

COMPUTE

SPRING 2022

Meet the UCIC Student Ambassadors



**New Degrees
and Certificates**

**New Building for
School of Computing**

**Expansion of Organick
Memorial Lecture Series**

UCIC Student Ambassadors

 **SCHOOL OF COMPUTING
UNIVERSITY OF UTAH**



WELCOME

The School of Computing is experiencing another year of significant growth in undergraduate and graduate programs. Enrollment in introductory undergraduate classes is up nearly 50% as compared to the 2020-2021 academic year, and the Masters of Software Development program has an increased enrollment of more than 15%. We also graduated a record number of students in 2021 after a small Covid-related dip in 2020.

Indeed, space has now become the primary limiting factor to our growth – modern classroom space that supports pair programming and group work, student collaborative space to provide a welcoming and supportive environment, and faculty office and research lab space so that new faculty can expand and enhance our curriculum. In light of this pressing need, we are so grateful to John and Marcia Price for their generous naming donation for a new Interdisciplinary Computing Building. With additional support from the legislature, we are optimistic that we will be moving into a beautiful new building in a few years, which will allow us to continue on the growth path so that we can meet the needs of the Utah tech industry.

We are also excited to be offering new interdisciplinary degree and credential programs in cybersecurity, deep learning, and fairness in artificial intelligence, thanks to new awards from the Utah System of Higher Education as part of their Deep Technology Initiative. These programs include collaboration with local industry to aid students in preparing to join the technology workforce.

The Utah Center for Inclusive Computing (UCIC) officially launched in September 2021, creating new pathways into computing-related majors, and developing programs that place inclusion at the forefront of the priorities of the School. In this issue, you will meet an impressive team of UCIC student ambassadors who exemplify the breadth of talented students in our program, and will help us spread the word that computing is a creative field with a myriad of opportunities.

Editorial Board

Sheri Carp
Chris Coleman
Mary Hall
Erin Parker
John Regehr

A handwritten signature in blue ink that reads "Mary Hall".

Mary Hall
Director, School of Computing

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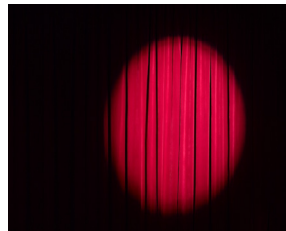
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U Image Library

New Curricula Offered to Meet Industry Demand

More than ever our national and local economies are hungry for computer professionals. There are more than 8,100 high-tech companies in Utah alone, and that number has been growing at an astonishing rate.

To address the burgeoning demand for a highly-trained tech workforce, the Utah System of Higher Education (USHE) has awarded the School of Computing more than \$1.4 million to launch new undergraduate and graduate stackable credentials and degrees through its Deep Technology Initiative. The goal of the initiative is to support the development of interdisciplinary technology-oriented training in partnership with local industry that prepares students for rapid integration into the technology workforce. The School of Computing received three-year grants in the following essential areas that demand computing experts: cybersecurity; deep learning, artificial intelligence and robotics; and, fairness in artificial intelligence algorithms.

Nearly every aspect of our lives involves computers and the internet, so keeping data and systems secure is paramount. The School of Computing is establishing both a Master of Science in Secure Computing and a Graduate Certificate in Secure Computing that will boost a student's prospects of working in the cybersecurity industry. "Our entire lives and all of our critical infrastructure are now networked and use computers, and we have to protect that," says U School of Computing professor Sneha Kasera. "There's going to be a huge investment in cybersecurity, and we want a superior workforce to deal with security threats and establish our world leadership in cybersecurity. The 15 credit-hour certificate program can be applied to the MS degree and will also be available online, Kasera says.

"Deep learning" describes machine learning that trains computers to learn by example. Through deep learning, computers are able to identify objects in images, translate languages, power robots, or drive cars autonomously. It's a fast-growing area that is used by companies from Google and Netflix to transportation departments and banks. The School of Computing will develop a graduate-level Deep Learning

Certificate Program, a 15 credit-hour curriculum that will teach students all aspects of deep learning in society. The funding will be used to purchase computer systems with high-powered graphics processors, establish capstone projects with local industry, and support the administration of the program. “We invited industry to participate in this, so it’s an industry-motivated certificate,” says U School of Computing professor Tom Henderson. “There are a thousand job titles related to this area, such as Big Data Machine Learning Engineer, Deep Learning Scientist, and Machine Vision Engineer.”

Artificial intelligence systems are used in a variety of functions such as determining financial, business, medical or legal risks or in helping weed out candidates for job interviews. While these algorithms can be better than humans at these tasks, emerging research has shown they can also discriminate against protected groups. This can impact millions of people as well as pose legal challenges for companies. School of Computing assistant professor Bei Wang Phillips, together with David Eccles School of Business marketing professors Arul Mishra and Himanshu Mishra, will use their grant to develop two new courses that address this issue. “Fair Algorithms for Business Decisions” will be taught to graduate students by the business school and so that students gain an understanding of the use of fair algorithms in business decisions and maintaining that fairness during their development and deployment. The “Fair Machine Learning” course will be taught in the School of Computing to undergraduate students and centers on how to ensure biases in both the data and the model do not lead to algorithms that treat people unfavorably. “Our aim is to train the next generation of data scientists for the Utah workforce who employ, implement, or deploy fairer machine learning tools in the industry,” says Phillips.

The U is one of five Utah universities that have received these Deep/Emerging Technologies grants, designed to help develop curricula in areas such as advanced materials, AI, augmented and virtual reality, quantum computing, and biotechnology.



A BOLD NEW CAMPAIGN

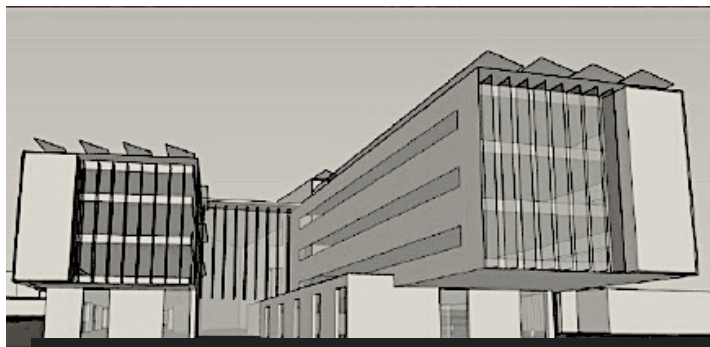
THE INTERDISCIPLINARY COMPUTING BUILDING

A \$15 million naming gift from philanthropists and University of Utah benefactors John and Marcia Price will be used towards a new 209,000 square foot, six-story building to support the growth of the School of Computing.

“We are pleased to lend our support to this effort that is so crucial to Utah’s expanding economy,” said John Price. “The University of Utah has an international reputation for innovation in computer science, and Marcia and I want to help ensure that opportunity for this generation and all future generations of Utah students.”

Computer Science is one of the largest majors on campus. The U produces 46% of the state system’s BS, MS and PhD computer science and computer engineering graduates with 1,929 enrolled students.

The need for additional space has become critical. With 58 faculty members and a growing enrollment, the School of Computing has outgrown its current location in the 60-year-old Merrill Engineering Building. The new building will enable the School to double the number of graduates and expand its offerings in the emerging areas of data science, cybersecurity, fintech, machine learning and AI, and human-centered computing. Its construction will benefit the entire college, by providing additional space for the other disciplines to expand, modernize their teaching and research laboratories, produce more graduates, and engage with the community.



John and Marcia Price



“At a time of rapid technological change, and when others are competing for talent, the University of Utah can continue to make major contributions in many fields by investing in the expansion of our facilities. We can and will continue to make the U a foundational school for the advancement of technology, its applications, and impact on local businesses.”

Ed Catmull
*Retired - President Pixar and
Walt Disney Animation Studios*

The School of Computing welcomed a former alumna in early November to present at the annual Elliott Organick Lecture Series, sponsored by the College of Science, Tanner Humanities Center, University Connected Learning, and the College of Engineering.

Telle Whitney, former CEO of Anita Borg Institute, co-founder of the Grace Hopper Celebration, co-founder of NCWIT, and newly elected member of the National Academy of Engineering, spoke on the state of the technology workforce. She also shared her unique journey as a woman computer scientist and her efforts to create a global movement for the advancement of women in technology. Her visit consisted of two lectures; meetings with faculty, and leadership; as well as a celebratory dinner in memory of Elliott Organick. Telle recalled fond memories of learning from Professor Organick, a pioneer in operating systems development and education.

The lecture series continues to be a highlight of the year, and the School plans to grow the lecture series with added events in the future. This goal will be realized with a generous gift of \$100,000 from Elliott's sons, Joe and Allen Organick, donated in honor of their late mother, Betty Organick.

**ELLIOTT I.
ORGANICK**
1925-1985

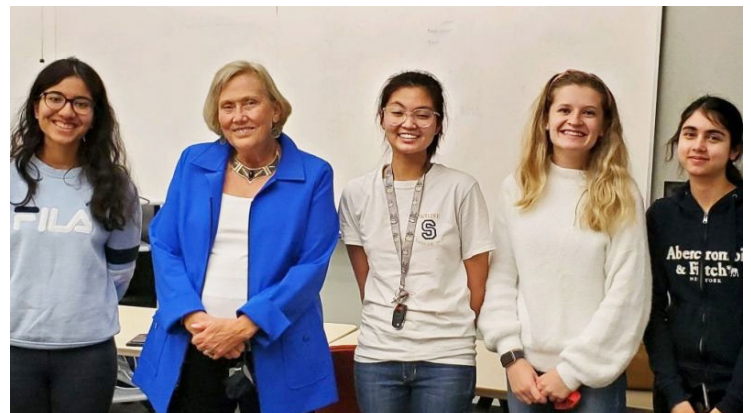


Photo by Serena Aeschilman





The official launch of the new Utah Center for Inclusive Computing (UCIC) took place on September 1, which recognizes the importance of inclusion in computing and is designed to boost the percentage of students from groups currently underrepresented in computing.

Speakers included School of Computing leadership, faculty; industry powerhouses Cydni Tetro of Women Tech Council, Club Ability Director Juliette Bautista; and computing student Serena Aeschilman.

For more information about the Center, and to view video excerpts from the launch, visit ucic.cs.utah.edu.



Cydni Tetro



Utah Center for Inclusive Computing Launch Guest Speakers

9/1/2021 | Catmull Gallery | 12-1:30 PM



Mary Hall
Director
UCIC & School of Computing



Daniel Reed
Senior Vice President for
Academic Affairs



Richard Brown
Dean
College of Engineering



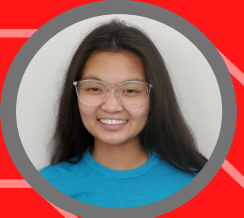
Sol Jimenez
UCIC Diversity & Outreach
Coordinator



Marina Kogan
Assistant Professor
School of Computing



Rogelio Cardona-Rivera
Assistant Professor
School of Computing



Serena Aeschilman
Student
School of Computing



Cydni Tetro
STEM Advocate & Founder
Women Tech Council



Juliette Bautista
Founder & Director
Club Ability



UCIC recently hired a new Diversity and Outreach Coordinator, Marissa Smith.

She comes to us from Weber State, with an extensive background in outreach initiatives and partnerships focusing on creating a pathway to college for underrepresented students.

Meet the UCIC Student Ambassadors

We are excited to announce the new Utah Center for Inclusive Computing Student Ambassadors! This enthusiastic team will be helping to recruit, retain and support current School of Computing students. They will be hosting campus tours for prospective students, taking part in the U's Major Expo, and using social media to keep students connected. They will also participate in outreach to local middle and high schools to spread the word that computing is an exciting field with opportunities for everyone.

See how they plan to make a difference in their new role!



Gabriella Goodman

I am in my second year as a CS major. I wanted to become an ambassador because working with people from various backgrounds is important to me. After graduating, I want to travel and possibly work abroad for a while.

My goal this year is to learn about the stories of different people that are interested in computer science.



Yash Ganathe

I am a freshman pursuing a career in CS. I would like to help improve the diversity of the School of Computing by instilling interest in computing through tutoring programs for younger students. After I graduate I want to find a job in the industry and later open up a tutoring facility designed to teach coding.

My goal for the program is to start a university outreach to younger students in order to get them interested in computing. This could mean starting new school programs at local schools or starting programs on campus.



Kane Hannay

I'm in my 4th year as a CS major, and I am pursuing a second major in mathematics. As a member of several marginalized communities, I take a personal interest in UCIC. I want to make the environment more inclusive and supportive for all. I am openly disabled and am currently an officer in the recently-established student organization DASTEM (Disability and Access in STEM.) After graduation I'd like to work as a software developer, though I'm considering a career in teaching mathematics.

My goal is to promote diversity and improve the experiences of marginalized students by offering a supportive and inclusive community, spreading awareness and providing education and resources to all.



Ashley Lujan

I am excited to be an ambassador because I get to make a difference by helping the School of Computing environment feel safe and welcoming to minorities of all identities, because diversity is a great asset. After graduating I would love to work in a company that includes non-programming interests, and I hope to create programs for high school students in disadvantaged communities.

I hope to engage with a lot of students from groups underrepresented in computing, and create a sense of allyship among the students.



Dhruv Rachakonda

I am a first year data science major. I wanted to become an ambassador because I heard many stories claiming that the U's engineering department was not a very inclusive place. I hope to make the School of Computing more inclusive. After graduating I hope to further my education and pursue research in topics related to data science.

My goal as an ambassador is to draw more talented individuals into our school and department, and help people realize the potential that entering a STEM field can do for everyone.



Sasha Singh

I am a CS major with a minor in psychology and entrepreneurship. My biggest purpose as an ambassador is to bring resources to low and middle income South Asian immigrants/international students, and especially to promote women of color in STEM. Upon graduation, I would like to work as a software engineer in a corporate setting that is customer-centric and provides real-world solutions. I also plan to pursue a master's degree in information systems, and hope to one day be the CEO of a holistic health company.

Mahatma Gandhi once said, "The best way to find yourself is to lose yourself in the service of others." This year I would like to live by his quote and give back to my community by improving lives.

ALUMNUS HIGHLIGHT:

Aaron Lefohn

MS in Computer Science 2003

by Sheri Carp



School of Computing alumnus Aaron Lefohn was recently promoted to Vice President of Graphics Research at NVIDIA. Aaron earned his masters in Computer Science from the University of Utah in 2003, working with Professor Ross Whitaker. He went on to win a National Science Foundation (NSF) graduate fellowship and complete his Ph.D. at the University of California Davis with Professor John Owens in 2006. Before joining NVIDIA in 2013, Aaron worked at Pixar Animation Studios, a computer graphics startup called Neoptica, and Intel. I recently had an opportunity to sit down with Aaron and ask him about his career and his time in the University of Utah School of Computing.

Q: Aaron, tell me about your new role at NVIDIA.

A: I'm Vice President of Graphics Research within NVIDIA Research. Bill Dally, NVIDIA's Chief Scientist, leads NVIDIA Research, which consists of over 200 research scientists spanning many computer science disciplines: computer vision, artificial intelligence, robotics, computer architecture, programming systems, and many other areas, including computer graphics. My team's mission is to define the future of real-time rendering. We are expected to take large risks, perform research across a range of time horizons, and guide NVIDIA graphics in entirely new directions. Our current focus areas are bringing physically-based light simulation to real-time rendering, automating 3D content creation, and inventing new graphics programming systems.

Q: Is your group's primary focus publishing papers?

A: NVIDIA Research's focus is inventing technology that creates new experiences for NVIDIA customers. We publish many peer-reviewed papers per year along our discovery journey, but the end goal is inventing new products.

Q: Can you describe some of your team's inventions that became NVIDIA products?

A: A few of our productized inventions include denoising for real-time ray tracing, artificial intelligence, computer graphics, and real-time path tracing. Creating products from research prototypes requires a significant amount of additional innovation and engineering by teams across NVIDIA; and we partner closely with these groups throughout productization. Our real-time ray tracing denoising inventions led to products which made it possible to generate ray traced images more than 100 times faster--one of the many NVIDIA inventions that together brought ray tracing to computer games in 2018. Our artificial intelligence computer graphics research led to the [OptiX AI denoiser](#) and the first real-time computer graphics product, [Deep Learning Super Sampling \(DLSS\)](#). Most recently, our algorithm and graphics systems research in real-time path tracing has made it possible to path trace scenes with billions of triangles in real-time, something that only two years ago I thought would be impossible.

Q: Tell me about your path to the University of Utah School of Computing.

A: I walked a non-traditional path to my computer science graduate degrees. I came to the University of Utah as a Ph.D. student in theoretical chemistry. My interest in computer science began during my undergraduate thesis chemistry research at Whitman College, studying Monte Carlo simulation of noble gas systems. I taught myself C++ to pursue computational chemistry research. I enrolled in my first formal computer science courses, as a chemistry Ph.D. student, to improve my theoretical chemistry research skills. I eventually convinced Professors Charles Hansen and Peter Shirley to let me take their graduate computer graphics courses, initially focused on

computer graphics to visualize chemistry simulations. I found myself spending far more time on computer science than my chemistry Ph.D. I was reading the computer science textbooks before the classes started, I fell in love with computer graphics' combination of physics and computer science, and I began dreaming of working at digital animation studios such as Pixar. The School of Computing accepted me into the masters program the second time I applied, and I left my chemistry Ph.D. with a masters degree.

Q: What were some highlights from your time in the School of Computing?

A: I rely daily on the broad base of foundational computer science courses I took during my School of Computing (SoC) masters program: computer architecture, operating systems, compilers, programming languages, etc. as well as the computer graphics courses. I was particularly inspired by Peter Shirley's Image Synthesis class, where he would mention numerous unsolved research problems in every lecture. The culture in the SCI and graphics graduate labs was one of the highlights of my time in the SoC. The graduate labs were fertile ground for idea synthesis. Students freely exchanged ideas, and late night whiteboard (and balance board) sessions regularly led to new papers.

Q: How did you pick your masters advisor - Professor Ross Whitaker?

A: I chose to work with Ross because I wanted a highly involved, strong advisor. Ross was full of energy, worked closely with his students, had high expectations, and provided strong career guidance. I also knew Ross outside of academics as a fellow rock climber. Ross was exactly the advisor I needed at the time. He was tough on me. My paper drafts came back covered in red ink, he advised me to finish graduate school with the best possible research rather than as quickly as possible, and he compassionately instructed me to deprioritize my mountain athletic pursuits to focus 100% on my computer science career.

Below are some recent research images from Aaron's team, showing real-time simulation of physically-based light transport on scenes containing orders of magnitude more geometric complexity than is found in modern computer games. Performing real-time simulation of light transport this complex on a single GPU was unimaginable only a few years ago.



Aaron's Advice for CS Grad Students:

- Learn core computer science before specializing.
- Pursue high-risk, high-reward research. Ignore projects that lead to easy publications.
- Intern at multiple companies during your graduate degree. Internships are extended job interviews for both the employer and the student.
- Differentiate between talking and collaborating. Collaborators actively contribute to a shared code or paper repository. Anything else is talking.
- Collaborate with your academic competitors. They share a passion for the same research.
- Give credit rather than take credit. Giving credit costs almost nothing. Not giving credit can permanently end collaborative relationships.

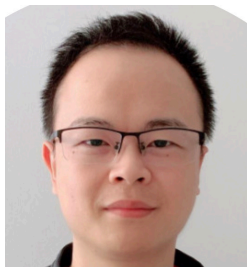
News and Notes

Faculty



Sameer Patil joined the School of Computing on July 1, 2021, as an Associate Professor. He comes to us from the School of Informatics, Computing and Engineering at Indiana University Bloomington. He also holds an affiliate appointment as an Assistant Research Professor in the Department of Computer Science and Engineering at New York University Tandon School of Engineering. He has held past appointments at Vienna University of Economics and Business (Austria), Helsinki Institute for Information Technology (Finland), University of Siegen (Germany) and Yahoo Labs (USA).

Patil's research interests cover the fields of human computer interaction, computer supported collaborative work and social computing, with a focus on privacy and security aspects. His research has been funded by the National Science Foundation, Department of Homeland Security and Google. His work has been published in top-tier conferences and journals, and he holds six U.S. patents related to mobile technologies. Patil obtained a Ph.D. in computer and information science from the University of California, Irvine and holds master degrees in computer science and engineering and information from the University of Michigan, Ann Arbor.



On January 1, 2022, Jun Xu joined the School of Computing as an Assistant Professor. He received his PhD degree from Penn State University in 2018. His research focuses on software security and system security. His goal is to secure computing systems by neutralizing the risk of vulnerabilities in the software stack. His research has discovered hundreds of software vulnerabilities and led to 9 papers published, including IEEE S&P, ACM CCS, USENIX Security, and Blackhat. Jun has been funded by NSF, ONR, and several industry organizations. He is a recipient of the 2018 CCS Outstanding Paper Award, Penn State Alumni Dissertation Award, and RSAC Security Scholarship.



We are proud to announce the School of Computing's faculty members who have received this year's National Science Foundation's Faculty Early Career Development Program (CAREER) Award, the organization's most prestigious grant in support of early-career faculty. Congratulations to Aditya Bhaskara for his work in "AF: Models and Algorithms for Beyond Worst-Case Analysis of Learning;" Rogelio Cardona-Rivera for his work in "Plan-based Simulation of Human Story Understanding;" and Shandian Zhe, for his work in "Embedding High-Order Interaction Events: Models, Algorithms, and Applications."



Members of the U's School of Computing are part of the new CI Compass, an NSF Center of Excellence dedicated to helping research facilities cope with their "data lifecycle" more effectively. The world's most important scientific facilities, from the CERN Large Hadron Collider to the National Radio Astronomy Observatory, deal with massive amounts of data every day that are mined, stored, analyzed and visualized. It's a colossal task that requires help from the top minds in data management to handle. CI Compass is funded by an \$8 million, five-year NSF grant and will work in conjunction with another NSF center, the Center for Trustworthy Cyberinfrastructure,

that will advise these facilities on all issues of cybersecurity. In addition to Valerio Pascucci, John R. Parks Endowed Chair; the U team also includes School of Computing research Associate Professor Robert Ricci, and researchers Giorgio Scorzelli and Steve Petruzza.



Robert Ricci, a research Associate Professor, received a \$4,393,345 grant from the NSF to support his Cloud Lab research computing infrastructure. Many ideas that drive modern cloud computing, such as server virtualization, network slicing, and robust distributed storage, arose from the research community. Despite this success, today's clouds have become environments that are unsuitable for moving this research agenda forward with unmalleable implementations "baked in". The lab allows researchers to create their own cloud computing environments to test developing architectures.

Students



Anna Bell, a Data Science major, was awarded the Student Pathway Award from the Women Tech Council. She is known for her drive and ability to think deeply on a micro scale in the context of project work as well as on a macro scale in how technology impacts the broader world. Prior to her focus on STEM, she studied philosophy in ancient civilizations, which led her to identify similarities in issues needing to be addressed in today's society. She is now using data science as a powerful tool for investigating big questions and finding solutions to social problems. After graduating, Bell plans to pursue a Ph.D., teach others as a professor and become an innovator and contributor to private projects.



Vivek Gupta, a PhD student working with Professor Vivek Srikumar was selected as a recipient of the 2021-2022 Bloomberg Data Science PhD Fellowship. Vivek will receive financial and professional support to pursue his research interests over the course of the academic year as he works towards the completion of his doctoral degree. He was one of 9 students selected this year for this prestigious award.

STUDENT FEATURE: Q&A with Serena Aeschilman

Computer Science Major in the BS/MS Graduate Program



Q: Hi Serena! How did you get interested in computing?

A: I was interested in computing because of my fascination with space and UFO Aliens. Along the way, I realized that computing is versatile and can be applied in any field. I went to high school in Salt Lake valley.

Q: How did you choose the U of U?

A: I chose the University of Utah because its computing program is highly ranked in the nation.

Q: How has your experience been at the U School of Computing?

A: My experience at the U has been wonderful! I have found ways to network with professors and industry individuals. Many professors are really open if you stop by and chat! A lot of them can be intimidating at first, but once you start regularly chatting with them, they are super approachable and supportive. Classes can be large, but as long as you utilize the TAs and Professors, you can ensure you get the help and support you need. I was also involved with Women in Computing, Data Science Club, and Association for Computing Machinery. Joining clubs can broaden your network and provide you with opportunities with like-minded individuals.

Q: What do you like to do with your free time, outside of class?

A: Outside of school, I enjoy hanging out with my two dogs, Astro and Nebula. We go hiking, boating, paddle boarding, and more! I enjoy going on adventures with them. I try to do one new thing a month, which has exposed me to a variety of new experiences, such as: eating fire, throwing axes, and aerial acrobatics. Along the way, I have met a variety of individuals who have helped me with my career. Surprisingly, these new experiences have expanded my network and lead to new opportunities to grow. I also enjoy volunteering my time to non-profit organizations that need it. From fostering pets, speaking to K-12 to inspire female engineers, or donating code, I enjoy giving what I can. I also recently got more involved with local politics and activism.



Q: What career would you like to pursue?

A: I would like to use my degree and skills to continue to create and innovate. There is so much that has yet been created; I hope to be at the forefront of it! I have luckily already landed a role at Microsoft upon graduation.

Q: Where do you see yourself in 10 years?

A: Ultimately, I hope to land myself a role in Congress! I would like to bring attention to technical political

problems that I believe should be addressed by the government. Given that technology plays such an imperative role in just about everyone's daily lives, we should have elected officials who are knowledgeable in technology.

Q: What advice would you give new students at the U School of Computing?

A: A piece of advice I love to provide is being comfortable with being uncomfortable! In most situations, if you are uncomfortable, it may provide you with an opportunity to learn or grow from an experience. From raising your hand to ask a question in class, to being assertive and introducing yourself to a new individual, you may be surprised by how far you can grow just by being uncomfortable.



Considering a gift to the School of Computing?

Your donation can be used to offer scholarships, purchase laptops for students in need, or help fund a new building that will provide dedicated space for our students and faculty.

Thanks to an appropriation from State leaders, the College of Engineering is offering a dollar-for-dollar match for scholarship donations of \$1,000 and above, up to \$2,000. Gifts of \$2,000 and above will be matched with \$2,000. This additional match represents a tremendous opportunity to leverage your gift and helps students with a substantial scholarship.

The School of Computing is committed to preparing students to compete in local and national markets for computing professionals, fostering excellence in teaching and research, to help drive our nation's economy and be of service to our community.

Your support is essential to our success. Contact Sheri Carp at sheri@cs.utah.edu for more information, or call 1-800-716-0377 to make a pledge by phone.

In Memoriam



Robert R. Kessler

School of Computing professor Robert R. Kessler, co-founder of the No 1-ranked Entertainment Arts and Engineering (EAE) video game development program at the U, and esteemed colleague, passed away on July 8, 2021.

Kessler earned his B.S., M.S., and Ph.D. in computer science in 1974, 1977, and 1981 respectively, all from the University of Utah. He became part of the faculty at the School of Computing in 1983, where his early work centered on the portable implementation of the Lisp programming language and then distributed and parallel implementations of Lisp.

In the early 90s, Kessler founded the Center for Software Science, a state of Utah Center of Excellence, which was a research group working in nearly all aspects of system software for sequential and parallel/distributed computers. In the late 90s, he served as chairman of the Department of Computer Science (which became the School of Computing in 2000). He was one of the very first researchers to explore pair programming and its potential in software engineering. He also dabbled in agent technologies.

In 2007, he co-founded and ran the Entertainment Arts and Engineering (EAE) program, a video games emphasis for undergraduates. It then became an official program in 2010, with its own master's degree. In 2017, EAE added a BS in Games degree. Over the years, the program has been consistently ranked in the top 5 best video game design programs in the world and achieved No. 1 three times, according to the Princeton Review rankings. His insight and vision in creating EAE fixed the University of Utah as one of the world leaders in the discipline of games.

He authored two books, over 75 journal and conference publications, and received over \$16 million in external funding. He founded two startup companies and was on several corporate boards. He was an award-winning teacher having received the College of Engineering Outstanding Teaching Award in 2000 and the University of Utah's highest teaching honor, the Distinguished Teaching Award in 2001, and the IEEE Computer Society Computer Science and Engineering Undergraduate Teaching award in 2019.

Graduation day brought him joy every year, even during the pandemic, when he was the mastermind of a collaborative online game developed with the help of his students so that they could virtually graduate together and celebrate as a group. Bob loved to travel, and was fortunate to be able to see many beautiful places in the world. He and his wife Julie especially loved going on cruises, and their blogs developed a following. Bob was an avid reader, with a penchant for science fiction. Most recently, during the pandemic, he mastered bread-making and the wood smoker. Bob will be forever missed and never forgotten.



Gary E. Lindstrom

Gary E. Lindstrom, a cherished member of the School of Computing faculty for 30 years, passed away Jan. 10, 2022.

He attended Carnegie-Mellon University in Pittsburgh where he earned a bachelor's and master's degree in mathematics and a Ph.D. in computer science, and was an enthusiastic member of the bagpipe marching band. Lindstrom started his academic career as an assistant professor of computer science at the University of Pittsburgh in 1970. During that time, he also was a Visiting Scientist with the University of Grenoble, the Institut National de Recherche en Informatique et en Automatique, both in France, and at the Department of Applied Mathematics and Computer Science at MIT.

He joined the University of Utah as an associate professor of computer science in 1977 and was named professor in 1987. He was appointed the department's associate chair from 1992 to 1993. During his years with the U, his research focused on programming language design, specification and implementation, with special emphasis on the programming aspects of parallel and distributed systems. Lindstrom served as an IEEE Computer Society Distinguished Visitor and was awarded the University of Utah College of Engineering Outstanding Teaching Award. He retired as founding Editor in Chief of the *International Journal of Parallel Programming*, and co-edited the book *Logic Programming: Functions, Relations and Equations*. He served on the NSF Computer and Computation Research Advisory Committee and as a consultant to the United Nations Development Programme in 1988. He was also chair of the School of Computing's Organick Memorial Lecture Series - a lecture series Lindstrom founded in honor of his colleague and long time collaborator, Elliot Organick.

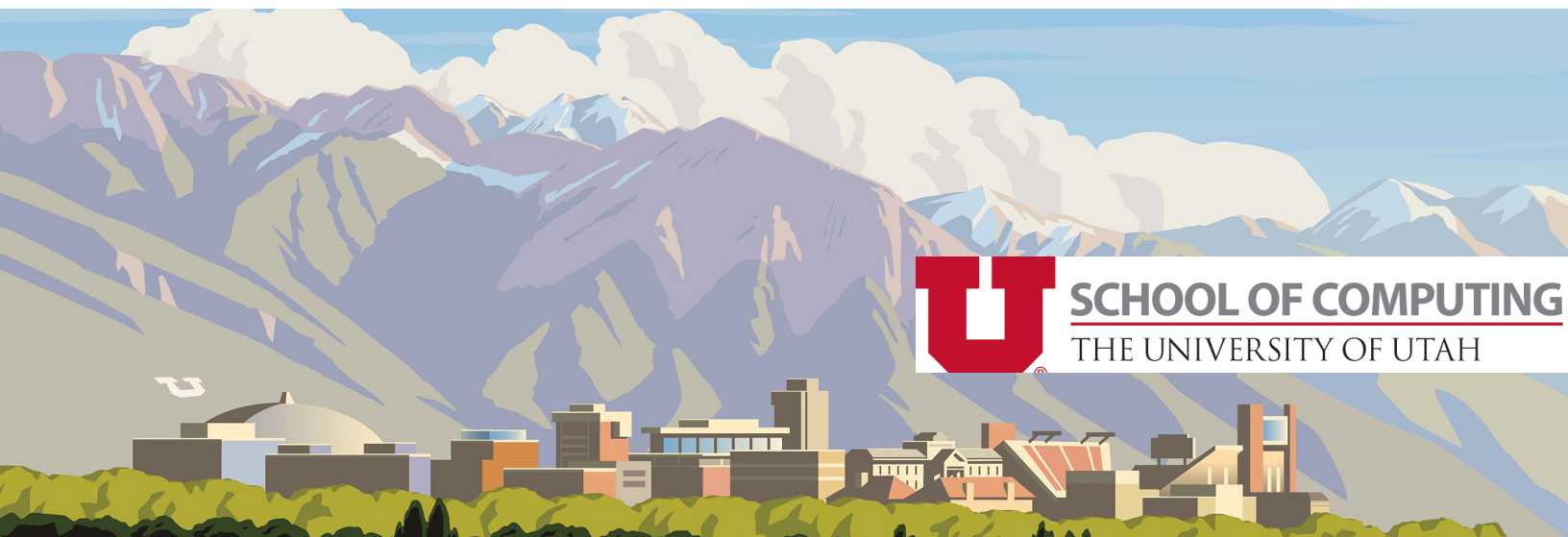
Gary also enjoyed socializing with his faculty colleagues, often playing fierce games of squash and sharing his love for fine wine, generously delving into his wine cellar to ensure the finest quality libations for special occasions. Gary's colleagues would also fondly remember his uncanny ability to seemingly nod off during seminars and then suddenly raise his hand to ask the speaker an exceptionally insightful question.

Gary and his wife Sandy enjoyed raising their beloved Old English Sheepdogs and Siamese cats. Gary was especially pleased to be the multi-year winner of the "look alike" contest with his sheepdogs in charity contests for the Best Friends Animal Society. They also enjoyed pursuing Gary's hobby of restoring and driving British Sports Cars from the 1950s and '60s, partaking in and running river rafting expeditions, and traveling abroad - always seeking the best cuisine they could find. Gary will be remembered for his kindness, his generosity, and his sense of humor (especially his love of terrible puns). He retired from the university in 2007 after 30 years of dedicated service.

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