37th Annual Math, Engineering and CS (*MECS*) Conference

Mathematics

Engineering

MECS
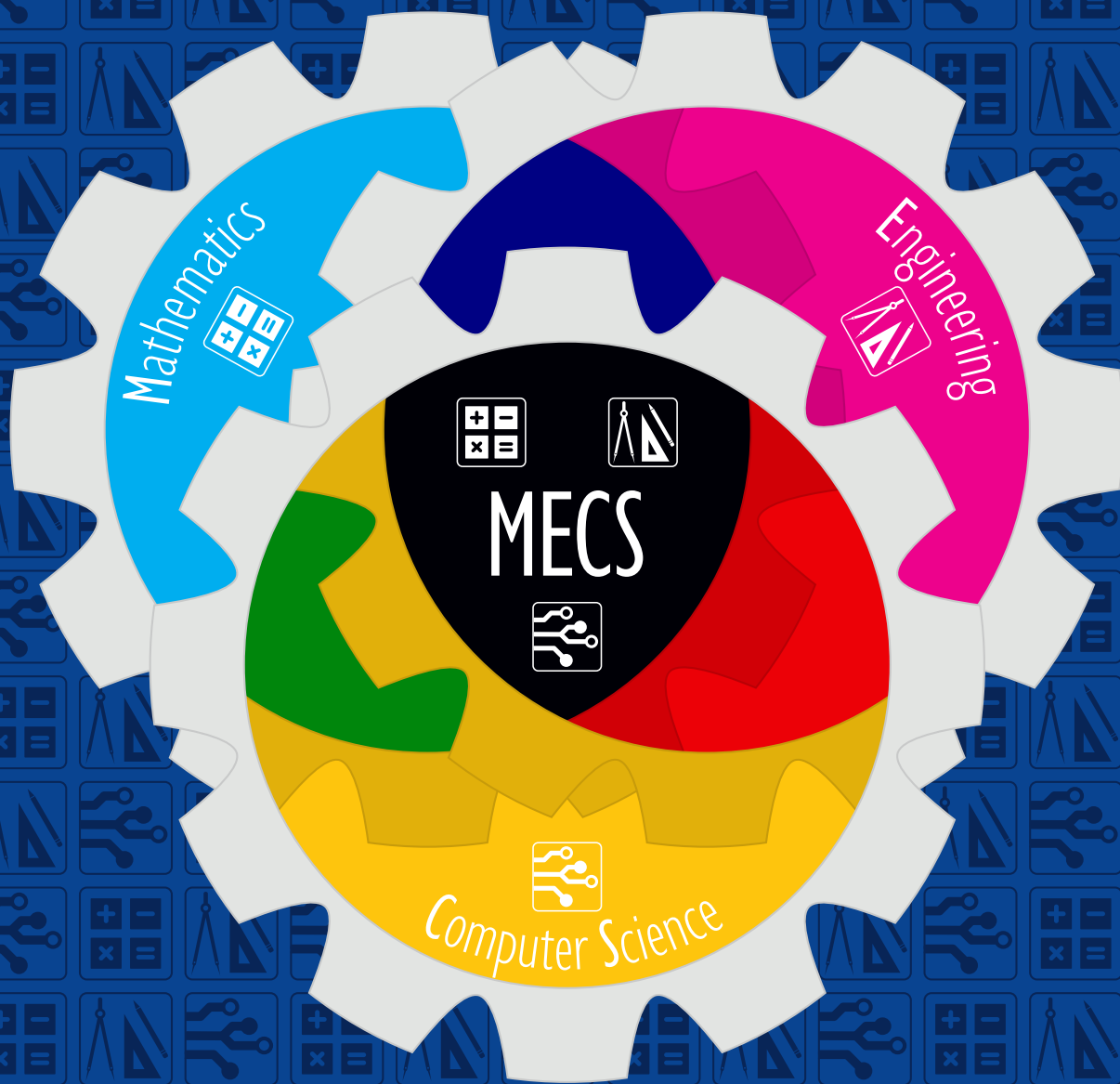
Computer Science

Mathematics, Engineering and Computer Science
Meaningful Engagement, Collaboration and Scholarship

Friday | Feb. 2, 2024

Georgia State University | PERIMETER COLLEGE

37th Annual Math, Engineering & CS (MECS) Conference

Perimeter College at Georgia State University

February 2, 2024

Clarkston Campus

Conference Guest Speakers

Welcome	**Dr. Cynthia Lester, Dean of Perimeter College**
Introduction of Speaker	**Stephanie Garofalo** **Chairperson, Perimeter College MECS Conference**
Keynote Address	**Dr. David Rettinger** **Applied Professor of Psychology** **University of Tulsa**
Closing Remarks	**Dr. John King** **Chair of the Department of Mathematics,** **Computer Science, and Engineering** **Georgia State University Perimeter College**

About the Keynote Speaker

Dr. David Rettinger is a "utility infielder" of academic integrity. He has taught psychology at the college level for over 20 years, including over 15 at the University of Mary Washington where he holds the title of Professor Emeritus. During that time he served as Procedural Advisor to UMW's student-run honor system and has published frequently on the psychology of academic integrity. With a PhD in Cognitive Psychology, he is also well versed in the basic principles of learning science that underlie excellent teaching. He is currently Applied Professor of Psychology at the University of Tulsa.

His academic research interest is in academic integrity behavior, having published research on the psychology of cheating in Theory into Practice, Research in Higher Education, Ethics and Behavior, and Psychological Perspectives on Academic Cheating. He is co-editor of Cheating Academic Integrity: 40 Years of Research published by Jossey Bass.

He has presented on topics relating to pedagogy, policy, and practice in academic integrity around the U. S. and internationally. His collaborations include partnerships in Chile, Mexico, Nigeria, Thailand, and Ukraine and was a Fulbright Specialist in Nepal. He has appeared in numerous media outlets like the CBS Morning Show, Good Morning America, The New York Times, The Washington Post, Inside Higher Education, and The Chronicle of Higher Education. Rettinger is President Emeritus of the International Center for Academic Integrity, an organization founded to combat cheating, plagiarism, and academic dishonesty in higher education. In addition, he leads the organization's efforts in assessment and survey research, continuing the McCabe academic integrity survey.

He earned a Ph.D. (1998) and an M.A. (1994) in psychology from the University of Colorado, Boulder, after receiving a B.A. (1991) with high honors and distinction in psychology from the University of Michigan, Ann Arbor.

Keynote Address:

 "When Good Students Make Bad Decisions: The Psychology of Why Students Cheat"

ABSTRACT:

Online instruction during Covid highlighted some fundamental challenges to teaching and learning in higher education. Just as we began to return to a new normal, generative AI has forced even further reconsideration of fundamental principles of learning in the 21st century. In order to fulfil the promise that higher education makes to our students and to society, we must understand what authentic learning and academic integrity mean in this new world. Academic integrity is more than just the absence of cheating. True academic integrity requires an academic culture that promotes authentic learning and communities of mutual respect. While enforcement of policy is important, psychological research supports a holistic approach to academic integrity that includes a strong emphasis on personal ethical development, excellent pedagogy, and an educational environment focused on the goal of authentic learning.

Welcome from the Conference Planning Committee Chair

On behalf of the conference committee, it is my pleasure to welcome you to the 37th Annual "Math" Conference at Perimeter College. While we are honored to continue this tradition, we are also excited to branch out and welcome our colleagues in Engineering and Computer Science, and to formally rename the conference the MECS Conference (Math, Engineering & CS)! We are also thrilled to have many student presentations at both the graduate and undergraduate levels.

This year we have added designated exhibitor time after lunch to allow you to learn about their offerings without having to shorten your lunch or miss a session.

Some housekeeping items:

- Parking passes are available at the registration desk for non-GSU attendees. If you do receive a ticket please bring it to registration, and we will take care of it.

- Presenters may send their presentations and any handouts to mathconference@gsu.edu to be posted on the conference website.

- At the end of the day, please fill out the conference evaluation form on the conference website or use the QR code:

We hope you learn something today and are inspired. Thank you for being a part of the 2024 MECS Conference!

Warm regards,

Stephanie Garofalo

Chair of the 37th Annual MECS Conference

Thank you!

The Perimeter College Math, Engineering & CS Conference Committee thanks the following for their contributions and generous support of the 37th Annual Math, Engineering & CS (MECS) Conference. Please be sure to visit the exhibitors throughout the day:

Cengage
Lumen Learning
McGraw Hill
Pearson Education
Way to Succeed

Schedule at a Glance

Friday, February 2, 2024		
Time	**Event**	**Location**
8:00 AM	**Registration Begins**	**CN building, 1st floor**
8:15 AM	**Hot Breakfast**	**CN-2220**
9:00 AM – 10:45 AM	**Full Sessions**	**CE building**
11:00 AM	**Welcome & Keynote Address**	**LRC - 1100**
12:10 PM	**Lunch**	**CN-2220**
12:30PM – 1:00PM	**GMATYC Meeting**	**CN-2240**
12:40PM – 1:30PM	**Exhibitor**	**CN building, 1st floor**
1:30 PM – 2:15 PM	**Full Sessions**	**CE building**
2:30 PM – 3:50 PM	**Mini Sessions**	**CE building**
4:00 PM – 5:00 PM	**Closing Reception**	**CN building, 1st floor**

Detailed Schedule

Friday, February 2, 2024

<table>
<tr><td rowspan="4">9:00 – 9:45 AM
Full Sessions</td><td>CE-1120</td><td>CE-1130</td><td>CE-1150</td></tr>
<tr><td>1. The 'ABC' of a Mathematics Syllabus</td><td>2. Improve Student Outcomes in your Co-Requisite Courses with ALEKS</td><td>3. Data Science: The DIFUSE Project at Dartmouth College</td></tr>
<tr><td>CE-1160</td><td></td><td></td></tr>
<tr><td>4. Matrix Exponentials</td><td></td><td></td></tr>
<tr><td rowspan="4">10:00 – 10:45 AM
Full Sessions</td><td>CE-1120</td><td>CE-1130</td><td>CE-1150</td></tr>
<tr><td>5. An Analysis of the Open Educational Resources Survey given to the MCSE Faculty in Fall of 2023</td><td>6. Enhancing Student Readiness with WebAssign</td><td>7. **CANCELLED**
A Logistic Regression approach to model Stem VS NON-STEM Majors</td></tr>
<tr><td>CE-1180</td><td></td><td></td></tr>
<tr><td>8. Enhancing Online Instruction: The Power of Regular and Substantive Interaction</td><td></td><td></td></tr>
<tr><td>11:00 AM</td><td colspan="3">Keynote Address: Dr. David Rettinger LRC - 1100</td></tr>
<tr><td>12:10 PM</td><td colspan="3">Lunch CN – 2220</td></tr>
<tr><td>12:30 PM</td><td colspan="3">GMATYC Meeting</td></tr>
<tr><td>12:40 PM</td><td colspan="3">Exhibitor</td></tr>
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		CE-1120	CE-1130	CE-1150
1:30 – 2:15 PM	**Full Sessions**	9. Improving Student Engagement with Low-Cost Courseware	10. Help Your MECS Students Find Their Way to Succeed	11. Hands-on Activities for Mathematics Teacher Education Using Virtual Manipulatives
		CE-1160	**CE-1170**	
		12. Spatial Visualization in Geometry	13. Q&A with Keynote Dr. David Rettinger	
2:30 – 2:50 PM	**Mini Sessions**	**CE-1120**	**CE-1130**	**CE-1150** **Student Presentation**
		1. **CANCELLED** Annuities and Loans Models in Finance	2. Application of Probability Distribution Functions in Environmental Engineering	3. Designing User-inclusive Transparent AI Systems
		CE-1160 **Student Presentation**	**CE-1170**	**CE – 1180** **Student Presentation**
		4. **CANCELLED** Linear Redundancies in P(Z_2^4)	5. Best Practices - Consistent and Effective Student Engagement and Methodology	6. FOCUS: Fast Observation and Collection of Underground Soil
3:00 – 3:20 PM	**Mini Sessions**	**CE-1120**	**CE-1130** **Student Presentation**	**CE-1150** **Student Presentation**
		7. A hybrid course, an alternative to fully online class	8. Developing an Integrated System for Soil Fertilization	9. System for Ontology Learning and Extraction (SOLE)
		CE-1160	**CE-1170** **Student Presentation**	**CE-1180** **Student Presentation**
		10. Discovering Companion Pell Numbers	11. Genetic Algorithm with Evolutionary Jumps	12. Investigating Coexistence of Bursting and Silent Regimes in Models of Leech Heart Interneurons

			CE-1150 **Student Presentation**
	CE-1120	**CE-1130**	
3:30 PM – 3:50 PM **Mini Sessions**	13. Enhancing Inclusive and Equitable Instruction Through Developing Open Courses	14. Guiding Students to Success One Assessment at the Time	15. Personalized Learning: Tailored Education Solutions through AI Study Tools and Large Language Models
	CE-1160	**CE-1170** **Student Presentation**	
	16. Bullish and Bearish Engulfing Japanese Candlestick Patterns: A Multi-Industry Statistical Analysis	17. **CANCELLED** Real Estate Listings Website	
4:00 PM – 5:00 PM	**Reception - CN building** **Remarks by Dr. John King**		

9:00 a.m. – 9:45 a.m.

1	*The 'ABC' of a Mathematics Syllabus*	CE – 1120
	Dr. Dihema Longman, dlongman1@gsu.edu - Georgia State University Perimeter College	
	Explore this simple approach to effectively communicate course information, designed to enhance student success and inspire new faculty members on engaging with students right from day one.	

2	*Improve Student Outcomes in your Co-Requisite Courses with ALEKS*	CE - 1130
	Dr. Alvina Atkinson, aatkinso@ggc.edu - Georgia Gwinnett College;	
	Leigh Jacka, Leigh.jacka@mheducation.com - McGraw Hill ALEKS Regional Specialist	
	Every student brings different levels of knowledge and preparedness to your class. Learn how ALEKS can help you identify knowledge gaps, on day one, to meet the unique needs of every student. With ALEKS, instructors now have even more flexibility to create their course their way. The ALEKS prerequisite tool helps instructors create a Corequisite course efficiently by providing all back mapping of content based up the curriculum content selected for the course. Various implementations with ALEKS will be discussed.	

3	*Data Science: The DIFUSE Project at Dartmouth College*	CE-1150
	Dr. Kouok Law, klaw@gsu.edu - Perimeter College at Georgia State University	
	The NSF funded DIFUSE Project at Dartmouth College aims to help integrate Data Science into introductory STEM and Social Science curricula. They have 16 Modules. During Fall 2023, my Statistics class worked on the Science and Environment Module that examines the effects of the racial, economic, and economic factors on Covid-19 mortality in Louisiana.	

4	*Matrix Exponentials*	CE-1160
	Chris Hill, chris.hill@mga.edu - Middle Georgia State University	
	The matrix exponential is a matrix function on square matrices analogous to the ordinary natural exponential function f (x) = e^x. It was originally used to solve systems of ordinary linear differential equations. In the theory of Lie groups, the matrix exponential gives the connection between a matrix Lie algebra and the corresponding Lie group. This talk will give various properties of matrix exponentials and use them to investigate conjectures on the product of matrix exponentials.	

10:00 a.m. – 10:45 a.m.

5	**An Analysis of the Open Educational Resources Survey given to the MCSE Faculty in Fall of 2023**	CE – 1120
	Dr. Laurn Jordan, Ljordan8@gsu.edu ; Michelle Chung, Mchung12@gsu.edu *Georgia State University Perimeter College* An analysis of the OER (Open Educational Resources) Survey given to MCSE Faculty in the fall of 2023. The presenters will share the results of the OER Survey followed by a discussion of the pros and cons but also the reality of OER adoption.	

6	*Enhancing Student Readiness with WebAssign*	CE - 1130
	Tom Ziolkowski, Tom.Ziolkowski@cengage.com - Lead Product Marketing Manager for Math at Cengage; Dr. Dale Dawes, dawes.consulting@gmail.com - City University of New York - Borough Manhattan Community College	
	When students enter Math and Statistics courses, their knowledge and study skills can vary greatly. Discover innovative WebAssign resources that help overcome prerequisite gaps and prepare your students for success, including readiness bootcamps and corequisite support that activate background knowledge and interactive modules that improve a students approach. We will also present our training and support services for students and faculty.	
7	*CANCELLED A Logistic Regression Approach to Model Stem VS NON-STEM Majors*	CE-1150
	Joy D8, jdandrea@mail.usf.edu - USFSM In this talk we will discuss a fun activity that turned into a small research problem: for determining the probability of a STEM major VS a NON-STEM major...based off the independent variable(s) of number hours working at a job, number of hours studying a week, number of hours exercising and the number of hours spent on their hobbies. We will show the first small sample (n= 50) and then the larger sample (n=100) results and discuss the model, odds ratio and also the covariance and correlation between specific significant	
8	**Enhancing Online Instruction: The Power of Regular and Substantive Interaction**	CE-1180
	Sharon Weltlich, sweltlich@gsu.edu; Keisha Lanier Brown, klanier1@gsu.edu Georgia State University Perimeter College In online education, the pivotal role of regular and substantive interaction cannot be overstated. This presentation explores practical and evidence-based strategies for elevating the quality of online instruction. Attendees will gain insights into fostering an interactive and dynamic online classroom where students actively participate, collaborate, and engage with course content. Participants will learn about key tools within Desire2Learn/Brightspace that can be used to meet all five tenants of regular and substantive interaction.	

1:30 p.m. – 2:15 p.m.

9	*Improving Student Engagement with Low-Cost Courseware*	CE – 1120
	Allison Williams, awilliams89@gsu.edu ; Michelle Chung, mchung12@gsu.edu ; Behnaz Rouhani, brouhani@gsu.edu - Georgia State University Perimeter College; Alecia VanBuren, alecia@lumenlearning.com; Paul Golisch, paul@lumenlearning.com - Lumen Learning	
	Lumen Learning's OHM platform provides flexibility for various pedagogical styles at Georgia State University-Perimeter College. The presenters will share their experiences from a three-semester pilot using Lumen's Online Homework Manager (OHM.) Additionally, they will share student survey responses that support increased student engagement and academic success.	
10	*Help Your MECS Students Find Their Way to Succeed*	CE - 1130
	Jane Reed, jane.reed@waytosucceed.com - Way to Succeed: Mindful Insights for Learning Way to Succeed offers a low-cost, effective, and time-efficient mini-course designed especially for math and other STEM courses to counteract underachievement. Used concurrently with STEM courses, students complete short assignments that address learning how to learn, analyze learning practices, provide personalized feedback, and suggest recommendations for improving effective STEM learning.	

11	Hands-on Activities for Mathematics Teacher Education Using Virtual Manipulatives	CE-1150
	Dr. Nikita Patterson, npatterson@gsu.edu - Georgia State University Perimeter College	
	One of the key components of a mathematics education course is the use of manipulatives. Examples will be presented of hands-on virtual manipulatives used for an undergraduate mathematics course for preservice elementary teachers. The audience will compare the virtual and concrete manipulatives, and discuss the benefits and disadvantages of both.	
12	*Spatial Visualization in Geometry*	CE-1160
	Arsalan Wares, Awares@valdosta.edu - Valdosta State University	
	In this presentation I will share a non-routine spatial visualization activity that can be used in any geometry classroom. The participants are encouraged to bring their cell phones with them as they will be able to access the geometric structure used in the activity using their cell phones.	
13	*Q&A with Keynote Dr. David Rettinger*	CE-1170
	Dr. David Rettinger, University of Tulsa	
	Continue the discussion of a wholistic approach to academic integrity with our keynote speaker Dr. David Rettinger!	

Abstracts for Mini Sessions
Friday, February 2, 2024

2:30 p.m. – 2:50 p.m.

1	CANCELLED *Annuities and Loans Models in Finance Mathematics Class*	CE – 1120
	Dr. Shinemin Lin, lins@savannahstate.edu - Savannah State University	
	Finance mathematics is a multifaceted discipline that plays a crucial role in shaping the financial landscape of individuals and organizations. Annuities and loans models are fundamental components of this field, serving as cornerstones in understanding the time value of money, risk assessment, and investment decision-making. This paper provides an overview of the importance of annuities and loans models in the education of finance mathematics students.	
2	Application of Probability Distribution Functions in Environmental Engineering	CE – 1130
	Andrew Kim, dkim112@gsu.edu - Georgia State University Perimeter College	
	The Residence Time Distribution (RTD) is a probability distribution function that quantifies the duration fluid elements spend inside the reactor. Environmental engineers employ the RTD to analyze mixing and flow patterns to compare real reactors to ideal models and design future reactors. Perimeter students practiced obtaining and analyzing the RTDs.	
3	*Designing User-inclusive Transparent AI Systems*	CE - 1150
	Pardaz Banu Mohammad, pmohammad2@student.gsu.edu - Georgia State University	
	AI Systems that make decisions or recommendations have a responsibility to be accurate, fair, and transparent to their users. Users of AI systems must request selective transparency or exhaustive transparency from the AI system, depending on their requirements. We present that selective transparency is attainable, and we plan to implement this through our research work.	

4	*CANCELLED Linear Redundancies in P(Z_2^4)*	**CE-1160**
	Amanda Tran, atran15@tufts.edu - Tufts University	
	Given pz, there are fifteen projective points and thirty-five projective lines. The projective line complex admissibility problem seeks to describe and generalize the underlying structures that separate admissible (linearly independent) versus inadmissible (linearly redundant) complexes. Specifically, the line complex problem is used in the context of Radon Transforms over these projective points. This project addresses necessary conditions that contribute to admissible and inadmissible linear structures using discrete analysis, vector analysis, linear algebra, and discrete geometry. In particular, we are interested in generalized classes of minimally inadmissible collections of lines, their associated geometry, and its dependence on the "Even Incident Condition".	
5	*Best Practices - Consistent and Effective Student Engagement and Methodology:*	**CE-1170**
	Dr Babs Onabanjo, bonabanjo@atlm.edu - Atlanta Metropolitan State College	
	Whether face-to-face, hybrid, or a fully online course, teaching must deliver the same objectives and expected outcomes. Regardless of the method, the delivery must consistently conform to best practices and produce desired outcomes. Therefore, in my judgment, the objective outcome approach is the most effective strategy for teaching computer Science courses because it lends itself to addressing complex issues related to the phases of problem-solving at a higher level of taxonomy. The delivery methodology must produce the desired outcomes configured from inception by design. The objective outcome approach may include but is not limited to the following: demonstration, analysis, creativity, innovation, synthesis, and problem-solving skills required for a challenging programming course. Any well-designed course must address the following areas namely: 1, Effective Online Design, 2. Engaged and Effective Instruction, 3. Robust Learning Management Tools and Technology (D2L) and 4. Appropriate and relevant Learning Materials linked to Course Learning Objectives.	
6	*FOCUS: Fast Observation and Collection of Underground Soil*	**CE-1180**
	Tisha Thakkar, tishathakkar15@gmail.com; Razat Sutradhar, rsutradhar1@student.gsu.edu; Shadae Page, shadaeapage23@gmail.com	
	Georgia State University	
	The presenters will share a student-built robot and how they will be using it to collect soil moisture data.	

3:00 p.m. – 3:20 p.m.

7	*A hybrid course, an alternative to fully online class*	**CE-1120**
	Avijit Kar, akar1@gsu.edu ; Ashraful A Chowdhury, achowdhury13@gsu.edu	
	Georgia State University Perimeter College	
	The presenters will discuss successes and challenges of teaching a hybrid course, an alternative to fully online course. The course had a face-to-face component and an online component each week. The authors will share various teaching pedagogies attempted to promote learning and improve retention rate. Preliminary data from surveys including qualitative and quantitative data will also be shared. Feedback from the audience will be appreciated.	

8	*Developing an Integrated System for Soil Fertilization*	CE – 1130
	Haneen Ahmed, hahmed21@student.gsu.edu; Andrew Kim, dkim112@gsu.edu; Min Khant Zaw *Georgia State University Perimeter College*	
	A presentation over the development, design, and programming of an autonomous fertilizing robot. This robot is being made in hopes to reduce harmful nutrient runoff. It uses Arduino, several different types of motors, an NPK Sensor, a load cell, and a PID control algorithm to run.	
9	*System for Ontology Learning and Extraction (SOLE)*	CE - 1150
	Sundos Al Subhi, salsubhi1@student.gsu.edu - Georgia State University	
	System for Ontology Learning and Extraction (SOLE) aims to automate hazard-specificontology construction from knowledge bases of disaster-related information (e.g., scholarly articles) through the use of ontology learning techniques. The hazard-specific ontologies that are extracted from knowledge bases of disaster-related information will provide planners, policymakers, and decision-makers with the information they need in cases of disaster. This research will contribute by enabling the automated extraction and organization of unstructured data into structured data and information related to a crisis resulting from specific hazards. The proposed system, SOLE can be used to process real-time data from social media to uncover the effects of disasters in different locations, thereby improving critical disaster relief efforts. Also, this research will identify place and hazard-specific impacts by integrating formal and informal terms. Such information can provide critical intelligence for improving disaster planning, recovery, and resilience efforts.	
10	*Discovering Companion Pell Numbers*	CE-1160
	Xiaoyan Hu Chase, shannon.chase@mga.edu - Middle Georgia State University	
	We will investigate the series $\{(1 + \sqrt{2})^n + (1 - \sqrt{2})^n\}$. It is revealed to be an integer series with a recursive formula. Additionally, it generates a sequence of Companion Pell Numbers.	
11	**Genetic Algorithm with Evolutionary Jumps**	**CE-1170**
	Hafsa Farooq, hfarooq5@student.gsu.edu - Georgia State University	
	It has recently been noticed that dense subgraphs of SARS-CoV-2 epistatic networks correspond to future unobserved variants of concern. This phenomenon can be interpreted as multiple correlated mutations occurring in a rapid succession, resulting in a new variant relatively distant from the current population. We refer to this phenomenon as an evolutionary jump and propose to use it for enhancing genetic algorithm. Evolutionary jumps were implemented using C-SNV algorithm which find cliques in the epistatic network. We have applied the genetic algorithm enhanced with evolutionary jumps (GA+EJ) to the 0-1 Knapsack Problem, and found that evolutionary jumps allow the genetic algorithm to escape local minima and find solutions closer to the optimum.	
12	*Investigating Coexistence of Bursting and Silent Regimes in Models of Leech Heart Interneurons*	*CE-1180*
	Anna Gianella, agianella1@student.gsu.edu - Georgia State University	
	Coexisting bursting and silent regimes are separated by a saddle periodic orbit in leech interneurons. This orbit is born and disappears along with parameters of ionic channels changing by neuromodulation. Mechanisms underlying this coexistence are evaluated by variation of leak current conductance and properties of perturbations switching between the regimes*.*	

	3:30 p.m. – 3:50 p.m.	
13	**Enhancing Inclusive and Equitable Instruction Through Developing Open Courses**	**CE-1120**
	Stephanie Reikes, sreikes7@gatech.edu; Greg Mayer, greg.mayer@gatech.edu ; Natanel Ha, nha36@gatech.edu ; Cara Bennett , cara.bennett@gatech.edu ; Melissa Leng, melissaleng@gatech.edu - Georgia Tech	
	This talk gives an overview of promoting inclusion and equity at Georgia Tech. Our approach, the Open Course Project, is supporting student success in core mathematics courses that students can use to supplement their learning. The Open Course project at Georgia Tech has developed open courses in several subjects.	
14	**Guiding Students to Success One Assessment at the Time**	**CE - 1130**
	Rusandica Manole, rmanole@gsu.edu - Georgia State University Perimeter College	
	Assessments have a significant impact on students' success. The presenter will share how combining low-stakes in-class graded activities categories with the typical tests promotes learning and students' success.	
15	*Personalized Learning: Tailored Education Solutions through AI Study Tools and Large Language Models*	**CE-1150**
	Chris-Andre Brissett, cbrissett2@student.gsu.edu ; Israel Hardley, ihardley1@student.gsu.edu Georgia State University Perimeter College	
	This research introduces the idea of personalized AI study tools, harnessing the power of large language models like GPT-4, Bard, and Claude. By implementing adaptive learning paths, these tools contribute to bridging education gaps. The objective is to optimize individual learning experiences, promoting efficient and effective study strategies for diverse learners.	
16	*Bullish and Bearish Engulfing Japanese Candlestick Patterns: A Multi-Industry Statistical Analysis*	**CE-1160**
	Mohamed I. Jamaloodeen, mjamaloo@ggc.edu - Georgia Gwinnett College	
	Technical analysis uses historical security prices to forecast future prices based on charts. These charts show fluctuations of prices, which can be used to predict future prices. In this work, we study Japanese candlesticks, the chart style which relies on four pieces of data: Open, High, Low and Close prices. It is thought that certain candle patterns have the capability to forecast imminent price tops, bottoms, and/or trend continuations. We use statistical analyses to study the effectiveness of Bullish Engulfing and Bearish Engulfing patterns using past stock prices of indexes in six different industries. The industries studied and analyzed include materials select, energy select, financial services select, industrial select, information technology select, and health care select sectors. Our results suggest that the Bearish Engulfing has significant predictive capability when using the Open and High criteria but not the Close criterion. Similarly, Bullish Engulfing offers significant predictive power when using the Open and Low criteria but not the Close criterion. However, the comparison of the size of the candles bodies is not statistically significant. These results have useful implications for investors and for future research.	
17	**CANCELLED** **Real Estate Listings Website**	**CE-1170**
	Shadae Page, shadaeapage23@gmail.com ; Thakkar Tisha, tishathakkar15@gmail.com Georgia State University	
	A Real Estate Listing Website will be created using Flask in Python. The website will have features like adding listings to the website, deleting listings, redirecting the user to the homepage, and buying and viewing listings.	

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