnerable states.

92. BBP Toxicity in Blue Mussel (Mytilus edulis) Locomotion in the Presence and Absence of Tidal Waves
Lorenzo Bafumi, Jamie Songco
Faculty mentor: Kaplan, Lisa
Quinnipiac University

The effect of Butyl Benzyl Phthalate (BBP) and ethanol on Blue Mussel (Mytilus Edulis) locomotion was assessed under wave and still water conditions. Mussel locomotion was recorded for control (exposed to seawater), chemical vehicle (0.1 ppm ethanol, 90 minutes) and BBP (0.1 ppm, 90 minutes) groups. Control mussels exhibited a net movement of 48.26cm under wave action and 10.16 cm in still conditions. Ethanol-exposed blue mussels had a net movement of 60.96 cm under wave action and no movement in still water. BBP exposed mussels had a net movement of 35.56 cm under wave action and zero motion in still water. While all treatment groups exhibited reduced movement in still conditions, control animals were observed to move more than either ethanol or BBP exposed individuals in still water. Under wave action, movement was 26% greater among ethanol exposed mussels and 26% lower among BBP exposed mussels as compared to control. Ethanol and BBP had a net movement of zero in still water conditions, however exposure produced very different results under wave action. Thus, it appears that BBP, administered with ethanol as the chemical delivery vehicle, eliminates the impact of ethanol and suppresses movement below that of unexposed control.

93. Benzyl Butyl Phthalate (BBP) Induction of Hyalella Azteca Morbidity and Mortality
Cherneskie, Thomas; Nicholas, Theodora
Faculty mentor: Kaplan, Lisa
Quinnipiac University

Hyallela azteca, a freshwater amphipod, has been shown to be responsive to benzyl butyl phthalate (BBP) exposure at environmentally relevant concentrations. No mortality was observed after 12-hr exposure for any doses. No mortality was observed for 1.25 or 2.5 ppm BBP following 24 or 48-hr exposure. The lowest observed effect level (LOEL) for BBP-induced mortality was 5 ppm 48-hr exposure, and a lethal concentration (LC50) was only observed at 10 ppm 48-hr exposure. Following 24-hr-BBP exposure, increased mortality was only observed at 20 ppm. Increases in mortality for the 48-hr exposure, however, increased with doubling the dose at 5 ppm (12%), 10 ppm (56%), and 20 ppm (94%). Based upon Likert Scale analysis of morbidity, the no observed effect level (NOEL) was 1.25 ppm, and the LOEL was 2.5 ppm for all exposure times. It appears that H. azteca responds to BBP delivered in an acetone vehicle in a way that is both dose and time dependent. Therefore, H. azteca is a good animal model for evaluating BBP toxicity in freshwater ecosystems.

94. Effect of Benzyl Butyl Phthalate (BBP) on Behavior, Obesogenicity, and Anxiogenicity of Fundulus heteroclitus
Crowley, Maeve
Faculty mentor: Kaplan, Lisa
Quinnipiac University

Benzyl butyl phthalate (BBP) is a manufactured plasticizer and suspected endocrine disruptor shown to induce aggressive behaviors (Betz et al., 2013, Kaplan et al., 2013). Previous research points to obesogenicity and anxiogenicity as potential mechanisms to promote aggression in some animal models (Betz et al., 2013). There were no significant changes in serotonin as determined by ELISA. No significant protein or glycogen concentration changes were determined by Pierce BCA and colorimetric glycogen assays, respectively. Overall, while there were no significant changes in biochemical endpoints (brain serotonin, brain protein, liver glucose, and liver glycogen), aggression was significantly higher among BBP-exposed Fundulus heteroclitus (ANOVA $p \leq 0.00001$). In response to trauma, shoaling was reduced in BBP-exposed fish. While data eliminates BBP as an obesogenic compound for F. heteroclitus, it substantiates that BBP is anxiogenic and has the capacity to disrupt vital protective behaviors (shoaling) in response to trauma.

95. Effect of Benzyl Butyl Phthalate (BBP) and Ethanol on Morbidity and Mortality in Hyalella azteca

Frier, Kelly; Amiti, Elsa
Faculty mentor: Kaplan, Lisa
Quinnipiac University

Hyallela azteca locomotion, morbidity, and survivorship were used to assess the impact of Benzyl Butyl Phthalate (BBP) and ethanol (chemical vehicle). No statistically significant difference was observed between ethanol-exposed and unexposed controls. The lowest observed effect level (LOEL) for survivorship was dose and time dependent (20 ppm: 12-hr exposure, 10 ppm: 24-hr exposure, 2.5 ppm: 48-hr exposure). Following 10 or 20 ppm BBP exposure, survivorship decreased 6% (12-hr exposure), 94% (24-hr exposure), and 100% (48-hr exposure). Lethal concentration (LC50) was also dependent on exposure time (12-hr = no mortality), 24-hr = 7.30 ppm, and 48-hr = 3.81 ppm). Morbidity, scored from 0 (no morbidity) to 4 (maximum morbidity), was also dose and time dependent. For BBP doses between 1.25 and 20 ppm, mean morbidity increased with each doubling of exposure time (12, 24, 48-hrs). As dose increased from 1.25 ppm to 20 ppm, mean morbidity increased 2.1 fold, 2.9 fold, and 2.0 fold at 12, 24, and 48 hr-exposures, respectively. Overall, H. azteca is responsive to BBP (rather than sensitive or resistant), and ethanol does serve as an effective vehicle for BBP delivery. Therefore, H. azteca (with these endpoints and chemical vehicle) serves as a good model for BBP toxicity.

96. Impact of Social Isolation on Gromphadorhina portentosa (Madagascar Hissing Cockroach) Exoskeleton Luster

Perrotta, Reagan
Faculty mentor: Kaplan, Lisa
Quinnipiac University

The social isolation that occurred during both the 2003 SARS outbreak and 2019 COVID pandemic caused significant and long-lasting psychological effects in humans (Balasankar, 2021). Several animal models have been used to assess isolation stress (Lihoreau, 2009), but endpoints are often associated with behavioral disruption that may be challenging to assess. In this study, exoskeleton luster, an easily recognizable morphometric endpoint, was used to assess Madagascar Hissing Cockroach (MHC) isolation stress. MHCs (N=20) were placed in isolation for 10 weeks with food and water ad libitum. By the end of the isolation period, 100% of MHCs exhibited a significant decline exoskeleton luster coupled with increased flaking of the superficial exoskeletal material. When MHCs were reunited in a common enclosure, all 20 MHC exoskeletons (100%) stopped flaking and regained luster within four weeks. Since the stress of MHC isolation manifests in easily identifiable alterations in exoskeleton appearance, MHCs may make a suitable model for the easy detection of other types of social stressors. This endpoint should also be explored as an indicator of other stress types in this model organism.

97. Impact of Chemical Vehicle Choice and Size Class on BBP Toxicity in Blue Mussels (Mytilus edulis)

Fieramosca, Tessa; Mack, Gretchen
Faculty mentor: Kaplan, Lisa
Quinnipiac University

Mytilus edulis (blue mussels) are filter feeding organisms that inhabit coastal areas; they are an ideal model organism to assess environmental disturbances involving toxic pollutants (Carrington et. al, 2014). In this pilot study, small, medium, and large mussels were randomly assigned to one of the three groups: control (unexposed), ethanol (chemical vehicle), and BBP (phthalate plasticizer). Following a 90-minute exposure to ambient water (24 ppt instant ocean®), the chemical vehicle (0.1 ppm ethanol), or BBP (0.1 ppm dissolved in ethanol), mussels were rinsed and placed into observation enclosures. Linear and torque movement was recorded over 123.5 hours. Small mussels exposed to BBP experienced greater linear and torque movement as compared to those exposed to ethanol alone. Larger mussels exhibited decreased linear and torque movement across all treatment groups. These results lead support the use of ethanol as a chemical vehicle to deliver BBP. They also indicate that mussel size class is significant factor in assessing BBP related locomotion.

98. Effects of BBP and Acetone on Fuldulus heteroclitus Foraging Behavior

Ortiz, Brian;Belotti, Todd
Faculty mentor: Kaplan, Lisa
Quinnipiac University

We examined the effect of benzyl butyl phthalate (BBP) on Fundulus heteroclitus foraging. Female fish (N=27) were collected from Long Island Sound (Milford Point) in August 2022. Fish were randomly assigned to Control (C), Acetone Vehicle (AV), or Benzyl Butyl Phthalate (BBP) groups. Prior to exposure, no difference in mean mass (5.2 g), length (5.9 cm), or somatic index (0.857g/cm) was observed among groups. Fish were placed in an observation tank, and the mean time for the first fish (9.6s) and half of the group (28.0s) to find food was recorded. Following depuration and 28 days of 0.1 ppm BBP or AV exposure, fish were reassessed. Mean time for the first unexposed control fish and half of the group to find food was 5.8s and 16.6s. AV fish appeared to find food faster (first fish 3.2s; half the group 13.6s). BBP-exposure resulted in a 3-fold increase in time for the first fish and a 1.8-fold increase in time for half the fish to find food as compared to AV control. No significant difference in food consumption while in the housing aquaria was observed throughout the course of the study. Thus, BBP appears to interfere with foraging behavior among F. heteroclitus.

99. Allelopathic Influence of Eucalyptus Leaves on Growth and Development of Common Brazilian Agricultural Plants

Jafri, Shuja Hassan; Annon, Oshane
Faculty mentor: Garrett Kluthe, Brandy
Saint Peter's University

Eucalyptus sp.are suspected of having allelopathic properties in their roots, bark, and their dried leaf litter. As they are grown in abundance in Brazil, Eucalyptus has a considerable potential for inhibiting the growth of understory and nearby vegetation. This could have a production and income impact on farmers which rely on both the trees and agricultural products they grow. This study used grounded Eucalyptus sp. leaf litter to test for the impact of allelochemicals contained within the leaves on common Brazilian agricultural crops. Extraction techniques mimicked the Folin- Ciocalteu Method; the grounded plant material via pestle and mortar was washed to remove contaminants, after which the milled leaves were extracted in 6.3L of 7:3 acetone: water via gravity filtration. In continuation, serial dilution was performed to test for the levels of allelochemicals within the Eucalyptus sp. leaf litter. Results indicate different amounts of allelochemicals were contained within the Eucalyptus sp. These results suggest that there is a considerable potency of transmission which is occurring at the understory vegetation level, as the Eucalyptus releases its allelochemicals.

100. Baseline macroinvertebrate and infauna communities in an eroding salt marsh prior to restoration

Eaton, Madison
Faculty mentor: Steele, LaTina
Sacred Heart University

Salt marsh restoration is key for resilient coastlines. Invertebrates are key components of salt marsh food webs, serve as water quality indicators, and provide ecosystem services such as nutrient cycling. This study collected baseline invertebrate community data in an eroding Spartina alterniflora marsh with unvegetated sediment seaward of the marsh cliff at Stratford Point, Connecticut as a reference point to assess future restoration. We hypothesized that the existing invertebrate community would resemble that of a mudflat more than a mature salt marsh. We surveyed macroinvertebrates in quadrats along four transects (higher and lower intertidal within the vegetated area; higher and lower intertidal within the unvegetated area) and collected core samples from unvegetated quadrats for infauna. Few macroinvertebrates were present in vegetated transects where slipper shells and periwinkles were most common. Macroinvertebrate densities were highest in the unvegetated higher intertidal transect while infauna density was highest in the unvegetated lower intertidal transect. Polychaetes and mud snails were among the most common macroinvertebrates in the unvegetated transects, while nematodes and copepods dominated the infauna. Overall, baseline data indicated degraded marsh conditions, and we expect the invertebrate community to change following restoration, with an increase in macroinvertebrates like bivalves, gastropods, and decapods.

101. Patterns of snail herbivory and phenolics in restored and natural Spartina alterniflora populations in Long Island Sound

Kailher, Amanda
Faculty mentor: Steele, LaTina
Sacred Heart University

In recent years coastal restoration efforts have been at the forefront of reestablishing resilient salt marsh environments, which are essential in preventing coastal flooding and conserving biodiversity. However, the role of snail herbivory and plant chemical defenses in salt marsh restoration has been understudied. We aimed to determine if snail grazing patterns were linked to plant phenolic content in two naturally-occurring and two restored S. alterniflora populations by collecting 20 whole S. alterniflora stems from four locations in Connecticut: Milford Point (natural), Chaffinch Island Park (Guilford; natural), Stratford Point (two restored populations, one planted in 2015 and another planted in 2017). Leaves were separated and photographed, frozen at -80°C, lyophilized, ground, and stored at -80°C. We also conducted snail surveys at each location. ImageJ was utilized to calculate leaf area and grazed area for each leaf. The Folin- Denis assay was conducted to measure total reactive phenolics in each leaf. Data analysis is underway. We expect lower phenolics in the more heavily grazed S. alterniflora leaves and more evidence of snail herbivory in areas with higher snail densities. Understanding interactions between S. alterniflora and herbivores may prove useful in selecting appropriate plant strains to maximize the success of future restoration efforts.

102. Native and Invasive Aquatic Plant Responses to Amphipod and Snail Grazing

Robinson, Xanthe
Faculty mentor: Steele, LaTina
Sacred Heart University

Invasive species can negatively affect biodiversity and may be connected to plant chemical defenses. However, the extent to which small grazers affect growth and chemical defenses in native and invasive aquatic plants is not well understood. The effect of amphipod (mostly Hyalella azteca) and snail (Physella sp.) grazing on growth and phenolic content was compared in a native aquatic plant (coontail, Ceratophyllum demersum) and an invasive aquatic plant (Eurasian watermilfoil, Myriophyllum spicatum) in two laboratory experiments. In each experiment, growth of each plant was measured as changed in wet mass, and at the end of the experiments each plant was freeze-dried and ground in liquid nitrogen before running Folin-Denis assay for total phenolics. Neither amphipods nor snails had a significant effect on either coontail or milfoil growth. In both experiments (amphipods and snails) milfoil consistently grew more than coontail, and milfoil contained higher levels of phenolics than coontail in the amphipod experiment. However, phenolics were not affected by amphipod grazing itself. Phenolic results are still underway for the snail experiment. The data suggest that although invasive milfoil is more chemically defended than native coontail, grazing by small herbivores did not affect plant growth or induce phenolic production.

103. Nesting site variability of The American horseshoe crab (Limulus polyphemus) and implications egg development within Long Island sound.
Templeman, Graham B.
Faculty mentor: Mattei, Jennifer H.; Kasinak, Jo-Marie E.
Sacred Heart University

Limulus polyphemus, the American horseshoe crab, is a foundational species in their environment and plays a vital role in their ecosystems. The population of L. polyphemus in Connecticut has dramatically declined within the last twenty years due to overharvesting and loss of spawning habitat. Research regarding horseshoe crab nesting habits and the development of clutches must be conducted to better conserve this species. Horseshoe crabs have been observed nesting on rocky beaches, sandy beaches, and in marshes, so research was conducted to determine how habitat affects horseshoe crab egg development. We hypothesized that there would not be a significant difference in egg development based off nesting habitat. Two different habitats were surveyed in Long Island Sound, marsh and sandy beaches from June 2022 through July 2022. Nests were marked and a small portion of the clutch was taken ~7 and ~21 days after they were laid. Preserved eggs were observed for physical traits including color and size to track the development. Initial results show significantly larger eggs in marsh habitat early in development, but no difference in egg size later in development. More research and continued monitoring are needed to further understand how habitat might impact horseshoe crab egg development.

104. Asian shore crab population decline at a marsh restoration site in Stratford, Connecticut
Foito, Leah
Faculty mentor: Steele, LaTina
Sacred Heart University

Invasive species like Asian shore crabs (Hemigrapsus sanguineus) can disrupt coastal ecosystems, including restoration efforts. However, comparatively little attention has been given to the effects of restoring habitats on invasive H. sanguineus populations. This study estimated changes in H. sanguineus population size at a restored marsh site in Stratford, Connecticut from 2019 to 2022. Based on previous predation studies, we hypothesized that the H. sanguineus population would decrease as the restored marsh matured. We conducted mark-recapture studies on H. sanguineus at Stratford Point each July in 2019, 2021, and 2022 and measured smooth cordgrass (Spartina alterniflora) density in 2019, 2020, and 2021. We used three common population size equations (Lincoln-Petersen index unmodified and with Bailey and Jolly-Seber modifications for resampling and non-closed populations) to calculate H. sanguineus population size in each year. The H. sanguineus population declined by 24 – 25% over the study period according to all three population size equations, supporting our hypothesis. Cordgrass density increased over the same time span. Since H. sanguineus occurs mainly in areas with substantial cobble or rock and marshes encourage sediment deposition that can bury rocks, the maturing marsh may be a less suitable habitat for these crabs, reducing their population over time.

105. Environmental factors may drive plant size differences between a restored and a natural marsh in the Housatonic River Estuary

Scarpello, Angelina
Faculty mentor: Steele, LaTina
Sacred Heart University

Spartina alterniflora (smooth cordgrass) provides habitat for many species and prevents erosion along coastlines globally and is a common restoration target. However, restored and natural marshes often have different traits due to genetic or environmental differences. Previous data has shown that S. alterniflora from a restored marsh in Stratford, Connecticut are consistently smaller than those from a naturally occurring marsh in Milford, Connecticut. We aimed to determine whether environmental differences such as nutrients play a role in observed size differences by performing two greenhouse experiments in which we grew S. alterniflora shoots from each location 1) in identical conditions and 2) under nutrient enriched and unenriched conditions. Height and diameter were measured weekly for four weeks in each experiment. When grown in identical conditions, Milford plants were taller with larger diameters than those from Stratford throughout the experiment, but growth rates were similar in plants from the two sites. Although not statistically significant, nutrient enrichment seemed to increase growth rates in plants from Stratford more than plants from Milford, with no difference in growth in unenriched plants from the two sites. These results suggest that environmental factors do play a role in the observed Spartina alterniflora height differences between sites.

106. Observing the Color Preference of Native Pollinators

Bacon, Louise; Metzler, Kristen
Faculty mentor: Lawson, Sarah
Quinnipiac University

The decrease in pollinator populations has been an ongoing trend for years. A pollinator’s population is dependent on their environment. In Connecticut, the amount of flora, weather conditions, and competing foreign pollinators influence the population of native bees. Native bees have a certain preference for the color of the flora they choose to pollinate. To observe the pollinators, white Shasta daisies were colored using pollinator safe markers with a control of a white flower. During the experiment, the native pollinators were observed and recorded, based on the number of pollinators, the time spent on a flower, and its color. Native bees favored the blue- and purple-colored flowers over the orange- and red colored ones. The other pollinators that were observed preferred the blue- and purple-colored flowers. Based on our results, we recommend an increase of newly planted purple and blue colored flowers would overall increase the native bee populations.

107. Impact of pollinator gardens on pollinator diversity and populations
Filandro, Alina
Faculty mentor: Lawson, Sarah
Quinnipiac University

Pollinator gardens focus on the planting of native species which provide nectar and pollen throughout the growing season. Pollinator gardens have been thought to bring an increase of pollinator occupancy and help support ecosystems by setting up optimal conditions for pollination to occur. Due to insufficient amount of research and a lack of quantitative data, the direct impact of the installation of pollinator gardens remains unknown. In the spring of 2022, a pollinator garden was installed at the Albert Schweitzer Institute (ASI) at Quinnipiac University in Hamden, Connecticut. In order analyze the change in pollinator populations, a pan trap transect sampling method was used to sample throughout the season before and after the installation of the garden. When the bowls were collected the specimens were dried, sorted by species, and counted. Although we are still working on analyzing the data, we have observed the variety of species visiting the pollinator garden has increased as well as the number of pollinators populating the garden. In the upcoming future to continue to observe the impact of pollinator gardens, new plants will be added, and more time will allow for oversight of the impact a pollinator garden.

108. METHOD DEVELOPMENT: Fragmentation and effective population size in populations of Eastern redback salamander, Plethodon cinereus.
Wrobel, Samantha; vanLieshout, Clare;
Faculty mentor: Edwards, William
Niagara University

With habitat fragmentation, local populations can have reduced genetic variation due to allele loss through genetic drift. In practice, this occurs when an originally large population size gets split by some natural or anthropogenic force, leading to the formation of two smaller populations. Typically, larger fragments or populations are thought to have reduced loss of genetic diversity and larger effective population sizes. Eastern redback salamanders (Plethodon cinerus) are the most abundant vertebrate in the Northeast United States. Populations of the woodland salamanders have become fragmented due to human development. Here we assess the effect of habitat fragmentation in the salamander populations along the Niagara Gorge on the effective population size. We will amplify microsatellite loci from historical (2008) and current DNA extracted from salamander tail samples in a larger, intact population and a smaller fragmented population. We analyze the microsatellites by Sanger Sequencing after PCR and clean up with previously optimized PCR primers. Historical and current sequences show loss of microsatellite alleles in the two populations. Additional samples and loci will be needed to demonstrate the effect of fragmentation over a short period. This work will provide us with future insight on fragmentation in endangered salamander populations.

109. Diet analysis of Daphnia magna using the 16S gene and next generation sequencing

Wojtas, Sarah; Wrobel, Samantha; Edwards, Ciaran
Faculty mentor: Marnocha, Cassandra; Edwards, William; Edwards, Coleen
Niagara University

Daphnia spp. are a type of zooplankton present in many environmental water sources. They are a vital component of the food chain, providing nutrition for many fish species. While zooplankton are known to consume phytoplankton, protists, and bacteria, their exact diet can be difficult to determine. Further knowledge of Daphnia feeding activity would be helpful in understanding base food chain interactions. This study examines a streamlined method for analyzing zooplankton gut contents through DNA extraction of the whole organism. In the laboratory, Daphnia magna were fed artificially constructed phytoplankton communities composed of Synechococcus, Gloeocapsa, and Eucapsis. Following DNA extraction, samples were sequenced to analyze the 16S gene using next generation sequencing (NGS). Our results indicate that food sources are able to be detected using the method performed. This suggests that diet analysis can be performed through whole organism DNA processing. Future work will include collecting field samples to investigate the diet of zooplankton in natural environments.

110. A symbiotic trifecta: the world's largest parasitic flowers, their host plant, and the microbes that live within

Diaz, Denia; Kirdiianova, Anastasiia
Faculty mentor: Molina, Jeanmaire
Pace University

The plant family Rafflesiaceae, composed of Rafflesia, Sapria, and Rhizanthes, is known for producing the largest iconic flowers in the world, but are endangered, being restricted to the fast-disappearing tropical forests of Southeast Asia. They are solely parasitic to the plant genus Tetrastigma of the grape family. Since Rafflesiaceae species are parasites, and it is unknown how they infect their Tetrastigma hosts, it has been difficult to propagate and conserve them ex situ by traditional horticultural techniques. However, bacterial endophytes--bacteria that reside inside plant tissues--have shown to play a major role in promoting the growth of plants. We hypothesize that Rafflesiaceae species may also rely on certain bacteria to facilitate their growth inside the host plant. In this study, we characterized and analyzed the microbiome of Tetrastigma roots infected with Rafflesia speciosa and Sapria himalyana and compared this to that of uninfected Tetrastigma using nanopore metagenomic sequencing. We found evidence that Rafflesiaceae-infected hosts have a different microbiome compared to uninfected Tetrastigma. This could suggest that either these plant parasites transfer their bacterial endophytes into their host altering host microbial composition for their benefit, or that only Tetrastigma roots with a certain microbiome are vulnerable to Rafflesiaceae infection. These newly characterized bacterial endophytes could potentially serve as bioinoculants that may have applications in the ex situ propagation and conservation of Rafflesiaceae species.

111. Is It Raining Over the Hill? Microclimate on the Dingle Peninsula
Ribaudo, Charlotte; Farkas, Ilona
Faculty mentor: Rapaglia, John; Bartholomew, Kirk.
Sacred Heart University

Investigations into the effects of land use and cover (LULC) on ecosystem function are important in areas stressed by human activity. The conjoined Feohanagh, Milltown, and Owenmore River basins of the Dingle Peninsula in Ireland are similar in size but vary but vary significantly in LULC. Our current work focuses on understanding the effects of differences in LULC on the river water quality. Anecdotally reported differences in microclimate between river basins could be a confounding variable in our investigations. In this experiment weather parameters (temperature, precipitation) were correlated with water quality measurements (dissolved oxygen (DO), and conductivity) in the three basins to investigate how basin microclimates relate to changes in water quality. Weather data from the basins was collected using Onset RX3000 remote monitoring systems in conjunction with HACH conductivity and DO data loggers to record water quality parameters. We created python coding scripts to condense and organize data points recorded at five-minute intervals from March 2022 to January 2023. Due to malfunctions in the RX300 from the Owenmore basin considerable data was lost that site. Preliminary analysis suggests significant temporal and spatial differences between the watersheds in both weather parameters and river outflow water quality measurements.

112. Excavation of the Lower Blue Licks Paleoindian Site, Kentucky: 19th Century Deposits Overlie Mammoth and Mastodon Remains.
Fantulin, Katarina
Faculty mentor: Yorke, Alexander L.; Robinson, Guy.
Fordham University

Excavation of an Upper Paleolithic archaeological and paleontological site at Lower Blue Licks, Nicholas County, Kentucky began in 2022. Exploratory trenches cut with a backhoe uncovered mastodon tusk and mammoth tooth fragments together with Paleolithic artifacts. Adjacent to where these materials were disturbed, we took a sediment core using a bucket auger. We recovered 1.5 meters before the bucket auger met resistance on gravel and cobbles. We washed subsamples through 500-micron and 250-micron sieves to find a quartz gravel and sand unit with no biological material up to 80 centimeters below the surface. Above 80 cm, quartz sand, anthracite, and silt included a few seeds of aquatic plants, broken twigs, ostracodes, and small mollusk shells. From 11 cm to the surface, black soil is characterized by abundant wood charcoal fragments. Our findings suggest the gravel and sand unit is a massive slopewash deposit. This is consistent with the historical record of early 19th-century deforestation by European settlers clearing the woodland for salt production. Salt was rendered from the nearby mineral spring by extensive wood burning. More recent excavation has exposed a deeper layer of black gravel lying on limestone bedrock. We will now focus our efforts on this fossil-rich unit.

113. Environmental Change in Southern New York Since the Last Ice Age
Trzeciak, Grace; Collins, Isabella; Griffin, Jennifer
Faculty mentor: Robinson, Guy
Fordham University

The Nature Study Woods Swamp occupies the floodplain of the Hutchinson River as it flows south along the western boundary of the City of New Rochelle in Westchester County, New York. We extracted a 3.4-meter sediment core from the Swamp during the fall 2022 semester for a Fordham University class project. Fibrous peat near the surface graded into detrital peat down to 2.4 meters where it became a clayey peat, grading into gray clay. We wet-sieved subsamples of the gray clay using 500-micron and 250-micron mesh, yielding elements of a tundra community, arctic willow, and Dryas leaves. Also present were branchlets of white spruce, indicating a late Ice Age environment transitioning from tundra to spruce parkland. Our findings are consistent with a previous 5-meter sediment core taken 500 meters due north and which was analyzed for fossil pollen. That pollen data reflected a tundra community with spruce trees present at a level where the conventional carbon-14 age was 11,330 +/-50 years before present. We are continuing our analysis of plant and animal macrofossils up-section to the transition from the earlier Pleistocene to the current Holocene Epoch.

114. POPULATION GROWTH AND CARRYING CAPACITY OF LEMNA MINOR IN SPRING WATER USING VARYING CONCENTRATIONS OF NITRATE AND PHOSPHATE UNDER HIGHER INTENSITY LIGHT
Wang, Oscar
Faculty mentor: Stearns, Donald
Wagner College

For ≈ 30 days, Lemna minor (duckweed) was grown in test tubes containing store-purchased spring water. For the control groups (n = 4), no additional nutrients were added. For the treatments (n = 5), nitrate or phosphate was added while maintaining the same total volume (50 mL). One three-frond plant was added to each test tube and placed under continuous lighting (range ≈ 20.3 - 28.5 μEm -2 s -1). The number of fronds (considered the population size, initially 3 fronds) was monitored; estimates of k (carrying capacity) were compared. When combined with similar research by Pitt (2022), nitrate results showed an increase in k from 9.11 to 12 fronds when nitrate concentration was increased from 10 ppm (control) to approximately 25 ppm as determined using nutrient strip indicators, followed by decreased k at higher concentrations. When combined with similar research by McLean (2022), phosphate results showed a general increase in carrying capacity from 9 to 22.2 fronds when phosphate concentration was raised from 30 ppm (control) to well above 300 ppm, followed by decreased k at higher concentrations. These results follow Liebig's law of the minimum and Shelford's law of tolerance and indicate nitrate and phosphate concentrations required for optimal population growth.

115. Comparing Urban and Rural Microparticle Deposition
Conklin, Jesse ; Warner, Nicholas
Faculty mentor: Urban-Rich, Juanita
Fordham University

Microparticle fibers and microplastics (MPs), defined as plastic particles smaller than 5 millimeters, are ubiquitous. Through processes such as photo-oxidation and physical abrasion, larger macroplastics can degrade in the environment into MPs, which are transported by wind currents and become concentrated in the air we breathe. This study analyzed atmospheric MPs, particularly the variation of MP concentration, size, color, and composition between urban and rural areas. We collected atmospheric deposition of MPs in three sites in Massachusetts: Boston, Franklin, and Nantucket Island. After a two-week collection period, samples were filtered, treated with hydrogen peroxide, and heated to digest any organic material present in the sample. These digested samples were examined under a microscope to count each individual MP. A subsample of MPs was measured using Image Analysis and analyzed using FTIR to identify their composition. Contrasting our predictions, results suggested the Franklin site had the largest concentration of MPs with an average of 52.6 MPs/m2/day while Nantucket Island and Boston followed in sequential order averaging 23.3 and 15.2 MPs/m2/day. The more rural areas, Franklin and Nantucket, also had a greater variation of colors, a wider range in MP size, and a larger proportion of petroleum-based plastics than the Boston site.

116. The Impact of Ionic Liquids on Limulus polyphemus
Miguel Pereira; Maria Nettgen
Faculty mentor: Alma Rodenas-Ruano; Marie Thomas; Mark Botton
Fordham University

Ionic liquids are recognized as excellent solvents. Compounds like cellulose require strong solvents to break them down, so ionic liquids are used as alternative solvents. Although ionic liquids are considered relatively safe, new evidence suggests they can be toxic. Due to their widespread use, the risk of ionic liquids seeping into waterways is large, but their effect on aquatic species' nervous systems has been largely unexplored. My research is focused on understanding how ionic liquids may impact behavior and neuronal function in horseshoe crabs (Limulus polyphemus). More specifically, I'm testing chronic exposure of ionic liquids on horseshoe crabs at three early developmental stages. Horseshoe crabs were exposed to three different ionic liquids: [omim][Cl], [emim][dmp], and [emim][OAc]. These ionic liquids were selected due to their varying chain lengths, which are known to impact their level of toxicity. Our preliminary results shows that the nervous system of horseshoe crabs can be immunostained with fluorescent probes, and we are examining changes in morphology and synaptic contacts. We also see that horseshoe crabs exposed to [omim][Cl] have the lowest survival time. Ongoing behavior and neuroimaging studies will further help understand the potential toxic effects of these ionic liquids.

117. Relationship between nicotine, mental distress and psychoactive substances

Dwyer, Emily; Patrissy, Cara; Scott, Nicole; Bonventre, Samantha
Faculty mentor:
Binghamton University

Across college campuses, the misuse of cannabis, nicotine, ADHD medication and other psychoactive substances have become a prominent issue in North America. Many students abuse these substances as a way to aid their studying or cope with mental distress. Previous studies demonstrated that nicotine use is associated with psychological disorders like depression, anxiety, alcoholism and eating disorders. ADHD medication consumption is known to be high on college campuses. Nicotine use during adolescence has been known to impact the prefrontal cortex by affecting cognitive function later in life. Although, it is unknown how these substances are related to nicotine smoking in college students.The purpose of this study is to assess the relationships between nicotine use, ADHD medication, and mental distress in this cohort. A total of 702 undergraduate college students from different US college campuses completed an anonymous survey administered online. Self-reported data on the use of ADHD medications, cannabis, nicotine, other psychoactive drugs and mental distress, and opinions on the use of illicit study drugs were analyzed. The anonymous survey was created on Google Forms, and data were analyzed in SPSS, Version 25.0, using Pearson's Correlation Coefficient. This study assessed nicotine by very frequent use (100 or More Cigarettes in your Life and at Least 1 Cigarette Every Day During the Last Month) and non frequent use (Few Puffs to a Whole Cigarette in your Life) and its relationship with mental distress. Nicotine use produced many correlations with mental distress. Our results showed that very frequent use of nicotine was positively correlated with mental distress, while non frequent use of nicotine was negatively correlated with mental distress, which is concerning as young adults with random use become attracted to reduce mental distress. By addressing the abuse of nicotine on college campuses, we hope to curtail the abuse of nicotine and smoking among college populations. By spreading awareness and educating students on college campuses about the abuse of nicotine we hope to increase awareness about the consequence of nicotine abuse among this population.

118. Academic Persistence Among First Generation Community College Students: An exploration of social and cultural capitals

Platero, Stephany;
Faculty mentor: Resko, Jody
Queensborough Community College

First-generation community college students (FGS) regularly enter college with no frame of reference of the academic experience and are frequently confronted with a unique set of challenges and systematic disadvantages. Studies have found that FGS differ significantly from non-FGS in areas such as academic readiness (i.e., SAT prep), racial/ethnic demographics, socioeconomic status, and parental involvement. The literature has also revealed that FGS students had much greater dropout rates and reported lower levels of life satisfaction. Accordingly, interpersonal resources and parental involvement have been identified as common themes for confidence in their academic choices and adapting to the college setting. These factors have been characterized as social capital (i.e., qualitative resources that are inherited by interpersonal relationships such as parents with postsecondary degree) and cultural capital (i.e., inherited norms and values that can help an individual advance their goals and successfully navigate their environment). This research aims to investigate the foundations of social and cultural capital in FGS and to explore the role social and cultural capital play on the academic persistence of FGS.

119. Understanding the Relationship Between Hardiness and Academic Performance During COVID

Chen, Clarence Zhi Xin
Faculty mentor: Resko, Jody
Queensborough Community College

Students have varying degrees of abilities to cope with the rigors of the academic system. Even more so during the COVID period when issues such as depression and work-life balance are emphasized and lack of confidence, loss of sense of control, and inability to commit to their academic necessities may be exacerbated. The construct of Hardiness proposes that to live a vibrant life, individuals must demonstrate all 3Cs: Commitment, Challenge, and Control. These characteristics are thought to feed into existential courage to make the necessary and difficult choices for future success. As such, this study examines student responses to a survey measuring personal hardiness, resilience, and academic performance. It is expected that those who score low on the 3Cs (i.e., have poor hardy attitudes) and academic resilience, would be associated with poor academic performance during COVID. The purpose of the study is to fill the gap in the literature on the construct of hardiness, which goes beyond resiliency, during COVID which contributes to our understanding of the struggles that college students face due to the pandemic. To facilitate a healthier environment that improves hardy attitudes and ultimately leads to better academic performance even during difficult times.

120. Through Their Eyes: How Students View Growth Mindset Teaching in Middle and High Schools

Simak, Lauren; Brown, Katrina; Wilk, Abigail
Faculty mentor: Dr. Kathryn Kroeper
Sacred Heart University

When teachers communicate growth mindsets – or the belief that student intelligence is malleable vs. fixed – their students report greater belonging in the classroom, show increased motivation, and perform better. However, extant research on the benefits of teacher growth mindsets focused exclusively on college student samples. Thus, the purpose of the present research is to determine how teachers' mindset beliefs affect middle and high school students in the classroom. Specifically, we examined how students perceived four dimensions of growth mindset teaching: (1) messages about success, (2) provision of opportunities, (3) responses to struggle, confusion, or poor performance, and (4) value placement. Students (Nstudent = 90) learned about mindsets and then categorized 42 teaching practices as either growth- or fixed- minded (NObservations = 3,780). Results revealed that much like college-students, middle and high school students were more likely to perceive teaching practices as growth-minded (vs. fixed-minded) when teachers suggested that all students are capable of academic success, when they provided opportunities to improve, when they offered support and reassurance to struggling students, and when they valued learning over performance. Future research should explore how to train teachers to foster growth-minded classrooms that are perceived as such by students.

121. Low-dose drinking water bisphenol-A does not alter anxiety or cognitive functioning in adolescent male rats

Alvira, Nicole; Andre, Abigail; Berni, Teresina; Maiolo, Lauren; Piasecki, Alexandra
Faculty mentor: Bowman, Rachel
Sacred Heart

Bisphenol-A (BPA) is an endocrine disruptor that regulates the effects of estrogenic, androgenic, and antiandrogenic systems. BPA is extensively used in the manufacturing of hard plastics leading to detectable BPA levels in body fluids of humans and animals indicating that BPA exposure is ubiquitous and has potential health hazards. The purpose of this study was to investigate the effects of adolescent exposure to low-dose BPA via oral ingestion in water on behavior and neuronal morphology in intact adolescent male rats. The dose given, a concentration equivalent to 40/µg/kg/day, is lower than daily safe-dose levels set by the United States Environmental Protection Agency (1993). Results showed that BPA had no behavioral effects. Anxiety was measured using an Elevated Plus Maze (EPM) and Open Field (OF) tests. On the EPM, results showed that most rats made equal visits to the closed and open as well as the OF where all rats visited the outer sectors more frequently than inner visits with no treatment effects. Object placement and recognition tests were used to measure cognitive function and results showed no significant difference between treatment groups. These results differ from past work in our lab following adolescent BPA exposure via injection. Thus, the route of administration and dosage of BPA appears to have differential effects on physiological and cognitive measures.

122. Remain Calm: How Emotional Responses Influence Perception of Women Confronting Sexism

Rogers, Sophia*; Piney, Ashley* (*first authorship is shared)
Faculty mentor: Kroeper, Katie
Sacred Heart University

While previous studies show that people who confront prejudice are negatively perceived by others, recent research has focused on methods to mitigate these effects. In this study, we examined how the emotional tone of confronters ameliorates observers' negative perceptions. Specifically, we presented participants (N = 682) with a workplace scenario involving sexism between two characters, Emily and John. In all scenarios, Emily confronted John's sexist remarks, but we manipulated her emotional tone in the confrontation to be either angry, confident, calm, or sad. Afterward, participants rated Emily's competence, warmth, and unprofessionalism. Findings revealed that Emily was perceived as competent, regardless of her emotional tone during the confrontation. However, Emily was perceived as warmer when she expressed low arousal emotions (i.e., calmness or sadness), compared to high arousal emotions (i.e., anger or confidence). Moreover, expressing anger led to Emily being perceived as unprofessional. We also observed discrepancies between male and female participants. Female participants perceived Emily as more competent and warmer, whereas male participants perceived her as more unprofessional. These findings suggest that regulating one's emotional expression may be a key factor in effectively challenging prejudiced behavior, though such regulation may prove challenging in the context of a confrontational exchange.

123. How Context Shapes our Concerns: Investigating the Causal Effects of Social Identity Threat Concerns using the SITC Inventory

Debrot, Noelle; Millien-Faustin,Fabiola; Granja, Nicholas
Faculty mentor: Kroeper, Kathryn
Sacred Heart University.

The Social Identity Threat Concerns (SITC) Inventory measures people’s concerns about being devalued because of their important social identities (e.g., being stereotyped, disrespected, marginalized, etc.). So far, research examining the validity of the SITC Inventory has been correlational. The objective of the present study is to examine the causal effects of social identity and context on social identity threat concerns, as measured by the SITC Inventory. We Predicted that people exposed to threatening social contexts would report greater social identity threat concerns than people exposed to non-threatening social contexts. Participants (N=###) were placed in either a threatening or a non-threatening discussion group, based on their political or racial identity. Then social identity threat concerns were assessed. As Predicted, when people were placed in threatening (vs. non-threatening) contexts, they reported greater social identity threat concerns. Taken all-together, these results further support the validity and utility of the SITC Inventory as a threat assessment tool.

124. Recreational Drugs: Relationships with Negative Mood States
Meldrim, Carol Ann; Perez, Isaac
Faculty mentor:
Ithaca College

Past studies have explored the relationship between recreational drug use including alcohol, marijuana, nicotine vape and negative mood states such as anxiety and depression. Bertholet et al. for example, found that recreational drug use can lead to higher depression and anxiety rates (Bertholet, et al. 2018). These relationships are concerning, given the increasing acceptance of the legalization of recreational drugs. The current study explores the relationship between recreational drugs (alcohol, marijuana, nicotine vape) and negative mood states. This study also explores gender differences in rates of use and relationships to negative mood states. A sample of 417 college age participants from the Ithaca College completed an online anonymous survey that included questions about drug use, gender, and measures including the Zung self-rating anxiety scale, Zung self-rating depression scale among others. Greater use of alcohol, marijuana, and nicotine vape were associated with higher anxiety, higher anxiety sensitivity, increased depression, greater impulsivity, greater neuroticism, and lower conscientiousness. Of the drugs explored, the negative effects of marijuana are the most consistent. These results are discussed, limitations are noted and suggestions for future research are made.

125. Clustering Effects in Free Recall by Emotion and Content
Ephault, Ciara; Castro, Kendra; Ramos, Inkaira
Faculty mentor:
Ithaca College

We investigated if emotion and social content would display interaction effects in the free recall of images. We also explored whether images of the same valence are more likely to be recalled consecutively (cluster effects). Previous research suggests that the presence of emotion during the encoding context is reinstated during the recall of an emotional image, which can serve as a retrieval cue for emotionally similar items. This can increase the probability of emotional clustering in free recall (Long et al., 2015). Twenty-two participants encoded six blocks containing 30 images: 10 negative, neutral, and positive images that were equally divided by social and non-social content. A 2x3 repeated measures ANOVA revealed a main effect of emotion with greater recall for emotional images than neutral images and greater recall for negative than positive images. There was no main effect of content or a significant interaction. A repeated measures one-way ANOVA based on valence revealed greater clustering for negative images than neutral or positive. This suggests that negative emotional context may serve as a stronger retrieval cue than positive emotional context, contributing to the reported negativity bias in recall.

126. Object Play in Bottlenose Dolphins
Alvia, Kayla; Giuffra, Alexandra; Sheehan, Erin; Williams, Carlie
Faculty mentor: Yeater, Deirdre
Sacred Heart University

An exploratory study was conducted on bottlenose dolphins in managed care to examine the characteristics of object play. This is the first detailed underwater investigation of dolphins interacting with various objects. Data were collected at the Roatan Institute for Marine Sciences in Honduras. Sixteen dolphins (7 males/9 females) out of 17 were observed over seven sessions in March 2020, with an average session length of 30 minutes. There were 10 adults, 2 sub-adults, 2 juveniles, and 2 calves observed engaging in object play. Play events were coded for which body parts and body postures used, whether play was solo or mutual, and which actions were performed with the objects: 199 object play events were recorded. Preliminary findings indicated the dolphins played most often with man-made rather than natural objects. Nearly all events involved the rostrum. Solo play was dominant over mutual play (127 vs. 71 events). Sub-adult males were observed most interacting with objects. Investigating object play in detail for dolphins in managed care is important as play is a potential indicator of welfare. Future studies should expand to wild populations for comparison and a better understanding of the role of play in dolphin social life.

127. Be Kind to Yourself: Examining How Self-Compassion Mediates the Relationship between Minority Stress and Health
Cavalea, Samantha
Faculty mentor: Vale, Michael
Sacred Heart University

Sexual minorities (e.g., LGB people) experience stressors specific to their minority status. Minority stressors are either proximal (intrapersonal) or distal (interpersonal), and both negatively predict mental and physical health. Self-compassion is the ability to hold one's experiences of suffering with warmth and understanding, integrating aspects of self-kindness, common humanity, and mindfulness. A recent metanalysis (Helminen et al., 2022) found that self-compassion relates to minority stress and potentially helps buffer the links between stress and health. However, past work examined single aspects of minority stress and there is uncertainty determining which types of stressors self-compassion may relieve. This study examined the relations between self-compassion and seven minority stressors, outness concealment, outness disclosure, internalized homonegativity, anticipated stigma, microaggressions, general discrimination and family discrimination. We additionally examined the mediating (i.e., buffering) role of self-compassion between each stressor with depressive and anxiety symptoms, and self-rated physical health. Self-compassion was significantly correlated with each stressor, expect general discrimination. Further, self-compassion fully mediated the links between internalized homonegtaivity and outness concealment, and each outcome. There was at least partial mediation for the links between the other stressors. Our findings indicate that self-compassion appears to be a stronger buffer for proximal, compared to distal, minority stressors.

128. The Effect of Self-Affirmation on Memory for Negative Images
Cavalea, Samantha; Del Pino, Grace; Gutierrez, Rosalyn; Michel, Abbygail
Faculty mentor: Crowell, Adrienne L.
Sacred Heart University

Thinking and writing about important personal values is a means of self-affirmation that can change how individuals react to self-threats. Previous work has demonstrated that self-affirmation increases the processing of negative stimuli, particularly among individuals high in behavioral inhibition system (BIS; i.e., sensitive to threats; e.g., Finley, Crowell, & Schmeichel, 2018). The current study was designed to test the hypothesis that if self-affirmed participants high in BIS are processing the negative stimuli more deeply as in Finley et al., then they should have better memory for those pictures. Ninety-six college students were randomly assigned to a self-affirmation condition, viewed emotional images, and completed a recognition memory test one week later. Preliminary findings suggest that self-affirmed participants high in BIS did not have higher memory for negative images. More research on the emotional processing effects of self-affirmation for threat-prone individuals would be beneficial for therapeutic purposes.

129. Online vs In-Person Learning: Self-Efficacy, Self-Regulation, and Motivation in College Students
Pecorella, Gia
Faculty mentor: England, Jessica W
Wagner College

As a result of the COVID-19 pandemic, college students experienced significant academic and psychological challenges as they struggled with the stressors of the pandemic while shifting to all online courses. Students reported difficulty staying academically motivated, decreased self-regulation, concerns about their academic performance, and increased struggles with mental health (Kecojevic et al., 2020; Son et al., 2020; Usher et al., 2021). As the world continues to shift out of the pandemic, it is important to investigate the potential ripple effects on the success and well-being of college students and explore their current experiences with different learning formats, especially students most impacted by the pandemic. The current study explores potential differences between college student experiences in online versus in-person learning environments. More specifically, researchers will examine how self-efficacy, career adaptability, and self-regulation impact student motivation across learning environments in order to investigate students' current academic functioning following the pandemic. Researchers surveyed both first-generation and continuing-generation students to investigate potential differences. College initiatives aimed at the recruitment and retention of college students are vital to the success of students who may be continuing to struggle academically following the pandemic. Additional qualitative responses will be analyzed, and implications for best educational practices will be discussed.

130. The Impact of Brief Animal Assisted Therapy Dog Interactions on College Student Stress and Self-Efficacy Levels
Vaillancourt, Victoria; Kutka, Paige; Percoco, Julian; Giordano, Savannah
Faculty mentor: Melzer, Dawn; Yeater, Deirdre; Pierce, Barbara
Sacred Heart University

The aim of the current study was to examine the potential benefits of dog therapy programs on student stress levels on a college campus. While these programs have become increasingly popular there is little evidence on the effectiveness of animal centered activities. We compared the differences on three types of assessments related to stress levels (e.g., Self-Efficacy Scale, Perceived Stress Scale and relative changes in stress hormone levels (cortisol)) for college students before and after interacting with therapy dogs for 10 minutes. Saliva samples were collected using Salimetrics' Salivabio Oral Swab (SOS) method from student participants 15 minutes after arrival at the study (baseline) and 15 minutes after interaction with therapy dogs (treatment). Saliva samples were processed for cortisol using Salimetrics' High Sensitivity Salivary Cortisol ELISA kit. This data will provide insight on how interacting with therapy animals can affect stress levels.

131. Emotion Regulation Strategies and Youth Mental Health During COVID-19: Examining Longitudinal Associations and the Role of Socioeconomic Status
Joshi, Soumyaa
Faculty mentor: Lopez, Marla; Nelson, Timothy
Ithaca College

The study (N=261) examined how socioeconomic status (SES) moderated the association between earlier use of emotion regulation (ER) strategies, such as cognitive reappraisal and emotion suppression, and internalizing symptoms during COVID in adolescents. In 2015, youth completed an Emotion Regulation Questionnaire and parents completed SES measures. In 2020, adolescents completed the GAD-7 and PHQ-9. Our results showed that interactions between early-adolescent use of ER strategies and SES did not significantly predict internalizing symptoms.

132. Can Dogs Detect a Surprising Event?
Faeth, Samantha; Higley, Emma; Alvira, Nicole; Borg, Kaitlyn; Colloca, Marissa; Esposito, Gabrielle
Faculty mentor: Yeater, Deirdre; Melzer, Dawn
Sacred Heart University

Infants demonstrate object permanence understanding during violation of expectation tasks. These tasks consist of expected (e.g., ball stops at solid wall) and unexpected (e.g., ball rolls through solid wall) events. Infants look longer at the unexpected event as opposed to the expected event (Perez & Feigenson, 2021). Similarly, studies have shown that dogs present increased looking times during unexpected object permanence tasks (Pattison et al., 2010). In the current study, dogs participated in a violation of expectation task which investigated object permanence understanding. To conduct this study, dogs were positioned in front of a stage with a concealed opening in the back wall and a ramp. One wall was placed at the end of the ramp, and the other in the middle of the ramp. An occluder was placed in front of the ramp. A tennis ball was rolled down the ramp, behind the occluder. After the occluder was removed, the dog would see either the ball was stopped in front of the solid wall (expected event), or the ball would appear to have rolled through the solid wall (unexpected event). Results reveal that dogs looked longer at the unexpected events, which suggests that dogs have object permanence understanding.

133. Men Work, Women Smile and Pose: A Content Analysis of Gender Stereotypes Reflected in the Characters Portrayed in Children's Activity Books
Kleynerman, Elizabeth; Onah, Ehikowoicho
Faculty mentor:
Ithaca College

Previous studies of gender messages in children's TV programs, commercials, and literature have found that girls and women are often underrepresented and portrayed in stereotypical ways (Berry et al., 2017; Hamilton et al., 2006), and that activity books aimed at girls were significantly more likely to feature pink and purple, have themes related to friends, family, physical appearance and romance, and the activities required less physical and cognitive effort compared to the books targeted to boys (D'Addio et al., 2021; Edelstein & Richardson, 2022). The current study focuses on how characters were portrayed in 11 children's activity books published between 2000-2020. A total of 3018 characters were analyzed by pairs of trained coders, identifying gender differences in appearance (including body type), occupations and activities of the characters. Findings showed that females were often shown in magical roles (mermaids, fairies) compared to males. Female characters were much more likely than males to be portrayed as thin, posing, and smiling compared to male characters, and were most frequently engaged in activities requiring little physical effort (sitting, standing, reading, etc.), while males were shown in a wider range of activities and were portrayed in an occupation three times more often than females.

134. Psychological and Emotional Effects Caused By Cataract and Cataract Surgery
Fattakhov, Gabriel
Faculty mentor: Resko, Jody
Queens College

Cataract is a clouding of the crystalline lens of the eye. For people who have cataracts, seeing through a cloudy lens is a bit like looking through a fogged-up window. Luckily there's a treatment known as cataract surgery which replaces that cloudy lens with an intraocular lens (IOL) transplant; Patients have a choice to do the surgery with or without the femtosecond laser. Some types of IOLs include monofocal lenses, multifocal lenses, or toric lenses; each type of lens has their own specifications and functions. The success rate of the procedure is about 99 percent. Patients begin to develop cataract around the age of 40 but the vision impairment usually begins around 65 where the doctor may begin to recommend the procedure. The main focus of this study is to determine the psychological effects of receiving a cataract diagnosis, finding out if they need cataract surgery, and how they feel after the procedure by using a brief questionnaire. Data will be analyzed to examine the relationship among the variables. It is hypothesized that patients will report various and mixed feelings regarding the diagnosis and surgery. These feelings may vary as a function of age or other demographic variables. The results of this study will contribute to the literature on patient feelings towards both the diagnosis of, and surgery for, cataracts.

135. Student engagement in a traditional versus flipped classrom
Hopkins, Jennifer; Unetich, Greta
Faculty mentor: Gondek, David; Brady, Rebecca
Ithaca College

Student engagement in college classrooms is correlated with student success. Following the COVID-19 pandemic, a delay in student social-emotional development has made it more difficult to engage in classroom settings. Different teaching methods contribute substantially to student engagement. Two prevailing methods of teaching include a traditional classroom and a flipped classroom. The traditional classroom is lecture-based. In a flipped classroom, students learn the material outside of the designated class period, and the class period is used for answering questions and problem-solving. In this study, we asked if student engagement levels are higher in a traditional classroom or in a flipped classroom within a post-pandemic cohort. Students were observed and scored for engaged versus disengaged behaviors in each classroom type. Students self-reported their personal effort, the value of group activities, and the instructor's contribution to their learning. We predict that students will be more engaged and will report higher levels of satisfaction in a flipped classroom.

136. Climate change in the Mediterranean Basin
Then, Nathali
Faculty mentor:
Pace University

Climate change is having significant impacts on the Mediterranean basin, a region that is highly vulnerable due to its unique geography, high population density, and dependence on agriculture, tourism, and fisheries. Increasing temperatures and changing precipitation patterns are leading to more frequent and severe droughts and wildfires, as well as flooding and erosion in coastal areas. Sea level rise is also affecting the region's coastal cities, infrastructure, and ecosystems. These impacts are exacerbating existing socio-economic and environmental challenges, such as water scarcity, food insecurity, and migration. A coordinated and all-encompassing strategy involving governments, civic society, and the corporate sector will be necessary to mitigate and adapt to climate change in the Mediterranean region. This entails lowering greenhouse gas emissions, boosting the use of renewable energy, encouraging sustainable land and water management, and enhancing communities' and ecosystems' resistance to the effects of climate change.

137. Visual Assessment of a Meiofaunal Community
Guglielmi, Ashley; Bove, Lilly; Moore, James
Faculty mentor: Piastuch, Lisa; Stoehr, Ashley
Sacred Heart University

Meiofauna are small invertebrates (45 µm-1mm) that live between sand grains in marine and freshwater environments. Meiofaunal diversity is a good indicator of anthropogenic influence and environmental health. The overall goal of this project is to determine the most efficient method of meiofaunal identification on a polluted shoreline: cheap, but time-consuming visual identifications to higher taxonomic levels (e.g., phyla) or expensive, but fast, genetic identifications to lower taxonomic levels (e.g., species). The specific aim of this study was to visually asses the diversity, richness, and evenness of the meiofaunal community on a polluted shoreline (Seaside Park; Bridgeport, CT). Five random samples were collected three times per year over a 100m transect. Meiofauna were separated from sediment by suspending and filtering the sample through a 40um mesh sieve. About ~5ml of subsample was viewed underneath a microscope to count and identify meiofauna. Results indicate that the H’ value for taxon (lowest level of identification) was greater than that for class and phylum, which were similar. There were few taxa present in each sample and nematodes dominated most samples. Identification to a level lower than phyla may be necessary for biomonitoring, but further research is necessary.

138.  It's a Bad Week to be a Seal/Woman: Shark Week's Portrayal of Women Scientists

deHaven, Morgan
Faculty mentor: Stoehr, Ashley
Sacred Heart University

There has been a massive increase in the number of women scientists in the past few decades. However, this increase has not been reflected in television series, such as Discovery's Shark Week in which the majority of episodes contain more male scientists. The goal of this study was to determine how women were portrayed during select Shark Week episodes, in terms of their scientific contribution and screen time. A total of 27 episodes featuring 49 named women were analyzed using a modified Bechdel-Wallace test. Of the named women, 51.02% could be confirmed as experts, of which 12% were dating men in the same episode. Screen time for any named women was about 8.68% of the episode duration. The lacking portrayal, in time, number, and scientific contribution of women on television series like Shark Week could be detrimental to young girls considering a future in science. This could be fixed by allowing more screen time for more women to discuss their experiments and findings.

139. How will the installation of a pollinator garden impact pollinator communities?

Faculty mentor:
Quinnipiac University

Pollinator populations across the globe have been in decline. A possible solution that has been increasing in popularity is the installation of a pollinator garden. A pollinator garden is a garden that focuses on providing food sources throughout the blooming season for a variety of native species. This, in theory, will help promote healthy pollinator levels and diversity. However, we have very little quantitative data to support this hypothesis. Beginning in the spring of 2022, we turned a grass lawn at the Albert Schweitzer Institute at Quinnipiac University in Hamden, CT into a pollinator garden that includes over 200 species of native plants and cultivars to study the potential affect the garden will have. In order analyze the change in pollinator populations, a pan trap transect sampling method was used to sample throughout the season before and after the installation of the garden. The captured pollinators were taken back to the lab, sorted by species, and pinned. Although we are still working on analyzing the data, we predict that the garden will raise both diversity and population levels. If this is true, we would look to further improve and potentially expand the garden.

140. Associations between Frequency of Cannabis Usage and Mental Distress

Cara Patrissy, Samantha Bonventre, Nicole Scott, Emily Dwyer
Faculty mentor: Lina Begdache
Binghamton University

In the United States, cannabis usage has continued to increase among college students in the past 5 years, reaching its highest levels in over thirty years. Increased usage of cannabis and marijuana has been a prevalent problem across college campuses, with many students using the drug for recreational purposes or to self-medicate for symptoms of anxiety and mental distress. There has been conflicting research on whether the effects of cannabis are beneficial or detrimental for mental distress. The purpose of this study is to examine the relationship between cannabis use and mental distress; it also examines the relationship between cannabis and other drug usage, including Attention Deficit Hyperactivity Disorder (ADHD) medication and psychoactive substances. This study included 702 undergraduate college students from different universities across the United States. The anonymous survey, which was distributed online via Google Forms, assessed self-reported drug usage and mental health. The data were analyzed in SPSS, Version 25.0, using a Pearson's correlation coefficient. Our results revealed that when not used frequently (above 40 times annually), cannabis usage is correlated with less feelings of nervousness. Alternatively, frequent cannabis (above 40 times annually) usage was significantly correlated with increased issues with mental health. Cannabis usage is significantly correlated with increased cigarette, "sniff" glue solvents, magic mushroom, sedative and adrenochrome drug usage. These results support the hypothesis of marijuana being a "gateway drug", as individuals who used cannabis were more likely to abuse other psychoactive substances. Our findings support previous conflicting research that cannabis usage can show both adverse and beneficial effects on mental well-being. Our results furthered these findings by proposing that frequency of cannabis usage plays a dual role in mental wellbeing, which requires further investigation.

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Data is arranged as:

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