The 9th Annual 2024 Maryland Collegiate STEM Conference Program

April 20, 2024 | Montgomery College Rockville

Conference Schedule

Time	Event	Location (Map)	Links
8AM - 9AM	Check-in and Breakfast	Science Center (SC) Atrium	
9AM - 9:15AM	Opening Remarks	Robert E. Parilla Performing Arts Center (PA)	
9:15AM - 10AM	Student Keynote Speaker	PA	Biography & Abstract
10:10AM - 10:40AM	Breakout Session #1	SC, Floors 1-3	Presentation Schedule
10:50AM - 11:20AM	Breakout Session #2	SC, Floors 1-3	Presentation Schedule
11:30AM - 2:25PM	Transfer and Exhibition Fair	SC, Floors 1-3	Organizations with Tables
11:30AM - 1:30PM	Lunch	SC 151, 152	
11:30AM - 12:30PM	Poster Session A	SC, Floors 1-3	A Posters
12:30PM - 1:30PM	Poster Session B	SC, Floors 1-3	B Posters
1:40PM - 2:25PM	Faculty Keynote Speaker	PA	Biography and Abstract
2:35PM - 3:05PM	Breakout Session #3	SC, Floors 1-3	Presentation Schedule
3:15PM - 3:45PM	Breakout Session #4	SC, Floors 1-3	Presentation Schedule
3:50PM - 4:00PM	Closing Remarks & Raffle	SC First Floor Atrium	Raffle Details and Feedback Survey

Additional Links

Sponsors
Conference Location & Map
Organizational Committee (OC) Members
Abbreviations used for colleges/universities

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Morning Student-Centered Keynote

Dr. Aeriel D. M. Leonard

Dr. Aeriel D.M. Leonard holds the position of Assistant Professor in the Department of Materials Science and Engineering at The Ohio State University (OSU), where she has distinguished herself through notable achievements and contributions to her field. In recognition of her innovative research and commitment to excellence, Dr. Leonard has received several prestigious awards, including the National Science Foundation CAREER Award in 2023, the Department of Energy Early Career Award in 2022—making her the first assistant professor from OSU's College of Engineering to do so—and the Office of Naval Research Young Investigator Award in 2021. At OSU, Dr. Leonard plays a pivotal role as the Co-advisor for the Society of Women Engineers chapter, demonstrating her dedication to mentoring and leadership within the engineering community. Her commitment to education and inclusion is evident through her initiatives to boost graduate student numbers in materials science and engineering. She has launched impactful programs, such as a 2-day exploratory workshop for undergraduate students from historically black colleges and universities, as well as a program to introduce K-12 students in the Columbus, OH area to science and engineering, aimed at fostering early interest in STEM fields.

Dr. Leonard embarked on her academic journey by earning a bachelor's degree in Metallurgical and Materials Engineering from the University of Alabama in 2012, followed by a Ph.D. in Materials Science and Engineering from the University of Michigan in 2018. Her doctoral research focused on the real-time analysis of microstructural and deformation evolution in magnesium alloys, employing cutting-edge techniques such as high-energy diffraction microscopy and electron microscopy. During her Ph.D., Dr. Leonard played a key role in fostering diversity in engineering through leadership in initiatives like the Grad-SWE SUCCESS leadership camp for female engineering students in Monrovia, Liberia, and the establishment of L-SWE, contributing significantly to the inclusion of underrepresented minorities in engineering.

Beyond her professional achievements Dr. Leonard is a proud boy mom and wife of an active duty service member. Dr. Leonard shares insights and experiences through her lifestyle blog, AerielViews, targeting young graduate and professional students, offering a unique perspective on balancing life and a demanding career in STEM. Her career is a testament to her pioneering spirit, dedication to diversity and education, and her outstanding contributions to the field of materials science and engineering.

Keynote Title: Trusting The Process: My Journey In Materials Science

Keynote Abstract:
Until she reached high school, Dr. Aeriel Leonard aspired to follow in Condoleezza Rice's footsteps. However, everything changed when her ninth-grade science teacher introduced her to the world of science fairs. This revelation sparked a newfound passion in scientific research, transforming her into an avid science fair participant who would eventually compete in international events across the United States. Throughout this transformative journey, Dr. Leonard encountered numerous obstacles, learning that the path to realizing one's fullest potential is often paved with challenges. Success isn't about being the most intelligent person in the room; it's about possessing resilience and the determination to persevere through difficult times. Embracing the journey involves trusting in the path you're on and maintaining belief in your abilities, especially when your goals feel out of reach. Dr. Aeriel Leonard is set to explore the essence of remaining dedicated to your dreams, even in the face of challenges.

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Breakout Session #1 Presentation Schedule

15 Minute Student Primary Research Presentations

(Multiple presentations in the same room will run from 10:10AM-10:25AM and 10:25AM-10:40AM)

Abstract #	Presenters	Title	Location
1.10	Avraham Logan	Factorization in selected algebraic systems	SC 106
1.11	Anjolie Tuazon, Joshua Mussie, Valeria Monterroza	Stellar evolution study: Wolf-Rayet	
1.12	Alexander Hossainkhail, Ariana Ascherl	Educational integration of biofilm research: Creating a versatile assay for diverse bacterial species	SC 108
1.13	Damilola Fapohunda	Overexpressing hematopoietic stem cell related transcription factors using Lentiviral vectors	
1.14	Grace Allen, Meklit Yante, William Diguiseppe	Designing a carbon fiber reinforced 3D printed AFO	SC 113
1.15	Clarissa DeSalvo, Andrew Goff, Nickolas McClelland, Zachary Mittman, Joshua Wilson Shatto	Construction, testing and evaluation of CosmicWatch Desktop Muon Detectors	

30 minute Faculty- and Student-Centered Presentations

All are welcome in either 'focus'

Abstract #	Focus	Presenters	Title	Location
1.20	Student	Shannon Buenaflor, Erin Wessell	Engineering your future: A. James Clark School of Engineering transfer student admission & scholarship information	SC 226
1.21	Student	Pamela Pape-Lindstrom	Intersection: Economy and Environment	SC 204
1.22	Student	Antonio Chaves	The economic and environmental costs of electric and flex-fuel vehicles	SC 259
1.23	Faculty	Sven Holbik	Utilizing remotely operable research instrumentation as a teaching tool in Earth Science	SC 302
1.24	Faculty	Jennifer Wilcox	Integrating home laboratory extra credit projects to reduce student anxiety and increase retention	SC 305
1.25	Faculty	Lori M. Kelman	NISTCHO and undergraduate education: undergraduate research and a biomanufacturing curriculum	SC 125

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Breakout Session #2 Presentation Schedule

15 Minute Student Primary Research Presentations

(Multiple presentations in the same room will run from 10:50AM - 11:05AM and 11:05AM - 11:20AM)

Abstract #	Presenters	Title	Location
2.10	Ryan Day	Assessment of stability of NISTCHO cells cryogenically preserved at -20°C and -80°C	SC 106
2.11	Katrina William, Idrees Chaudry, Samuel Barnett	Structural and procedural confirmation of Saccharomyces cerevisiae RAS G19C for modeling KRAS G12C cancers	
2.12	Rana Hanif	The effect of time of year, nest condition, and nestbox reuse on the reproductive success of Eastern Bluebirds	SC 108
2.13	Julian Dumayas	The impact of pests on Eastern Bluebird reproductive success	
2.14	Stephen Shaner	Chloride and heavy metals in HCC's stream systems	SC 113
2.15	A. Ibacache, J. X. Lin, C. Spendley, D. Jagodige, I. Reyes Campos, J. Kinsinger, T. Belen	Purifying NASA's water: The UV solution	

30 minute Faculty- and Student-Centered Presentations

All are welcome in either 'focus'

Abstract #	Focus	Presenters	Title	Location
2.20	Student	Veronica Seward	DoD STEM: How about those internships!	SC 226
2.21	Student	Robin Searles-Adenegan, Amrita Madabushi	UMGC Biotechnology Programs: Overview and Transfer Options	SC 204
2.22	Student	Emily Davis, Shanen M. Sherrer, Dominiqua M. Griffin	STEM career opportunities in the Federal Government	SC 210
2.23	Faculty	Natalie Minkovsky	Introducing students to authentic research: Course-Based Undergraduate Research Experiences (CURE) in Genetics classroom	SC 302
2.24	Faculty	Meena Chandok, Alla Webb, Michaela Pacesova, James Sniezek	BioTrain and Computer Science multidisciplinary experiential learning transforming education and empowering students	SC 125
2.25	Faculty	Eric Cotton, Linda Prentice, PJ Mitchell	Preliminary results of the application of an item writing flaw analysis for the college wide Final Exam for an Introductory Chemistry course	SC 305

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Transfer and Exhibition Fair

Below are the organizations who will be present during the transfer and exhibition fair.

- Hood College
- Johns Hopkins University
- McDaniel College
- McGraw Hill
- Mt. St. Mary's University
- National Capital Area Branch of the American Association for Laboratory Animal Science
- Shippensburg University
- St. Mary's College
- Trinity Washington University
- West Virginia University
- University of Maryland, Baltimore County (UMBC)
- UMBC – College of Engineering and Information Technology
- UMBC – Shady Grove
- University of Maryland, College Park – A. James Clark School of Engineering
- University of Maryland Global Campus

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Poster Session A

Poster Session A includes all **odd** numbered posters from 1-49. Posters will remain hanging during the entire conference, but will be actively presented during this session. Click on the poster number to read the abstract.

Poster #	Presenters	Title
1	Antonio Chaves	Following the science in the age of institutional corruption
3	Preston M. Ayd, Ryan C. Rowland	Thermal expansion measurements using semi-automated Michelson Interferometer
5	Damilola Fapohunda, Ian C. Keane, Kyle J. Shenton	Improving thermal expansion measurements using computer control
7	William Stephens, Gabriel McGill, Joshua Wilson Shatto, Aaron Hepler	Electric go-kart, a study in student learning of the engineering process with a real project
9	Angel Bentsil	A multiple regression analysis of health care access in least developed countries
11	Faith Anyanwu, Ashley Ekpo, Viviana Jaramillo, Andrew Mangrum	Seeing double: Investing unknown double stars
13	Katrina William, Idrees Chaudry, Samuel Barnett	Structural and procedural confirmation of Saccharomyces cerevisiae RAS G19C for modeling KRAS G12C cancers
15	Grace Allen, Meklit Yante, William Diguiseppe	Can posterior AFOs be 3D printed using reinforced composites with optimized mechanical performance and lower cost compared to traditional AFOs?
17	Anusha Tasnim	Examination of NISTCHO seeding density in EX-CELL Fusion medium
19	Ghada Shams, Jana Alasady	Additional supplementation of Feed 1 results in increased IgG production by NISTCHO cells
21	Nisha Dev	Comparison of cNISTmAb production in NISTCHO cells grown with two different media
23	Teddy Slotta	NISTCHO cells can be stored at -150°C and -80°C but not -20°C
25	Nichelle Cathlin, Celeste Copay, Ellie Geddes	Doubling times of NISTCHO cells banked at different temperatures
27	Thomas J. O'Pray	cNISTmAb can be produced in a static culture to teach principles of antibody production
29	Stanley Smerin	Culturing of a monoclonal antibody CHO cell
31	Neha Nair	The effect of Solar Proton Events on the magnetic field strength in the South Atlantic Anomaly
33	Savannah Moser, Farina Hussain	Optimizing a separation experiment designed for Life Science majors

35	Allison Rhea	Reinforcing the chemistry of liquid-liquid extractions in the Organic Lab
37	Maimouna Diouf, Sarah Kreh, Allison Rhea, Kaid Ryland	Honors peer mentors: Guiding students to success
39	Liam Donegan, Joanie Young	Exploring the putative ortholog of the FoxO gene in Drosophila guanche previously mapped in Drosophila melanogaster
41	Victor Rodgers, Amaka Ibe	FOX hunting: The annotation and analysis of Drosophila miranda dFOXO to its D. melanogaster ortholog
43	Darienne Stansbury	Investigation of chemolithotroph microbial diversity in marine sediment and identification of cable bacteria by molecular diagnostics
45	Myanna Brooks	Illuminating the depths: culture selection and molecular identification of bioluminescent bacteria from marine organisms
47	Darienne Stansbury, Myanna Brooks	Microbial biofilm community formation from Trunk River marsh sediment on naïve Cigarette Butts (CB) filters in microcosms
49	Sitthixai Vongdeuane	Targeting capase-1 to ameliorate mitochondrial electron transport chain (ETC) complexes deficiency in proinflammatory microglia

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Poster Session B

Poster Session B includes all **even** numbered posters from 2-50. Posters will remain hanging during the entire conference, but will be actively presented during this session. Click on the poster number to read the abstract.

Poster #	Presenters	Title
2	Alexander Hossainkhail, Ariana Ascherl	Educational integration of biofilm research: Creating a versatile assay for diverse bacterial species
4	Bryant F. Pepe	El Niño/Southern Oscillation analyses of early 2020s events
6	Anthony Terselic	Hands-on learning in engineering education
8	Michelle Lui	Understanding the technological and mental health impacts of social media
10	Kaitlyn Wylie, Yashila Shrestha, Morgan Bruns	Increasing Vitamin D Receptor expression in T-cells
12	Zahra Aziz, Elisha Kabongo	EGFR expression in different cell types
14	Matthew Quintanilla, Kylie Rankin, Rowan Cain, Subeen Lee	Rhythmicity of timeless expression in Manduca sexta larvae
16	Anjolie Tuazon, Valeria Monterroza, Joshua Mussie	Stellar evolution study: Wolf-Rayet
18	Stephen Shaner	Chloride and heavy metals in HCC's stream systems
20	Paul Mahaffey, Dominic Day, Gavin Dalton, Brison Tichnell	A study into the accessible remote evaluation of fire risk factors
22	John Langlois, Matt Garner, Seth Grimes, Jack Sipe	Language translation as an alternative application of quick response technology
24	Lexy Strine, Madeline Blattau, Max Kurth-ford	L. variegatus exposed to differing wavelengths: reproductive and behavioral responses
26	Raunak Maheshwari, Gautham Ramchandran	Gut-microbiome derived metabolite profiling using artificial intelligence for ESRD drug design/discovery
28	Alexander Ibacache, Jia Xi Lin, Caitlin Spendley, Dinushka Jagodige, Ian Reyes Campos, Joshua Kinsinger, Tyler Belen	Purifying NASA's water: The UV solution
30	Maria Parra Sarmiento, Monique Perez, Tinsaye Kirub	Establishment of a wastewater detection system for SARS-CoV-2 at Montgomery College
32	Krishay Iyer, Sudeep Abburu, Christian Garcia, Kevin Pei	SmartVault – Changing security as we know it
34	Zachary Mittman, Andrew Goff, Sean Castillo, Peter Warren	An investigative analysis of ambient radioactive emissions using an assembled Geiger counter
36	Justin Parker, Gary Knott	Discovery and genome annotation of Bacteriophage Madvan
38	Kellie Simon, Alexandra Fender	Effects of Murraya koenigii leaf liquid extract on the viability of CHO-K1 cells
40	Nicholas Bender	The Speed Eater: Analysis and genome annotation of bacteriophage Hermeonysus

42	Jessica Tran	Host range of Oaklynn and other phages in Cluster EE: Why and where are they different?
44	Tristan Williams	Finding and growing plastic degrading bacteria from Zophobas morio
46	Hugo Molina, Yevhenii Dementiev, Albert Laino Troendle	Want to have a head-start in your Cyber career? CTFs are what you are looking for!
48	Kayla Diaz, Paria Chehreghani, Michael Lopez	Unraveling the health hazards of vector-borne diseases. Mitigating the spread of disease through sustainable urban development
50	Eloi Ferguson, Brett Geaman, Ruta Yigzaw, Diamond Taylor, Sylvia Laciny	Cloning GAPDH gene segment: Exploring a Housekeeping Gene in Genetics Lab

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Afternoon Faculty-Centered Keynote

Dr. Laura Ott

Dr. Laura Ott is a teaching assistant professor in the Department of Biology at the University of North Carolina at Chapel Hill. She holds a PhD in immunology and at UNC, she leverages her broad training in cell and molecular biology to teach large-enrollment introductory cell and molecular biology and anatomy & physiology courses that employ evidence-based pedagogies. She is also the co-director of the Carolina Biology Education Research Laboratory that has the mission of engaging undergraduates in disciplinary-based education research (DBER). She regularly mentors undergraduates in DBER projects and publishes results from these studies in peer-reviewed biology education journals with undergraduates co-authors. Prior to UNC, Dr. Ott completed a postdoctoral teaching fellowship in the NC State University Biotechnology Program before serving as the Science Education Research Unit director at the University of Maryland, Baltimore County (UMBC). At UMBC, Dr. Ott served in leadership roles on two large federally funded grant initiatives. The first, funded by the NSF, involved an inter-institutional collaboration between biology and math faculty at UMBC and four Community Colleges to promote students' quantitative reasoning skills within a biological context. The second, funded by the NIH, explored various curricular and co-curricular interventions to promote the success of diverse students in STEM, including those who transfer from community colleges to four-year institutions.

Keynote Title: Engaging Students in STEM Education Research to Promote Their Science Identity and Research Self-Efficacy

Keynote Abstract:
It is well established that undergraduates who engage in authentic research experience greater academic outcomes and persistence in STEM, which are associated with their development of research self-efficacy (RSE) and scientific identities (SI). That said, many students miss out on the opportunity to conduct research due to there not being sufficient traditional STEM disciplinary-specific research opportunities. We have developed a mechanism to address this problem by creating a credit-based course for students to engage in authentic STEM education research. Students may take this course for two semesters, and we are using quantitative, validated instruments and focus groups to evaluate if students engaged in STEM education research develop the same psycho-social measures of RSE and SI as those engaged in traditional research. This talk will focus on the structure of our STEM education research program, a review of preliminary assessment results, and provide faculty the opportunity to brainstorm possible education research projects suitable for undergraduates to pursue.

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Breakout Session #3 Presentation Schedule

15 Minute Student Primary Research Presentations

(Multiple presentations in the same room will run from 2:35PM - 2:50PM and 2:50PM - 3:05PM)

Abstract #	Presenters	Title	Location
3.10	William Wall	Effect of additional Feed 1 supplementation on NISTCHO cell growth and IgG production	SC 106
3.11	Shreya Swaminathan	Production of cNISTmAb by NISTCHO in shaker flask culture	
3.12	Ayesha Babar	The analysis of chloride, pH, dissolved oxygen, and transparency in urban and rural water bodies	SC 108
3.13	Rio Miura	SARS-CoV-2 quantification in the wastewater of the Montgomery College Rockville campus, using Real Time PCR	

30 minute Faculty- and Student-Centered Presentations

All are welcome in either 'focus'

Abstract #	Focus	Presenters	Title	Location
3.21	Student	Emily Love, Shannon Stutler	Exploring the essential role of animals in research and the humans who care for them	SC 204
3.22	Student	Laxmi Chataut	Enhancing student learning through small teaching strategies	SC 113
3.23	Student	Joe Sparenberg	A unique perspective for mental health of students (A roundtable discussion)	SC 226
3.24	Student	Emily Davis, Shanen M. Sherrer, Dominiqua M. Griffin	Creating and maintaining your professional network in STEM	SC 210
3.25	Faculty	Raza Khan	How have roles of a faculty morphed within the last decade other than teaching an in-person course, hybrid course or online courses to help our students and know the impact of their learning?	SC 302
3.26	Faculty	Brendan Diamond	Scientific thought and practice in introductory labs / inquiry based labs	SC 305
3.27	Faculty	A. Madabushi, R. Searles-Adenegan, L. Kelman, S. Prabhakar, J. Madden	(This one hour session is during this Breakout Session #3 and Breakout Session #4) Maryland BioEducators Meeting – Enhancing collaboration & sharing strategies	SC 125

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Breakout Session #4 Presentation Schedule

15 Minute Student Primary Research Presentations

(Multiple presentations in the same room will run from 3:15PM - 3:30PM and 3:30PM - 3:45PM)

Abstract #	Presenters	Title	Location
4.10	Attia Robinson	Evolution of HDAC4 gene orthologs across three increasingly distant Drosophila species with brief analysis of conserved functional sequences	SC 106
4.11	Rowan Cain, Matthew Quintanilla, Kylie Rankin, Subeen Lee	Rhythmicity of timeless gene expression in Manduca sexta larvae	
4.12	Jonathan Matthew De Las Alas	Relationship of diet towards Type-2 Diabetes	SC 108

30 minute Faculty- and Student-Centered Presentations

All are welcome in either 'focus'

Abstract #	Focus	Presenters	Title	Location
4.20	Student	Cristina Cardona	STEMSEAS is for you	SC 113
4.21	Student	Joe Sparenberg	Resume Building 101	SC 226
4.22	Student	Raza Khan	What does it take to successfully pass a STEM course? What are some of the characteristics of a successful student in STEM course?	SC 302
4.23	Faculty	Victor Mathias	How can clean energy be used in entry-level engineering projects?	SC 305
4.24	Faculty	Tricia Crossett	Teaching about the science of learning to improve student learning	SC 204

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Abstracts for Breakout Session #1

Breakout Session #1 - Abstract 1.10

Factorization in selected algebraic systems

Avraham Logan, student – MC
Mentor: Zhou Dong, faculty – MC

While students may be familiar with properties of factorization within the integers, these properties cannot be taken for granted in a variety of algebraic systems, simple and complex. This presentation introduces the Gaussian integers, a complex ring where versions of the prime divisibility property and the unique factorization property hold, given a more generous allowance for when numbers may be considered "equivalent" in factorizations; also explored is a superficially similar ring where these same prime factorization properties fail to hold. A simpler algebraic system is also discussed to illustrate the key idea of this presentation, that unique factorization should not in general be taken for granted; this simpler system comes with the caveat that it fails to be an integral domain.

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Breakout Session #1 - Abstract 1.11

Stellar evolution study: Wolf-Rayet

Anjolie Tuazon, Valeria Monterroza, Joshua Mussie, student – HowardCC
Mentors: Kenny Diazeguigure & Brendan Diamond, faculty – HowardCC

Wolf-Rayet (WR) stars, distinguished by their massive white-type status with stellar masses ~25 M☉, exhibit distinctive features that offer valuable insights into their evolutionary trajectory. These stars are classified into three main spectroscopic classes (WN, WC, and WO), determined by the specific emission lines evident in their spectral profiles. Notably rare, their high-velocity stellar winds set them apart from O- type stars by the absence of a hydrogen envelope and they continuously expel the products of fusion from their circumstellar shells. Spectral analysis of the chemical emissions from WR stars suggests proximity to supernovae. In our scientific investigation, we conducted spectrographic observations of the Wolf-Rayet star EZ Canis Majoris. Our investigations unveiled the presence of Oxygen (III) emissions in EZ-CMa's nebula, a revelation that defied our initial spectral analysis of the star, marking a critical phase in its stellar evolution. These findings contribute to broader understanding of the dynamics and elemental behaviors within Wolf-Rayet stars, offering invaluable insights into their evolutionary pathways and impending stellar destinies.

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Breakout Session #1 - Abstract 1.12

Educational integration of biofilm research: Creating a versatile assay for diverse bacterial species

Alexander Hossainkhail, Ariana Ascherl, students – AACC
Mentor: Sandy Fox-Moon, faculty – AACC

Biofilms, complex microbial communities encased in a self-produced extracellular matrix, play a vital role in chronic infections and antibiotic resistance. This study investigates the biofilm formation of key bacterial species—Proteus mirabilis, Proteus vulgaris, Escherichia coli, Staphylococcus aureus, and Staphylococcus epidermidis—employing a quantifiable crystal violet-based assay tailored for educational environments. Results from two trials, utilizing 500 µL and 1 mL samples, revealed notable differences in biofilm production both between and within bacterial genera. Specifically, E. coli demonstrated significant biofilm mass formation (average absorbance of 2.288 and 0.761 respectively across trials), whereas S. aureus exhibited the lowest (average absorbance of 0.050 and 0.108 respectively across trials). These findings illustrate the diverse biofilm-forming capabilities among bacteria, emphasizing the influence of inherent bacterial characteristics. Moreover, the study highlights the assay's utility as an educational tool in microbiology classrooms, enabling students to assess biofilm dynamics visually and quantitatively. This hands-on approach not only enhances theoretical understanding but also allows for critical thinking and scientific inquiry to further develop.

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Breakout Session #1 - Abstract 1.13

Overexpressing hematopoietic stem cell related transcription factors using Lentiviral vectors

Damilola Fapohunda, student – HarfordCC
Mentor: Jaclyn Madden, faculty – HarfordCC

Hematopoietic stem cells are a vital component of many systems in the body. They mature into blood cells that support nearly every organ in the body. Due to their regenerative nature, hematopoietic stem cells have the potential to revolutionize treatment for terminal illnesses, including cancer, organ failure, and many more. Transcription factors are proteins that play a crucial role in the differentiation of all stem cells by regulating gene expression. They help naïve stem cells differentiate into what the body needs for maintaining homeostasis. There is a plethora of different transcription factors, each of which has a specific role. My project over the summer at the Wistar Institute's REU program was to overexpress many different transcription factors that are vital to the development of naïve stem cells, specifically for hematopoietic cells. I did this by using lentivirus, which is a viral vector system derived from HIV, to overexpress many different transcription factors in human embryonic kidney cells (293T) through means of bacterial cultivation, plasmid DNA purification, transfection, and infection. The transcription factors that I generated will be used to determine the genetic driving force behind the differentiation of hematopoietic stem cells.

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Breakout Session #1 - Abstract 1.14

Designing a carbon fiber reinforced 3D printed AFO

Grace Allen, Meklit Yante, William Diguiseppe, student – HowardCC
Mentor: Mark Edelen, faculty – HowardCC

This research focused on creating a posterior Ankle Foot Orthotic (AFO) for individuals with foot drop, addressing two main issues: the expense of functional AFOs often not covered by insurance and the ineffectiveness of cheaper online alternatives. AFOs provide lower extremity support, and this study utilized 3D printing with continuous carbon fiber reinforcement to develop a cost-effective, mechanically equivalent AFO compared to high-cost commercial options. A carbon fiber reinforced nylon AFO was designed, printed, and then tested using the PASCO apparatus to compare stiffness with a purchased polyethylene AFO and a purchased carbon fiber AFO. Results showed plantar flexion stiffness for the 3D printed AFO: 0.7985 Nm/degrees, similar to the purchased carbon fiber AFO (0.6429 Nm/degrees) and the polyethylene AFO: 0.2847 Nm/degrees. Cost analysis revealed that the printed AFO was substantially cheaper at $30.79, compared to $509.99 for the purchased carbon fiber AFO and $44.50 for the polyethylene AFO. Therefore, the research demonstrates that a 3D printed AFO made using continuous carbon fiber reinforcement matches the stiffness of traditional carbon fiber AFOs at a cost 16.6 times lower, providing a viable solution for patients with foot drop.

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Breakout Session #1 - Abstract 1.15

Construction, testing and evaluation of CosmicWatch Desktop Muon Detectors

Clarissa DeSalvo, Andrew Goff, Nickolas McClelland, Zachary Mittman, Joshua Wilson Shatto, students – HarfordCC
Mentor: Wayne Manrakhan, faculty – HarfordCC

The CosmicWatch Desktop Muon Detector is a self-contained, low-cost cosmic ray muon detector designed to be built, evaluated, and used primarily by four-year university students with access to electronics and machine shops. The end goal of this project is to construct working devices that will augment the modern physics experiments available to students in the physics laboratory at Harford Community College. This study describes our experience constructing these detectors from sourced parts and troubleshooting issues during the construction process. We encountered several issues with PCB build quality and electronic component performance, especially with the SiPM detectors. In addition, the lack

of access to a machine shop meant adjustment and compromises needed to be made with the mechanical parts of the devices. Finally, we evaluated our build quality by performing a series of basic measurements including flux rate measurements and angular distribution measurements using the working devices.
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Breakout Session #1 - Abstract 1.20

Engineering your future: A. James Clark School of Engineering transfer student admission & scholarship information

Shannon Buenaflor, Program Director – University of Maryland A. James Clark School of Engineering
Erin Wessell, Director – University of Maryland A. James Clark School of Engineering

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.
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Breakout Session #1 - Abstract 1.21

Intersection: Economy and Environment

Pamela Pape-Lindstrom, Dean of STEM – HarfordCC

Traditional economics has an ever-increasing gross domestic product (GDP) as a goal. In the United States, purchases by consumers represent 70% of the economy. Increasing production of goods to meet consumer needs requires natural resources. In contrast, the planet is finite, with the concept of planetary boundaries first defined by Röckstrom et al. in 2009. A new economic paradigm, proposed in 2017 by Kate Raworth, integrates the concept of planetary boundaries and modifies traditional economic theory. Doughnut Economics proposes a "sweet spot" where all human basic needs are met, and planetary boundaries are not exceeded. Thus, the "sweet spot" is both environmentally safe and socially just. The seventeen Sustainable Development Goals (SDG) adopted by all United Nations Member States in 2015, provide a framework to help provide peace and prosperity for all humans now and into the future. This new economic model is growth agnostic and endorses an economic system wherein all humans thrive.
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Breakout Session #1 - Abstract 1.22

The economic and environmental costs of electric and flex-fuel vehicles

Antonio Chaves, faculty – MC

This activity utilizes raw data from the governmental and commercial websites to calculate the practicality of electric and flex-fuel vehicles in terms of battery costs, kilowatt hour expenditures for charging the batteries, and land need to produce ethanol. Data is also used to estimate the impact of gas taxes on the overall U.S. economy as well as the effect of variations in U.S. consumption on the world price of petroleum. Attendees will compare and contrast the pros and cons of alternative energy vehicles with their petroleum-powered counterparts and discuss strategies for reducing petroleum dependence that do not undermine the economy. Finally, attendees will apply basic principles of well-to-wheel to obtain a more comprehensive understanding of the true cost of alternative transportation energy.
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Breakout Session #1 - Abstract 1.23

Utilizing remotely operable research instrumentation as a teaching tool in Earth Science

Sven Holbik, faculty – HarfordCC

Instrument-driven, active learning techniques, and/or research-based curriculum has been an effective strategy in teaching across many disciplines in science, technology, engineering, and mathematics (STEM) and has long been a part of science instruction. Faculty at Valencia College (VC) implemented a

study to measure student achievement, depth of knowledge, and student sentiment after conducting an in-class activity using the remotely operable Scanning Electron Microscope (SEM) at the Florida Center for Analytical Electron Microscopy (FCAEM). This study was conducted using two sections of Earth Science courses (a control & experimental group) in the Fall of 2018 & in the Spring of 2019. Students in the experimental group participated in the instrument-based curricula collecting real-time data over the internet while the control group received the course material without the activity. Students that participated in the in-class activity showed an increase in post-assessment average test scores of ~ 20% greater than the students that didn't participate, scored higher (~ 4%) on formative quizzes, and answered the Creative Exercise (CE) questions with more correct responses and with greater depth of knowledge. The student feedback from student impression surveys on the in-class activity was overwhelmingly positive and, in some cases, students would consider pursuing a degree in (STEM) related fields. Active-learning and instrument-driven integrated activities conducted by this study may aid the development of technical and intellectual skills in undergraduates appropriate for continued independent research and potentially foster the next generation of STEM scientists.

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Breakout Session #1 - Abstract 1.24

Integrating home laboratory extra credit projects to reduce student anxiety and increase retention

Jennifer Wilcox, faculty – HarfordCC

One of the greatest challenges as a chemistry instructor is to make the subject inviting and approachable. It is challenging to balance demanding curriculum while adding enjoyment in the course to facilitate motivation. The majority of students arrive in class with a sense of dread and trepidation as they are "forced" to take chemistry as part of their major. When computational word problems begin, student confidence declines and a cloud of anxiety hovers over the classroom. While some students are comfortable vocalizing their anxiety openly, many students become quiet and withdrawn from classroom discussion and problem solving.

One approach to reduce student anxiety is to offer extra credit. Among educators, extra credit assignments are a controversial topic. Educators that oppose extra credit believe when and how will students be able to complete anything "extra"? However, extra credit assignments can serve as a platform for students to apply course material, reduce student anxiety, and increase retention.

Extra credit assigned the second half of a semester fails to capture students struggling with material early in a course. Based on student feedback and performance, integration of cost-effective home laboratory projects within course units was shown to increase motivation, reduce anxiety prior to quizzes and exams, and increase the number of students taking the final exam.

Back to Breakout Session #1 Schedule

Breakout Session #1 - Abstract 1.25

NISTCHO and undergraduate education: undergraduate research and a biomanufacturing curriculum

Lori M. Kelman, faculty – MC

The NISTCHO cell line was developed for use by industry, academia, and National labs. A brief history of NIST (National Institute for Science and Technology), the NISTmAb (the first antibody reference material), and the NISTCHO cell line will be presented. Many undergraduate research projects can use NISTCHO cells and cNISTmAb, the product of the cells. A summary of Montgomery College Biotechnology student research on NISTCHO will be presented. Educators who teach biology, biotechnology, cell biology, cell culture, biomanufacturing, and who conduct undergraduate research will learn how they might use NISTCHO cells in their courses. This mammalian cell line is robust and easy to grow, and a biomanufacturing curriculum using NISTCHO has been developed; details about how to get, grow, and use the cells will be included. You, and your students, will love working with this CHO cell line!

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Abstracts for Breakout Session #2

Breakout Session #2 - Abstract 2.10

Assessment of stability of NISTCHO cells cryogenically preserved at -20°C and -80°C

Ryan Day, Student Assistant to the NISTCHO Project – MC
Mentor: Lori Kelman, faculty – MC

The gold standard for cryogenic preservation of mammalian cell lines is storage at temperatures equivalent to the vapor phase of liquid nitrogen < -130°C. However, not all academic institutions have access to liquid nitrogen storage or mechanical freezers capable of reaching such temperatures. This project focused on the stability of cells frozen at -80°C and -20°C, as measured by cell density/viability and growth. NIST CHO cells were frozen in 7% DMSO in cryovials at a cell density of 5 X106 cells/mL and stored in three storage conditions, -150°C, -80°C, and -20°C. Two vials from each storage condition were thawed weekly into 15mL of CD CHO Fusion media in 125mL shake flasks. They were incubated at 37°C and 5% CO2, and shaking at 130rpm. The viability and cell density of these flasks were assessed daily until they reached ~3- 5X106 cells/mL, at which point they were passaged. Our data indicated that the -150°C, and -80°C cell banks produced viable cultures that survived thawing and passaging up to 21 weeks post-freeze, and the -20°C cell bank did not produce viable cells during any week of the project.

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Breakout Session #2 - Abstract 2.11

Structural and procedural confirmation of Saccharomyces cerevisiae RAS G19C for modeling KRAS G12C cancers

Katrina William, Idrees Chaudry, students – HowardCC; Samuel Barnett, student – University of Maryland Baltimore County
Mentor: Joseph Sparenberg, faculty – HowardCC

Cancer is characterized by uncontrolled cell growth due to mutations and is often caught in later stages. One such mutation in humans is in the oncogene KRAS. The protein translated from KRAS regulates cell growth, and mutations are implicated in cancer. GTP is the substrate for the KRAS protein, which activates the protein leading to cell replication. When GTP is converted to GDP, KRAS is inactivated. Mutations in KRAS can prevent GTP to GDP conversion leading to unregulated proliferation. We are using Saccharomyces cerevisiae (baker's yeast) cells, due to their similarities to human cells (30-40% genetically identical) and transferable methods. We propose a method to model a commonly studied mutation, the glycine to cysteine substitution at the 12th amino acid in KRAS-based cancer (KRASG12C) in humans using S. cerevisiae by modifying RAS1 (an analog to KRAS). The modification of the RAS1 gene leading to a mutation in the subsequent protein may disrupt signaling by restricting the RAS1 protein from being deactivated, leading to rapid cell proliferation (analogous to KRAS tumorigenesis). We amplified and confirmed the KRAS gene using polymerase chain reaction (PCR) and are developing primers to optimize our PCR process. We will then visualize the RAS1 mRNA using small molecule fluorescent in situ hybridization (smFISH) with a two-plasmid system. Our model could visualize a live cell to observe pathways and mimic tumor growth in real-time. Using S. cerevisiae cells as a carcinogenesis model may elucidate inhibitors to potentially create an on/off switch for replication related to the KRAS G12C mutation. Future collaborations could produce promising results in human cell lines. If successful, this project may aid in the understanding of why cancer exists and could potentially delay metastasis.

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Breakout Session #2 - Abstract 2.12

The effect of time of year, nest condition, and nestbox reuse on the reproductive success of Eastern Bluebirds

Rana Hanif, student – MC
Mentor: Kiersten Newtoff, faculty – MC

This study investigates how Eastern Bluebirds' nesting behaviors and habitat preferences affect their reproductive success in the bluebird trail on the Montgomery College Germantown campus, Maryland. Usually, after a nesting attempt, nestboxes are completely cleaned. In this study, nesting material was left behind to compare the fledging success between clean and dirty boxes. Dirty boxes had significantly higher fledging success at 100% compared to 70% in the clean boxes. Bluebirds begin nest building as early as April and can have up to 3 clutches during the season, though two is more common. In comparing boxes with two nest attempts over the season, the fledgling success of the first attempt was 73%, and of the second attempt, it was 70% and was insignificant. Finally, the differences in fledgling success were compared between the months that nestlings were active, April-July. Success rates varied between 66%-100%, but the differences were not significant. These results have shaped new studies, particularly around clean versus dirty nestboxes, as well as more through records of temperature. Understanding these parameters is crucial for maintaining ecosystem health and population growth in the species.
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Breakout Session #2 - Abstract 2.13

The impact of pests on Eastern Bluebird reproductive success
Julian Dumayas, student – MC
Mentor: Kiersten Newtoff, faculty – MC
The Eastern Bluebird plays an essential role in the world's ecology as they are insect eaters, so they serve as a natural pest control and fertilize the soil with their droppings. The bluebird has three essential reproduction stages: incubation, nestling, and fledgling. However, they can face many challenges during reproduction. In this study, the impact of pests to the reproductive success of bluebirds was examined at each stage of reproduction, using reproductive success data from 2020-2023 from the bluebird trail on the Montgomery College, Germantown campus. The primary pests in the boxes were earwigs, ants, and mites. In each year of the data sets, the percentage of hatching and fledgling was lower in the presence of a pest infestation, but it was not significant. Even without pests, Eastern Bluebird success was not 100%, indicating there are many factors impacting hatching and fledgling success. For citizen scientists monitoring bluebird boxes, pest treatment may not need to be given priority, particularly if the pests are non-parasitic.
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Breakout Session #2 - Abstract 2.14

Chloride and heavy metals in HCC's stream systems
Stephen Shaner, student – HowardCC
Mentor: Rebecca Carmody, faculty – HowardCC
Stream pollution caused by road runoff is a problem for stream ecosystems and the overall quality of the water. Many different pollutants accumulate on roads and can be washed into streams by storm runoff, such as trash, road salts, and metals. Our goal for this project was to measure the levels of manganese, iron, nickel, and chloride in two streams on the Howard Community College (HCC) campus in order to monitor how the overall health of the streams is affected by road runoff. We collected monthly water samples from five locations on two campus stream systems. We examined the water quality at each site using sensors and then analyzed the concentrations of manganese, iron, and nickel using an atomic absorption spectrophotometer. Iron and manganese levels varied by location with Site B consistently having the highest concentrations of both metals. However, nickel was generally below the detection limit at most of the sites, with the exception of Site D, which is the closest site to the ongoing campus construction project. Another notable aspect of the data is that in 2023 there is a weaker correlation between the concentrations of chloride and manganese than there was in 2022, which could be related to a decrease in road salt application the winter of 2022-2023 due to the almost complete lack of snow. In the future we hope to look closer into potential microbial growth in Site B that could influence the levels of manganese and iron at that location, as well as determine if some of the rocks at Site B that were seemingly artificially placed to reduce erosion at the outflow of the culvert have any effect on the iron and manganese concentrations at the site.
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Breakout Session #2 - Abstract 2.15

Purifying NASA's water: The UV solution

Alexander Ibacache, Jia Xi Lin, Caitlin Spendley, Dinushka Jagodige, Ian Reyes Campos, Joshua Kinsinger, Tyler Belen, students – MC
Mentors: Ishrat Rahman & David Kuijt, faculty – MC

Water purification and reuse is critical to human existence, especially for those in space. To tackle this important issue, Montgomery College Ultraviolet (MC UV) has created a UV-C light water purification system that can be implemented within NASA's current water tanks. This would irradiate harmful microbes like E. coli and allow astronauts to have safe drinking water. The project's design implemented an electrical box, UV-C lights, pump system, camera, and thermometers inside of a stainless steel tank. This design allowed MC UV to test the effectiveness of UV-C lights as a purification method, and the potential benefits of various variables such as exposure times, temperatures, and water-flow speeds on bacteria growth. To ensure the safety of the water, this project aimed to reach a bacteria count < 50 CFU/mL and ensure the prevention of new growth of microorganisms in the tank. The test conducted included spiking the water with a bacterial count up to 100 cfu/mL, using the system with UV-C lights on, taking multiple water samples, separating the bacteria, and counting the amount in 1 mL. MC UV's hopes that the tests from this project can provide NASA with a new approach to their current water filtration systems on spacecraft and ensure astronauts' health.

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Breakout Session #2 - Abstract 2.20

DoD STEM: How about those internships!

Veronica Seward, faculty – PGCC, DoD

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 also discuss tips on how to search, apply, and stand out to help land the internship opportunity that you've been waiting for.

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Breakout Session #2 - Abstract 2.21

UMGC Biotechnology Programs: Overview and Transfer Options

Robin Searles-Adenegan, Collegiate Professor and Program Director – University of Maryland Global Campus (UMGC)
Amrita Madabushi, Collegiate Professor – University of Maryland Global Campus (UMGC)

University of Maryland Global Campus (UMGC) offers biotechnology degrees at both undergraduate and graduate levels. This presentation provides students with an overview of the degrees with a focus on the admission and transfer process. At the bachelor's level, UMGC's has two offerings, a Bachelor of Science in Biotechnology and in Lab Management. Through a combination of interactive online courses, students engage in a dynamic learning experience that fosters intellectual growth, professional development and opportunities to transition to graduate programs. UMGC's professional science master's degree in biotechnology offers four concentrations: Biotechnology Management, Bioinformatics, Regulatory Affairs, and Biodefense and Biosecurity, along with a master's level Bioinformatics certificate. UMGC's Biotechnology programs are distinguished by their flexible online format, allowing working and military-affiliated professionals to pursue their academic goals without compromising their professional or personal obligations and facilitating a balanced work-life dynamic. These programs equip graduates with the competencies required for positions in biotechnology workforce including research laboratories, pharmaceutical companies, and government agencies.

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Breakout Session #2 - Abstract 2.22

STEM career opportunities in the Federal Government

Emily Davis, Program Manager – National Institutes of Health

Shanen M. Sherrer, AAAS Science & Technology Policy Fellow and faculty – St. Mary's College of Maryland

Dominiqua M. Griffin, AAAS Science & Technology Policy Fellow and Founder and CEO – Black Women PhDs

From entry-level positions to advanced research and management roles, the federal government offers a wide range of opportunities for individuals with a background in STEM. In this panel discussion, we will review the various career opportunities available for STEM disciplines within the federal government. Attendees will learn about the benefits of pursuing a career in the federal government, the different agencies and departments that hire STEM professionals, and the skills and qualifications needed to succeed in these roles. By shedding light on the diverse career paths available, this talk aims to inspire and empower community college students to consider a future in STEM within the federal government.

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Breakout Session #2 - Abstract 2.23

Introducing students to authentic research: Course-Based Undergraduate Research Experiences (CURE) in Genetics classroom

Natalie Minkovsky, faculty – CCBC

Undergraduate research experience is one of the high impact practices demonstrably improving student engagement and increasing student interest in research careers. Implementation of Course-Based Undergraduate Research Experiences (CUREs) at Community Colleges is most promising due to their flexibility of application and relatively low cost. The session will discuss curriculum developed by the Genomics Education Partnership (GEP) introducing students to authentic research and tools of genomics and bioinformatics by engaging them in low-cost authentic research projects, which involve annotation of genes from recently sequenced species of Drosophila. The session will focus on lessons from a three-year evolution of a CURE in Genomics introduced into a sophomore-level Genetics course. Individual classroom and national college consortium data on student learning gains, and attitudes toward science will be presented. The GEP support structure providing professional growth opportunities and contributing to the success of the project will also be discussed.

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Breakout Session #2 - Abstract 2.24

BioTrain and Computer Science multidisciplinary experiential learning transforming education and empowering students

Meena Chandok, BioTrain Program Director & Biotechnology Program Manager – MC

Alla Webb, Chair, Science, Engineering and Technology at Germantown and Takoma Park – MC

Michaela Pacesova, faculty & ATPA Coach – MC

James Sniezek, Dean of Instruction, Chemical and Biological Sciences – MC

A collaboration between Montgomery College's BioTrain and Computer Science programs provides a multidisciplinary experience which incorporates 21st-century skills needed to tackle real-world problems. This training provides a crucial real-world perspective and prepares students, in a less conventional way, for a wider range of career options and industries. The biotechnology industry faces many challenges in identifying the skilled workers they seek. To skill a sustainable biotech workforce by engaging, exciting, and inspiring students for their journey in the evolving biotech industry, BioTrain is developing an application aimed at guiding individuals to embark on their journey toward a career in biotechnology. The collaboration between BioTrain and Computer Science provides students the opportunity to get involved at various points of project development. Our employed method of training students helps promote critical thinking, problem-solving, and the practical application of knowledge in different contextual ways. These approaches make learning more relevant, keeps students engaged, and promotes effective communication

skills while working with peers from different backgrounds. This holistic training approach exposes students to the often-complicated challenges workplace team problem-solving.
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Breakout Session #2 - Abstract 2.25

Preliminary results of the application of an item writing flaw analysis for the college wide Final Exam for an Introductory Chemistry course
Eric Cotton, Linda Prentice, PJ Mitchell, faculty – CCBC
Multiple Choice (MC) Examinations are a common assessment instrument in the undergraduate curriculum for chemistry courses. The validity of these instruments in measuring learning outcomes of course objectives can be questioned in the presence of certain writing flaws. These flaws can advantage or disadvantage a student taking such exams. A methodical analysis of these flaws can be applied question by question to these instruments in order to elucidate them in each question. A review of the development of the item writing flaw analysis will be given. Further, a comparison of selected questions will be discussed both before and after the application of revisions based on the analysis. Multiple sections and multiple instructors were assigned both a revised and unrevised exam over the course of the Fall 2023 semester and Spring 2024 semester. From this work, the talk will detail preliminary results gathered from the comparison of the unrevised introductory chemistry final exam to the results of a revised exam developed from the application of a systematic item writing flaw assessment to that same exam.
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Abstracts for Poster Session A

Poster Session A - Poster 1 Abstract

Following the science in the age of institutional corruption
Antonio Chaves, faculty – MC
The COVID-19 countermeasures laid bare the extent to which special interests undermine the scientific process. It also pitted those who blindly trust governmental institutions against those who habitually question prevailing narratives. The first group facilitates corruption by making federal agencies less accountable to the public. On the other side of the coin, those who distrust the government create opportunities for charlatans who take advantage of their sense of institutional distrust. The goal of this lesson plan is to provide students with a rough guide for discerning whether or not the “science” is based on systematic or narrative-driven data-gathering. Most importantly, it gives students a “checklist” for objectively evaluating what they consume from both mainstream and alternative sources of news.
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Poster Session A - Poster 3 Abstract

Thermal expansion measurements using semi-automated Michelson Interferometer
Preston M. Ayd, Ryan C. Rowland, students – HarfordCC
Mentor: Wayne Manrakhan, faculty – HarfordCC
An improved Michelson interferometer (see build in another presentation at this conference) was used to measure the thermal expansion coefficient of six different metal (commonly used alloys) cylinders. Previous work using the original instrument identified that manual control and measurements could have introduced errors into the results. It was anticipated that thermal nonuniformity throughout sample and possibly uneven expansion rates in the sample was the largest contribution to this error. The computer-based temperature control and measurements system resulted in a higher automated interferometer. Using this improved instrumentation, the thermal expansion coefficient of six different metal cylinders was completed and will be reported on. For several samples, comparison with results from the non-automated instrument showed improvement in repeatability and error reduction. For the other samples, first results will be reported and comparison to expected values for the materials made.
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Poster Session A - Poster 5 Abstract

Improving thermal expansion measurements using computer control Damilola Fapohunda, Ian C. Keane, Kyle J. Shenton, students – HarfordCC
Mentor: Wayne Manrakhan, faculty – HarfordCC
A Michelson interferometer was previously constructed and successfully used in our lab to measure the thermal expansion coefficient of cylindrical metal samples. To improve precision and repeatability of the measurements, a process to automate the data collection and analysis has been instituted. Previously, manual control of the voltage output from the power supply applied to a foil heater controlled the temperature change in the sample. This can create thermal nonuniformity throughout the sample and possibly uneven expansion rates in the sample. This work describes the first stage where we automate the measurement of the temperature of both the foil heater and center axis of the sample and control the power supply to provide a consistent rate of temperature change in the sample. The design was accomplished using an Arduino UNO R3 and involved computer control and measurement of the output from the power supply and measurement of foil heater and sample temperature. We will describe the system, including computer codes, present information about the challenges encountered and a summary of the tests we conducted on our system.
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Poster Session A - Poster 7 Abstract

Electric go-kart, a study in student learning of the engineering process with a real project
William Stephens, faculty – HarfordCC
Gabriel McGill, Joshua Wilson Shatto, Aaron Hepler, students – HarfordCC
Engineering outside of the classroom is oftentimes an interdisciplinary, collaborative effort between engineers with varying expertise driven by budget and schedule constraints. This is very difficult to get this reality across in an academic setting without having a complex project that may span several semesters. Through the Harford Community College Engineering Club, we were able to replicate this experience for our engineering students through a project to design, fabricate, and test an electric go-kart from scratch.
We designed and built an electric go-kart of wooden construction over several semesters. It was a careful balancing act of novel design and prefabricated parts. There are plenty of kits online that will assemble into a working go-kart, but the use of such kits does not help the students learn about the engineering design process and hone their skills as aspiring engineers. Through this project, the students learned much about the highs and lows of the iterative design process. These highs and lows will be described in our presentation and the lessons that we learned from this project.
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Poster Session A - Poster 9 Abstract

A multiple regression analysis of health care access in least developed countries
Angel Bentsil, student – HowardCC
Mentor: Allison Bell, faculty – HowardCC
Availability and accessibility to health care are vital to every person's existence, no matter where they live in the world. This research aims to analyze the number of physicians in comparison to different socioeconomic rates for 46 of the world's Least Developed Countries (LDC), according to the United Nations Department of Economic and Social Affairs. An LDC is determined by the gross national income of a country, the human asset index, and the economic and environmental vulnerability of a country. [1] The desire is to eventually determine if the data will show how accessible health care is to adults and children in these countries. The data in this research was gathered from the World Health Organization, United Nations, World Bank, and Central Intelligence Agency on several factors in each country including average income per year, median age, number of hospital beds per thousand, neonatal mortality rate, average years of education, and life expectancy from birth. Using multiple and linear regression, this data will be charted and analyzed to determine if any trends exist between the number of physicians and the factors listed above. The expectation is to discover correlations between some of these factors and the

number of physicians and hope to include pediatric factors in this observational study, by using specific categories in relation to children.
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Poster Session A - Poster 11 Abstract

Seeing double: Investing unknown double stars
Faith Anyanwu, Ashley Ekpo, Viviana Jaramillo, Andrew Mangrum, students – HowardCC
Mentor: Anna DeJong, faculty – HowardCC
A double star is a pair of stars that always appear coupled in the night sky, even after years of observations. This coupling can indicate that the stars are gravitationally bound, i.e. a binary system, or just in the same line of sight. We used the Washington Double Star catalog to find four pairs of stars of an undetermined nature. The selection criteria included previous observations, with a lack of observations within the last decade. The Las Cumbres Observation Portal provided images of each pair of double stars, allowing us to measure their position angle and separation. By adding to the historical data, we hope to determine the nature of these double stars.
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Poster Session A - Poster 13 Abstract

Structural and procedural confirmation of Saccharomyces cerevisiae RAS G19C for modeling KRAS G12C cancers
Katrina William, Idrees Chaudry, students – HowardCC; Samuel Barnett, student – University of Maryland Baltimore County
Mentor: Joseph Sparenberg, faculty – HowardCC
Cancer is characterized by uncontrolled cell growth due to mutations and is often caught in later stages. One such mutation in humans is in the oncogene KRAS. The protein translated from KRAS regulates cell growth, and mutations are implicated in cancer. GTP is the substrate for the KRAS protein, which activates the protein leading to cell replication. When GTP is converted to GDP, KRAS is inactivated. Mutations in KRAS can prevent GTP to GDP conversion leading to unregulated proliferation. We are using Saccharomyces cerevisiae (baker's yeast) cells, due to their similarities to human cells (30-40% genetically identical) and transferable methods. We propose a method to model a commonly studied mutation, the glycine to cysteine substitution at the 12th amino acid in KRAS-based cancer (KRASG12C) in humans using S. cerevisiae by modifying RAS1 (an analog to KRAS). The modification of the RAS1 gene leading to a mutation in the subsequent protein may disrupt signaling by restricting the RAS1 protein from being deactivated, leading to rapid cell proliferation (analogous to KRAS tumorigenesis). We amplified and confirmed the KRAS gene using polymerase chain reaction (PCR) and are developing primers to optimize our PCR process. We will then visualize the RAS1 mRNA using small molecule fluorescent in situ hybridization (smFISH) with a two-plasmid system. Our model could visualize a live cell to observe pathways and mimic tumor growth in real-time. Using S. cerevisiae cells as a carcinogenesis model may elucidate inhibitors to potentially create an on/off switch for replication related to the KRAS G12C mutation. Future collaborations could produce promising results in human cell lines. If successful, this project may aid in the understanding of why cancer exists and could potentially delay metastasis.
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Poster Session A - Poster 15 Abstract

Can posterior AFOs be 3D printed using reinforced composites with optimized mechanical performance and lower cost compared to traditional AFOs?
Grace Allen, Meklit Yante, William Diguiseppe, student – HowardCC
Mentor: Mark Edelen, faculty – HowardCC
This research focused on creating a posterior Ankle Foot Orthotic (AFO) for individuals with foot drop, addressing two main issues: the expense of functional AFOs often not covered by insurance and the ineffectiveness of cheaper online alternatives. AFOs provide lower extremity support, and this study utilized 3D printing with continuous carbon fiber reinforcement to develop a cost-effective, mechanically

equivalent AFO compared to high-cost commercial options. A carbon fiber reinforced nylon AFO was designed, printed, and then tested using the PASCO apparatus to compare stiffness with a purchased polyethylene AFO and a purchased carbon fiber AFO. Results showed plantar flexion stiffness for the 3D printed AFO: 0.7985 Nm/degrees, similar to the purchased carbon fiber AFO (0.6429 Nm/degrees) and the polyethylene AFO: 0.2847 Nm/degrees. Cost analysis revealed that the printed AFO was substantially cheaper at $30.79, compared to $509.99 for the purchased carbon fiber AFO and $44.50 for the polyethylene AFO. Therefore, the research demonstrates that a 3D printed AFO made using continuous carbon fiber reinforcement matches the stiffness of traditional carbon fiber AFOs at a cost 16.6 times lower, providing a viable solution for patients with foot drop.
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Poster Session A - Poster 17 Abstract

Examination of NISTCHO seeding density in EX-CELL Fusion medium
Anusha Tasnim, student – MC
Mentor: Lori Kelman, faculty – MC
NISTCHO is a mammalian cell line developed by NIST and we are assessing the suitability of using this cell line for teaching biomanufacturing. Our experiment involved growing NISTCHO cells at different seeding densities to determine the optimal seeding density for use in college laboratories. The cells were grown in shaker flasks, each with 30 mL of EX-CELL CD CHO Fusion media and different seeding densities, and the cell density and viability were recorded every day. The results showed that the optimal seeding density was 6.00x105 cells/cm2. The highest number of viable cells were produced at this concentration. Funded by NIIMBL 70NANB21H085.
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Poster Session A - Poster 19 Abstract

Additional supplementation of Feed 1 results in increased IgG production by NISTCHO cells
Ghada Shams, Jana Alasady, students – MC
Mentor: Lori Kelman, faculty – MC
NISTCHO is a mammalian cell line generated by NIST that produces an anti-RSV IgG and we are exploring its use for teaching Biomanufacturing. We investigated whether the additional supplementation of Feed 1 to NISTCHO cells would result in an increase in IgG production. NISTCHO cells were seeded at a density of 3 x 105 cells/mL in 30 mL shake flask cultures in EX-CELL Advanced CHO Fed-batch medium. Cultures were supplemented with 5% Feed 1 from Day 3 which was repeated every two days. From Day 7, the supplementation was increased to 10% Feed 1, and the culture was harvested when viability fell below 60%. Cell density, viability, glucose content and pH were determined daily. Conditioned media was subjected to Protein A affinity chromatography, and eluted IgG was quantitated by A280 absorbance and by Bradford Assay. The results suggest that enhanced supplementation by 10% Feed 1 from Day 7 results in increased IgG production by NISTCHO cells. Funded by NIIMBL 70NANB21H085.
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Poster Session A - Poster 21 Abstract

Comparison of cNISTmAb production in NISTCHO cells grown with two different media
Nisha Dev, student – MC
Mentor: Lori Kelman, faculty – MC
The NISTCHO mammalian cell line is being studied to see if it can be used to teach biomanufacturing. This cell line expresses cNISTmAb, a non-originator form of the NISTmAb. The purpose of this study was to identify which media prompted higher cell density and IgG production. Cells were initially cultured at a density of 3 x 105 cells/mL in two different types of media (EX-CELL Advanced Fed-Batch medium and EX-CELL CD CHO Fusion media). Cell growth was monitored regularly. Conditioned media was collected, and cNISTmAb was purified through Protein A affinity chromatography. The quality of the cNISTmAb obtained from both types of media was evaluated using A280 measurements and SDS-PAGE electrophoresis. Funded by NIIMBL 70NANB21H085.

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Poster Session A - Poster 23 Abstract

NISTCHO cells can be stored at -150°C and -80°C but not -20°C

Teddy Slotta, student – MC
Mentor: Lori Kelman, faculty – MC

NISTCHO is a new cell line which is being studied to see if it can be used to teach biomanufacturing skills. Not all colleges have liquid nitrogen storage. We investigated whether NISTCHO cells could be stored frozen at three temperatures: -20°C, -80°C and -150°C. Cells were banked, stored at one of the three temperatures, and thawed on a weekly basis to see whether the cells were still viable. Our results showed that NISTCHO cells can be stored for several months at -80°C and -150°C, which suggests that colleges without liquid nitrogen storage can keep cells between semesters. Funded by NIIMBL 70NANB21H085.

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Poster Session A - Poster 25 Abstract

Doubling times of NISTCHO cells banked at different temperatures

Nichelle Cathlin, Celeste Copay, Ellie Geddes, students – MC
Mentor: Lori Kelman, faculty – MC

The NISTCHO mammalian cell line is being studied to see if it can be adapted to an academic Biomanufacturing setting. The goal of this study was to compare the doubling times of NISTCHO cells stored at different temperatures. NISTCHO cells were cryopreserved at -20°C, -80°C, and -150°C to evaluate the effect of different storage temperatures on cell doubling time, viability, and protein production. Vials were thawed and recovered weekly, and viability and cell density was determined for the resulting cultures. In this study, the growth curve data were used to calculate the generation number and doubling time of the recovered cultures. Doubling times will be compared for cells stored at different temperatures. This project was supported by NIIMBL 70NANB21H085 funding.

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Poster Session A - Poster 27 Abstract

cNISTmAb can be produced in a static culture to teach principles of antibody production

Thomas J. O'Pray, student – MC
Mentor: Lori Kelman, faculty – MC

Using the research grade test material NISTCHO as a model cell line, colleges with modest laboratory resources can teach the principles of monoclonal antibody production as part of a biomanufacturing curriculum. We demonstrated this by validating protocols developed by another institution as part of a grant funded by the National Institute for Innovation in Manufacturing Biopharmaceuticals (NIIMBL), an organization dedicated to training tomorrow's biopharmaceutical professionals. We seeded and grew NISTCHO in a static culture using T-75 flasks instead of shake flasks and followed growth over seven days by photomicrography. Then the conditioned media was harvested, centrifuged, and clarified, prior to Protein-A affinity chromatography. Antibody was characterized by A280 absorbance readings and SDS-PAGE. Our work confirmed that NISTCHO cells can be grown in static culture to demonstrate biomanufacturing principles such as cell culture, antibody production, and purification. While the methods were not optimized, these protocols can be used by colleges without expensive cell culture equipment as part of a biomanufacturing curriculum. This was funded by NIIMBL 70NANB21H085.

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Poster Session A - Poster 29 Abstract

Culturing of a monoclonal antibody CHO cell

Stanley Smerin, student – MC
Mentor: Lori Kelman, faculty – MC

NISTCHO cells, a mammalian cell line that produces a non-originator version of the NISTmAb, were cultured in EX-CELL CD CHO Fusion media in 125 mL shaker flasks. The cells grew for nine to ten days following an exponential curve to over 3X107 cells/mL. When the media was augmented with Feed 1, IgG, as purified by Protein A chromatography (Thermo Scientific), was secreted by the cells to 1.7 mg/mL, as measured by A280. The IgG was confirmed to be IgG by dissociation of the H and L chains by dithiothreitol in SDS-PAGE. Future Western Blot or ELISA with the RSV antigen for the mAb is required to confirm that the IgG secreted by these CHO cells is the RSV antibody for which the CHO cell is recombinant. Funded by NIIMBL 70NANB21H085.
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Poster Session A - Poster 31 Abstract

The effect of Solar Proton Events on the magnetic field strength in the South Atlantic Anomaly
Neha Nair, student – FrederickCC
Mentor: Perry Wood, faculty – FrederickCC
From the bottom of South America to the tip of Africa, the South Atlantic Anomaly (SAA) interferes with data collection instruments due to it being an area in the geomagnetic field that is exceptionally weak. Scientists monitor the SAA to predict the magnitude of its interference. Solar Proton Events (SPEs) are known to affect the magnetosphere. This study discusses the SPE's effect on the magnetic field strength of the SAA to begin considering the impact solar activity has on SAA behavior.
A python program extracted and algorithmically processed data on the SAA from SWARM satellite files 5 days before, after, and during each SPE event from 2013-2017. SPE data was gathered from NASA's SPEs Affecting the Earth Environment dataset. The overall, positive, and negative correlations were 0.0104, 0.1187, and -0.2602, respectively. The average slopes pre and post SPE were 5.3133 nT/day and 13.3426 nT/day.
There was no significant correlation between changes in the magnetic field of the SAA and SPEs. However, the slope changes indicate that the SPE made a significant increase in the rate of increase of the magnetic field. Calculations with larger data samples may determine if the impact of SPEs on the SAA magnetic field is consistent.
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Poster Session A - Poster 33 Abstract

Optimizing a separation experiment designed for Life Science majors
Savannah Moser, student/tutor – FrederickCC; Farina Hussain, student – University of Maryland
Mentor: Debbie Ellis, faculty – FrederickCC
Separatory techniques are crucial tools in life sciences research labs. Methods exist to separate mixes of natural or synthetic compounds that rely heavily on the use of intermolecular forces, differences in solubility, and acidic and basic characteristics. In Organic Chemistry at Frederick Community College, students are exposed to a variety of separation methods. In Organic Chemistry II, the most challenging experiment is the separation of three chemicals using fundamental separation techniques. Successful completion is evaluated based on the percent recovery of each chemical in the mix once the separatory steps are completed.
Our volunteer intern research revised an existing Organic Chemistry II lab. Students previously struggled with separating benzoic acid, tert-butyl phenol, and dimethoxy benzene using the extraction and recrystallizations given in the procedure. Often published procedures need to be revised due to differences in lab time, lab equipment, etc. The procedure was repeated using a diversity of solvents and changing parameters, while tracking the presence of each compound at each step. A new protocol was created that incorporated changes in solvent, amounts of compounds, procedure steps, and was presented in a clear, step-by-step procedure. The experiment was successfully revised and is being used in the Organic Chemistry II lab.
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Poster Session A - Poster 35 Abstract

Reinforcing the chemistry of liquid-liquid extractions in the Organic Lab

Allison Rhea, student – FrederickCC
Mentor: Debra Ellis, faculty – FrederickCC
Liquid-liquid extractions are a pivotal separation procedure in organic chemistry. Organic chemistry students must have a thorough understanding of liquid-liquid extractions to ensure success in future chemistry courses and professional laboratory positions. This project involved the development of two experiments to facilitate student comprehension of liquid-liquid extractions and related topics. The first procedure introduces first-semester organic chemistry students to extraction equipment and reviews the concept of miscibility. This is done through three separations with varying solvents: water and methanol; water and dichloromethane (DCM), and water and tert-butyl methyl ether. Students added food coloring to easily identify the behavior of the aqueous layer. This procedure was test-run in Organic Chemistry I labs in the Fall 2024 and Spring 2024 semesters and optimized based on student feedback.
The second procedure, designed for Organic Chemistry II students, introduces the effects of saline solutions, and incorporates the use of acid-base characteristics into liquid/liquid extractions. The separation of a mixture of caffeine and benzoic acid shows how to separate acids from bases and reinforces intermolecular forces. This advanced introduction to liquid/liquid extractions is being optimized by including trial runs and feedback from Organic Chemistry II students. These experiments are being designed by students, for students.
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Poster Session A - Poster 37 Abstract

Honors peer mentors: Guiding students to success
Maimouna Diouf, Sarah Kreh, Allison Rhea, Kaid Ryland, students – FrederickCC
Mentor: Debra Ellis, faculty – FrederickCC
Frederick Community College (FCC) Honors students complete research projects in STEM, Humanities, and Social Sciences. Honors Peer Mentors (HPMs) provide guidance throughout the Honors research process and support the success of students. Their insights and mentoring become crucial during the last few weeks of the semester, as Honors students are preparing their final presentations. At the end of each semester, FCC holds an Honors Forum. Honors students are required to present either a PowerPoint or poster presentation on their Honors research, but for first time Honors students, this can be a new and often overwhelming assignment.
HPMs are former and current FCC Honors students, so they have experience successfully completing an Honors research project and preparing the forum presentation. HPMs have a designated office where they can work with Honors students as needed. They also meet with students in the STEM Learning Center and the Learning Commons, two centers at FCC that support and foster student learning and engagement and provide tutoring.
The Honors Peer Mentoring Program, created in 2017, is now an essential component of FCC's Honors Program. HPMs are role models and purveyors of culture that anchor the FCC Honors community. HPMs represent a mix of students of color and diverse backgrounds, including Early College students.
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Poster Session A - Poster 39 Abstract

Exploring the putative ortholog of the FoxO gene in Drosophila guanche previously mapped in Drosophila melanogaster
Liam Donegan, Joanie Young, students – CCBC
Mentor: Natalie Minkovsky, faculty – CCBC
FOXO proteins, critical downstream regulators of insulin signaling, are transcription factors that play key roles in proteostasis, aging, and disease, including cancer and neurodegenerative disorders. They function as transcriptional activators promoting autophagy but are inhibited by insulin. In Drosophila, they impact organismal size, immune function, and responses to environmental cues. In Homo sapiens, FOXO proteins influence bone mass and are implicated in diseases such as Alzheimer's disease and Parkinson's disease. Comparative genomics between Drosophila guanche and Drosophila melanogaster, closely related species, revealed conserved genetic sequences and functional elements, illustrating their evolutionary relatedness. Expectations of finding a FOXO gene ortholog in D. guanche due to its

evolutionary proximity to D. melanogaster were met, with predicted significant synteny observed. Bioinformatics tools such as NCBI BLAST and the UCSC Genomic Browser facilitated sequence similarity and synteny analysis. Ortholog annotation using USCS Genomic Browser, FlyBase, and NCBI BLAST, alongside validation with the GEP Gene Checker tool, ensured data reliability. This study, part of the Genomic Education Partnership (GEP) Pathways project, focused on understanding the evolutionary trajectory of insulin signaling pathway genes in fruit fly species, contributing to broader insights into genetic mechanisms governing biological processes.
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Poster Session A - Poster 41 Abstract

FOX hunting: The annotation and analysis of Drosophila miranda dFOXO to its D. melanogaster ortholog

Victor Rodgers, Amaka Ibe, students – CCBC
Mentor: Natasha Minkovsky, faculty – CCBC

The insulin pathway is integral to maintaining homeostasis. Insulin maintains a negative feedback loop with the blood glucose levels in the body. When blood glucose levels are too high, the pancreases' beta cells respond by releasing insulin. Insulin then proceeds to bind to receptors that trigger glucose channels. These glucose channels allow for the uptake of glucose in muscle, fat, and (stored in the form of glycogen) liver cells. This stabilizes blood sugar levels, preventing hyperglycemia. FOXO genes, or subfamily O Forkhead Box genes, are significant not only to the insulin pathway but can greatly impact several cellular processes. FOXO genes encode for transcription factors. In humans, these transcription factors may lead to a decrease in glycogenesis and gluconeogenesis. FOXO genes may also aid in tumor suppression, as they are frequently found nonfunctional within tumors. In fruit flies (Drosophila), there is only one FOXO gene. The dFOXO gene regulates organ size through reducing cell size and number. In regards to the insulin pathway, if insulin signaling decreases, the expression of dFOXO increases, implying that dFOXO is regulated by the insulin pathway. In the experiment, the FOXO gene of Drosophila miranda was annotated and compared to that of Drosophila melanogaster. It was hypothesized that FOXO genes in Drosophila miranda will be an ortholog with some significant differences to Drosophila melanogaster due to the evolutionary distance between the two species. To assess the similarity of the sequences, an NCBI BLAST analysis was completed. To determine the level of synteny between the FOXO gene in D. miranda and its potential ortholog in D. melanogaster, the USCS genomic browser was utilized. The ortholog was annotated using a combination of Flybase, the USCS genomic browser, and the NCBI BLAST and was verified using the GEP gene checker tool. The research was conducted in order to contribute to the Genomic Education Partnership Pathways project, which seeks to expand current knowledge of the evolution of the insulin signaling pathway within fruit fly genes.
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Poster Session A - Poster 43 Abstract

Investigation of chemolithotroph microbial diversity in marine sediment and identification of cable bacteria by molecular diagnostics

Darienne Stansbury, student – BCCC
Mentor: Kathleen Gillespie, faculty – BCCC

Anaerobic aquatic sediments serve as sources of fascinating microbial communities, which includes specialized chemolithotrophs such as sulfur reducers and thiosulfate oxidizing species. Their microbial diversity can be assessed by construction of sediment microcosms, which are used as a model representation for experimental purposes. This study utilized a sediment sample collected from the trunk river mash near Woods Hole, Massachusetts, and held under anaerobic conditions in the laboratory. A mini core was extracted into Marine broth and cultivated with Nutrient agar and a selective thiosulfate agar medium. Microscopic observation yielded numerous microbial morphologies, including elongated cell form. These may potentially be cable bacteria, which are filamentous bacteria that facilitate long-distance electron transport in sediments. They play a role in sulfur cycling and local geochemistry, belonging to the Desulfobulbaceae and Deslufovovibrio family (Geelhoed, 2020). This study seeks to identify members of the sulfur oxidizing community through molecular methods. DNA extraction, PCR

(Polymerase Chain Reaction), gel electrophoresis and 16srRNA sequencing are used to enumerate the abundant species and confirm the presence of cable bacteria with specific primer sets. Future studies will use Fluorescence In situ hybridization and attempt to cultivate these cable bacteria in a single strain through a filament capture method.
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Poster Session A - Poster 45 Abstract

Illuminating the depths: culture selection and molecular identification of bioluminescent bacteria from marine organisms

Myanna Brooks, student – BCCC
Mentor: Kathleen Gillespie, faculty – BCCC

Bioluminescence, the emission of light by living organisms, is a widespread phenomenon, particularly prevalent in marine environments where visible light diminishes with depth. Deep sea organisms utilize bioluminescence in symbiosis with bacterial genera such as photobacterium, Photorhabdus and Vibrio as an adaptive strategy for communication, predation, and camouflage in light-deficient environments (Calogero, 2022). Through an integrated approach combining molecular techniques and culture-dependent methodologies, this study investigates the presence of luminous bacteria associated with marine organisms. A selection of marine organisms (squid, mussel, perch, oyster, and shrimp) was purchased from a local market. The samples were analyzed for the presence of bioluminescent strains using Luminous Agar (LA) and Sea Water Complete (SWC) agar spread and streak plates. Selected colonies were subjected to colony PCR using both universal 16srRNA and a series of lux primers, followed by gel electrophoresis to confirm the presence of the genes responsible for bioluminescence production. Positive PCR samples were further analyzed through sequencing for creation of phylogenetic trees. Future steps involve culturing selected bioluminescent samples in liquid media for presence of light production, and DNA extraction of plasmid DNA to be used for molecular cloning of the genetic mechanisms underlying bioluminescence in these symbiotic relationships.
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Poster Session A - Poster 47 Abstract

Microbial biofilm community formation from Trunk River marsh sediment on naïve Cigarette Butts (CB) filters in microcosms

Darienne Stansbury, Myanna Brooks, students – BCCC
Mentor: Kathleen Gillespie, faculty – BCCC

In the marine environment, accumulation of plastic waste and subsequent fragmentation into microplastics, forms a “Plastisphere” establishment of unique biofilms on these surfaces (Du,2022). Cigarette butts (CB) disposal is one of the leading causes of environmental pollution worldwide, with an estimated 5.6 trillion butts discarded annually (Koroleva, 2021, Quéméneur, 2020). CB fragmentation of this material was shown through a 15% per year weight loss in a seawater microcosm, and the microbial biofilm formation (Gerritse, 2020). The delivery of these pollutants into the marine environment is directly deposited by littering, especially on beaches (Asensio-Montesinos, 2021) or movement due to stormwater runoff from surfaces. CBs are a mixture of Heavy metals and toxic chemicals which will dissolve and cause unknown effects on marine microbial communities (Koroleva,2021, Quéméneur, 2020). CB has cellulose acetate, a type of plastic membrane that comprises the filter and is photo degradable but not biodegradable due to the presence of the acetate group (Dobaradaran, 2017). This study examines the formation of a biofilm community onto naïve cellulose acetate or cotton surfaces, assesses the attractant and/or retardant nature of the CBT leachate by chemotaxis, and later determines the community composition by 16sRNA sequencing and metagenomic analysis.
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Poster Session A - Poster 49 Abstract

Targeting capase-1 to ameliorate mitochondrial electron transport chain (ETC) complexes deficiency in proinflammatory microglia

Sitthixai Vongdeuane, student – BCCC
Mentor: Kathleen Gillespie, faculty – BCCC
Excessive pro-inflammatory microglial activation contributes to many neurodegenerative diseases. This activation is modeled in vitro by combined exposure to the Toll-like receptor 4 (TLR4)-activating molecule lipopolysaccharide cytokine and the (LPS) and the cytokine interferon-gamma (IFN-y), which causes microglia to adopt a neurotoxic state. Inducible nitric oxide synthase, (INOS)-mediated nitric oxide (NO) production, mitochondrial electron transport chain (ĔTC) dysfunction, and NLRP3 inflammasome- dependent caspase-1 activation is implicated in the pro-inflammatory activation. The mitochondrial ETC dysfunction includes large decreases in multiple ETC complex subunits and is thought to depend on NO production. However, the precise mechanisms of subunit loss are unclear. Here, we tested the hypothesis that both TLR4- dependent caspase-1 protease activation and NO production are required for mitochondrial ETC subunit loss in pro-inflammatory microglia.
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Abstracts for Poster Session B

Poster Session B - Poster 2 Abstract

Educational integration of biofilm research: Creating a versatile assay for diverse bacterial species
Alexander Hossainkhail, Ariana Ascherl, students – AACC
Mentor: Sandy Fox-Moon, faculty – AACC
Biofilms, complex microbial communities encased in a self-produced extracellular matrix, play a vital role in chronic infections and antibiotic resistance. This study investigates the biofilm formation of key bacterial species—Proteus mirabilis, Proteus vulgaris, Escherichia coli, Staphylococcus aureus, and Staphylococcus epidermidis—employing a quantifiable crystal violet-based assay tailored for educational environments. Results from two trials, utilizing 500 µL and 1 mL samples, revealed notable differences in biofilm production both between and within bacterial genera. Specifically, E. coli demonstrated significant biofilm mass formation (average absorbance of 2.288 and 0.761 respectively across trials), whereas S. aureus exhibited the lowest (average absorbance of 0.050 and 0.108 respectively across trials). These findings illustrate the diverse biofilm-forming capabilities among bacteria, emphasizing the influence of inherent bacterial characteristics. Moreover, the study highlights the assay's utility as an educational tool in microbiology classrooms, enabling students to assess biofilm dynamics visually and quantitatively. This hands-on approach not only enhances theoretical understanding but also allows for critical thinking and scientific inquiry to further develop.
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Poster Session B - Poster 4 Abstract

El Niño/Southern Oscillation analyses of early 2020s events
Bryant F. Pepe, student – AACC
Mentor: Dan V. Ferandez, faculty – AACC
On the tail end of a historic La Niña event- starting in 2019 and ending in 2023- equal and opposite conditions appeared to coalesce in the southeastern Pacific in early summer 2023. While unpredictable by nature of current understanding of the phenomenon, effects of higher-magnitude El Niño Southern Oscillation (ENSO) events are expected to produce higher-magnitude effects globally, aiding in various methods of remote analysis. By comparing average climatic data from historic ENSO events against the current timeline, weather and climatic trends share stark, and sometimes startling similarities. These trends are expected to aid the extended forecast of such events. Furthermore, when appropriate economic data from South American nations directly affected by such events is evaluated against event timelines, the resulting trends are expected to further insulate overall ENSO forecasts.
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Poster Session B - Poster 6 Abstract

Hands-on learning in engineering education

Anthony Terselic, student – FrederickCC
Mentor: Christine Chin Choy, faculty – FrederickCC
Hands-on learning is a crucial component of engineering education that allows students to tackle an issue by applying what they have learned in their coursework in a practical setting. Prior to the mid-1950s, engineering curriculum specifically set aside time for hands-on coursework to give students a more practical understanding of the concepts they would use in future designs. In 1955, engineering education significantly changed when the American Society for Engineering Education (ASEE) published a report detailing their vision for the ideal curriculum for engineering students. Most notably, it discouraged technician-style practice in order to make room in the curriculum for expanding course theory. This project evaluates two options in renewing hands-on learning in engineering education. An online survey will be administered to engineering students at Frederick Community College to gauge their interest in such activities.
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Poster Session B - Poster 8 Abstract

Understanding the technological and mental health impacts of social media
Michelle Lui, student – FrederickCC
Mentors: Christine Chin Choy, Matthew Lochman & Val Lochman, faculty – FrederickCC
Technology is integrated into our everyday lives. Social media is used worldwide to share experiences and raise awareness, or other diverse influences. There are positive aspects of social media such as access to information, efficient communication, and the ability to express creativity. However, it may lead to cyberbullying, a decrease in privacy, and misinformation. Research showcased the negative impacts of social media on mental health due to social stress, cyberbullying, and connections to mental illness. The three primary risks of social media involve awareness, collection, and errors present in technology and its applications. Research indicates there are patterns between the older and younger generations when it comes to technology and privacy. The familiarity of technology from the younger generation correlates with fewer privacy concerns compared to the older generation. Young adults with increased social media engagement may be more susceptible to cyberbullying due to less privacy, which can lead to an increase in anxiety and depression.
The poster will involve a preliminary survey regarding the correlation between cyberbullying and anxiety/depression. The goals of the study include understanding usage of social media, negative experiences/cyberbullying, along with privacy concerns and behavior on social media.
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Poster Session B - Poster 10 Abstract

Increasing Vitamin D Receptor expression in T-cells
Kaitlyn Wylie, student – Hood College; Yashila Shrestha, student – Walkersville High School; Morgan Bruns, student – University of New Hampshire
Mentors: Savita Prabhakar & Damaris Jackson, faculty – FrederickCC
Vitamin D absorption rates are important for the functioning of the immune system and its disequilibrium has serious implications. T cells are white blood cells that are vital to the immune system, but they cannot recognize and engulf foreign materials like viruses and bacteria without sufficient Vitamin D levels. Homo sapiens do not produce vitamin D naturally rather, it is a nutrient absorbed through ingestion. Per contra Homo sapiens do have vitamin D receptors which allow bodily response and absorption of the essential vitamin. Calcium has been found to stimulate and increase the Vitamin D receptors which would increase absorption efficiency and compensate for low vitamin D levels. This project's focused on looking at the effect of calcium carbonate to increase vitamin D receptor expression levels on T cells. Using reverse transcription RT-PCR, the expression levels of vitamin D receptor expression was quantified in T-cells treated with varying calcium carbonate concentrations. It was found that calcium carbonate increases the expression of vitamin-D receptor which could have cascading benefits specifically for T cells by allowing for more vitamin D absorption. Increasing VDR expression would help the body naturally to increase vitamin D absorption through calcium carbonate instead of the current status quo of supplying the body with vitamin D supplements.

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Poster Session B - Poster 12 Abstract

EGFR expression in different cell types

Zahra Aziz, student – FrederickCC; Elisha Kabongo, student – Hood College
Mentors: Savita Prabhakar & Damaris Ponciano-Jackson, faculty – FrederickCC

Epithelial cells possess regenerative qualities crucial for healing deep injuries. Their effectiveness differs among organs, functioning in organs such as the bladder but not in organs such as the trachea. Some epidermal cells have higher regeneration capacity than others. The research project was focused on looking at the expression levels of Epidermal Growth Factor Receptors (EGFR) in three different types of cells: Human Embryonic Kidney (HEK) Cell, A549 Lung cells, and Jurkat T-cells. Since EGFR is involved in Epidermal Mesenchymal Cell Transition (EMT) which happens during embryonic development, the project focused on looking at the levels of EGFR expression in HEK cells which are are embryonic cells and compared the of EGFR in two other cell lines which are not involved in EMT. After analyzing the results, we discovered that T cells had higher levels of EGFR.

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Poster Session B - Poster 14 Abstract

Rhythmicity of timeless expression in Manduca sexta larvae

Matthew Quintanilla, Kylie Rankin, Rowan Cain, Subeen Lee, students – HowardCC
Mentor: Ellena McCarthy, faculty – HowardCC

Manduca sexta, known as the tobacco hornworm, is a common pest of Solanaceous plants, thus, rendering the mechanisms underpinning Manduca sexta's feeding behavior a topic of interest. Circadian rhythms, 24- hour endogenous biological rhythms present in most organisms, have been shown to regulate feeding behavior in many organisms, including certain caterpillars. We are seeking to explore whether this regulatory mechanism for feeding behavior is active in the tobacco hornworm. The adult hawkmoth has a functioning circadian clock that influences their behavior, but whether it is functional in larval caterpillars is still unknown. In this study, we sought to determine whether the 5th instar larvae of Manduca sexta exhibit rhythmic clock gene expression, by measuring expression of the clock gene, timeless (tim). Gut tissues of 5th instar Manduca sexta larvae were harvested at different times of the day, ZT3 and ZT15, and tested for rhythmic expression of the Tim. To study this gene expression, RNA was extracted from samples, put through cDNA synthesis, and analyzed under quantitative polymerase chain reaction (qPCR) to analyze relative gene expression. A statistically significant difference was found in the relative expression of tim at these two ZT times. This data is consistent with the larvae having a functional circadian clock.

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Poster Session B - Poster 16 Abstract

Stellar evolution study: Wolf-Rayet

Anjolie Tuazon, Valeria Monterroza, Joshua Mussie, student – HowardCC
Mentors: Kenny Diazeguigure & Brendan Diamond, faculty – HowardCC

Wolf-Rayet (WR) stars, distinguished by their massive white-type status with stellar masses ~25 $M_{\odot}$, exhibit distinctive features that offer valuable insights into their evolutionary trajectory. These stars are classified into three main spectroscopic classes (WN, WC, and WO), determined by the specific emission lines evident in their spectral profiles. Notably rare, their high-velocity stellar winds set them apart from O- type stars by the absence of a hydrogen envelope and they continuously expel the products of fusion from their circumstellar shells. Spectral analysis of the chemical emissions from WR stars suggests proximity to supernovae. In our scientific investigation, we conducted spectrographic observations of the Wolf-Rayet star EZ Canis Majoris. Our investigations unveiled the presence of Oxygen (III) emissions in EZ-CMa's nebula, a revelation that defied our initial spectral analysis of the star, marking a critical phase in its stellar evolution. These findings contribute to broader understanding of the dynamics and elemental behaviors within Wolf-Rayet stars, offering invaluable insights into their evolutionary pathways and impending stellar destinies.

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Poster Session B - Poster 18 Abstract

Chloride and heavy metals in HCC's stream systems
Stephen Shaner, student – HowardCC
Mentor: Rebecca Carmody, faculty – HowardCC
Stream pollution caused by road runoff is a problem for stream ecosystems and the overall quality of the water. Many different pollutants accumulate on roads and can be washed into streams by storm runoff, such as trash, road salts, and metals. Our goal for this project was to measure the levels of manganese, iron, nickel, and chloride in two streams on the Howard Community College (HCC) campus in order to monitor how the overall health of the streams is affected by road runoff. We collected monthly water samples from five locations on two campus stream systems. We examined the water quality at each site using sensors and then analyzed the concentrations of manganese, iron, and nickel using an atomic absorption spectrophotometer. Iron and manganese levels varied by location with Site B consistently having the highest concentrations of both metals. However, nickel was generally below the detection limit at most of the sites, with the exception of Site D, which is the closest site to the ongoing campus construction project. Another notable aspect of the data is that in 2023 there is a weaker correlation between the concentrations of chloride and manganese than there was in 2022, which could be related to a decrease in road salt application the winter of 2022-2023 due to the almost complete lack of snow. In the future we hope to look closer into potential microbial growth in Site B that could influence the levels of manganese and iron at that location, as well as determine if some of the rocks at Site B that were seemingly artificially placed to reduce erosion at the outflow of the culvert have any effect on the iron and manganese concentrations at the site.
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Poster Session B - Poster 20 Abstract

A study into the accessible remote evaluation of fire risk factors
Paul Mahaffey, Dominic Day, Gavin Dalton, Brison Tichnell, students – CarrollCC
Faculty Mentors: Jane Jones, Jennifer Fain-Thornton & Ashley Combs, faculty – CarrollCC
Studies have shown that humidity levels are one of the largest factors in forest fires, so our project identifies areas of considerable risk. Humidity is usually measured in relative humidity percent. People can manually survey land to obtain these numbers, but the operation is often exhaustive. To make the process of obtaining fire risk data safer and quicker, this could be done remotely by drone. The team designed and three- dimensional (3D) printed a polylactic acid (PLA) carbon fiber harness to affix a humidity sensor to a drone. A control board on the harness with humidity sensing capabilities is used to calculate the data, and data will be transmitted to a laptop using Bluetooth. MATLAB is used to process and evaluate the data received from test scenarios. Testing consists of monitoring the data gathered from the drone's flight over different simulated environments of extremely high and low humidity. These closed environments are created with a humidifier and dehumidifier, respectively.
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Poster Session B - Poster 22 Abstract

Language translation as an alternative application of quick response technology
John Langlois, Matt Garner, Seth Grimes, Jack Sipe, students – CarrollCC
Mentors: Jane Jones, Jennifer Fain-Thornton & Ashley Combs, faculty – CarrollCC
Quick response (QR) codes are two dimensional patterns featuring a sequence of black and white squares that are used to encode data. Using an optical scanner such as a camera, the encoded data can be decoded to access images, files, web pages, or text. However, the most common of these QR reader applications require the accessibility of an internet connection, which is not always available or reliable. We are developing a software that does not require the use of an internet connection and expands the use of QR technology even further. Our project demonstrates the use of QR technology as a means of language translation. Our application resides in a device that will locally store the translations of predetermined phrases in memory. The translations for each specific phrase are assigned an ID number that corresponds

to a specific QR code that we have created. After the user chooses a language, they will scan a QR code and receive a translation of the phrase associated with that code.
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Poster Session B - Poster 24 Abstract

L. variegatus exposed to differing wavelengths: reproductive and behavioral responses
Lexy Strine, Madeline Blattau, Max Kurth-ford, students – CarrollCC
Mentors: Jane Jones, Jennifer Fain-Thornton & Ashley Combs, faculty – CarrollCC
Lumbriculus variegatus, known as California blackworms, are freshwater worms that reproduce asexually. These worms are beneficial because they serve as a food source for freshwater fish and other aquatic vertebrates. In this experiment, blackworms were exposed to different LED lights to see how different wavelengths of light affect their reproductive cycle. Seventy-five California blackworms were split into three groups and exposed to specific lighting. The worms were observed for their reproductive behaviors and their changes were recorded. In addition to observing their reproductive cycle, pH, nitrate, nitrite, and ammonia levels were also recorded to see if exposure to the various light sources affected waste production by the worms. High waste levels could potentially affect the vitality and the rate at which the worms reproduce.
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Poster Session B - Poster 26 Abstract

Gut-microbiome derived metabolite profiling using artificial intelligence for ESRD drug design/discovery
Raunak Maheshwari, student – MC; Gautham Ramchandran, student – FrederickCC
Mentor: Rebin Muhammad, faculty – MC
End-Stage Renal Disease (ESRD) is the final, most deadly stage of Chronic Kidney Disease (CKD). This disease affects 800,000 people in the US and 800 million across the globe. The Gut Microbiome is a collection of trillions of bacteria, fungi, parasites, and other microorganisms, located in the gastrointestinal tract. Previous research has shown how the gut microbiome has been able to impact the body's systems, such as being able to respond to infection or poor diet. In our project, we wanted to investigate the relationships/correlations between the gut microbiota and End-Stage Renal Disease, and thus, curate a gut microbiome-derived metabolite profile for drug-design pathogenesis with the use of Artificial Intelligence neural networks and statistical analysis methods.
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Poster Session B - Poster 28 Abstract

Purifying NASA's water: The UV solution
Alexander Ibacache, Jia Xi Lin, Caitlin Spendley, Dinushka Jagodige, Ian Reyes Campos, Joshua Kinsinger, Tyler Belen, students – MC
Mentors: Ishrat Rahman & David Kuijt, faculty – MC
Water purification and reuse is critical to human existence, especially for those in space. To tackle this important issue, Montgomery College Ultraviolet (MC UV) has created a UV-C light water purification system that can be implemented within NASA's current water tanks. This would irradiate harmful microbes like E. coli and allow astronauts to have safe drinking water. The project's design implemented an electrical box, UV-C lights, pump system, camera, and thermometers inside of a stainless steel tank. This design allowed MC UV to test the effectiveness of UV-C lights as a purification method, and the potential benefits of various variables such as exposure times, temperatures, and water-flow speeds on bacteria growth. To ensure the safety of the water, this project aimed to reach a bacteria count < 50 CFU/mL and ensure the prevention of new growth of microorganisms in the tank. The test conducted included spiking the water with a bacterial count up to 100 cfu/mL, using the system with UV-C lights on, taking multiple water samples, separating the bacteria, and counting the amount in 1 mL. MC UV's hopes that the tests from this project can provide NASA with a new approach to their current water filtration systems on spacecraft and ensure astronauts' health.
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Poster Session B - Poster 30 Abstract

Establishment of a wastewater detection system for SARS-CoV-2 at Montgomery College
Maria Parra Sarmiento, Monique Perez, Tinsaye Kirub, students – MC
Mentor: Michael Chase, faculty – MC
This project's goal is to establish a reliable early detection and confirmation system for SARS-C0V-2 at Montgomery College using wastewater surveillance. Wastewater surveillance provides a more comprehensive picture of viral levels in a community, as it captures SARS-CoV-2 genetic material from both asymptomatic and symptomatic individuals. Since the beginning of the COVID-19 pandemic (winter of 2020), Montgomery County has consistently had the highest number of confirmed SARS-CoV-2 cases compared to all other jurisdictions in the state of Maryland and as of 3/5/2024 stands at 260,171.(1) Montgomery County also has the second highest per capita confirmed death rate in Maryland at 2,537/100,000.(1) SARS-CoV-2 RNA isolated from daily wastewater samples on the MC campus was used in RT-qPCR to quantitate N1 nucleocapsid gene copy levels of the virus based on comparison of their threshold cycle (Cq) to a standard curve of a dilution series of nucleocapsid control samples. Using data from Montgomery College's Public Health, Safety, and Emergency Management Office, we would like to show a correlation between detectable levels of SARS-CoV-2 from wastewater sampling to number of COVID-19 cases on campus on a given day. Positive correlation between these would then serve as validation of our detection system. 1. https://imap.maryland.gov/pages/covid-data
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Poster Session B - Poster 32 Abstract

SmartVault – Changing security as we know it
Krishay Iyer, Sudeep Abburu, Christian Garcia, Kevin Pei, students – MC
Mentors: Monica Mellini, faculty, Alla Webb, faculty Chair & Helio Zwi, faculty Chair – MC
As adolescents, our personal belongings are one of our main priorities. In order to keep these belongings safe, people store them in secure spaces such as vaults. However, the standard vaults have limitations, such as being uneconomical and lacking structural integrity. Through many nights of experimenting, we have reinvented the vault into something more secure and affordable, the SmartVault. The SmartVault is an electronic vault system that can be opened using advanced card reading features and a secure PIN pad code, rather than traditional analog inputs. With all these features, our creation far surpasses the standard vault regarding reliability, efficiency, and beauty. Overall, the SmartVault is the best of both worlds by combining technology and security to protect the invaluable possessions we hold most dear.
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Poster Session B - Poster 34 Abstract

An investigative analysis of ambient radioactive emissions using an assembled Geiger counter
Zachary Mittman, Andrew Goff, Sean Castillo, Peter Warren, students – HarfordCC
Mentor: Alejandro Satz, faculty – HarfordCC
The aim of this ongoing project is to look into the presence and intensity of background radiation present in proximity to power generation facilities. The first phase, which is currently underway, is the construction and bootstrapping of a Geiger counter from components to a functioning unit. The Geiger counter is assembled from a custom PCB and specially sourced components, and then calibrated with a known stable radioactive source. In the second phase, local nuclear and coal power facilities will be visited to collect readings of radioactive emissions, with a particular focus on beta activity. Readings are taken at varying locations in proximity to the power generation facilities. The rates at these varying distances will be averaged and compared to a background radiation of a controlled reading at a location distant from the tested power generating facilities (e.g. Harford Community College). Comparing the average radiation rates to the expected background will determine which, if either, power generation method releases more radiation into the environment.
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Poster Session B - Poster 36 Abstract

Discovery and genome annotation of Bacteriophage Madvan
Justin Parker, Gary Knott, students – HarfordCC
Mentors: Breonna Martin & Jaclyn A. Madden, faculty – HarfordCC
A bacteriophage or phage is a virus that can only infect bacteria. Phages cannot infect humans. However, they can be beneficial to humans when they are used to treat antibiotic-resistant bacterial infections. The purpose of this study is to annotate phage Madvan's genome. Madvan was isolated from a soil sample collected in Bel Air, Maryland. Methods from the SEA-PHAGES Phage Discovery Guide were used to isolate, purify, and amplify the phage to create a phage lysate. When grown with Gordonia rubripertincta, Madvan is a lytic phage that produces medium, mostly clear plaques with some halos. Some of the phage lysate was sent to the University of Maryland Baltimore County for transmission electron microscopy, which indicated a siphovirus morphology. The University of Pittsburgh's Bacteriophage Institute sequenced Madvan's DNA and determined that it was part of the DJ cluster. The genome length was determined to be 60,154 base pairs. Madvan has a full-genome similarity of 96% with Nadmeg and 95% with Crocheter, Runhaar, and Vardy, which are other DJ cluster phages. Multiple resources and programs were used to annotate the phage's genome, including PhagesDB, NCBI, DNA Master, GeneMark, Glimmer, Phamerator, and tRNAscan. There are 88 protein-coding genes and one tRNA gene predicted.
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Effects of Murraya koenigii leaf liquid extract on the viability of CHO-K1 cells
Kellie Simon, student – HarfordCC Alexandra Fender, student – HarfordCC
Mentor: Susan Walker, faculty – HarfordCC
The Indian spice Murraya koenigii, commonly known as curry leaf, has been suggested to possess therapeutic properties including anti-inflammatory, antimicrobial, and antidiabetic effects (Balakrishnan et al., 2020). To investigate the safety of this holistic medicine, a modified cell viability assay was performed using CHO-K1 epithelial cells. Cells were treated with increasing concentrations of the liquid leaf extract for 48 hours followed by fixation and staining with crystal violet to quantify the presence of living cells. Preliminary results from this modified viability assay indicate cells treated with M. koenigii extract exhibited either no change or a slight increase in cell survival following the short-term exposure. No significant difference ($p > 0.05$) was found between the viability values for each concentration. Further studies are required to elucidate the effects of greater concentrations and longer exposure times of the reagent on CHO-K1 cell viability.
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Poster Session B - Poster 40 Abstract

The Speed Eater: Analysis and genome annotation of bacteriophage Hermeonysus
Nicholas Bender, student – HarfordCC
Mentors: Jaclyn Madden & Breonna Martin, faculty – HarfordCC
The goal of this project was to discover a novel bacteriophage that we named Hermeonysus and annotate its genome. Hermeonysus was isolated from a grass sample in Bel Air, Maryland. After the amplification of the phage and the extraction of its DNA, the phage's genome was sequenced by the Pittsburgh Bacteriophage Institute. The phage's genome was analyzed through a computer program called DNA Master with the help of various bioinformatics tools such as Phamerator, Starterator, PhagesDB, NCBI, and HHPred. The phage's predicted genes were compared with the genes of other phages in the EC cluster, and the start codons and functions of the genes were analyzed. Hermeonysus displayed a high rate of replication, based on how quickly its plaques cleared the plates. Upon genetic characterization, it was found to be a virulent phage with a siphovirus morphology. The genome of Hermeonysus has 52,943 base pairs including 89 genes, all of which are forward-facing. This annotation adds to the SEA-PHAGE database to support advances in phage therapy and other phage applications.
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Poster Session B - Poster 42 Abstract

Host range of Oaklynn and other phages in Cluster EE: Why and where are they different?
Jessica Tran, student – Allegany College of Maryland
Mentor: Steven Heninger, faculty – Allegany College of Maryland
The overall similarities of the bacteriophage Oaklynn with its relatives in cluster EE were investigated. (Bacteriophages, or phage for short, are viruses that utilize bacteria as hosts, while a cluster is a group of similar phages.) Comparing Oaklynn to several other phages of cluster EE using bioinformatic tools and phylogenetic trees was done. Any significant differences, including gene functions and host range of phages from cluster EE will be noted.
Implications of these results in terms of biodiversity, host range and future potential uses of phages of cluster EE in phage therapy/medicine will be discussed.
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Finding and growing plastic degrading bacteria from Zophobas morio
Tristan Williams, student – Allegany College of Maryland
Mentor: Carolyn George, faculty – Allegany College of Maryland
Much of the world's waste is plastic, which can take hundreds of years to break down on its own. Our usage of plastic has soared in recent years, adding 430 million tons of plastic waste every year and causing irreparable damage to ecosystems. Superworms (Zophobas morio) have been found to ingest and breakdown Styrofoam, and current studies are focused on identifying and isolating the gut microbes of the worms that break it down.
The goal and purpose of this experiment is to attempt to grow, isolate, and identify bacteria with plastic degradation abilities that reside in the digestive tract of Z. morio. Three sets of 36 worms will be fed oatmeal and potato, Styrofoam and potato, and oatmeal mixed with Styrofoam and a separate potato. Fecal samples will be collected and cultured to identify any major changes in the types of bacteria residing in the guts of each of the three groups. Microbes isolated from the gut will also be tested for their ability to break down Styrofoam. Since many of the methods used in similar studies have relied on expensive technology, we hope to develop a simpler, less expensive process for isolating and screening potential plastic-degrading microbes. By doing this without more advanced and expensive lab equipment, we hope to find a way to open this research up to more people.
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Poster Session B - Poster 46 Abstract

Want to have a head-start in your Cyber career? CTFs are what you are looking for!
Hugo Molina, Yevhenii Dementiev, Albert Laino Troendle, students – MC
Mentors: Alla Webb, faculty, Norman Singer, lab manager, David Vargas, faculty – MC
A valuable means of training both beginning and advanced students in core Cybersecurity concepts are Capture the Flag competitions, otherwise known as “CTFs.” A CTF Is a ‘’Jeopardy’’ style competition consisting of multiple teams racing to see who can answer and solve the most challenges/questions accurately from a wide array of fundamental Cybersecurity related topics. CTFs can help you become a better Cybersecurity professional by giving participants great exposure and experience to “hands-on” material. As a result, CTFs can be a fun and exciting way to practice technical skills, to further a student’s understanding of material covered in class, or learn new skills. Further, participating in CTF competitions allows participants to gain the skills necessary to be able to work collectively, collaborate, and think critically as a team; exposure to real-world scenarios. Many tools and tips on how to prepare are covered. Participation in a CTF is an effective means to raise a student’s Cyber career to that next level!
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Poster Session B - Poster 48 Abstract

Unraveling the health hazards of vector-borne diseases. Mitigating the spread of disease through sustainable urban development
Kayla Diaz, Paria Chehreghani, Michael Lopez, students – MC

Mentor: Nafeesa Azizi, STEM Ambassadors Advisor – MC

Vector-borne diseases are increasing due to lack of sustainable urban development methods, which is an issue negatively impacting human health worldwide. Warmer temperatures and changes in precipitation patterns can expand the geographic range of these vectors, increasing the transmission of diseases such as Malaria, Lyme disease, and Zika virus, especially in tropical regions like Brazil. Brazil, for instance, has many U.S. tourists which may expose more foreigners to vector-borne diseases, thereby exponentiating the population of infected people.

We hypothesize that vector-borne disease can be mitigated in Brazil and other areas to reduce vector populations through urban development methods. Bioswales, rain gardens, and retention ponds can manage stormwater runoff to avoid standing water on the ground. Standing water is commonly used as a breeding ground for mosquitos, thus leading to the creation and transmission of diseases.

Overall, Brazil should prioritize environmentally sustainable urban development methods, with increased sustainable practices the spread of vector-borne diseases would decrease. We propose an observational experiment to discover a correlation between urbanized centers and their vector-borne disease populations. Within those urbanized centers, an increase in sustainable practices can be implemented to support our hypothesis that sustainable urban development methods can be used to decrease vector-borne diseases.

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Poster Session B - Poster 50 Abstract

Cloning GAPDH gene segment: Exploring a Housekeeping Gene in Genetics Lab

Eloi Ferguson, Brett Geaman, Ruta Yigzaw, Diamond Taylor, Sylvia Laciny, students – BCCC

Mentor: Amrita Madabushi, faculty – BCCC

This project, undertaken as part of an undergraduate genetics lab, focused on isolating and cloning a segment of a plant gene from the GAPDH family, responsible for encoding the glyceraldehyde-3-phosphate dehydrogenase enzyme crucial in glycolysis. GAPDH, a housekeeping gene, plays a pivotal role in regulating fundamental cellular functions necessary for survival across various cell types. Students chose both a unique plant species and the model species Arabidopsis thaliana. The methodology encompassed plant genomic DNA extraction, gene segment amplification via a two-step polymerase chain reaction (PCR), subsequent cloning into a vector, transformation, and analysis. This provided an opportunity to delve deeper into plant genetics while engaging in hands-on activities to grasp basic molecular biology and genetics laboratory techniques, thereby preparing for future career opportunities in research laboratories.

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Abstracts for Breakout Session #3

Breakout Session #3 - Abstract 3.10

Effect of additional Feed 1 supplementation on NISTCHO cell growth and IgG production

William Wall, student – MC

Mentor: Lori Kelman, faculty – MC

NISTCHO cells produce cNISTmAb, an anti-RSV IgG, and can be used as a model cell line to teach biomanufacturing. We asked whether supplementing production media with 2X Feed1 or 1X Feed1 plus 1X glucose results in higher cell density and IgG production. NISTCHO cells were seeded at 3x105 cells/mL in EX-CELL Advanced Fed-batch medium. On Days 3 and 5 the culture was supplemented with 5% Feed1. Beginning on Day 7, and every 2 days thereafter, cells were supplemented with A) 10% Feed1, or B) 5% Feed1 and 5% glucose. Viability and density were determined daily. Conditioned media was harvested when cell viability dropped below 50%. cNISTmAb was purified using Protein A affinity chromatography and assessed using A280 and SDS-PAGE. The differences noted in IgG production will be discussed. Funded by NIIMBL 70NANB21H085.

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Breakout Session #3 - Abstract 3.11

Production of cNISTmAb by NISTCHO in shaker flask culture

Shreya Swaminathan, student – MC
Mentor: Lori Kelman, faculty – MC

The NISTCHO mammalian cell line is being studied to see if it can be used in an academic Biomanufacturing setting. The cell line has been engineered to express the cNISTmAb (a non-originator version of NISTmAb). The purpose of this experiment was to see if NISTCHO cells can produce enough protein to be used to teach Biomanufacturing and follow production of cNISTmAb protein over time. NISTCHO cells were inoculated at a density of 3x105 cells per mL in 30 mL of EX-CELL Advanced Fed Batch medium, then incubated with shaking for 10 days. Every 2 days (starting on day 3) we supplemented with 5% Feed 1. Samples were taken on Days 0, 3, and 6, and protein purified using a Protein A spin column. Results showed that IgG expression increased with time. Funded by NIIMBL 70NANB21H085.

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Breakout Session #3 - Abstract 3.12

The analysis of chloride, pH, dissolved oxygen, and transparency in urban and rural water bodies

Ayesha Babar, student – MC
Mentor: Kiersten Newtoff, faculty – MC

Annual water testing is crucial for all living things. There are multiple factors that need to be at a certain standard like chloride, pH, dissolved oxygen, and transparency, and deviations from this standard can result in reduced ecological diversity. These parameters were compared between a retention pond on the Montgomery College, Germantown campus and Little Seneca Lake at Black Hill Regional Park in November 2023. The chloride concentration and transparency were greater at the MC pond than Little Seneca Lake. The pH level was consistent for both locations, while the dissolved oxygen concentration was lower at the MC pond than Little Seneca Lake. The habitats directly surrounding, and draining into, these water bodies have different anthropogenic influences which may explain some of the differences seen.

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Breakout Session #3 - Abstract 3.13

SARS-CoV-2 quantification in the wastewater of the Montgomery College Rockville campus, using Real Time PCR

Rio Miura, Riya Bhatt, Ian Virga, students – MC, Rockville
Mentor: Evdokia Kastanos, faculty – MC, Rockville

This project aims to develop a system of wastewater surveillance at Montgomery College (MC) for early detection of SARS CoV-2. Wastewater surveillance can provide a more comprehensive picture of infectious diseases circulating in a community, in both asymptomatic and symptomatic individuals. An autosampler, for collecting wastewater from a sewer, was installed at the MC Rockville campus. Wastewater was collected hourly, for ten hours during the day, five days a week. Wastewater samples were frozen immediately at -80 C. Samples were centrifuged to remove solid waste and Bovine respiratory syncytial virus (BRSV) was seeded in each wastewater sample as a process control. The aqueous phase, containing virus particles, was concentrated by ultrafiltration using Amicon-15 filters. Total RNA was extracted using a commercially available kit and quantified. Reverse transcription to produce cDNA was followed by quantitative PCR, using fluorescent probes and primers targeting both the nucleocapsid (N) gene of the SARS-CoV-2 virus and the BRSV genome. The level of amplification of the N gene in wastewater samples was determined by comparison to a series of standards. Dimensional analysis was used to quantify the number of copies of the SARS-CoV-2 genome per liter of wastewater.

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Breakout Session #3 - Abstract 3.21

Exploring the essential role of animals in research and the humans who care for them

Emily Love, Corporate Training Manager – BIOQUAL Inc., on behalf of National Capital Area Branch of the American Association for Laboratory Animal Science

Shannon Stutler, consultant/part-time Facility Veterinarian – University of Maryland, on behalf of National Capital Area Branch of the American Association for Laboratory Animal Science

Laboratory animal science is an essential branch of biomedical research, focusing on the care and use of valuable animal modules 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.

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Breakout Session #3 - Abstract 3.22

Enhancing student learning through small teaching strategies

Laxmi Chataut, faculty – HarfordCC

Inspired by James Lang's "Small Teaching," this presentation explores practical strategies to elevate student learning. Focusing on easily implementable yet impactful teaching techniques, the session delves into the transformative power of minor instructional adjustments. Participants will learn how minor adjustments to instructional strategies, course layout, and technology integration can significantly impact retention, comprehension, and student engagement. By embracing the philosophy of "Small Teaching," faculty can establish a lively and supportive learning environment that will eventually increase students' motivation, critical thinking skills, and academic success.

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Breakout Session #3 - Abstract 3.23

A unique perspective for mental health of students (A roundtable discussion)

Joe Sparenberg, faculty – HowardCC, AACC, CCBC

As a former nontraditional student who attended community college in his late 20’s, I provide a unique perspective for students who feel they may not belong. Part of the reason I took the time off between high school and college was because of debilitating anxiety. It was a struggle to make it back, but I earned a BS in Biochemistry and Biology, a MS in Chemistry in my late 30’s. As an educator and instructor, I have made the mental health of students my primary focus. From being a student frozen with anxiety and almost giving up on my dreams to becoming a community college instructor, I provide perspectives not often available to students. This round-table discussion with students will focus on the mental health of students, being a nontraditional student, and tips on how to succeed on exams and presentations 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 and be involved in an open, honest discussion where everyone would benefit and feel safe to open up to each other.

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Breakout Session #3 - Abstract 3.24

Creating and maintaining your professional network in STEM

Emily Davis, Program Manager – National Institutes of Health

Shanen M. Sherrer, AAAS Science & Technology Policy Fellow and faculty – St. Mary's College of Maryland

Dominiqua M. Griffin, AAAS Science & Technology Policy Fellow and Founder and CEO – Black Women PhDs

Building and nurturing genuine professional connections is crucial for career growth and success. This talk will explore strategies for creating and maintaining a strong professional network in STEM disciplines with a focus on building authentic connections that align with your professional goals and values. Attendees will learn practical tips and strategies, including leveraging social media platforms, successfully utilizing conferences and events, and cultivating professional relationships with mentors and peers in a way that feels meaningful. We will also discuss the importance of diversity in professional networks and how to build inclusive and supportive communities within STEM fields. We encourage those who cringe at the word 'networking' to attend.

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Breakout Session #3 - Abstract 3.25

How have roles of a faculty morphed within the last decade other than teaching an in-person course, hybrid course or online courses to help our students and know the impact of their learning?

Raza Khan, faculty – CarrollCC

Faculty have heard much about the changing dynamics of the teaching profession – the most cherished profession of all the cherished professions. Shift of teaching modalities are something not new – Artificial Intelligence immersion is but let us discuss that topic yet. Join the session to learn how faculty can be a better mentor to the students outside the classroom and even after the students have left the college? It is also about how unintentionally the faculty can promote the good work of the classroom, a program and the institution. Oh my! Times have changed just in the last 10 years. The presenter will show some of the avenues with examples and evidence of the impact that the faculty has outside the walls of a classroom or a learning management online system. The presentation will also touch upon the most important element of belonging within the classroom semester and far beyond after the semester has elapsed. As faculty mentors, the intent is to help one's own professional development and align with the success of our students.

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Breakout Session #3 - Abstract 3.26

Scientific thought and practice in introductory labs / inquiry based labs

Brendan Diamond, faculty – HowardCC

A common concern with science lab courses is that students lose the "Why?" in their focus on the "What", becoming more like recipes without an understanding of the methods or reasoning of the original experimenters. Nobel Laureate and education researcher Carl Wieman studied the impact of labs on student's final exam scores and found no appreciable increase in performance. A renewed approach is to bring the nature of science back into the student lab experience. One important aspect of this is to explicitly, consistently, and precisely address topics such as proportional reasoning, experimental design, inference, and other foundational ideas. The way this will be accomplished is through inquiry-based labs that are more student-driven with the instructors serving as a guide and calling attention to patterns of thought. This format is a natural fit for Course-based Undergraduate Research Experience (CURE) which has been shown to be a high-impact educational practice.

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Breakout Session #3 - Abstract 3.27

Maryland BioEducators Meeting – Enhancing collaboration & sharing strategies

Amrita Madabushi, Collegiate Professor – University of Maryland Global Campus (UMGC) Robin Searles-Adenegan, Collegiate Professor – University of Maryland Global Campus (UMGC) Lori Kelman, faculty – MC
Savita Prabhakar, faculty – FrederickCC Jaclyn Madden, faculty – HarfordCC
The MD BioEducators network, established in 2020, includes biotechnology educators in community colleges and high schools across Maryland, DC, Virginia and Delaware. This roundtable session will serve as a quarterly in-person meeting for the Maryland BioEducators Network. Discussions will focus on strategies to improve biotechnology education and training across different educational levels, linking them to employment opportunities and higher education pathways. We will share updates and insights regarding various state models in the US and the National Center for Biotechnology Education, InnovATEBIO. The session will feature interactive discussions where participants can exchange teaching experiences and insights, fostering a collaborative learning environment. By the end of the session, participants will have gained valuable insights and strategies to enhance biotechnology education and forge connections with fellow educators in Maryland.
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Abstracts for Breakout Session #4

Breakout Session #4 - Abstract 4.10

Evolution of HDAC4 gene orthologs across three increasingly distant Drosophila species with brief analysis of conserved functional sequences
Attia Robinson, student – CCBC
Mentor: Natalie Minkovsky, faculty – CCBC
Histone Deacetylases regulate gene expression by removing acetyl groups from histone proteins to inhibit transcription.
This study was done as a part of the Genomics Education Partnership Pathways project, which applies network analysis to examine evolutionary and functional changes across various biological pathways, specifically the insulin signaling pathway in Drosophila species. As this pathway is highly conserved, we hypothesized that the orthologs of the HDAC4 gene exist in other Drosophila species. We identified and annotated HDAC4 orthologs in three increasingly distant Drosophila species; D. suzukii, D. persimilis, and D. arizonae. Gene models were used to assess the evolution of HDAC4 and conservation of the functionally significant sequences. We anticipated that the relative evolutionary distance between species would correlate with the extent of perturbation in the genomic neighborhoods and protein coding sequences of the gene.
The conclusion supports our hypothesis that the further apart the species are, the more protein coding sequences and genomic neighborhoods change. The protein function appears to be conserved in the species irrespective of the evolutionary distance, evidenced by the conservation of three functionally important motifs and essential deacetylase domain at the protein C terminus of all three Drosophila species.
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Breakout Session #4 - Abstract 4.11

Rhythmicity of timeless expression in Manduca sexta larvae
Matthew Quintanilla, Kylie Rankin, Rowan Cain, Subeen Lee, students – HowardCC Mentor: Ellena McCarthy, faculty – HowardCC
Manduca sexta, known as the tobacco hornworm, is a common pest of Solanaceous plants, thus, rendering the mechanisms underpinning Manduca sexta's feeding behavior a topic of interest. Circadian rhythms, 24- hour endogenous biological rhythms present in most organisms, have been shown to regulate feeding behavior in many organisms, including certain caterpillars. We are seeking to explore whether this regulatory mechanism for feeding behavior is active in the tobacco hornworm. The adult hawkmoth has a functioning circadian clock that influences their behavior, but whether it is functional in larval caterpillars is still unknown. In this study, we sought to determine whether the 5th instar larvae of Manduca sexta

exhibit rhythmic clock gene expression, by measuring expression of the clock gene, timeless (tim). Gut tissues of 5th instar Manduca sexta larvae were harvested at different times of the day, ZT3 and ZT15, and tested for rhythmic expression of the Tim. To study this gene expression, RNA was extracted from samples, put through cDNA synthesis, and analyzed under quantitative polymerase chain reaction (qPCR) to analyze relative gene expression. A statistically significant difference was found in the relative expression of tim at these two ZT times. This data is consistent with the larvae having a functional circadian clock.
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Breakout Session #4 - Abstract 4.12

Relationship of diet towards Type-2 Diabetes
Jonathan Matthew De Las Alas, student – HowardCC
Mentor: Heather Lemko, faculty – HowardCC
One of the major causes of type-2 diabetes can be referenced back to a person's lifestyle. Diet plays a role in both the increase of glucose in the blood and the ability of the body to uptake glucose to different tissues and cells (Sizer & Whitney, 2021). Diet also plays a factor regarding insulin resistance. Insulin is a hormone produced by the pancreas, and it is responsible for the uptake of glucose in the blood. The pancreas' ability to produce insulin is also essential for blood glucose regulation (Marieb & Hoehn, 2019). This research would observe the effect of diet in the occurrence of type-2 diabetes.
References: Marieb, E. N., & Hoehn, K. (2019). Human Anatomy & Physiology (11th ed.). Pearson. Sizer, F. S., & Whitney, E. (2021). Nutrition Concepts & Controversies (16th ed.). Cengage
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Breakout Session #4 - Abstract 4.20

STEMSEAS is for you
Cristina Cardona, faculty – CCBC Essex
This is a presentation regarding Science Technology Engineering and Mathematics Student Experiences Aboard Ships (STEMSEAS). Although it is STEM focused, any student may apply, no matter their field of study. These are real-world interdisciplinary experiential learning activities aboard research vessels on the ocean or a bay, like the Chesapeake Bay.
As an oceanography instructor at CCBC, Dr. Cardona was one of 12 community college faculty to participate in an inaugural expedition on the North Pacific Ocean. Faculty in this cohort were instructed to act like students for 11 days aboard the R/V Thompson. Not only do students engage in their own research aboard these vessels, but they get to learn from professionals such as marine technicians, "able-bodied seamen", the captain, engineers, and more.
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Breakout Session #4 - Abstract 4.21

Resume Building 101
Joe Sparenberg, faculty – HowardCC, AACC, CCBC
Many students are looking to transfer to 4-year colleges, enter into career-specific programs, or will be looking for a career after community college. In all cases, resumes will either be immediately important or important in the near future. What should you include? What should you avoid? This presentation will help students prepare a resume or CV (and understand the difference between the two) and/or improve upon an existing resume. We will discuss what recruiters would be looking for, traps to avoid, and certain action words that should be included in every resume. Additionally, we will look at how resumes should be structured including the order sections should be written, font types and size, length of the resume, and how to structure resumes to fit the specific jobs desired. If students want to bring their resume, I will provide feedback and give suggestions individually or in groups.
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Breakout Session #4 - Abstract 4.22

What does it take to successfully pass a STEM course? What are some of the characteristics of a successful student in STEM course?
Raza Khan, faculty – CarrollCC
Let's face the fact head-on: Students are taking the STEM course because they are told it is either a general education course, or a required program course, or rarely they take the course for the love or the passion of the course content. Regardless of the three reasons, how do faculty know in a matter of short weeks with good probability as to who is going to be successful in this course? Is it the attendance? Is it raising your hand for every question asked? Is it doing well on the tests? Is it integrity? What would the faculty focus on that student's recommendation letter? Attend the session to find out from a faculty member (calls himself a mentor) who has taught STEM courses for over 20 years in community colleges and has moved up the rank from Assistant, to Associate, and now to a Full Professor and is a Division Chairperson.
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Breakout Session #4 - Abstract 4.23

How can clean energy be used in entry-level engineering projects?
Victor Mathias, student – MC
Mentors: Monica Mellini, Alla Webb, Helio Zwi – MC
Workers in the everyday world work in the way that they were taught at school. This is no different from engineers, who work to innovate and create new systems around the world to keep everyone active. As clean energy becomes more important, so too does the innovation regarding clean energy. If clean energy can be taught to engineers in schools, they will have an easier time doing their work in the future, which will prioritize clean energy usage. Many engineering classes use the Arduino board, which is usually powered by wasteful energy methods. Finding a way to power these with clean energy will allow this methodology to be demonstrated through other projects and have the effect of forcing new engineers to work with clean energy, making their work-life easier and more successful. Solar panels can be used in a circuit to charge batteries and renew their energy to power the Arduino, which limits waste in the system. This project can be done in classes to educate young learners on how clean energy can be used and how important it can be to the future.
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Breakout Session #4 - Abstract 4.24

Teaching about the science of learning to improve student learning
Tricia Crossett, faculty – CarollCC
The Faculty Learning Community (FLC) at Carroll Community College engaged in the study of cognitive science and the science of learning during Fall 2023. We know that students often disregard lessons on effective study skills, like directed reading and self-testing, or how sleep and breaks are important to learning. A new approach to incorporating teaching effective study skills in an Introduction to Engineering class was developed for Spring 2024 using information generated by the FLC's conversations on these topics. This presentation will include significant highlights from the FLC's reading and discussion about current research on the science of learning and how my Introduction to Engineering students responded to the new approach I took to integrating effective study skills into lessons about problem solving.
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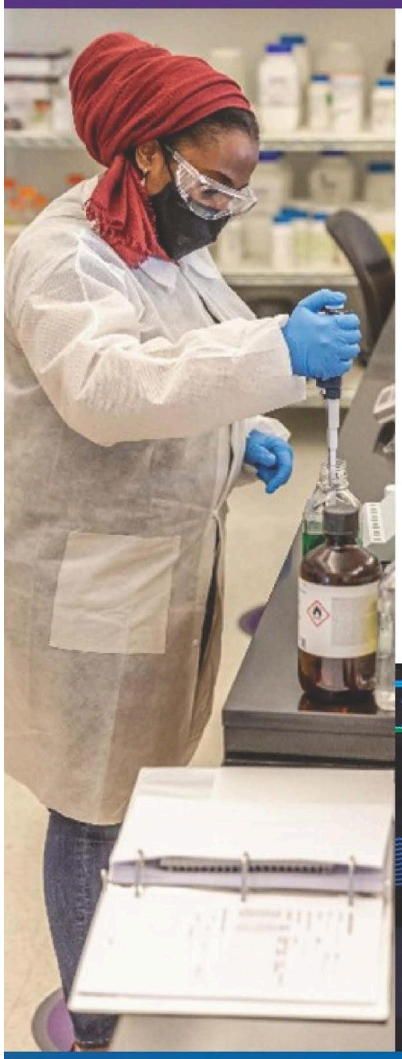

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Dr. Vivien T. Thomas, a world-renowned Black scientist, is best known for his work in developing a cardiac surgery technique to treat "blue baby syndrome" (a congenital heart defect) at The Johns Hopkins Hospital.

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The Vivien Thomas Scholars Initiative (VTSI) is a $150 million initiative, backed by Bloomberg Philanthropies, dedicated to nurturing, mentoring and connecting exceptional diverse talent at historically black colleges and universities and minority serving institutions to STEM graduate education and future leadership in STEM.

VTSI Provides:

- **Research Training:**
  Join one of over 30 STEM PhD programs for your own graduate journey of discovery, working closely with the world's leading scholars and scientists at the nation's first research university.
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  Join an outstanding community of Hopkins students and scholars whose diverse histories and life journeys bring exceptional community and richness to the Hopkins space. Join fellow VTSI scholars for regular social and community activities across the entire course of your journey at Hopkins.
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▶ ▶ ▶ MORE INFORMATION AVAILABLE AT JHU.EDU/VIVIEN-THOMAS

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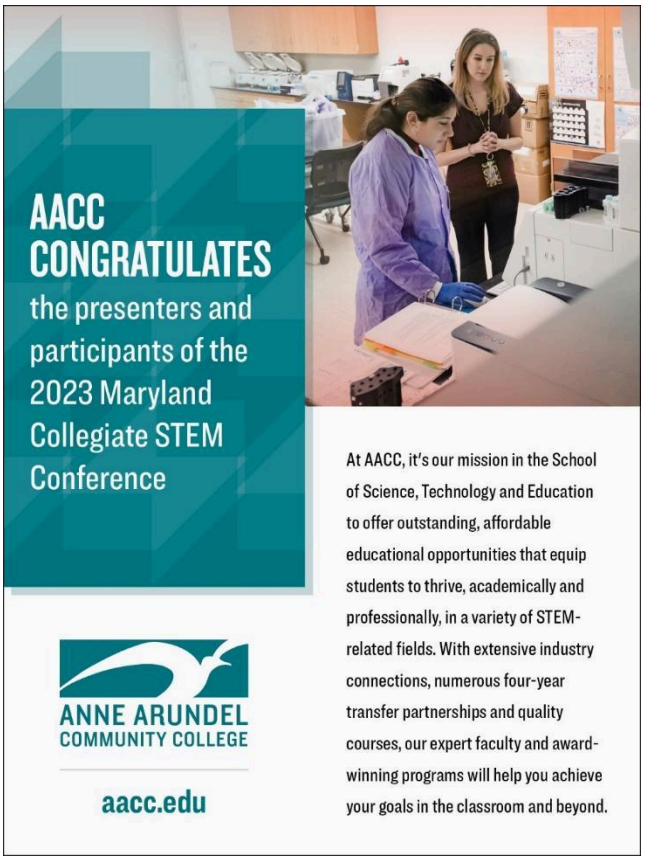

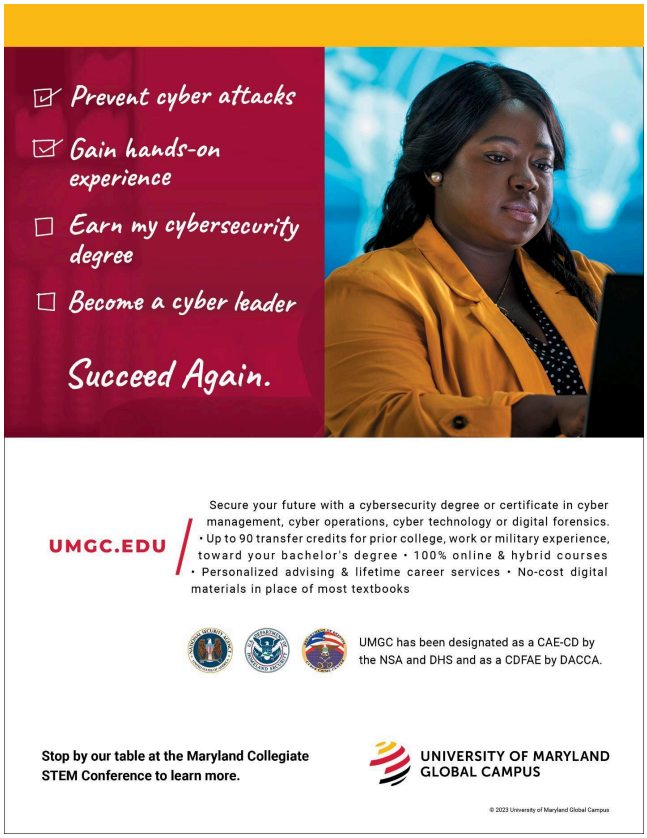

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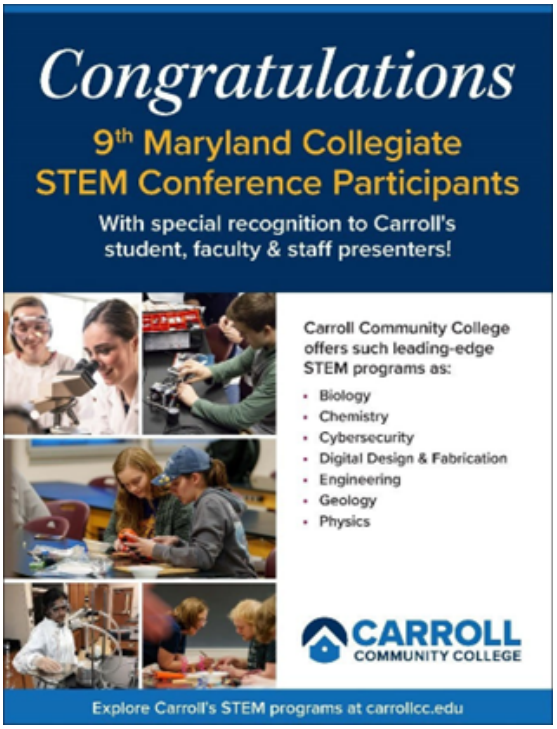
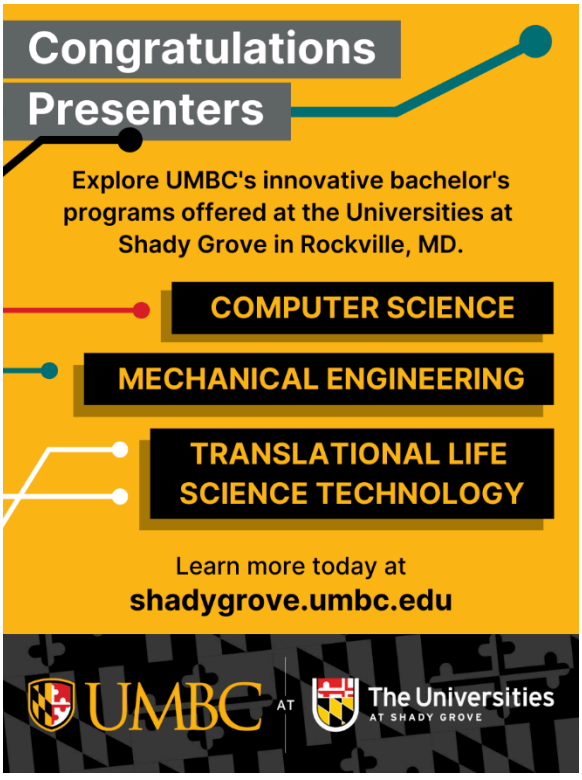
Bronze Sponsor Ads





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Organizational Committee (OC) Members

- Professor Raza Khan, Carroll Community College - *Director*
- Professor Kiersten Newtoff, Montgomery College – *2024 Conference Chair*
- Professor Brendan Diamond, Howard Community College – *2024 Conference Vice Chair*

- Professor Maria Burness, Carroll Community College
- Professor Gwen Gilinger, Community College of Baltimore County – *Proposals and Presentations Vice Chair*
- Professor Sven Holbik, Harford Community College
- Professor Amrita Madabushi, University of Maryland Global Campus
- Professor Anil Malaki, Baltimore City Community College
- Professor Wayne Manrakhan, Harford Community College
- Professor Natalie Minkovsky, Community College of Baltimore County, *Sponsors Chair*
- Professor Alejandro Satz, Harford Community College
- Professor Russ Seidel, Harford Community College - *Proposals and Presentations Chair*
- Professor Maureen Sherer, Anne Arundel Community College
- Professor Valerie Shelton, College of Southern Maryland
- Professor Shyamala Sivalingam, Anne Arundel Community College – *Guest Speakers and Dignitaries Chair*
- Professor Joe Sparenberg, Howard Community College, *Sponsors Vice Chair*
- Professor Anita Wahi, Prince George Community College
- Professor Jennifer Wilcox, Harford Community College
- Professor Ayse Gul Yavuz-Cular, Community College of Baltimore County

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Abbreviations used for colleges/universities

AACC – Anne Arundel Community College
ACM – Allegany College of Maryland
BCCC – Baltimore City Community College
CCBC – Community College of Baltimore County
CarrollCC – Carroll Community College
CSM – College of Southern Maryland
HagerstownCC – Hagerstown Community College
HarfordCC – Harford Community College
HowardCC – Howard Community College
MC – Montgomery College
SMCM – St. Mary's College of Maryland
Towson – Towson University
UMBC – University of Maryland, Baltimore County
UMD – University of Maryland, College Park

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Raffle Details and Feedback Survey

There will be two raffles held at the end of the day.

Transfer & Exhibition Raffle

- Students must get their card (given during check-in) stamped by 6 institutions or exhibitors after having a conversation. Please do not just go to a table and ask for a stamp.
- Drop your card off at the closing remarks session
- You must be present to win

General Raffle

To be eligible for the raffle prizes at the end of the day, participants must:

- Have registered and paid (to include sponsorships) for the Conference
- Be present to win

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Link to Feedback Survey

Please complete our conference survey at the end of the day to help us improve the conference experience in future years! You can scan this QR code by opening the camera app in your phone and hovering over the QR code. A link should appear on your screen taking you to the Google Form. Thank you!

Link to survey: https://forms.gle/nSSrwyh18vXm4Y1s9

QR Code to survey:

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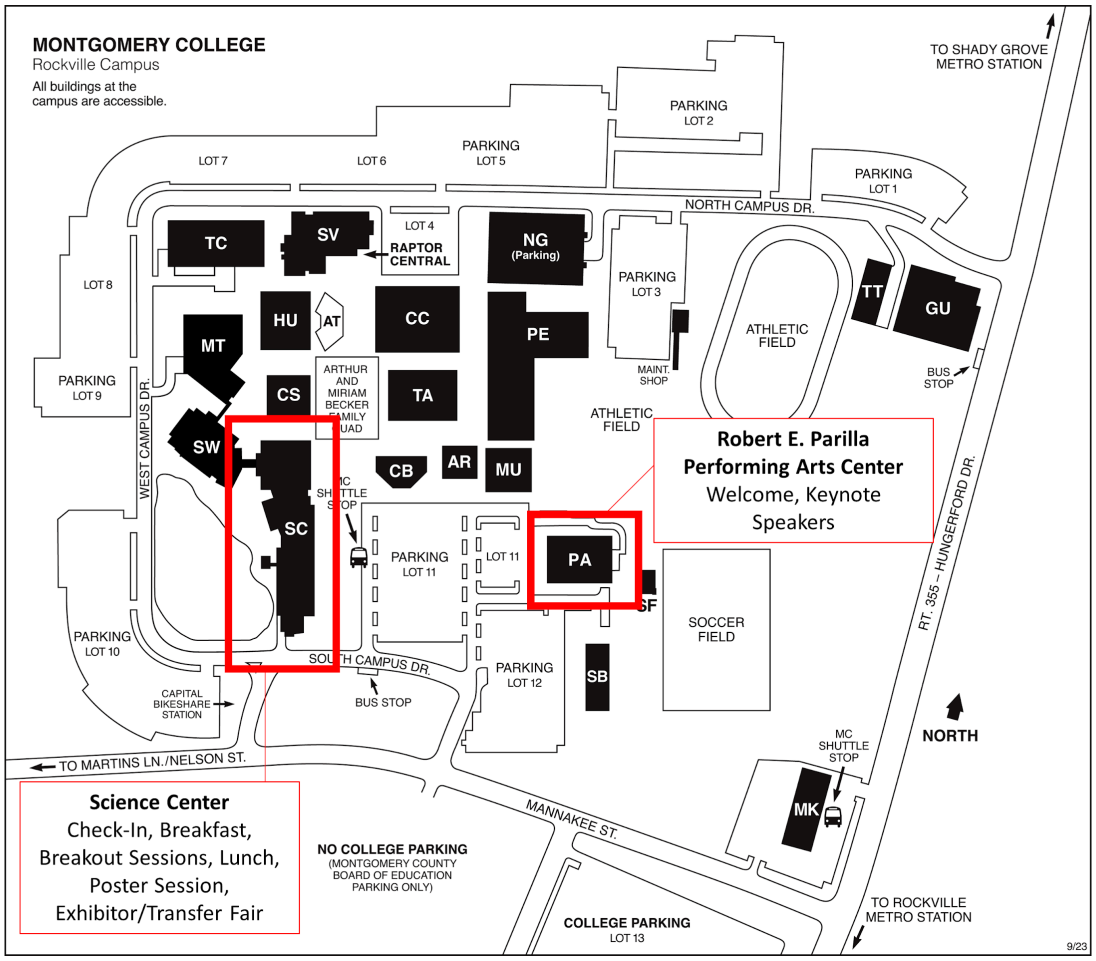
Campus Map



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