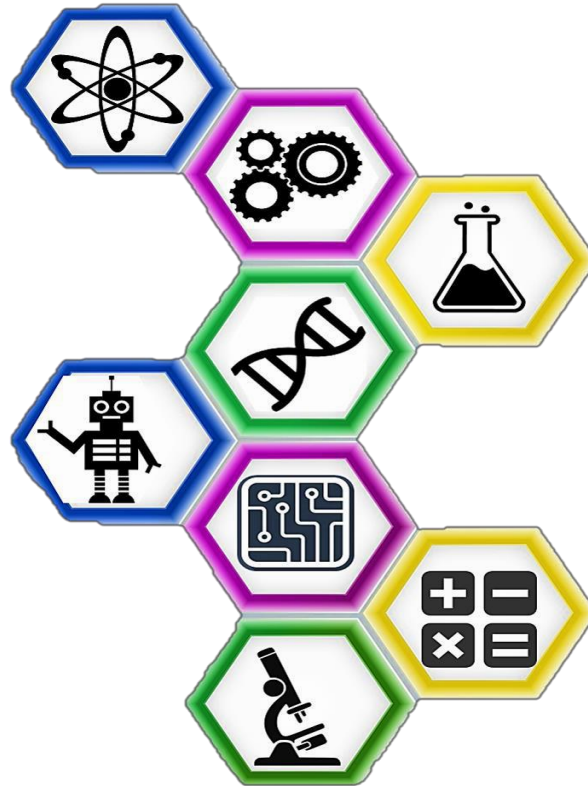


**The 8th Annual
2023 Maryland Collegiate STEM
Conference Program**

**STEM Innovations:
Building a Stronger Future Together**



April 22, 2023

Howard Community College

Abbreviations used for colleges/universities:

AACC – Anne Arundel Community College

BCCC – Baltimore City Community College

CCBC – Community College of Baltimore County

CarrollCC – Carroll Community College

CSM – College of Southern Maryland

FCC – Frederick Community College

Goucher – Goucher College

HarfordCC – Harford Community College

HowardCC – Howard Community College

JHU – Johns Hopkins University

MC – Montgomery College

PGCC – Prince Georges Community College

Polk -Polk State College

SMCM – St. Mary's College of Maryland

Towson – Towson University

UMB – University of Maryland, Baltimore

UMBC – University of Maryland, Baltimore County

UMD – University of Maryland, College Park



60 West Street, Suite 200

Annapolis, MD 21401

410-987-8117

April 22, 2023
8th Annual Maryland Collegiate STEM Conference
Columbia, Maryland

Dear Students, Faculty, and Staff,

Welcome to the Maryland Collegiate STEM Conference, being hosted on Howard Community College's beautiful campus! This will be the eighth year for the conference, and it remains one of a kind for Maryland and the nation, with a focus being on community college students in STEM as well as their matriculation into our four-year universities. This conference also serves to promote professional development for faculty and staff in STEM-related fields.

Maryland's higher education system and policymakers are striving to make our STEM education one of the best in the nation. Our colleges and universities are developing the next generation of leaders to take on the challenges our State will need to be both successful and prosperous. The opportunities are great and thanks to a dedicated STEM community, Maryland will be prepared and ready for a successful future.

In so many ways, Maryland has several advantages but the only way our State grows will be because of the quality students and dedicated professionals that are helping to achieve this goal. Thank you for being here and please enjoy the Maryland Collegiate STEM Conference.

Sincerely,

A handwritten signature in black ink, appearing to read "Brad Phillips", with a stylized flourish at the end.

Brad Phillips, Ed.D.
Executive Director

Morning Keynote

Chance Favors the Prepared!

Dr. Tonya Nichols



With more than 25 years of experience in microbiology and biodefense, Dr. Tonya Nichols serves as a Senior Science Advisor in the Center for Environmental Solutions and Emergency Response and as the One Health Coordinator for the US Environmental Protection Agency (EPA). Dr Nichols' work focuses on building interagency collaborations and coordination with White House science policy workgroups related to health security and biodefense. She also represents the EPA on the Biodefense Coordination Team supporting the implementation of the National Biodefense Strategy.

As a research microbiologist in the National Homeland Security Research Center, Dr. Nichols has managed research programs to assess the risks and impacts of exposure to biological agents that have been accidentally or deliberately released into the environment that would require the EPA to respond.

Dr. Nichols co-sponsors the One Health Academy in Washington, DC. focused on bringing together health professionals, industry, and policy makers to discuss emerging issues at the intersection of human, animal, plant, and environmental health.

Afternoon Keynote

What You See is Not What You Perceive: Mechanisms of Selective Attention

Dr. Sarah Shomstein



Sarah Shomstein is a cognitive neuroscientist and director of the Cognition Attention and Perception Lab at the George Washington University. Her research focuses on elucidating neural mechanisms of brain functioning relating to visual processing and attentional selection, asking questions such as: How does the human brain select what to attend to given overstimulation? What information captures our attention? Why do smaller objects necessitate more attention? How does our knowledge influence attention? Research in her laboratory employs various methods ranging from human psychophysics and neuroimaging techniques to working with brain damaged populations. Dr. Shomstein teaches advanced level Cognitive Neuroscience courses at undergraduate and graduate levels that explore the intricate relationship between brain and behavior. Her scientific work has been continuously supported by grants from the National Science Foundation (NSF) as well as the National Institutes of Health (NIH). Dr. Shomstein has been on the faculty of the Department of Psychology since joining GWU in 2007. She received a B.S. in Psychology from Carnegie Mellon University in 1998 and a Ph.D. in Psychological and Brain Sciences from The Johns Hopkins University in 2003.

PROGRAM SNAPSHOT

8:00 am – 9:00 am: Breakfast and Check-in

9:00 am – 9:05 am: Official Opening Remarks

9:05 am 9:15 am: Remarks from Dr. Brad Phillips, Executive Director of Maryland Associate of Community Colleges (MACC)

9:15 am – 10:00 am: Student Centered Keynote

10:10 am – 10:40 am: Breakout Session #1

10:50 am – 11:20 am: Breakout Session #2

11:30 am – 1:30 pm: Lunch and Poster Sessions

A – 11:30 am-12:30 pm

B – 12:30 pm-1:30 pm

Presentation from LrnR – 12:00 pm-1:00 pm

11:30 am – 2:25 pm: Exhibition and Transfer Fair

1:40 pm – 2:25 pm: Faculty Centered Keynote

2:35 pm – 3:05 pm: Breakout Session #3

3:15 pm – 3:45 pm: Breakout Session #4

3:50 pm – 4:00 pm: Closing Remarks and Raffle Giveaway
(must be present to win)

Keynote Abstracts

Morning Keynote

Chance Favors the Prepared!

Keynote Abstract:

Ever wondered what is different about very successful people? Is it that they were born in the right family, went to the right school, had the right friends, or did they just happen upon success all by themselves out of sheer determination? Digging deeper into the question of what makes people successful requires one to ask themselves, what is success? Success is defined by a person's values. What a person values is reflected in how they spend their time and energy. When you spend time and energy in any specific area of study, you are preparing yourself to take advantage of unforeseen opportunities in the future. Also, preparing oneself for greatness requires listening and learning from others. We will walk through history to see examples of how the masters of the Modern Age prepared themselves and worked with others leading to serendipitous discoveries and technological innovations impacting society and enhancing our lives today.

Afternoon Keynote

What You See is Not What You Perceive: Mechanisms of Selective Attention

Keynote Abstract:

There you are in the supermarket tracking down the ingredients for making your famous chocolate-bottomed crème brulee when your cell phone rings and stops you in your tracks. There are two kinds of attention at work here. Your active search for specific ingredients among the multitude of products in the supermarket unfolds by way of a voluntary goal-directed—top-down—attentional system. When your cell phone rings, however, a stimulus-driven—bottom-up—attention-grabbing system butts in. Without a fine balance between these two attentional systems, you would vacillate during the day between a kind of “tunnel vision” and a complete inability to focus on anything. And even as you do that balancing act, you still are totally not aware of the vast majority of stimuli relentlessly coming your way. To attend to anything is to simultaneously ignore mostly everything else. How do we manage that! Join a discussion with George Washington University cognitive neuroscientist Sarah Shomstein who has laser-focused her own scientific attention on how human beings manage to attend to anything at all amidst what otherwise would be an utter sensory cacophony of visual, aural, tactile, olfactory, gustatory and other internal and external stimuli.

Conference Schedule

8:00am – 9:00am Check-in and Breakfast – Duncan Hall

9:00am – 9:05am – Official Opening Remarks – Smith Theater

9:05am – 9:15am – Remarks from Dr. Brad Phillips – Smith Theater

9:15am – 10:00am – Keynote – Dr. Tonya Nichols – Smith Theater

**10:10 – 10:40am: Breakout Session #1 – Science Engineering
Technology Bldg. (SET)**

Student Primary Research Presentations

SET 107

Life Sciences/Health Sciences

- Grace Armendariz – HarfordCC

Bioinformatic Analysis of eDNA Metabarcoding Data Targeting Chesapeake Bay Fishes (see abstract on page 16)

- Daniel Chin – MC

CRISPR Guide RNA Designed to Knock Out the CTLA4 Gene in CAR T cells as a Potential Treatment for Non-Small-Cell Lung Cancer (see abstract on page 17)

SET 109

Mathematics

- Peyton Thomas – HowardCC

The Simulation of The Factor Game, Playing Using Algorithms (see abstract on page 17)

- Dylan Brown – Polk State Coll.

Fibonacci Numbers Generating Lucas Numbers (see abstract on page 17)

Student Centered 30-minute talks

SET 111

An Experiential Journey to Success as Student Professionals

Adam Ritz William Britz, EJ Klezer, Ben Lorch – students, CarrollCC

Mentors: Dr. Jennifer Fain-Thornton, Dr. Raza Khan and Dr. Gregory Leppert, faculty – CarrollCC

Student presenters will share information obtained by having conversations with professionals in different STEM fields. The conversations included the requirements for the work environment, and professional work opportunities that include internships and networking. In addition, STEM scholars had the chance to be exposed to scientific research and engage in it. This presentation will provide information on how to conduct a literature search, use a design matrix to help define the research process, and provide information to give a brief overview of two semesters of classes and how the experience has helped students develop as professionals.

SET 209

A Unique Perspective for Mental Health of Students (A Roundtable Discussion)

Joseph Sparenberg, faculty – AACC, CCBC, HowardCC

As a former nontraditional student who attended community college in his late 20's, Joseph brings a unique perspective for students who feel they may not belong. Part of the reason he took the time off between high school and college was because of debilitating anxiety. He earned dual degrees in Biochemistry and Biology in his mid-30's and his MS in Chemistry the day before his 40th birthday. He has focused on mental health of students during his entire teaching career and previously had a certification in Mental Health First Aid. From being a student frozen with anxiety and almost giving up on his dreams to becoming a community college chemistry instructor and research mentor, he provides perspectives not often available to students. This round-table discussion will focus on the mental health of students, being a nontraditional student, and tips on how to succeed on exams, assignments, and presentations all of which naturally induce anxiety. The purpose here is to open up about mental health and to avoid anxiety from reaching detrimental levels. While the focus is to have a discussion with students, faculty are welcome to attend to be involved in an open, honest discussion where everyone would benefit.

Faculty Centered 30-minute talks

SET 211

Measuring Dissolved Oxygen under Different Conditions and How this Applies to Readings from the US Geological Survey

Antonio Chaves, faculty – MC

Participants measure dissolved oxygen in water that is subjected to measured levels of temperature and aeration (based seconds of agitation), then use these measurements to generate graphs. Participants also evaluate how turbidity and temperature affect biological oxygen demand in pond samples previously stored in the dark and use this data to generate tables. After all these wet lab activities are completed, participants visit the US Geological Survey interactive website to see how the data they generated applies to different bodies of water in the state of Maryland. This overall activity helps students to better understand the consequences of nutrient pollution in the Chesapeake Bay, and why anoxic “dead zones” occur only in the summer.

SET 203

Using a Client Focused Project to Teach Engineering to First Year Students

William Stephens, faculty - HarfordCC

Engineering by necessity is a group-oriented endeavor where all participants need to bring their best analytical and practical skills in a disciplined way to solve a problem for a client. The use of processes such as the Engineering Design Cycle is often a foreign concept to first year engineering students. In this paper I will describe a successful project where a group of first year student engineers successfully designed, fabricated, built and installed stabilizers for a wheelchair for a disabled client so that the client could participate in more activities. The project was sponsored by the Volunteers for Medical Equipment (VME). The students had to follow the Engineering Design Cycle to brainstorm ideas, develop a concept, fabricate a solution, and install the equipment.

I will describe how the students performed these activities: conceptualize a design, use computer aided design to design the parts necessary, fabricate the parts using additive 3-D printing, and install the parts. I will describe the successes and failures and what the students learned about engineering from this project.

SET 303

Mentoring Chemistry Honors Students at FCC: Challenges and Rewards

Debbie Ellis, Christine Chin Choy, Wen Nellis, faculty – FCC

Working with Honors students can be a professionally enriching and intellectually rewarding experience. Doing this at a four-year institution is straightforward. Doing this at a community college poses significant challenges. There can be financial, space, experience and time limitations involved when attempting to provide a hands-on chemistry lab research experience to a community college student. The Honors Program at Frederick Community College actively engages both FCC students and faculty. It is dedicated to fostering academic success and leadership skills. Honors students enrolled in a chemistry course often wish to gain additional lab experience by doing a lab-based Honors project.

This presentation, given by the three full-time chemistry faculty at FCC, will focus on the different challenges and successes we have experienced as we mentored chemistry Honors students over the years. Each of us will share our experiences, successes, failures and stumbling blocks. We will discuss our individual solutions to the challenges we face, and the support we have received. It is a time-consuming and occasionally exhausting experience to mentor a hands-on research project in a community college chemistry lab. So why do we keep doing it? As we will share, the rewards can be amazing, and even priceless.

SET 401

Developing a Multi-semester eDNA Metabarcoding Course-based Undergraduate Research Experience for First- and Second-year Biology Students

Dr. Katie Benson and Prof. Dan Ford, faculty - HarfordCC

All organisms, from bacteria to humans, leave a genetic fingerprint in their environment, and advances in environmental DNA (eDNA) analyses are allowing scientists to detect these signals in samples of air, water, and soil. One such analysis, eDNA metabarcoding, can be used to target entire taxonomic assemblages for species-level identification. In this talk, we will discuss how we have been scaffolding an eDNA metabarcoding project targeting Chesapeake Bay fishes into BIO121 - General Biology II and BIO208 - Genetics Laboratory courses. During September 2022, BIO121 students assisted with the collection of water samples at seven sites at the Otter Point Creek component of the Chesapeake Bay National Estuarine Research Reserve in Maryland. Samples were sent to a commercial eDNA laboratory (Jonah Ventures, Inc.) for DNA extraction, PCR, and next generation sequencing. Then, during December 2022, BIO208 students assisted with bioinformatic analyses and species identification. Across all sites, we detected a total of 72 fishes, including endangered species, Maryland Species of Greatest Conservation Need, invasive species, and economically important species. We will discuss the nut-and-bolts of starting this type of project with first- and second-year students, lessons learned during our first year running this project, and plans for the future.

10:50-11:20am – Second Breakout Session – SET

Student Primary Research Presentations

SET 107

Life science/Physical science

- Andrew Starvaggi, Reuben Puthumana, Zarif Solayman, Annaelle Le Guellec – FCC

In Vitro Induced Pluripotent Stem Cell Disease Modeling for Primary Sclerosing Cholangitis (see poster #11 on page 20)

- Arinze Michael Ezeifeke, Arsany Amgad Doud – HowardCC

*Targeting the Untargetable: Is *Saccharomyces cerevisiae* a Viable Model for Studying Cancer Mutations in KRAS?* (see poster #30 on page 30)

SET 109

Life science

- Sithixai (Joseph) Vongdeuane, student – BCCC

Targeting Caspase-1 to Ameliorate Mitochondrial Electron transport Chain (ETC) Complexes Deficiency in Proinflammatory Microglia (see abstract on page 18)

Student Centered 30-minute talks

SET 111

Red Pill Blue Pill: Following the Science in the Age of Institutional Corruption

Antonio Chaves, instructor - MC

The session will start with a short PowerPoint describing a very recent example of scientific fraud (the Surgisphere scandal of 2020). This will be followed by tips for discerning misinformation from trusted sources. Attendees will also review a series of online discussion rubrics based on examples of mainstream institutions like government agencies and corporate media misleading the public at the behest of special interests. Topics covered include the FDA's slow-walked approval of "Bactrim," a generic medication for treating pneumococcal pneumonia in AIDS patients (1980's), the infamous Tuskegee experiment (a group of African American men denied treatment for syphilis from 1930's to 1970's), the 1990's food pyramid (with its damaging emphasis on grain consumption), and a 2021 FOIA-requested document on how NIH outsourced genetic engineering of coronaviruses to the Wuhan Institute of Virology. To conclude, attendees will receive a worksheets and discussion rubrics for the movies "Contagion" and "Soylent Green."

SET 209

Engineering Your Future: A. James Clark School of Engineering Transfer Student Admission & Scholarship Information

Dr. Shannon Buenaflor, Dr. Erin Wessell and Dr. Nicole Roop, staff - UMD

The purpose of this presentation is to provide students with an introduction to the A. James Clark School of Engineering with a focus on 1) the admission process and 2) scholarship opportunities. The proposed audience for this presentation is prospective students, as well as advisors and faculty at the community college level. We will highlight some of the latest developments in the Clark School, including our newest majors and labs, and provide information on transfer pathways, support programs, student services, and scholarships.

Faculty Centered 30-minute talks

SET 211

Remote Teaching Post Pandemic and Pre AI

Mohammed Ali, Professor, Information and Engineering Technology - PGCC

When colleges first began offering courses online, remote teaching and learning posed challenges. These challenges increased when the institutions were forced to teach virtually due to COVID-19. Now with ChatGPT and other AIs, faculty and institutions of higher education are scrambling to mitigate the issue or integrate into their teaching pedagogies. Many faculty and older students were not trained on how to use the various technologies, which created frustration for those who preferred face-to-face instruction over an online environment. Now that students and faculty are two years into instruction models developed to mitigate the effects of the pandemic, almost everyone has at least some experience in remote learning and teaching. Given that, administrators need to reevaluate policies surrounding course delivery, assuming that there will be a demand for a robust online/remote option for learning and teaching after the pandemic. Participants will learn the dos and don'ts of online learning and teaching, ways to mitigate AIs and various tools and tips for faculty and students.

SET 203

Promoting Learning in Chemistry with Service Learning

Prof. Maureen Sherer, faculty - AACC

Applied learning enhances our understanding while it develops transferable skills and confidence. Service learning projects in environmental chemistry offer many opportunities for applying the learning in chemistry classes to improving our environment and serving our communities. Typical projects involve outdoor field work with such community partners as the Chesapeake Bay Foundation, the Real Food Farm, and Arlington Echo Outdoor School. Some students are working with their professor monitoring a campus stream adversely affected by parking lot runoff. An essential component of service learning is the reflective journal, in which the student documents her/his learning in conjunction with discussions with the professor and other students, independent study, and the project itself. As students find real world relevancy of theoretical concepts, their motivation and commitment to learning grows. Students are empowered by the realization that their learning and efforts can contribute to building a better world. Studies indicate that students from some under-represented groups are particularly empowered by this realization. Attendees will learn about ways of adapting service projects to learning in chemistry, and about the logistics of incorporating a service learning option in the course work.

SET 303

Offering Industry-validated and Workforce Related Curriculum

Dr. Savita Prabhakar, faculty – FCC

Frederick Community College (FCC) has put forth several industry-validated, in demand training to meet the needs of the regional workforce. FCC is offering a new cell therapy and Flow cytometry course in spring 2023 both as credit and non-credit options to meet the workforce demands of the local cell and gene therapy industry through the Advanced technology education (ATE) National science Foundation (NSF) grant. We are also offering a new Cell and gene therapy essentials certificate to train students on viral production and purification. In addition, non-credit courses like biotech and maintenance and supply chain and logistics will offer training on the facilities and warehouse part of the industry. We wanted to share our new courses and non-credit options with other Faculty so that if other colleges want to include these industry-validated curricula in their programs, we can share it. By incorporating new instruction into the biotechnology program, FCC will make it affordable for local students, many of whom come from underserved populations, to develop the specific skills that are in demand by the rapidly growing biotechnology industry.

SET 401

Building a Science Department DEIA Committee: A second Year Reflection

Dr. Krista White, faculty - AACC

The presenter(s) will share experiences and accomplishments two years after establishing an Inclusion, Diversity, Equity and Anti-racism (IDEA) committee, which is a faculty-driven initiative started at Anne Arundel Community College (Arnold, MD). This presentation will guide participants through the initial steps of assessing their departmental climate and establishing a committee of peers. Participants will be provided with steps to navigate the process of creating an IDEA committee and will learn about accomplishments and challenges encountered. This committee work is geared towards the Science disciplines; however, the foundational aspects of the committee structure can be used by any discipline.

**11:30am – 1:30pm Poster Sessions and Lunch – SET Lobby
(pick up lunch in Duncan Hall)**

Poster Session A – 11:30am-12:30pm

Odd numbered posters (see pages 19-25 for listing of Poster Abstracts) 1-33

Poster Session B – 12:30pm-1:30pm

Even numbered posters (see pages 25-31 for listing of Poster Abstracts) 2-34

**12:00pm-1:00pm Presentation by Lrn – SET 107
(see abstract on page 18)**

**11:30 am – 2:25 pm Exhibition and Transfer Fair – SET Lobby
See page 33 for list of transfer schools and exhibitors**

1:40 – 2:25pm Faculty Centered Keynote – Smith Theater

Keynote Address: Dr. Sarah Shomstein

2:35 – 3:05pm Third Breakout Session – SET

Telescope Viewing – meet at South entrance of SET

Student Centered 30-minute talks

SET 107

DOD STEM: How about those Internships!

Veronica Seward, professor and DOD STEM Ambassador - PGCC

DoD STEM's mission is to inspire, cultivate, and develop exceptional STEM talent through a continuum of opportunities to enrich our current and future Department of Defense (DoD) workforce poised to tackle evolving defense technological challenges. This presentation will provide a snapshot into several DoD STEM internship opportunities, and the impact that participating in these programs has on your STEM Journey. We will discuss tips on how to search and apply to internships, as well as how to stand out, to help land the internship opportunity that you've been waiting for.

SET 109

College Life is Rough for Me. How Do I Survive a STEM College Year and Get Good Grades? Well Come on in because this Presentation Session May Have some Answers.

Dr. Raza Khan, faculty - CarrollCC

College life is stressful for each one of you. If anyone tells you college was easy, walk away from seeking college-related advice from that individual. College is challenging but not difficult. Whether you are interested in a STEM career or any other career, there are ways to make your college life less stressful and in fact more rewarding too. The presenter, like many of you, had many moments where he thought of just giving up too. Why did he not? What made the difference? Who mattered? Who cared? How did he figure out the money issues? How did he handle the breakups? How did he handle the 200-student class size at the four-year college? Come on in, let us chat, be heard, and gain insights into your next steps to be the professional you see in you. Your life is not only about a college course. It is far more – it is about your journey through that college.

SET 111

From Bachelor's Degrees to Professors at BCCC: Let Us Tell our Stories

Kathleen Gillespie, Frederick Paraskevoudakis, Malathi Radhakrishnan, faculty – BCCC

The presentation of the Baltimore City Community College BSTEM faculty will focus on their real narratives of how their unique backgrounds and early introduction to science shaped and influenced their education, and lead to their future achievements. Faculty will share specific stories of key influences; their own mentors and students that they have successfully mentored, courses that changed their perspectives, roadblocks to success they had to overcome, and how to identify allies to science and help educate those who question scientific principles. This panel will allow students an opportunity to interact with a diverse faculty and feel free to discuss topics from bioethics, social and racial injustice, to how to start their own careers in science.

Faculty Centered 30-minute talks

SET 209

Introducing Mixed Reality Systems to the Classroom

Prof. David Hinton, faculty - HowardCC

As numerous industries are embracing the use of Virtual Reality, Augmented Reality and now, Mixed Reality, it has become clear that there is a demand for prospective employees that have the skills to develop, design and create software applications for use not only in industry but also for use in academia. There are a number of issues an institution must address when considering the introduction of Mixed Reality Systems. We will discuss the challenges we encountered and solutions we developed as we embarked on this quest to introduce this technology in the classroom.

SET 211

From 3D Printing to Additive Manufacturing: It Isn't About Toys and Trinkets

Prof. Mark Edelen, faculty - HowardCC

In the "hype cycle" associated with 3D printing, we have moved past the peak of inflated expectations and through the trough of disillusionment. Both in industry and academia, we are rapidly moving toward the plateau of productivity. This session will provide a broad perspective on the state of additive manufacturing, both as an industrial fabrication method and as an educational tool. We will also highlight Howard CC's additive manufacturing certificate program and capabilities. A variety of applications will be presented, with relevance across many disciplines (life science, health/medical, physical sciences, etc).

SET 203 – This is a 1 hour session

Maryland BioEducators Networking Meeting - Enhancing Biotechnology Education in Community Colleges & High Schools

Dr. Amrita Madabushi, lecturer – JHU, Dr. Lori Kelman faculty – MC, Ms. Jaclyn Madden, faculty – HarfordCC and Dr. Savita Prabhakar, faculty – FCC

This proposed session is aimed at Maryland educators in community colleges and high schools teaching Biotechnology. Biotechnology is a rapidly evolving field that has significant implications for advancing science and impacting human health. However, teaching biotechnology effectively can be challenging due to its interdisciplinary nature, rapidly changing technologies, and diverse student populations. The session will include interactive discussions and participants will have the opportunity to share their teaching experiences and insights, and to learn from others in the community.

This session will also serve as a meeting of the Maryland BioEducators Network. MD BioEducators network was established in 2020 and includes/ welcomes all community college and high school educators teaching Biotechnology. We will discuss strategies for enhancing biotechnology education. We will also share about the National Center for Biotechnology Education, InnovATEBIO which provides leadership in biotechnology education, and discuss strategies to best engage with them and utilize the resources they provide. By the end of the session, we hope the participants will have gained new insights to enhance biotechnology education in the state of Maryland.

SET 303

Pathways to a Bachelor of Science in Biochemistry

Shanen Sherrer, Asst. Professor - SMCM

Biochemistry programs are rarely offered at community colleges due to the high costs of scientific instruments and materials needed to support these academic programs. However, students in chemistry, biology, and related academic programs at community colleges are great candidates for transfer enrollment into Biochemistry programs at four-year colleges and universities. This presentation will help community college faculty prepare their students to enter a bachelor's degree program in Biochemistry. Faculty will also be introduced to a publicly accessible bioinformatics tool from St. Mary's College of Maryland that can be used to help students learn about protein-metal interactions through circular dichroism (CD) spectroscopy. As a scientific method that is very similar to ultraviolet-visible spectroscopy, the theory behind CD spectroscopy and its data analysis procedures can easily be taught in introductory chemistry, biology, and biochemistry courses.

3:15 – 3:45pm Fourth Breakout Session – SET

Student Centered 30-minute talks

SET 107

Professional Development and the Four-Year College Transfer Process for Community College Students

Lanie Lilly, Avery Lowe, Kieran Soliday and William Costlow, students - CarrollCC

Mentors: Prof. Jen Snyder, Prof. Jill Krebs and Dr. Raza Khan, faculty - CarrollCC

Have you ever thought about a business card as a student? How about a resume, or a LinkedIn profile? This presentation will include information on professional development courses that provided invaluable insight and often neglected skills necessary for applying for scholarships, college transfer, and success in a professional work environment. Information will be presented on how to ace an interview and utilize networking to its fullest potential. You can learn about the transfer process from a community college to a four-year college, and how to make your application stand out. You will be walked through the process of developing your communication skills and becoming your most professional self.

SET 109

Calling All Animal Lovers! – Career Opportunities in the Field of Laboratory Animal Science

Emily Love and Dr. Shannon A. Stutler - National Capital Area Branch of the American Association for Laboratory Animal Science (NCAB-AALAS)

Laboratory animal science is an essential branch of biomedical research, focusing on the care and use of valuable animal models used in research, teaching, and testing. Animals are the foundation of the research process. They hold the key to discoveries in disease prevention, treatment, and cures for both humans and animals. The people who care for these animals have a profound respect for animal life and dedication to humane care and treatment. From animal caretakers, to researchers, to veterinarians, there are many stakeholders involved in ensuring that animals are treated with the highest degree of care and compassion. In this session, experienced professionals in the laboratory animal science field will share the many career opportunities that work directly with animals, support research methodology, or indirectly enhance animal well-being. Maryland and the surrounding areas are home to many government, military, academic, and commercial institutions with a high demand for a technical workforce. We will highlight the education, work experience, certification, and networking opportunities that lead to a successful career progression in the field.

SET 111

UMD Fire Protection Engineering – A Unique Engineering Major at College Park

Dr. James Milke, Professor and Chair, Fire Protection Engineering - UMD

Maryland Engineering's fire protection engineering (FPE) program is the only ABET accredited FPE program in the U.S. Being unique, graduates from the program are highly sought by consulting engineering companies, corporations and government agencies. The bachelor of science in FPE provides students with a broad background in fire protection engineering design and analysis. Students apply these skills to the develop cost-effective fire protection solutions for wide range of applications. These applications include a variety of buildings such as high-rise buildings, arenas, malls, museums, whether such buildings are new or historic. The fire protection principles can also be applied to develop fire protection solutions to autos, trains, ships, aircraft and even spacecraft or to communities threatened by wildfires. These solutions are developed based on an understanding of the performance of fire protection systems along with conducting simulations of fires in these spaces. The undergraduate degree program also provides a foundation for students to conduct research, either while undergraduates or as graduate students.

This program is geared principally toward high school students (though transfer students can also benefit from this session). Students can learn about FPE career paths, activities available to FPE students while at UMD and scholarship opportunities. Graduates of this program will receive a B.S. degree in fire protection engineering from the University of Maryland, College Park.

Faculty Centered 30-minute talks

SET 209

Organizing Your Learning Management System (LMS) for Student Success in Anatomy and Physiology

Carrie Long, Associate Professor of Biology - AACC

For many colleges and universities, the start of the pandemic marked the first online delivery of Anatomy and Physiology content. With multiple modalities continuing at many institutions, it is important to think about the design of your Learning Management System (LMS). We will discuss organizational strategies that provide online, hybrid, and face-to-face students with detailed guidance for mastering the course learning outcomes.

SET 211

Colleagues - How are you Doing? Really, How are you Doing? An Honest Dialogue to Uplift Everyone

Dr. Raza Khan, faculty-CarrollCC

As a Chair of a STEM (Science, Technology, Engineering, and Mathematics) related division for over eight years, I have witnessed faculty join the profession with enthusiasm of the mantra that they want to change lives. But over my profession, I have also seen that the drive to that noble goal has taken a hit. Over time, the faculty are overloaded with other responsibilities. COVID-19 environment is one, but not the only reason to blame. Even though the COVID-19 pandemic has brought the issue of one's physical and mental well-being to light with some intensity, very few supervisors, if any, inquire of the faculty about their well-being. Well, this presenter is genuinely interested in this discussion topic because it has taken a toll on him as well! So let us talk about it and let us all walk away with some positive energy. After all, we are educators, mentors, and lifelong learners too.

SET 303

Pedagogy, Technology, & Challenges to Reduce DFW Rates in Introduction to Statistics at Harford Community College

Dr. Laxmi Chataut, faculty - HarfordCC

Many students dread Introduction to Statistics, a required course for many majors. Introduction to Statistics (Math 216) has one of the highest enrollments of any course offered at Harford Community college. Each academic year, this course attracts over 1000 students. Historically, a large percentage of students finish with D or F grades or drop out before completing the course (the DFW rate). Over the last five years, the DFW rate at HCC has been approximately 35% for both full-time and part-time students. To reduce DFW rates in Math 216, the math faculty at HCC have employed various approaches, including active learning in multiple ways, integrating technology, students' participation in class activities, case studies, etc. I will discuss some challenges, particularly in our online classrooms, and the pedagogy and technologies I use in my Math 216 classes. I will present data on student success rates from the previous five years and discuss plans for the coming semesters to improve attrition rates in Math 216.

Abstracts for Student 15 Minute Primary Research Presentations

Breakout Session #1

SET 107

Bioinformatic Analysis of eDNA Metabarcoding Data Targeting Chesapeake Bay Fishes

Grace Armendariz, student - HarfordCC

Mentors: Katie Benson, Dan Ford, biology faculty - HarfordCC

Environmental DNA (eDNA) metabarcoding is a powerful tool that can be used to characterize species assemblages from environmental samples. However, eDNA metabarcoding suffers from issues of bias and detectability that are often not reported in the literature. Therefore, the objective of this study was to explore issues of detectability associated with an eDNA metabarcoding study characterizing fishes at Otter Point Creek, Chesapeake Bay National Estuarine Research Reserve, Maryland. Using 12S MiFish primers, this study detected 72 fishes. Of these, there were detectability issues with 11 species due to sequence data being identical between two or more species in the GenBank database. For eight species, only one is known in the region, therefore we could hypothesize species identity. These include the longnose/shortnose gar, eastern/central mudminnow, eastern/western mosquitofish, eastern/western blacknose dace, longnose/speckled dace, longear/dollar sunfish, Blue Ridge sculpin/Cottus spp., and Chesapeake logperch/Percina spp.; where the former is known in the region. For the other three species, both were known in the region, and therefore we could not determine species identity. These include the black/white crappie, greenside/Johnny darter, and brown/yellow bullhead. These results highlight the importance of understanding the ability of primers to distinguish between target species when designing eDNA metabarcoding studies.

CRISPR Guide RNA Designed to Knock Out the CTLA4 Gene in CAR T cells as a Potential Treatment for Non-Small-Cell Lung Cancer

Daniel Chin, student - MC

Mentor: Linda Jurata, former faculty - MC

Clustered regularly interspaced short palindromic repeats (CRISPR)-Cas9 editing of immune checkpoint genes has been demonstrated to be an effective approach for activation of anti-tumor immune responses and improving the efficacy of Chimeric Antigen Receptor (CAR) T cell therapy. This study examines how CRISPR can be used to design a sgRNA to target and inhibit the CTLA4 gene function in CAR T cells as a potential treatment for non-small-cell lung cancer (NSCLC). We used a program created by the University of Bergen (CHOP CHOP) to find a sgRNA target sequence on the first exon of the CTLA4 gene. Next, we used a database by NCBI (Blastn) to identify mismatches and/or interferences. We used a genome browser by UCSC to find the homology arm sequence. The optimal location of the GFP in the gene was inserted at the target site using Homology Arm Repair (HDR) in the Horizon database by the PerkinElmer Company. A PCR strategy was designed to confirm the experimental success. Our analysis shows that we successfully designed a potential sgRNA to knock out the CTLA4 gene's exon 1 region. We concluded that this treatment strategy could be applied to cancer immunotherapy and gene disruption in the future.

SET 109

The Simulation of The Factor Game, Playing Using Algorithms

Peyton Thomas, student - HowardCC

Mentor: Kristel Ehrhardt and Loretta Tokoly, faculty - HowardCC

The Factor Game is a game created and published by the National Council of Teachers of Mathematics. Its current use is to teach students about the different factors of numbers. We put a slight twist on the standard rules that allowed for us to explore the game in a new way. We explored what happens with those variations. In early explorations we saw that player 1 had a slight edge. We explored the whys of how the advantage can be improved upon or countered. We discovered some algorithms that, if followed, improved the chance of winning. We discuss the observations we saw, analyze the results, and in the end discuss the most effective way of winning the Factor Game.

Fibonacci Numbers Generating Lucas Numbers

Dylan Brown, student - Polk State College, Lakeland, Florida

Mentor: Dr. Mike Long, former HowardCC faculty, current Prof. of Mathematics Polk State College

The Lucas Numbers are a set of numbers that are generated using the same recursive relationship as the more well known Fibonacci Numbers, but with different initial "seeds." Over time, number theorists have found many unique relationships between the two sequences, including the similarity of their generating functions. Some new relationships, using the Fibonacci Numbers to generate the Lucas Numbers, have been found by exploiting one already known relationship between these sets of numbers. Formal mathematical proofs of these relationships will be shared.

Breakout Session #2

SET 109

Targeting Caspase-1 to Ameliorate Mitochondrial Electron Transport Chain (ETC) Complexes Deficiency in Proinflammatory Microglia

Sitthixai (Joseph) Vongdeuane, student - BCCC

Mentor: Dr. Brian Polster, faculty - UMB

Microglia react to pathogens, injuries, and neurodegenerative diseases in the central nervous system (CNS) by turning themselves into pro-inflammatory stages. Pro-inflammatory cells, or activated microglia, undergo an inflammasome pathway or pyroptotic pathway to release neurotoxic cytokines such as IL-1beta and IL-18, causing severer and more deleterious secondary inflammation in the CNS. Mitochondria in microglial cells serve two key roles: energy production for cellular activities and immuno-surveillance. From our lab data, microglial Complexes I, II, and IV protein levels are reduced following proinflammatory stimulation. Previous proteomics data also suggested caspase-1 level increases on microglial heavy membrane fractions, which include mitochondrial membrane contents. The hypothesis is that caspase-1 mediates the cleavage and degradation of mitochondrial ETC complexes based on its protease activity. In this study, the caspase-1/11 inhibitor Belnacasan/VX-765 was applied to proinflammatory microglial cell lines, and a partial protection against Complexes I and II degradation was observed in a western blot experiment. This suggests caspase 1/11 may be involved in mitochondrial ETC complex degradation under pro-inflammatory conditions.

Abstract for presentation by Lrn

Enhancing Student Engagement and Efficacy in Sciences (Biology, Microbiology, Anatomy & Physiology, Labs, Chemistry, Psychology) Using Adaptive Quizzes, Activities using 2D / 3D models / cadaver / histology images, Virtual Lab Experiments, and Live Polling

Aravind Pochiraju, CoFounder, Lrn - CA (former Chief Architect of Innovation at Pearson)

Adoption of OER resources has become mainstream across many colleges in an effort to reduce student costs for course materials. In order to do so, faculty have to give up Publisher solutions which offer Instructor resources that help them better instruct and measure student efficacy. Lrn courseware aligned to Openstax and other OER providers bridge that gap at an affordable cost to the student.

During our workshop, we will discuss the best practices used by adopters of Lrn-Openstax to improve student engagement using Digital content and technology.

We will focus on instructional strategies and the significance of using:

- Adaptive quizzes with question banks written at a higher level of bloom's
- 2D activities with 12 different activity types
- Activities using 3D and Physical model images / Cadaver & Histology images
- Virtual Assignable Labs
- Active learning with live polling and lecture slides

[Please schedule a personalized demo](#) to showcase Lrn's STEM offerings aligned to Openstax.

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Poster Abstracts

Odd Numbered Posters – Session A, 11:30am – 12:30pm

1. *FTIR Study of Selected Astronomical PAHs*

Aiden C. Hathaway, student - AACC

Mentor: Wayne Manrakhan, faculty - AACC

FTIR spectra of common PAHs (Polycyclic Aromatic Hydrocarbons) including Naphthalene and Biphenyl were measured at temperatures close to room temperatures. The spectra and associated analysis were then compared to NASA AMES PAH database and selected astrophysical spectra. The newly launched James Webb Space Telescope (JWST) contains an instrument favorable to detecting PAHs called the Mid-Infrared Instrument (MIRI). This instrument works in both imaging and spectroscopic observing modes from 4.9 to 27.9 μm . We will utilize spectra obtained by MIRI that will allow us to characterize the PAHs in the area of warm dust and molecular gas surrounding a young star.

3. *Numerical and Experimental Study of Falling Spheres in Viscous Fluids*

Christopher A. Clark, Tyler D. Kendrick and Joessel A. Ruiz, students - HarfordCC

Mentor: Wayne Manrakhan, faculty - HarfordCC

This study presents a numerical and experimental investigation of the motion of falling spheres in two fluids of different viscosity. The aim of this study was investigating how fluid density and fluid viscosity affect the rate of descent of spheres through a fluid. The chosen fluids were water and castor oil. Experimentally, the motion of the spheres was measured by analyzing video obtained using a high-speed camera. We also developed MATLAB codes to determine the position and velocity of the sphere as a function of time and compared these numerical results with experimental results. The numerical methods chosen were both finite difference methods, one being the MATLAB native solver, ode45 and the other was an in-house developed code using a Runge-Kutta-Fehlberg (RKF) method.

5. *Thermal Expansion of Industrial Grade Metal Samples*

Noah W. Roman and Nicholas S. Saccenti, students - HarfordCC

Mentor: Wayne Manrakhan, faculty - HarfordCC

The thermal expansion coefficient of metal samples, especially alloys, are strongly affected by the manufacturing and history of the sample. Interferometry is an excellent method for low temperature determination of thermal expansion due to its high precision and accuracy. A Michelson interferometer was used to measure the thermal expansion coefficient of six different metal (commonly used alloys) cylinders. A set of similar sized rods of different alloys were purchased from McMaster-Carr and machined to fit the dimensions of Michelson interferometer. A repeated series of measures of each sample was completed and compared to values expected for that alloy.

7. Designing, Fabricating and Building Wheelchair Stabilizers for a Disabled Person

Glenn Nash, Kyle Wolferman, John Gilley, Emmalynn Mutombo, Aiden Hathaway and Kyle Shenton, students - HarfordCC

Mentor: Dr. William Stephens, faculty - HarfordCC

Gary is a young man who suffers from Cerebral Palsy. Due to his condition, Gary is wheelchair bound but is practicing standing upright on his wheelchair with the help of his parents and physical therapist. Gary throughout his life has been using a non-standard wheelchair, one built for his age and build, and as the chair is of unique design, commercial grade wheelchair stabilizers could not be mounted.

In this poster session, we will describe how a student engineering team at Harford Community College designed, fabricated, and produced a special wheelchair mount to allow for commercial wheelchair stabilizers to be easily attached to the frame of Gary's wheelchair without impeding his mobility and day to day experiences.

9. Genetic Variant Analysis Using Next Generation Sequencing Technology

Sanjanaa Viswanathan, Alexis Goetz and Siang Par, students - FCC

Mentor: Dr. Savita Prabhakaran, faculty - FCC

Several genetic diseases are caused by mistakes in the genome called Single Nucleotide Polymorphisms (SNPs). The purpose of this research project was to create a workflow that identifies SNPs in a genome and presents them in an understandable manner. Knowing where SNPs exist is beneficial for recognizing diseases that an individual is at risk for based on the position of the SNP. Unable to procure and handle a human genome given its size, a genome from *C. Elegans*, a model organism, was instead put through our workflow. The genome is obtained in fastq format; this is then put through the software, Galaxy, which identifies the mutations in the DNA. The workflow quality controls with several tools, aligns and compares a reference genome with the Map with BWA tool to then identify the differences with tools called Freebays and VCF Filter. The workflow created for the *C. Elegans* strain was then adapted through parameters for each tool to be applied in verifying a gene editing experiment: a gene knockout in 3T3 mouse cells. Research was then done on a SNP in the BRCA1 to further explore the devastating effects of a single mistake in the genome.

Lpin gene encodes a protein that has an essential role in fat body function and energy metabolism. *D. sechellia* is a species of *Drosophila* native to Seychelles.

11. In Vitro Induced Pluripotent Stem Cell Disease Modeling for Primary Sclerosing Cholangitis

Andrew Starvaggi, Reuben Puthumana, Zarif Solayman and Annaelle Le Guellec, students - FCC
Savita Prabhakar, faculty - FCC

Primary Sclerosing Cholangitis (PSC) is a chronic liver condition that causes scarring and inflammation of the bile ducts. The damage to the bile ducts results in blockage which can lead to liver failure. Currently, there is no cure for PSC with most cases requiring a liver transplant 10-15 years following the diagnosis. This research project worked to determine whether induced pluripotent stem cells (iPSCs) derived from patients with PSC have the potential to serve as accurate in vitro disease models. RNA and protein antibody assays showed expression of pluripotent transcription factors in the control and experimental groups. The results confirmed that the mechanisms of PSC do not affect the process of reprogramming of iPSCs derived from PSC cells. This research leads to further downstream studies such as *in vivo* subcutaneous injection of iPSC-reprogrammed PSC cells into chimeric mice to observe teratoma formation of the three germ layers. More analysis of iPSC disease models for PSC is imperative for developing pharmaceuticals and gene therapies that target factors that facilitate PSC development.

13. FCC Honors Project: Creating A Histology Tissue Guide

Jordan Reader, student - FCC

Mentors: Dr. Marc Frankenberry and Dr. Debbie Ellis, faculty - FCC

Anatomy and Physiology (A & P) courses at Frederick Community College (FCC) are rigorous and serve as academic stepping stones for students planning careers in biology, and medical fields. A & P I and II are required courses for six FCC healthcare degrees, four of them selective admission programs.

Students need access to every possible learning tool to help them succeed. A challenging topic is histology: the study of tissues. In A & P I, students must learn 20+ different tissue types by appearance, and memorize the functions, places, and type, to prepare for a lab quiz and the first exam.

This can be overwhelming, and deciding what to study can be difficult. Thus, my Fall 2022 Honors project focused on creating: Introduction to Histology: A Tissue Guide. This was designed for the FCC A & P courses. The format is in PowerPoint. Preliminary results obtained during Spring 2023 indicate the guide is increasing student success.

Dr. Marc Frankenberry served as my mentor for this project. Dr. Frankenberry was a wonderful professor and Honors mentor, and cared deeply about all of his students. He passed away unexpectedly in March 2023. It is an honor to dedicate this to his memory.

15. Calculus Through Starflower-Colored Glasses

Kaylie Musard, student - FCC

Mentor: Dr. Debra Ellis, faculty - FCC

Flowers supply many beneficial factors to their surrounding environment as they serve as hosts to pollinators, mitigate the amount of harmful atmospheric chemicals and boost the morale of those around them. Flowers with larger surface areas have an even larger environmental effect than those with smaller surface areas due to the increased ability to attract pollinators and house insects.

The goal of this Frederick Community College Honors project was to develop a mathematical approach for calculating the petal surface area of three distinctly different flowers. This project used polar equations found in calculus to create graphical models of the Starflower, pansy and Gerber daisy. The program Desmos aided determination of the equations needed to create a model of each flower. Using these equations, integration methods were applied to calculate the flowers' surface area.

This trial-and-error process ultimately led to the finding that math of real-life models is completely different than the reverse engineered examples taught in class. Due to the cusps on the intersections of the petals of Gerber daisies and pansies, integration over this area is not possible. Furthermore, this project highlights the individuality of life and the beauty of the mathematical world.

17. Uncovering Different Galaxy Populations Using Webb Deep Field Images

Zoe Brunton, student - AACC

Mentor: Marcio Melendez, faculty - AACC

We used the James Webb Space Telescope's (JWST) deep field capabilities as a tool in constructing a ratio of active galaxies to normal galaxies throughout the visible universe. Because of the depth of the images taken by JWST and the inherent isotropy of the visible universe, we can extrapolate that if a ratio is consistent in one part of the universe, it is consistent across the rest of the universe. We used a calibration image taken by NIRCam in the 0.70, 1.15, 2.00, 2.77, 3.56, 4.10, and 4.44 micron wide filters, and analyzed the data by hand using SAOImage DS9. The results showed a large impact from redshift. From here, we will use a Python notebook to expand the data set, and then the Lyman-break method to measure the redshift. The results will be presented.

19. Phage Therapy

Taalour Martin, student - BCCC

Mentor: Frederick Paraskevoudakis, faculty - BCCC

The purpose of the study we are conducting is to observe and understand food spoilage due to an increase in antimicrobial resistance. Phages work to kill bacteria, many of which are often drug resistant bacteria. It is possible with more study, to then use these same phages to take the place of antibiotics and save lives. How do different phages react against specific spoilage bacteria? That is the question we sought to answer with our research. With each trial we compared the efficiency of 4 individual phages and phage cocktails against differing fish spoilage bacteria. The spoilage bacteria that was used included *Aeromonas bivalvium*, *Aeromonas hydrophila*, *Aeromonas sobria*, and *Pseudomonas fluorescens*. The experiments consisted of a series of trials. Several different phages, a control, and a cocktail. We, at this time, understand that a phage is a virus that infects and replicates bacteria selectively. These small viruses have the potential to succeed in an area where most antibiotics do not. We found out that both individual phages and cocktails inhibit the growth of bacteria when compared to untreated controls. Cocktails showed more efficiency in inhibiting growth compared to individual phages. Our study shows that phages show a promise in controlling spoilage and other unwanted bacteria making it necessary to perform more studies on them in the future.

21. Parental Aggression in the Texas Cichlid: Natural Observations and Experimental Manipulations

Finley Lindsey, student - Goucher

Mentor: Dr. Natalie van Breukelen, faculty - Goucher

The goal of this experiment was to explore the parental defense behavior of the biparental Texas cichlid (*Herichthys cyanoguttatus*). We observed parental pairs at Independence Creek Preserve. We conducted natural observations to determine pair aggressive responses to intruders and experimental manipulations to determine the response to model intruders. In their natural environment, the pairs were more aggressive towards bass than non-parental cichlids. In the model presentations, the pairs were significantly more aggressive to the bass model than towards either cichlid model presentation. This may be due to bass being common and voracious fry predators whereas the cichlids may be less of a threat due to low population density.

23. Student Engagement in Wastewater Surveillance for Tracking the COVID-19 Pandemic

Beslin Aryeh, Klea Coli, Monica P. Diaz, Nqaba S. Mamba, Melissa R. Moreno, Christopher Regacho, Allison D. Sears, Vidya L. Srinivasan, Abdoulaye B. Traore, Rohan R. Vanga, Bradley W. Woodside, students - MC, Siril Stephen, student - UMD

Patricia D. Arcellana, faculty research assistant and Birthe V. Kjellerup, faculty - UMD

Mentors: Dr. Evdokia Kastanos and Prof. Michael B. Chase, faculty - MC

This work aims to develop and pilot a system of wastewater surveillance on Montgomery College (MC) campuses for early detection of SARS CoV-2. Wastewater surveillance provides a more comprehensive picture of the level of the virus in a community, as it captures SARS-CoV-2 genetic material from both asymptomatic and symptomatic individuals. MC faculty collaborated with B. Kjellerup's laboratory at UMD where they received training for the method. Students at the Rockville MC campus collected wastewater using an autosampler, installed on a centrally located sewer. The autosampler typically collected water over a 10-hour period, 1-2 days a week. Wastewater and pure water controls were first seeded with a processing-control virus. Wastewater samples were centrifuged to remove solid waste, and clarified samples were concentrated through Amicon filters or PEG precipitation and high-speed centrifugation. Total RNA was extracted using commercially available kits and quantified using a Nanodrop. Reverse transcription to produce cDNA was followed by quantitative PCR, using fluorescent probes and primers targeting the nucleocapsid gene of the SARS-CoV-2 virus. Comparison of the threshold cycle, Ct, of "unknown" wastewater samples, with a standard curve of a dilution series of nucleocapsid control samples, allowed quantification of samples as positive or negative for SARS-CoV-2.

25. Isolation of Extracellular Vesicles From Culture Media of Mouse N1E-115 Neuroblastoma Cells and Characterization of Contents Implicated in Neurogenesis

Vidya Srinivasan, Samiya Farhin and Amirparsa Ghasemi, students - MC

Mentor: Dr. James Cosgrove

Extracellular vesicles (EVs) are implicated in a range of physiological processes due to their role as intercellular communication agents. Upon release EVs appear to participate in intercellular signaling pathways. Coding and non-coding RNA contents of EVs are hypothesized to play key roles in target cell regulatory processes. We are investigating the contribution of EV-mediated signaling to neurogenesis in mouse N1E-115 neuroblastoma cells, focusing on miRNA.

Neurogenesis entails the production of neurites (structural precursors of axons and dendrites) through dynamic morphological changes in undifferentiated cells. Our analyses concern the role of EVs in regulating the cytoskeletal reorganization underlying these changes.

N1E-115 cells were grown in culture media, then cultured for 48 hours in the presence of EV-depleted or regular FBS. Vesicular fractions were obtained from each growth condition via sequential centrifugation at 4 C at 1000xg for 10 min., 12000xg for 15 min., then 120,000xg for 90 min.

SDS-PAGE analysis of the vesicular fraction from the third centrifugation yielded 3 main protein bands of approximate molecular weights greater than 250 kDa, 90 kDa, and 45 kDa. Western blot and immunodetection of known EV-associated proteins will be done. RNA extracts from fractionated culture media will be analyzed via northern blot to detect miRNAs.

27. *Determining Factors that Affect the Reproductive Success of Eastern Bluebirds*

Brian Shaffer, student - MC

Mentor: Prof. Kiersten Newtoff, faculty - MC

Eastern Bluebirds used to be at high risk of extinction but thanks to environmentalists' efforts, they are now extremely common. House Sparrows, an invasive species, would usurp Eastern Bluebirds nests, leaving them with no shelter. Creating man-made nest boxes was one of the main strategies for recovering the population of bluebirds. There are over 44,000 nest boxes for Eastern Bluebirds in the United States as of 2023. Eastern Bluebirds are a great species to collect data on due to the amount of nest boxes that exist and the ease to set up new trails. Data on bluebirds' behavior, reproductive success, and nesting strategies can be used to extrapolate to other cavity nesters that are less easy to study. In March 2020, a bluebird trail was set up at Montgomery College with 11 nest boxes and has grown to 15 nest boxes. Since then, students have been conducting research on variables that might affect the population of bluebirds. Using previous data collected, along with new data with more variables tracked, I will determine what factors at Montgomery College could be affecting the reproductive success of our local bluebird population. Our research will help others in assisting their local bluebird population.

29. *An Analysis of the Influence of Water Quality on the Morphology of Green Frogs*

Kevin Wise, student - HarfordCC

Mentor: Andrew Adams, faculty-HarfordCC

Amphibian populations are struggling around the globe and are declining at a rate of 3.79% per year. While there is no leading cause for amphibian population decline, several factors can be contributed, such as habitat loss, invasive species, disease, UV radiation, and pollutants. Given the general lack of studies on amphibian population decline and the overall susceptibility of amphibians to these factors, this study was conducted to explore the influence of water quality (water pollutants) on a common species in the US, the green frog (*Lithobates clamitans*).

31. *Affordable Detectors for Harmful Gases using Raspberry Pi*

Adam Ritz, William Britz, EJ Klezer and Ben Lorch, students - CarrollCC

Mentors: Dr. Gregory Leppert and Dr. Raza Khan, faculty - CarrollCC

Researching current gas detectors on the market, primarily ones used by fire departments, the need to create a less expensive, lighter, and more efficient means of detecting noxious or harmful gases was explored. Working with local fire departments, the commonly used detectors in the field, including their price (\$1500-2000) and detection capabilities were investigated. By using sensors detecting carbon monoxide, carbon dioxide, methane, natural gas, hydrogen, and propane, along with other electronic components such as Raspberry Pi, a handheld detector was manufactured. The device is designed to provide gas level readings for a wide range of gases while being a fraction of the cost to produce compared to other commercially available options. After sensor calibration, the group will test the device to ensure its capability for detecting safe versus dangerous levels of any listed gases. In addition, it might be advantageous to branch out to determine how the device might be further advanced, whether by means of transportation such as a drone, or adding more sensors to detect additional gases.

33. *Surveying Carroll County Streams for Phosphate and Nitrate*

Lanie Lilly, Avery Lowe, Kieran Soliday and William Costlow, students - CarrollCC

Mentors: Dr. Jennifer Fain-Thornton and Dr. Raza Khan, faculty - CarrollCC

Approximately 52% of the land in the United States and 32% of the land in Maryland is used for agriculture. Unfortunately, chemicals used in this industry can have dangerous environmental and health effects. When Carroll County farmers use pesticides and herbicides to treat their crops, chemicals and nutrients drain into streams and rivers that can potentially end up in the Chesapeake Bay. This project focuses on analyzing the effect of agricultural runoff on four streams in Carroll County. Sampling locations were determined based on the streams' proximity to either an agricultural, forested, or urban environment. Water samples from each location were tested for the presence of phosphate and nitrate. Phosphate and nitrate are normal products of agricultural runoff. An excess of either can have an adverse effect on community and wildlife health, including the growth of toxic algal blooms that decrease the amount of oxygen available to aquatic life. The outcomes of this project will be shared at the conference.

Even Numbered Posters – Session B, 12:30pm – 1:30pm

2. *Establishing the GlyS Gene's Ortholog in D. bipectinata and D. melanogaster*

Attia Robinson and Mahir Vahora, students - CCBC

Mentor: Dr. Natalie Minkovsky, faculty - CCBC

The insulin signaling pathway regulates glucose homeostasis by initiating a signaling cascade of metabolic enzymes. The process also promotes protein synthesis, lipid synthesis, and mitogenic responses.

The *GlyS* gene encodes enzyme glycogen synthase which regulates energy storage and glucose disposal. Insulin promotes dephosphorylation and activation of the enzyme. Glycogen synthetase deficiency prevents the production of glycogen from glucose, leading to lethargy, fatigue, and hypoglycemia. Since *GlyS* is a functional gene required for a significant metabolic pathway, we anticipated its conservation among related species.

Working as a part of the Genomic Education Partnership (GEP) Pathways project, which aims to investigate the evolution of the insulin signaling pathway genes in the *Drosophila* species, we identified *Drosophila melanogaster GlyS* ortholog in *D. bipectinata*. The gene sequence was obtained from the *D. melanogaster* gene record finder and was run against *D. bipectinata* genomic sequence in NCBI BLAST to identify candidate sequences. UCSC Genome Browser tools were used to analyze the candidates and identify the likely ortholog.

D. bipectinata. and *D. melanogaster* belong to different species subgroups: a melanogaster subgroup for *D. melongaster* and ananassae subgroup for *D. bipectinata*, indicating that their species complex diverged earlier than one common ancestor. Predicted similarity of the *GlyS* ortholog in *D. bipectinata* to the *D. melanogaster* gene was supported by our finding.

4. Identification of the Putative Ortholog in *Drosophila guanche* of the *CycG* Gene Previously Mapped in *Drosophila melanogaster*

Jennifer Alexander and Bisi Odetayo, students - CCBC

Mentor: Dr. Natalie Minkovsky

The insulin signaling pathway maintains homeostasis by regulating glucose to play a vital role in growth, metabolism, neuronal function and development, fertility, and lifespan.

The Cyclin G (*CycG*) gene in *Drosophila melanogaster* is a positive regulator of the Insulin-like Receptor signaling pathway, interacting with proteins to inhibit protein phosphatase and enable cyclin-dependent protein serine/threonine kinase. *CycG* encodes an atypical cyclin protein assisting with growth, metabolism, developmental stability, DNA and meiotic recombination repair, and epigenomic, transcriptional, and cell cycle regulation.

This project attempts to locate and annotate the ortholog of the *CycG* gene in *Drosophila guanche*. *D. guanche* and *D. melanogaster* are distantly related within the *Drosophila* genus with their most common recent ancestor being in the *Sophophora* subgenus.

The insulin signaling pathway is conserved in metazoans, therefore an ortholog to the *CycG* gene is expected to exist within *D. guanche's* genome. The ortholog should function similarly, with expected variations due to temporal and geographic distance as *D. guanche* originated in the Canary Islands and *D. melanogaster* evolved in sub-Saharan Africa.

This study is being done as a part of the Genomic Education Partnership (GEP) Pathways project to explore the evolution of the insulin signaling pathway genes in fruit fly species. The *CycG* sequence in *D. melanogaster* was obtained from Gene Record Finder and ortholog candidates were determined using NCBI BLAST tool. Tools provided by the GEP, such as UCSC Genomic Browser, Genome Assemblies and Gene Model Checker were used for annotation and synteny analysis.

6. *MIPP-2* Gene in *Drosophila elegans*

McKenzie Horne and Sarah Villegas, students - CCBC

Mentor: Dr. Natalie Minkovsky

The insulin/insulin-like growth factor signaling (or IIS) pathway is a fundamental system conserved across metazoan organisms. It is essential for fully functioning metabolism, facilitating glucose uptake. The parallelism between fruit fly (*Drosophila*) and human diseases related to insulin abnormalities including diabetes as well as the conservation of the pathway makes *Drosophila* a good model for exploration of these abnormalities. This research is being conducted as a part of the Genome Education Partnership (GEP) Pathways project which is seeking to explore and analyze the way that the IIS pathway has evolved in *Drosophila* species. In this study we identified and annotated the ortholog of the *Mipp-2* gene of *Drosophila melanogaster* in *Drosophila elegans* using NCBI BLAST similarity search and tools provided by the GEP, such as Gene Record finder, UCSC Genome Browser and Gene Model Checker. Multiple inositol polyphosphate phosphatase 2 (*Mipp-2*) is a protein coding gene expressed in the head of adult *Drosophila*. In the organism *D. elegans*, belonging to the melanogaster group and elegans subgroup, the *Mipp-2* gene plays a large role in energy metabolism, metabolism of inositol phosphate and calcium homeostasis, both of which are linked to insulin resistance and sensitivity within cells.

8. To find an ortholog gene to the Mipp2 gene in *D. melanogaster* in *D. miranda* species

Alleanna Hines and Lizbeth Juarez, students - CCBC

Mentor: Dr. Natalie Minkovsky, faculty - CCBC

The insulin pathway regulates the uptake and conversion of nutrients into storage macromolecules. It is important for maintenance of homeostasis and its disruption may potentially cause numerous diseases. Multiple inositol polyphosphate phosphatase 2 (Mipp2) is the insulin signaling pathway gene conserved across the *Drosophila* genus. The protein product of the gene enables acid phosphatase, diphosphoglycerate 3-phosphatase and inositol phosphate phosphatase activity. Due to its importance in regulating homeostasis, the insulin signaling pathway is conserved in metazoans, and its ortholog is expected to exist in *D. miranda*. The purpose of this project is to locate and annotate the ortholog of the Mipp2 gene in *D. miranda*. *D. melanogaster* and *D. miranda* are related within the *Drosophila* genus with their most recent common ancestor being in the *Sophophora* sub genus. BLAST was used to determine protein sequence similarity. UCSC Genomic browser was used for synteny analysis and gene annotation.

The current study is being done as a part of the Genomic Education Partnership (GEP) Pathways project which seeks to explore the evolution of the insulin signaling pathway genes in the fruit fly species.

10. Hands-On: Using Gestures to Control Descriptions of a Virtual Environment for People with Visual Impairments

Christina Trice, student - CCBC

Mentor: Shiri Azenkot, Assoc. Prof. - Cornell Tech

Virtual reality (VR) uses three main senses to relay information: sight, sound, and touch. People with visual impairments (PVI) rely primarily on auditory and haptic feedback to receive information in VR. While researchers have explored several approaches to make navigation and perception of objects more accessible in VR, none of them offer a natural way to request descriptions of objects, nor control of the flow of auditory information. In this demonstration, we present a haptic glove that PVI can use to request object descriptions in VR with their hands through familiar hand gestures. We contribute designs for a set of hand gestures that allow PVI to interactively get descriptions of the VR environment. We plan to conduct a user study where we will have PVI interact with a VR environment using these gestures to request audio descriptions.

12. STEM Scholar Success at FCC

Dr. Matt Lochman and Dr. Christine Chin Choy, faculty - FCC, Civian Osei and Sean Laverty, students - FCC

Through a S-STEM NSF grant, FCC's STEM Scholars program supports students in financial need through academic and professional mentoring. Over the period of 4 semesters, students participate in a semesterly seminar course taught by STEM faculty. Through these sessions students learn about academic goal setting, transferring into a 4 year program and career planning. Additionally, students select and pursue a research question through the 4 semesters. The professional deliverables include a cover letter, resume, research presentation and poster. These experiences help boost the confidence in the students and appear to improve their potential for success. This poster will describe some of the success metrics of this program based on completion by two cohorts. Lessons learned during implementation of the program will also be presented.

14. *What's in the Water? A Surface Water Report for the Monocacy River in Frederick County*

Kaid Ryland, student - FCC

Mentor: Dr. Christine Chin, faculty - FCC

The goal of this project was to use chemistry lab equipment to test Monocacy River water quality in Frederick and compare these results to relevant state and federal water quality standards. The ions tested were ammonium, nitrate, and chloride. The project consisted of two sampling events over the course of 2022. Samples were collected at the same four sites along the Monocacy River within a fifteen-mile radius of Frederick Community College. Ammonium ion levels were below the Maryland Department of Environment Surface Water Standard (M.D.E.S.W.S.) during both events. Nitrate ion levels were below 3.1ppm in the samples collected in the spring and between 13.1 and 40.7ppm for samples collected in the fall. Chloride ion levels were found to be above the M.D.E.S.W.S. in the spring (76.5 - 142.3ppm) and the fall (35.8 - 49.8ppm). As expected, there is variation in ion levels over distance downstream as well as across seasons.

16. *Tea-rrific Chemistry: Butterfly Pea Flower Tea as a Natural Teaching Tool*

Aeon Kaplowitz, student - FCC

Mentor: Dr. Debbie Ellis, faculty - FCC

Butterfly Pea Flower tea (BPFT) is a popular herbal tea obtained from the flowers of *Clitoria ternatea*. These contain a pH indicator known for its unique blue color that can change to green or pink based on the pH. This color change is caused by an anthocyanin pigment, whose chemical structure affects light absorption and reflection. The degree of conjugation in the pigments alters its color.

An experiment is being developed at Frederick Community College (FCC) by an FCC honors student for Organic Chemistry I based on this natural system: the impact of conjugation on the visual spectrum of BPFT and how pH affects its color. Students can visualize the color changes that result from acid-base reactions, gaining a better understanding of the underlying chemical principles. The experiment will include determining the ultraviolet and visible spectra for each of the three colors and relating them back to the chemical structure of the anthocyanin at that pH. This may inspire them to learn more about natural product chemistry and botanical sciences.

Trial runs in Organic Chemistry I and II indicate that the use of the natural BPFT anthocyanin provides a unique and engaging approach to teaching chemistry concepts and skills.

18. *Mentoring Chemistry Honors Students at FCC: Challenges and Rewards*

Dr. Debbie Ellis, Dr. Christine Chin and Dr. Wen Nellis, faculty - FCC

Working with Honors students can be a professionally enriching and intellectually rewarding experience. Doing this at a four-year institution is straightforward. Doing this at a community college poses significant challenges. There can be financial, space, experience and time limitations involved when attempting to provide a hands-on chemistry lab research experience to a community college student. The Honors Program at Frederick Community College actively engages both FCC students and faculty. It is dedicated to fostering academic success and leadership skills. Honors students enrolled in a chemistry course often wish to gain additional lab experience by doing a lab-based Honors project.

This presentation, given by the three full-time chemistry faculty at FCC, will focus on the different challenges and successes we have experienced as we mentored chemistry Honors students over the years. Each of us will share our experiences, successes, failures and stumbling blocks. We will discuss our individual solutions to the challenges we face, and the support we have received. It is a time-consuming and occasionally exhausting experience to mentor a hands-on research project in a community college chemistry lab. So why do we keep doing it? As we will share, the rewards can be amazing, and even priceless.

20. *Stimulated and Sunburnt: Do Caffeine and Ultraviolet (UV) Light Alter Epithelial Cell Viability?*

Christian Jednorski, Ethan Walters and Hanna Habiba, students - HarfordCC

Mentor: Susan Walker, faculty - HarfordCC

Caffeine is one of the most commonly ingested stimulants, especially amongst college students and faculty. Previous studies have shown that at high concentrations, caffeine affects cell cycle functions, inhibits cell proliferation, and induces apoptosis in certain cancer cells. Additionally, caffeine has also been shown to enhance the cytotoxic effects of ultraviolet (UV) light. Therefore, the objective of this study was to determine the sensitivity of our mammalian epithelial cell line, CHO-K1, to caffeine with or without UV light exposure. Using crystal violet staining, caffeine decreased CHO-K1 cell viability in a dose-dependent manner while UV light failed to have any effect. These preliminary results indicate that our CHO-K1 cells are indeed responsive and sensitive to high levels of chronic caffeine exposure.

22. *Isolation and Discovery of a Bacteriophage from an Environmental Sample*

Benjaporn Perkins and Druscilla Darkwa, students - HarfordCC

Mentor: Jaclyn Madden

With bacteria growing more resistant to antibiotics, alternative treatments are needed. Bacteriophages are being studied as an option, so documenting bacteriophages is becoming an increasingly important practice. By properly identifying and cataloging phages, along with the bacteria they infect, we can learn more about how bacteriophages work. They can be used later in several kinds of applications in medicine and agriculture. We describe the new bacteriophage, PhruitJuice, that we isolated from the soil of Harford County, MD.

24. *The Devourer: The Isolation and Genome Annotation of Bacteriophage Hermeonysus*

Druscilla Darkwa, Alexandra Fender and Izora Williams, students - HarfordCC

Mentors: Breonna Martin and Jaclyn A. Madden, faculty - HarfordCC

Bacteriophages are viruses that only infect and kill bacteria. A promising use of bacteriophages is fighting bacterial infections that are difficult to treat due to antibiotic resistance. Since phages are host species specific, it is crucial to continue discovering a wide variety of phages for future use. During the 2022 Fall semester, phage Hermeonysus was found by Harford Community College students. The phage was isolated from a grass sample, using the host bacteria *Microbacterium foliorium*. Hermeonysus' DNA was then extracted and sent for sequencing at the University of Pittsburgh. DNA Master was used to determine which parts of the genome had the potential to be genes. Then, resources such as NCBI Blast, Starterator, and HHPred were utilized to call the starts for the genes and functions of the proteins. Hermeonysus has been characterized as a virulent phage that causes small clear plaques. Hermeonysus is a Siphoviridae bacteriophage that belongs to the EC cluster. The genome has a length of 52,943 base pairs, a total of 89 genes, and a GC content of 68%. Annotating Hermeonysus allows for a better understanding of the characteristics of EC cluster phages. This information can be further used for phage therapy and other research efforts.

26. *Discovery of ShaKen Bacteriophage*

Kellie Simon and Alexandra Fender, students - HarfordCC

Mentor: Jaclyn Madden, faculty - HarfordCC

Bacteriophages are a type of virus with the ability to infect bacteria and use them as host cells for reproduction. During our semester-long research project, we isolated phage from a soil sample, performed plaque assays to purify our phage, and extracted its DNA for the purpose of characterizing our phage. Bacteriophages can be used to treat antibiotic-resistant bacterial infections in humans or for agricultural applications, and there are thousands of bacteriophages that have already been discovered. The characterization of our novel phage, ShaKen, provides additional information to the growing body of knowledge in this field.

28. *Frugal Science: Partial Molar Volumes of Binary Solutions Based on Simple Measurements*

Patricia Njwe and Kevin Totimeh, students - PGCC

Mentor: William Miller, faculty - PGCC

Frugal Science addresses the topic of “how do we make science accessible to people around the world.” We report a method for measuring the partial molar volumes of binary solutions that is significantly simpler than methods previously reported, thus making these types of measurements more accessible to students in colleges and high schools in the U.S. and around the world.

Partial molar volumes are used in industry to account for the fact that 50.00 mL of water added to 50.00 mL of ethanol only produces 96.40 mL of solution, a difference that is very important if you are making products like hand sanitizer or vodka. We report our results for the partial molar volumes of binary solutions and compare them to literature values.

30. *Targeting the Untargetable: Is *Saccharomyces cerevisiae* a Viable Model for Studying Cancer Mutations in KRAS?*

Arinze Michael Ezeifeke and Arsany Amgad Doud, students - HowardCC

Mentor: Joseph Sparenberg, faculty - HowardCC

Saccharomyces cerevisiae has been used as a model organism for many diseases as it has approximately a 32% protein similarity to humans. The question if *Saccharomyces cerevisiae* can be a model for cancer is discussed here. Mutations in KRAS are implicated in many human cancers and it was the first discovered oncogene. *Saccharomyces cerevisiae* has an analog to KRAS, RAS1 and the sequence is highly conserved. By using fluorescent microscopy, it will be possible to visualize individual molecules of RAS1 mRNA. Additionally, mutating RAS1 to mimic uncontrollable proliferation can be detected. By using single molecule in situ fluorescent hybridization (smFISH), it will be possible to detect the individual molecules and compare the wild-type RAS1 and the mutant. Before committing to wet lab experiments, bioinformatics methods were used to predict primary, secondary, and tertiary structures of the mutant protein to see if the RAS1 mutant would be a viable model to mimic the mutations of KRAS. Here it is shown that the predicted structures of the mutant are comparable to the known structures of RAS1 and indicate that RAS1 would be a viable model to mimic KRAS and *Saccharomyces cerevisiae* can be used as a model for cancer cells.

32. *A Tale of Two Streams: Chloride, Conductivity, and Trace Metals in Streams on the HCC Campus*
Dr. Hannah Pie and Dr. Rebecca Carmody, faculty - HowardCC

Water samples from two stream systems (five different sites) on the Howard Community College campus were collected monthly during 2022 to determine the impact on water quality due to road salt application in winter and ongoing construction on campus. Water quality was assessed by measuring the following parameters: water temperature, dissolved oxygen, pH, conductivity, turbidity, chloride levels, nitrate, and phosphate levels. In addition, concentrations of manganese, cadmium, and nickel were measured using an Atomic Absorption Spectrophotometer (AAS). Nickel and cadmium concentrations in all samples were below their respective chronic EPA Aquatic Life Criteria values. There is a strong positive correlation between chloride and conductivity, with both being higher in the winter, except after heavy rain events. These elevated winter levels likely resulted from input of road salt-laden runoff. Chloride levels in the streams also remain above the EPA chronic limit of 230 mg/L for most of the year, potentially leading to degradation of the freshwater stream ecosystem. The positive correlation between chloride and manganese concentrations suggests that the elevated chloride levels mobilize manganese from sediment into groundwater. Based on the results of this study, more targeted and judicious application of road salts to the college's sidewalks and roadways during the winter months is recommended to address chronically high conductivity and chloride levels in the campus streams.

34. *Scent-sational Synthesis: Innovative Organic Chemistry I Experiment*
Sabrina Purtee, Aeon Kaplowitz, students - FCC
Mentor: Dr. Debbie Ellis, faculty - FCC

Esterification is a key chemical process used in various industries, and it serves as an excellent teaching tool for connecting classroom learning to real-world applications. In this experiment, students are challenged to synthesize butyl acetate, an important ester with numerous commercial applications such as a solvent in nail polish and a synthetic fruit flavor. The ester is produced by combining butanol and acetic acid, and it can be found in fruits, flowers, and animal pheromones.

The experiment includes a range of techniques and concepts, such as infrared spectroscopy, gas chromatography, refluxing, extractions, chemical equilibrium, and reversible reactions. These skills and concepts prepare students for future careers in STEM-related fields, such as chemistry, chemical engineering, materials science, and medical research.

To supplement the laboratory experiment, instructional videos were created to aid in student learning. The videos provide a step-by-step guide on how to perform the experiment, including equipment setup, measurement procedures, and data analysis.

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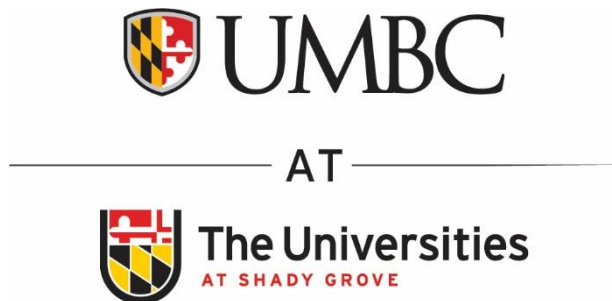
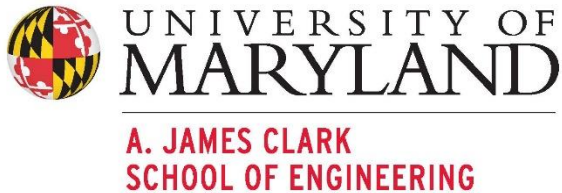
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* Source: The U.S. Bureau of Labor Statistics (BLS), Employment in STEM occupations (2020) <https://www.bls.gov/emp/tables/stem-employment.htm> ** Source: National Science Foundation | National Science Board, The STEM Labor Force of Today: Scientists, Engineers, and Skilled Technical Workers (2019) <https://nces.ed.gov/pub/factsheets/2019/04/14/146-facts-about-americas-stem-workforce-and-those-training-for-it/> *** Source: The U.S. Bureau of Labor Statistics (BLS), Why computer occupations are behind strong STEM employment growth in the 2019-29 decade <https://www.bls.gov/pub/btn/volume-10/why-computer-occupations-are-behind-strong-stem-employment-growth.htm>

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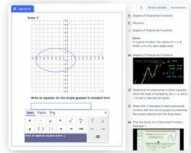



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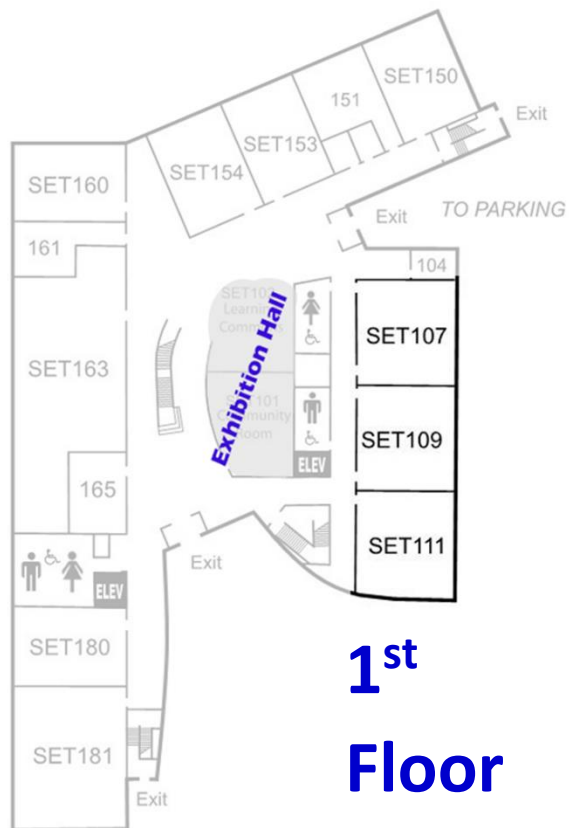
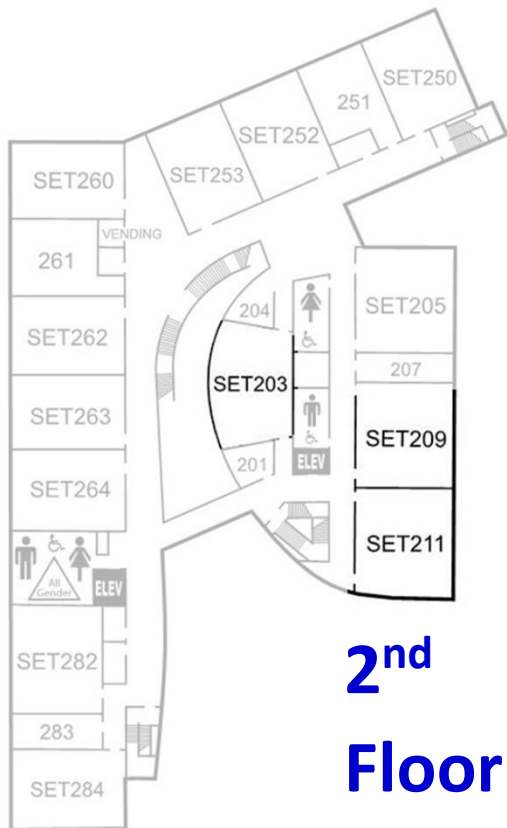
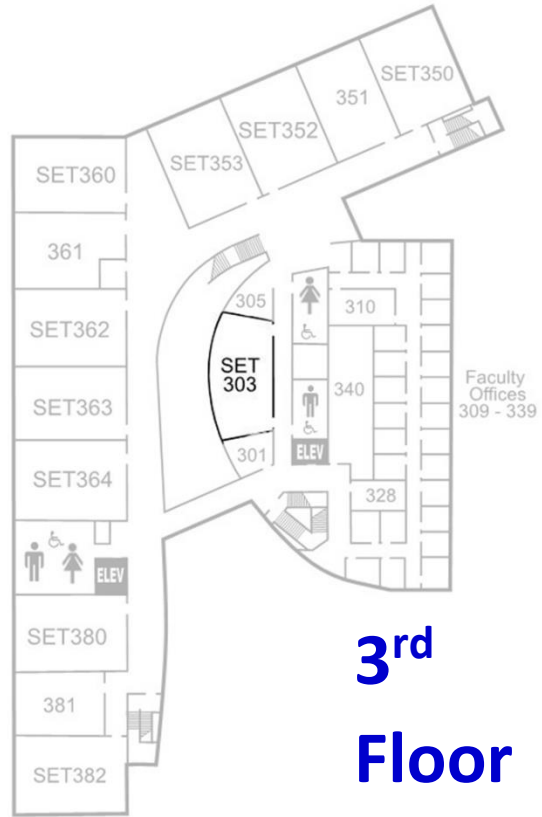
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SET Breakout Session Rooms



PROGRAM SNAPSHOT

8:00 am – 9:00 am: Breakfast and Check-in

9:00 am – 9:05 am: Official Opening Remarks

9:05 am 9:15 am: Remarks from Dr. Brad Phillips

9:15 am – 10:00 am: Student Centered Keynote

10:10 am – 10:40 am: Breakout Session #1

10:50 am – 11:20 am: Breakout Session #2

11:30 am – 1:30 pm: Lunch and Poster Sessions

A – 11:30 am-12:30 pm

B – 12:30 pm-1:30 pm

Presentation from LrnR – 12:00 pm-1:00 pm

11:30 am – 2:25 pm: Exhibition and Transfer Fair

1:40 pm – 2:25 pm: Faculty Centered Keynote

2:35 pm – 3:05 pm: Breakout Session #3

3:15 pm – 3:45 pm: Breakout Session #4

3:50 pm – 4:00 pm: Closing Remarks and Raffle Giveaway
(must be present to win)

QR Code for Surveys:



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- AC Academic Commons
- AF Athletics & Fitness Center
- CL James Clark Jr. Library Hall

- DH Mary Ellen Duncan Hall for English, Languages & Business
- GAL Dwight A. Burrill Galleria
- HR Hickory Ridge Building
- KHH Kathleen Hetherington Hall (formerly Health Sciences Building)
- HVPA** **Peter & Elizabeth Horowitz Visual and Performing Arts Center**
- MH Patrick & Jill McCuan Hall
- HW Howard Hall
- RCF The Rouse Company Foundation Student Services Hall
- SA Student Activities Building
- SET** **Science Engineering Technology Bldg**

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- (X) - Lot Letter
 - (6) - Accessible Parking
 - (W) - Welcome Center
 - (1) - Drop off / pick up
 - (2) - Employees Only - Yellow Striped
 - (3) - Main Receiving
 - (4) - Food Services and Bookstore Deliveries
- Bus Stop - Regional Transit Authority (RTA)
 All stops - Howard Transit GREEN 401 and SILVER 414
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