# 



Remembering John Warnock New Faculty Organick Lecture Series SIGGRAPH 2023

**KAHLERT SCHOOL OF COMPUTING** 

THE UNIVERSITY OF UTAH



As we near the end of the Fall 2023 semester, it is a good time to reflect on the profound changes in the computing field over the past year. Generative AI has emerged not just as a disruptive technology, but as part of the popular culture. It transforms our research, what we teach, and how we train our students.

As a backdrop for this transformation, we continue to experience rapid growth in all of our degree programs. As compared to Fall 2022, the undergraduate and graduate programs have grown by 13% and 9%, respectively. Nearly 8% of the students at the University of Utah are now in one of the Kahlert School of Computing degree programs. As we continue to attract more students, we are fortunate to have support from the university and the state of Utah to expand our faculty, with an additional 11 new faculty members starting in 2023, bringing total faculty size to 69. Meanwhile, the design for our future home, the Price Computing and Engineering Building, continues to take shape.

Mixed in with this good news, in this issue we sadly mark the passing of one of our most distinguished graduates, John Warnock. His legacy as co-founder of Adobe forever changed the landscape of digital publishing and design.

As we look towards 2024, we wish to thank all of our friends in the Kahlert School of Computing community for your continued support.

### **Editorial Board**

Rajeev Balasubramonian Sheri Carp Chris Coleman Mary Hall Erin Parker John Regehr

Mary Hall

Mary Hall Director, Kahlert School of Computing



# CONTENTS



04 Remembering John Warnock



07 Organick Lecture Series



Faculty and Student News



06 New Faculty



08 SIGGRAPH 2023



12 Student Spotlight



# Remembering one of our own... John Warnock (October 6, 1940 - August 19, 2023)

John Warnock, University of Utah alumnus, computer graphics pioneer, and co-founder of Adobe, passed away on August 19, 2023. He was 82 years old.

Warnock's development of some of the fundamental techniques behind computer-generated images and desktop publishing made him a luminary of the tech world. Over the course of his decades-spanning career, he was awarded the prestigious National Medal of Technology and Innovation by President Barack Obama; the Computer Entrepreneur Award from the IEEE Computer Society; the American Electronics Association Medal of Achievement; and the Marconi Prize for contributions to information science and communications.

Beyond this technological legacy, few individuals have had as great a philanthropic impact on the John and Marcia Price School of Engineering. Along with his wife Marva, whom he met on campus in 1965, he provided the naming gift for the Price College's main facility, the John E. and Marva M. Warnock Engineering Building, as well as support for two Presidential En-



dowed Chairs and several other campus projects.

"I remember John telling me that, when he was a young man, he really needed the College of Engineering, so when he learned the College of Engineering needed him, he couldn't say no," said Richard Brown, the H. E. Thomas Presidential Endowed Dean of the Price College of Engineering. "He has given back in ways that have had a huge impact on thousands of students who came after him."

Born in the suburbs of Salt Lake City, Warnock received bachelor's degrees in mathematics and philosophy from the U in 1961. He would go on to earn a master's degree in mathematics in 1964 and then a doctorate in electrical engineering in 1969.

Warnock's doctoral thesis, "A hidden surface algorithm for computer generated halftone pictures," was a foundational contribution to the field of computer graphics. In it, Warnock demonstrated a method for breaking down three-dimensional images into the collection of polygons that would be visible from a given viewpoint. With each polygon simple enough to be digitally rendered on the computers of the time, the "Warnock algorithm" was responsible for the first realistic computer software-generated images.

After a stint with one of the first commercial computer graphics companies, Evans & Sutherland (E&S), founded by his advisor David Evans and Ph.D. committee member Ivan Sutherland, and serving as a principal scientist at Xerox's Palo Alto Research Center (PARC), Warnock and collaborator Charles Geschke left to found Adobe Systems. John's work on translating physical images to digital ones, that had its seeds at E&S and had been continued at PARC, had come full-circle at Adobe

Image by Dan Hixson

with the development of PostScript, a computer language used to convert digital images into physical ones by way of a printer. The "Portable Document Format," or PDF, a descendent of PostScript, provided the ability to render images on the computer instead of in the printer, and became the de facto standard for document exchange. Building upon the success of PDF, Adobe would extend their capabilities into a suite of desktop publishing tools and technologies such as Photoshop, Illustrator, InDesign, and After Effects. Warnock's fingerprints can be found on nearly every creative pursuit and industry.



President Barack Obama presenting Adobe founders Charles Geschenke and John Warnock with the National Medal of Technology and Innovation at the White House on Oct. 7, 2009 (Image by Lawrence Jackson)

Warnock had recently returned to campus to celebrate an IEEE Milestone Award in March of 2023, where he was named one of the "pioneers of computer graphics" for his development of the Warnock algorithm. Speaking at that event, Warnock described the trajectory of an idea that started at the U, took him to E&S and Xerox PARC, and would go on to revolutionize desktop publishing: that printed images should be the product of a computer program that could be run on any printing device.

"I started to think 'how can you make a description of the printed page?' and started working on that with the brightest people in the world," Warnock said. "Xerox didn't understand it, so we left and started Adobe, and that was a pretty good decision. But I owe it all to the education I got here and the people in this room."



John Warnock, Martin Newell, Ed Catmull, Henry Fuchs

Image by Dan Hixson

# Welcome New Faculty!

The Kahlert School of Computing has expanded yet again with eleven new faculty members specializing in areas of research spanning Artificial Intelligence, Human-Centered Computing, Cryptography, High Performance Computing, Computer Architecture, Cyber-Physical Systems, Data Management, and also three new lecturing faculty.

From left to right: Luis Garcia, Assistant Professor; Aaron Wood, Assistant Professor, Lecturer; Fengjiao Wang, Assistant Professor, Lecturer; El Kindi Rezig, Assistant Professor; Vijay Nagarajan, Professor; Eric Heisler, Assistant Professor, Lecturer; Anna Fariha, Assistant Professor; Varun Shankar, Assistant Professor; Vineet Pandey, Assistant Professor; Pratik Soni, Assistant Professor; Ben Greenman, Assistant Professor.



# 2023 Elliott Organick Memorial Lecture Series

The 2023 Elliott Organick Memorial Lecture Series hosted Dr. Elizabeth Churchill, Senior Director of UX at Google at a public lecture on October 18 at The Cleone Peterson Eccles Alumni House. She presented on "The Past, Present, and Future of Human-Computer Interaction (HCI)."

Dr. Churchill challenged the audience to step back and think about the progression of how technology has been woven into our lives. She traced threads from early days of computing to demonstrate how early innovations grew into the world that we currently live in. She then leveraged that trajectory to explore how recent computing advances and perils that society is facing with technology may unfold in the future. Dr. Churchill focused on the importance of understanding and prioritizing human-centered perspectives in these thorny dilemmas, underscoring that even with new technologies and challenges like the recent AI boom and the rise of disinformation, classic human-centered ap-



Marina Kogan, Sameer Patil, Elizabeth Churchill, Jason Wiese, Eliane Wiese



proaches bring new and interesting insights that can better inform the design of the innovations we create. The talk was followed by a dinner with faculty and industry partners.

On October 19, Assistant Professor Jason Wiese moderated a lively student discussion with Dr. Churchill regarding reflections on the study of human-computer interaction, where students were able to share their personal observations and get valuable insights from the experienced leader from Google.



Dr. Churchill's lecture can be viewed on the Kahlert School of Computing website at www.cs.utah.edu.



In August, Professor Erik Brunvand served as the Conference Chair for the ACM SIGGRAPH conference, held in Los Angeles. This is the premier conference for computer graphics and interactive techniques, with 14,275 attendees in 2023. This year's conference was especially memorable as it was the 50th SIGGRAPH conference. In his welcome to the conference, Prof. Brunvand said "Like the Atomic Age of yesterday, the Information Age of today, and the Imagination Age of tomorrow, SIGGRAPH represents a near-perfect timeline of discovery and advancement in the computer graphics world. For 50 years, the conference has ushered in new breakthroughs, bolstered a community of perpetual dreamers, and mapped a future where exponential innovation isn't just possible — it's inevitable."

Because of this Golden Jubilee conference year there were a wide variety of special programs and events to celebrate the milestone, including a multi-media immersive "time tunnel" showcasing the 50 years of advancements celebrated at SIGGRAPH conferences, a retrospective showing of computer animation reels from the history of computer graphics, and displays of historical computer graphics and VR hardware. Planning for a conference of this scale and complexity started in 2021.







Another special event that happened in conjunction with this landmark conference was a gathering of current faculty and alumni from the Kahlert School of Computing. This was especially exciting given the recent IEEE Milestone award for our School's history in the computer graphics field. Attendees at the reception included alumni from that Milestone era including computer graphics pioneers Jim Blinn, Henry Fuchs and Gordon Romney, more recent alumni such as Steve Parker, Aaron Lefohn, David Hart, Chris Wyman (NVIDIA), Elena Driskill (Cinesite), John Peterson (Adobe), and Tom Thompson (Lightspeed LA), and recently retired KSoC faculty members Elaine Cohen, Chuck Hansen, and Rich Riesenfeld. This wonderful reception was organized by Professors Erik Brunvand and Cem Yuksel, and their students Elie Diaz, Gaurav Bhokare, and Eisen Montalvo.

# Faculty News



<u>Prashant Pandey, Assistant Professor</u>, receives IEEE Early Career Researchers Award for Excellence in High Performance Computing. This award celebrates individuals who have made outstanding, influential, and potentially long-lasting contributions in the field of high-performance computing within 5 years of receiving their PhD degree. Pandey's work on high-performance data structures has been employed by several applications across industry and academia.



Manish Parashar, Presidential Professor, SCI Institute Director, and Chair in Computational Science and Engineering, receives the 2023 Achievement Award in High Performance Distributed Computing for pioneering strategic and technical contributions, and international leadership in high performance parallel and distributed computing, computational science, and cyberinfrastructure.



<u>Bob Kessler, CS Professor and EAE's co-founder and founding Director</u>, will be posthumously inducted as a HEVGA fellow. Kessler was a towering figure in the history of EAE, a true visionary, a pioneer in the world of video games, and a beloved mentor to generations of students. His contributions in the field will never be forgotten, and his impact will continue to be felt for many years to come.



<u>Professor Ross Whitaker</u> and <u>Adjunct Professor Miriah Meyer</u> were part of a team to receive a Smart Cities North America Award for its Air Quality and You Project, a network of air quality sensors deployed throughout the county that monitor air pollution in real time. Each sensor for the AirView map provides real-time measurements of the air's concentration of particulate matter. Through color coding on the map, users can understand current local air quality in Salt Lake County.

# Student News



<u>CS Undergrad Ashley Lujan</u> received the Women Tech Council Student Pathway Award. This award recognizes up-and-coming women throughout the tech industry, accelerates their career trajectories, and helps inspire thousands of high school girls and other women into STEM careers.



<u>Sara Nurollahian, PhD student</u>, and <u>Assistant Professor Eliane Wiese</u> have received the best paper award for the Software Engineering and Training Track at the International Conference on Software Engineering (ICSE 2023) for their paper titled, "Improving Assessment of Programming Pattern Knowledge through Code Editing and Revision."

# William B. Thomson, CS Professor from 1975-2018

William B. Thomson passed away on May 26, 2023. He will be remembered for his enthusiasm for the outdoors, his incredible slide shows and stories, and his scientific contributions and mentoring. Bill contributed significantly early in his career to the field of computational vision, especially in the areas of visual motion perception and dynamic scene analysis. He developed innovative ways to study how human perception and performance and computer graphics interact.



# Calling All Alumni!

The School is putting together an alumni group to provide social and networking activities for our alumni as well as create meaningful connections, events, and opportunities for current students. Please fill out a survey linked through this QR code to show interest in various potential alumni group activities.



### BECAUSE OF YOU, WE IMAGINE MORE, AND WE DO IT.

Consider a gift this year to support students, sponsor events, expand teaching efforts, and help the school continue its efforts to increase the quality and size of its programs.

Thanks to an appropriation from state leaders, The John and Marcia Price 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 to help students with a substantial scholarship.

As part of the premier research institution in the state of Utah, the Kahlert School of Computing is committed to help prepare students to compete in local and national markets for computer professionals, fostering excellence in research to help drive our nation's economy, and to be of service to our community.

Your support is essential to our success.

Contact Sheri Carp (sheri@cs.utah.edu) to discuss a gift to the Kahlert School of Computing.

### **Q&A with David Dursteler BS/MS in Computer Science**

### What program are you in, and what year will you finish?

I am in the BS/MS program for Computer Science, and I'm finishing up my degree this semester (Fall 2023).

### Where are you from?

I moved from Iowa City, Iowa, to St. George, Utah, when I turned eight, so I consider Utah my home.

### How did you become interested in computer science?

When I was entering sixth grade, I was already interested in computers, mostly enjoying messing around with cool graphics in Microsoft Word or making "games" in Microsoft PowerPoint. I then joined the First Lego League (FLL) robotics team at my 6-7th grade "Intermediate School" and started getting exposed to how computers worked, but there was one slight issue: I was still eleven or twelve, so I didn't experiment with computers in the most constructive way. My friends and I would open command prompt and be "hackers" and do the "shutdown now" command to turn off the computers or make Windows versions of fork bombs. Needless to say, this vexed the librarians, but luckily for us we had an amazing principal, Sandy Ferrell, who took us aside and made a group for my friends and me to learn how to use these skills productively. She reached out to one of the school district's IT people and had us start doing club activities with them. They taught us how computers work, showed us around the IT infrastructure at the school, and taught us programming using CodingBat. Then, during 7th grade, we competed in the local ACM programming competition in the high school division and placed in the top 5! A lot of my free time was spent at the local library in the 000-100 section in nonfiction checking out whoppers of books such as a Java reference book or "Javascript for Dummies". I would carry (and read) these books everywhere, including to weddings.

### What interested you in pursuing this degree at the U?

I had already completed a good deal of classes in Computer Science at Dixie State University, during high school. Long story short, I attended an early college high school where I ended up testing out of CS 1400 and CS 1410 (with a few of my friends) and attending classes on college campus years earlier than most of my classmates. When I finally graduated after three years in this high school/college blend (10th through 12th grade) I had an associate degree and 94 college credits, with many credits in Computer Science, Information Technology, Design, and Web Development, and I wanted to continue along in Computer Science. I then applied to most of the colleges in Utah, and got into the University of Utah, which is the flagship university for computer science in the state.

### What is your favorite class in the program?

If I had to pick just one, I would probably say the Operating Systems course with Anton Burtsev. I really enjoyed being able to get to the point where I could answer my own questions about an operating system just by reading through the code and bouncing around different files. I also enjoyed being able to figure out an even lower level of how computers work and all the different history and research that goes into this. Professor Burtsev and I would often chat after class about different advanced topics, and I've recently started attending his research group's reading group to keep this up.

### Is there a specific mentor, club or program that made a difference in your experience here at the Kahlert School of Computing?

The program that made the biggest difference to my experience here was the tutoring program. When I started going to classes at the University of Utah in (Spring) 2021, we were still having all classes online which resulted in me spending most of my time alone in my dorm. The following fall semester, I spent most of my time alone still not knowing too many people in



my courses. This changed when I got the opportunity to be a tutor for the Kahlert School of Computing, which introduced me to many fun and interesting individuals. I'm not a tutor anymore, but the kickstarting of the connections to my classmates (as well as to professors) that this opportunity provided has been invaluable.

### How will you use your degree in the future?

One day I hope to build on my master's degree and pursue a Ph.D. to become a professor, but I want to take a recess from school for a few years. I will be starting a job with Amazon (in Bellevue, WA) in December after I graduate.

I'd like to thank the many people who have helped me get to this point I'm now at here. There have been so many people that I owe my success to, and I'd like to give credit where it is due:

•Sandy Ferrell, principal of Sunrise Ridge Intermediate School, whose intervention helped redirect the path I was on.

- •Bob Nelson, professor at Dixie State University, who helped me get a rocket boost to my education and skip CS 1400 and CS 1410.
- •Blair Sullivan, professor here at the U, who heard that I was going to retake my one class with an A- and told me to research with her instead and later convinced me to do a project for my master's degree with her.
- •David Johnson, professor here at the U, who I was extremely excited to be one of his Teaching Assistants for a year and a half.

•And many more, such as Saday Sadayappan, Anton Burtsev, Jaden Taylor, Bradley Walters, Colleen Gilman, and my wife Amy.

### Q&A with Noelle Brown PhD in Human-Centered Computing

### What year will you finish the Ph.D. program?

I'm currently about halfway through my Ph.D. program, and I'm aiming to finish in 2025. However, Ph.D. graduation dates are not fixed - they depend on a lot of factors and individual research progress, so this is just an estimate.

# What interested you in pursuing this degree?

My very non-linear career path led me to this degree. After several years of teaching middle school math following my undergrad, I wanted to explore my own educational development, so I studied data science in my Master's degree. After this, I spent several years teaching data science (including machine learning and AI) to adults interested in changing careers into data fields. Data science is a powerful field, but these models and AI applications have the potential to cause a lot of harm and amplify bias and discrimination. I loved teaching data science, but I always felt a little guilty that I was teaching people these powerful skills without also teaching them how to mitigate the potential harm these skills can cause. When I tried to teach these ethical implications alongside the technical topics, I struggled - it was hard to do this in a meaningful way where the ethical topics felt as important, authentic, or interesting as the technical topics. This inspired me to research ways to effectively teach ethics in data science and computing in a way that is easy for instructors, and in a way that feels authentic to how computing professionals might actually use and encounter ethical dilemmas in their professions. So, I came to the U for my Ph.D. to research this topic!





### What is your favorite class in the program?

This is a hard question to answer, as I've loved everything I've learned here! Two classes that stood out were a special topics course on Computer Science Education (taught by Prof. Eliane Wiese) and Advanced Human-Computer Interaction (taught by Prof. Jason Wiese). I loved these courses because I was able to directly apply what I learned in my research, so they felt relevant and interesting. However, I spend a lot more time on my research than in classes (I've actually completed all the classes I needed to take for my degree), so if research counts as a class, then that's my favorite class! I love researching - it is so motivating to be able to create new knowledge, contribute to the advancement of computing education, and challenge myself to think critically to solve new and interesting problems.

# Is there a specific mentor, club or program that made a difference in your experience here at the Kahlert School of Computing?

My advisor Eliane Wiese has made a huge difference in my experience in the Kahlert School of Computing. Advisors can make or break a Ph.D. student's experience, and mine has definitely made my experience fantastic. She is so supportive and brilliant - I learn so much from her every day. She makes me and her other students feel cared for as human beings first, and grad students second. She's been a great role model and mentor, and I'm extremely thankful to have the opportunity to learn from such a great person and researcher.

### How will you use your degree in the future?

I want to continue in academia and teach at a university. My degree allows me to apply the teaching and research skills I'm learning in my Ph.D. to impact the next generation of computing professionals and contribute new knowledge to the field.



Kahlert School of Computing University of Utah 50 S. Central Campus Drive RM3190 Salt Lake City, UT 84112-9200

www.cs.utah.edu

### Follow us:



linkedin.com/company/KahlertSoC

facebook.com/KahlertSoC



KAHLERT SCHOOL OF COMPUTING THE UNIVERSITY OF UTAH