College of Engineering & Information Technology

COMPUTER SCIENCE & ELECTRICAL ENGINEERING

CSEE NEWSLETTER - FALL 2023

A Message from the Chair

As a new year unfolds, CSEE stands ready along with the new UMBC leadership to serve our students and grow the stature of the department. We had an amazing year — a record number of students, increasing diversity of our students and faculty, major growth in research funding, newly established research centers, recognition for our faculty and students, and a successful ABET visit. We are also growing our faculty. You'll find this and more discussed in this issue of the newsletter. Happy Reading, and a Happy New Year!

Congratulations to Dr. Mohamed Younis on his official appointment as the Chair of CSEE, and to Dr. Ryan Robucci for his appointment as Associate Chair. We look forward to your leadership.

Members and friends of the National Society of Black Engineers (NSBE) enjoy "Coffee and Conversations" sponsored by the department.

In this issue

UMBC CSEE is a growing institution. Meet some of our newest faculty members!

Tejas Gokhale
Assistant Professor
AI, Machine Learning, Signal Processing

Lara J. Martin
Assistant Professor
Natural Language Generation, Neurosymbolic AI

Ajinkya Borle
Lecturer
Quantum Computing, Optimization

Mihail Cutitaru
Senior Lecturer
Computer Architecture, Embedded Systems

KMA Solaiman (Salvi)
Lecturer
Machine Learning, Multimodal Data Management

Faculty Awards

Our CSEE Faculty are being recognized near and far.

E. F. Charles LaBerge, Ph.D. '03, Professor of the Practice
UMBC'S Alumni Association Board of Directors' "Outstanding Faculty" Award

This award is given to one full-time faculty member to honor extraordinary teaching as demonstrated by the effectiveness in motivating students in ways that have a lasting influence on their lives. Dr. LaBerge is also an alumnus, having received his Ph.D. in Electrical Engineering from UMBC in 2003.

Chenchen Liu, Assistant Professor
NSF CAREER Award

The National Science Foundation has awarded UMBC CSEE Professor Chenchen Liu a significant Faculty Early Career Development Program (CAREER) award that provides nearly $540,000 in funding over the next five years. This generous support aims to further the transformative work on AI systems, titled Rethinking PIM-Assisted GPU Computing for Multi-Tenant Artificial Intelligence.
This grant is more than just about advancing technology. It represents a commitment to educating the next generation of technology leaders. It will support research students in Dr. Liu's Computing Compass Laboratory. By weaving research findings into course materials and championing the increased involvement of underrepresented groups in computing, the project has a vision for a more inclusive tech ecosystem.

Richard Forno, Principal Lecturer
UAEH, Mexico Honorary International Professor

Dr. Richard Forno, principal lecturer and cybersecuity graduate program director, was recently appointed an Honorary International Professor at the Universidad Autonoma del Estado de Hidalgo (UAEH), one of Mexico's older universities, in recognition of his accomplishments in both the cybersecurity industry and now in academia. Dr. Forno joins a small group of distinguished faculty from around the world now associated with the university.
The appointment coincided with the university's annual international Book Fair, a prominent 2-week event with key activities aligned around a single theme – in this case, cybersecurity. During his brief visit to UAEH, he held several seminars with students and research faculty and also conducted a talk about the 2022 book 'Cybersecurity and Local Government' (co-authored with Professor Emeritus Don Norris and Ph.D. student Laura Mateczun, both from UMBC's Public Policy).

Congratulations!

Dr. Naghmeh Karimi and Dr. Ramana Vinjamuri have both been promoted to the rank of Associate Professor, with Tenure.

ABET Visit Summary - Computer Science Program

Several of the programs at UMBC are accredited by ABET (Accreditation Board for Engineering and Technology). In the computer science and electrical engineering department (CSEE) two programs are accredited: Computer Science and Computer Engineering. Beginning Saturday, October 14 th through Tuesday, October 17 th, 2023, UMBC hosted teams of site visitors to evaluate the ABET accredited programs. Two evaluators from the ABET Computer Advisory Committee (CAC) came to UMBC to review a wide variety of materials regarding the program. The accreditation cycle is a six year period; as a part of the reaccreditation process, the site visit team provides feedback on the continual improvement processes and the available resources supporting the program. The team is tasked with reviewing several aspects of the program including program educational objectives, student outcomes, assessment, evaluation, and diversity, equity, and accessibility.

Overall, the site visit went well for computer science. The site team visited the classrooms, labs, and lecture halls at Shady Grove during the first day of the visit. During this time at Shady Grove, came to appreciate that there is one program being offered at two separate locations. The second day of the visit was focused on physical tours and course materials in Catonsville including meeting the ABET support team. During the third day, the site team met with students, faculty, staff, administrators, advisory board members, and alumni to discuss various perceptions of the program. After preparing a report on the final day of the visit, the results were presented to the ABET support teams, the provost, and the president of the university.

There was one identified minor weakness in the computer science program related to closing the loop with individual faculty members after reviewing their student's materials. For example, faculty members who have expertise in a particular subject would review an artifact from a particular course. They would then independently evaluate if there were improvements or changes that the faculty members should introduce in order to more effectively meet a specific student outcome. The improvements and changes would then be aggregated and provided in a formal letter to the instructors of that course. The weakness was related to whether the faculty member implemented the changes or not. Overall, this is a minor fix that was resolved with some minor documentation improvements in our processes.

Thank you to Dr. Jeremy Dixon for serving as the CS ABET Coordinator, and for writing this report.

ABET Visit Summary - Computer Engineering Program

In October, the Computer Engineering program successfully completed its once-every-six-years reaccreditation visit with program evaluators from ABET, the organization that accredits engineering programs around the world. The visit, which involved visits to laboratory spaces; interviews with faculty members, students and staff; and an in-depth review of material used to assess student achievement of the required Student Educational Outcomes, went very well due to a collegial exchange of information. The visit exit report listed no weaknesses or deficiencies in the program, and only identified a single area of concern that required attention before the next ABET visit, which will nominally be scheduled for Fall 2029. Thanks to Dr. Carter, Dr. LaBerge, and Dr. Robucci, who did most of the interfacing with the Program Evaluator, Dr. Walid Ibrahim, and to Dr. Younis and Dr. Joshi, who were the primary contacts with the ABET visit chair for the engineering programs, Dr. Tom DeNucci.

Thank you to Dr. Chuck LaBerge for serving as the CE ABET Coordinator, and for writing this report.

The CSEE department was pleased to celebrate our 110 December Graduates. 105 of these graduates completed their programs at the Catonsville campus, with the remaining 5 concluding at Shady Grove. 108 will earn BS Degrees in Computer Science, with 2 earning a BS in Computer Engineering. We wish all of our Class of 2023 Graduates the best of luck in their future endeavors.

Alumni Spotlight

We are excited to share updates on two recent CSEE graduates, both of whom are making their mark in their chosen careers.

Mr. Max Poole
BS in Computer Science, BS in Mathematics AND
BA in Economics, May 2018, UMBC
Current Position: Production Engineer for Meta

I'm sure it was a challenge to earn three Bachelors' degrees at UMBC. Do you draw on knowledge from all three in your current role?

I don't often directly draw on the knowledge I gained in my economics and mathematics degrees as an SRE but I don't think that was the real value of them. To me the value of those degrees was the 'thinking muscles' I learned to flex during that process. Economics helped me think about the bigger picture and understand tradeoffs: something I'm constantly needing to think about as a reliability engineer. It also helped me learn how to research topics where there is no 100% right answer. Economics forces you to take real world complicated problems and respond to them with imperfect instruments and imperfect data. Despite all our big shiny datacenters, rigorous testing, and state of the art infrastructure at some point you get to the uncomfortable and unfamiliar.

With mathematics I feel like the two big benefits of my degree are proofs and a common language with data scientists. Mathematical proofs force a way of structured thinking that is incredibly helpful when you need to actually explain to other people what you are doing, especially when the thing you are doing is rather complicated. Additionally while I haven't needed to directly leverage a lot of the math courses, I frequently need to work with people who do. Having that common language with them makes conversations more economical, which is especially important during a major site issue where a few minutes can be hundreds of thousands of dollars.

What aspects of your current job excite you most, and what contributions do you hope to make in this role?

I like efficiency and I like order. I like when I can take a big mess and smooth it out into something that is understandable to others so that they can build on top of it. It's not so much the specific technical problems that excite but more so this perfect state where everything is simple with a clear purpose. That state really does not exist anywhere in life, but getting close to it is what I desire the most. At Meta I'll be helping build a system that does just that with the complicated architecture of Meta. The system will help make that architecture simpler for other engineers to understand so they can build monitoring, deployment and other systems on top of it.

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What advice would you give to current undergraduates who are considering jobs in Industry after graduation?

1. Have a "plan" even if it's not "the" plan: It's okay to not have your whole life figured out in Freshman year, but try anyway. You want to always be operating with intention. Do your level best to figure out what you need to learn and what you need to do to achieve the position you want. You will be wrong so keep revisiting it every few months. What you learn along the process is what is important.
2. Get real experience as soon as you possibly can: Classes are great but they won't get you a job. What will get you a job is real world experience. Internships, research, freelance work, personal projects, anything is okay as long as you are building. There are some specialized fields where research may outrank internships, but generally internships are the gold standard and you should aim to get one as soon as you can. Talk to your advisor and the career center every quarter, go to every career fair and research all the companies beforehand, do everything you can.
3. You will never stop learning and you will never be smart in this field, be comfortable being vulnerable: I think the number 1 quality of a "bad developer" is that he/she fears failure. This industry has so many different disciplines, complicated pieces of architecture and decades of technological sea change for any one human being to really understand it all. If you can't get in front of a big room and say "I don't know this" or look at your own work and say "I did this poorly," you won't grow. It's actually really dang uncomfortable coming from college where you are expected to know everything on a syllabus. Try to push yourself into situations where you know a lot less than the people around you and seek out criticism. When I was at UMBC President Hrabowski would constantly tell us to read more literary criticism. Criticism expands your thinking and helps you better understand how the sausage is made. Since folks don't tend to publicly publish code reviews you need to seek out that criticism yourself.

What are your professional goals for the next 5 years?

I want to understand how an engineering organization as a whole can operate the most efficiently. I've developed a lot of thoughts but I don't have an order for them. It's unlikely to be achievable in 5 years but I want to be a director of Site Reliability.

CSEE Faculty will continue to grow ... Multiple Open Rank, Tenure-Track Faculty; Lecturer; and/or Professor of the Practice positions are open.

Please visit csee.umbc.edu/about/jobs/ to view the current job descriptions and find links to the Interfolio applications.

Dr. Samit Shivadekar

Bachelor of Engineering in Information Technology, May 2004, Shivaji University;
MS in Computer Science, December 2008, Cal State Fullerton;
PhD in Computer Science, August 2023, UMBC

Current Position: Visiting Lecturer at UMBC; CMSC 201 and CMSC 447

How did your time as a PhD student at UMBC prepare you for your current role as a Visiting Lecturer?

While pursuing Ph.D. , I was working as a teaching assistant and that was an opportunity for me to explore myself with different duties and responsibilities like teaching, grading and interacting with different backgrounds of students. For research purposes, I have to hone my technical skills and that made me explore different computer science and my research related topics. That helped me to gain confidence and be a technically strong researcher and faculty member.

What aspects of your Visiting Lecturer Position at UMBC excite you most, and what contributions do you hope to make in this role?

This position is definitely challenging in terms of teaching and interacting with students. I like to accept challenges and that excites me most. This position gave me opportunities to participate in faculty meetings and interact with different reputed well known professors in different areas of the computer science field. I would like to be part of student retention efforts like new student orientation, brown bag seminars that emphasize research techniques, organization of forum and lectures focusing on topics such as race and immigration and interdisciplinary/multidisciplinary themes and establishment of graduate student organizations that provide leadership training and a sense of community for graduate students. As a faculty member, I will strive to be a teacher and researcher who fosters diversity. I believe empathy and respect for every person's lived experience go a long way toward ensuring a better feeling of inclusion, and I intend to emphasize these values in the classroom and in my research group.

What advice would you give to aspiring academics who are considering a career in teaching and research?

I firmly believe that we can do a better job of getting students excited about computer science and programming earlier on, and making computer science a more accessible major. I believe computer scientists have an obligation to elevate society as a whole. However, to be able to do this in an equitable way, I think we need to ensure that computer scientists are as diverse as the broader society we live in. Improving representation in the field of computer science can help us better understand the problems faced by society, and better understand the effects of proposed solutions. Computer science departments can play an important role in solving this problem by shaping a more diverse workforce, and training skilled engineers with various backgrounds.

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What are your professional goals for the next 5 years?

Take on leadership roles within the department, university, or professional organizations. Engage in outreach activities to promote computer science education in local communities and schools. Actively mentor graduate and undergraduate students, fostering a research-oriented mindset. I will encourage students to participate in research projects and guide them in publishing their work. Stay current with advancements in computer science through continuous learning, attending conferences, workshops, and engaging with professional communities. Explore opportunities for sabbaticals or collaborative projects with industry partners. Encourage underrepresented groups to pursue computer science and support initiatives that promote diversity. Actively work towards creating an inclusive and diverse environment in both research and teaching. Contribute to committees and initiatives that shape the direction of the institution or the field.

Upcoming Opportunity for CS Undergraduates

Study Abroad

Historically, the computer science program (and almost no programs in the College of Engineering and Information Technology) has not been able to offer a study abroad. The most recent attempt, in Summer of 2020, was derailed by the shut down due to the Global Covid-19 pandemic. Studying abroad is usually transformational for students. Research shows that study abroad experiences are associated with many positive outcomes such as greater chances of getting a high-paying job, higher GPA upon return, getting into graduate school, success on the job, etc. Historically, students in the College of Engineering and Information Technology have had few opportunities to study abroad and the primary goal for this program is to provide an opportunity for student to experience a location and a culture different than our environment here at UMBC. Additionally, because computer science has never offered a successful program from CoEIT, there are fewer students who have had the opportunity to experience spending several weeks in another country.

The study abroad program for Summer of 2024 will allow up to 20 students to spend three weeks in the vibrant city of Newcastle in northeast England at Newcastle University. This program will be led by Jeremy Dixon and the focus of the program will be based on CMSC 304 - Social and Ethical Issues in Information Technology. By offering this course in another country, we hope that students will be exposed to the global nature of computing. Additionally, the program will incorporate a variety of local and cultural enriching topics specific to the region. We hope to be able to travel to London and other important locations in Europe during the program. Financially, this will cost each student ~$7500 for a three-week immersive program including airfare, room, board, and culturally enriching experiences. The program is working on securing enough scholarship funding to provide money for students who might not have the financial opportunity to participate in any capacity.

hackUMBC

UMBC's annual hackathon was hosted on September 22-23, 2023 in the Interdisciplinary Life Sciences Building. hackUMBC club President Claire Kim provides this summary of the event:

This year, even with the storm, we were able to get 350 participants! One of my main goals this year was to have the event open to people of all majors, not just Computer Science. Out of 350 participants, about 140 participants were non-computing majors, about 150 participants from outside of UMBC, and we got 50 project submissions!

Considering every bump that was in the way with booking a location, ensuring that swag arrived on time, finding catering options, and the change in economy, I would say this year's event was successful and I am very proud of everything the hackUMBC team was able to accomplish this year.

A special shoutout to all the UMBC staff who have helped make this year's event happen, I appreciate each and every one of you!

Although this is my last year as a student at UMBC, I plan to still support the hackUMBC community and team however possible and I look forward to what the team is able to accomplish in the coming years.

Undergraduate study space gets a face lift

The computer science program has continued to grow and is now one of the largest undergraduate programs at UMBC. Three of the introductory courses, CMSC 201 – Computer Science 1, CMSC 202 – Computer Science 2, and CMSC 341 – Data Structures are extremely large and require an exceptional amount of support. This support includes both tutoring and support from the course teaching assistants (graduate students) and teaching fellows (undergraduate students). To provide as much support as possible there is a dedicated lab where any students can come and ask questions on homework assignments, labs, or projects. There are usually around 1000 students across those three courses every semester.

The lab that was being used for these office hours was first built in October 2003 when the ITE building was first completed. As such, the tile floors, drab coloring, and a lack of decoration left the room looking well-worn. In 2023, a team to help redesign ITE 240 was convened, and the process started. The redesign team consisted of faculty, staff, and students (both graduate and undergraduate). After the team was assembled, they determined what changes were needed and provided supporting evidence for this decision. The team determined that there was a need to increase the capacity of the room including improving the power options and grouping of students. Related to this process, the need for new furniture, paint, carpet, and decorations in the room was agreed upon. New security cameras were also installed to help ensure that the room would remain clean and well maintained. The team also debated furniture design and asked the furniture supplier for a variety of design options. After discussing the new layout options related to flow, course size, and capacity, a design was agreed upon; following overall room design paint options, decorations, and other academic tools (such as mobile whiteboards and computers) were discussed and approved.

The dedicated lab reopened in October 2023.

From left to right, UMBC Task Director Professor Curtis Menyuk, graduate student Logan Courtright, Professor Gary Carter, and graduate student Pradyoth Shandilya. (Marlayna Demond '11/UMBC)

UMBC leads research into light-based timing and navigation technologies for DOD-funded consortium

The Center for Navigation, Timing & Frequency Research (CENTAUR) researchers are working to develop alternative timing and navigation technologies. UMBC recently received initial funding from the Department of Defense (DOD) to develop the knowledge base that is needed to design, test, and build clocks and communication protocols that could deliver critical information in the event of a disruption to GPS service.

Read more about CENTAUR in UMBC News | Contact CENTAUR