

COMPUTE

SPRING 2023



Kahlert Foundation Gifts \$15M
to School of Computing

50th Anniversary of the
Department of Computer
Science

IEEE Milestone Celebration

Valerio Pascucci receives
Distinguished Research Award



WELCOME

The 2022-2023 academic year has been a pivotal one, since in November the School of Computing became the Kahlert School of Computing. Through a generous donation from the Kahlert Foundation, the School has more resources to support our students, make our programs welcoming and inclusive, increase engagement with industry, and develop the careers of our faculty.

Plans for the John and Marcia Price Computing & Engineering Building are taking shape, as the state of Utah has now committed over \$100 million towards the cost of this 252,000 square foot future home for the Kahlert School of Computing (depicted below).

And we were inspired by historical contributions and key figures from the earliest days of Computing at Utah. Fifty years ago, the Department of Computer Science at the University of Utah was formed, after 9 years as a Division of Computer Science in the Electrical Engineering Department. In March, we celebrated our 50th anniversary and received an IEEE Milestone recognizing Utah's contributions to computer graphics and visualization from 1965-1978. At this event, we were honored to host IEEE leadership, early Utah professor Ivan Sutherland, and a number of other exceptional alumni and former faculty members. To commemorate the event, there is now a permanent IEEE Milestone plaque in front of the Merrill Engineering Building, and a Utah teapot signed by Martin Newell and Jim Blinn in the Kahlert School's front office.

We are indeed proud of our history, but even more excited about what is to come.

Mary Hall



Image provided by GSBS + LMN Architects

CONTENTS



KAHLERT SCHOOL OF COMPUTING
THE UNIVERSITY OF UTAH

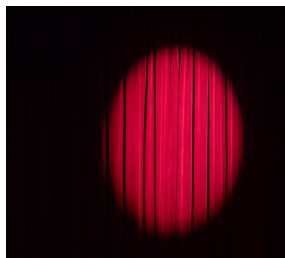
04

New Name for
School of Computing



10

IEEE Milestone



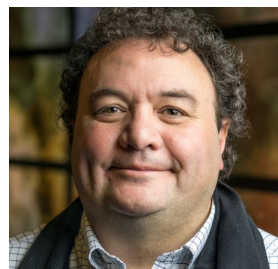
16

Student Spotlight



06

School Celebrates
50th Anniversary



12

Pascucci Receives
Distinguished
Research Award



Kahlert Foundation gifts \$15 Million to School of Computing

Photo credit: Heather Richardson, U of U



The University of Utah announced a \$15 million donation from The Kahlert Foundation to provide support for the university's renowned School of Computing.

The Kahlert Foundation's donation has established an endowment to provide the School of Computing with flexible, long-term funding that will expand student support, bring in top faculty and accelerate industry collaborations. In recognition of the gift, the university has renamed the school in collaboration with The Kahlert Foundation.

"The University of Utah's computer science program is a legendary strength of both the school and the state, and we wanted to do our part to help that legacy continue," said Heather Kahlert,

Vice President of The Kahlert Foundation and a University of Utah alumna. "Our foundation is passionate about the value of STEM in improving lives and building for the future, and helping to ensure ongoing generations of diverse, top-level computer scientists in Utah is right in line with our mission."

Established in 1991 by Bill Kahlert, a philanthropist and co-founder of Evapco Inc., the foundation provides grants to non-profit organizations in the areas of health care, education, youth programs, veteran organizations and human services. Originally established to support communities in the Maryland area, the foundation expanded its mission in 2015 to include Utah thanks to the influence and passion for philanthropy of Heather Kahlert, the founder's granddaughter and Vice President of the foundation.

The Kahlert Foundation has emerged as the leader of a new generation of philanthropy and a major voice for improving the lives and outcomes of students at the University of Utah. Including this most recent gift, the foundation has provided more than \$30 million in support across the university. Other recent projects funded and spearheaded by The Kahlert Foundation at the university include the Kahlert Initiative on Technology, a digital literacy certificate for all students, regardless of degree; Kahlert Village, a residential community for first-year students; scholarship support for student athletes and David Eccles School of Business majors; and generous support for the both the Spencer Fox Eccles School of Medicine Building and the Primary Children's and Families' Cancer Research Center at Huntsman Cancer Institute.

"The University of Utah is a pioneering program in computer science and its deep value is clear in the fact that computer science has become the single largest major on campus," said Taylor Randall, Ph.D., president of the University of Utah. "This generous gift from The Kahlert Foundation will ensure that the foundation and the School of Computing will continue to lead innovation and build the workforce that will continue to drive tech in Utah and around the world."

"The Kahlert Foundation's Gift is timely as it will amplify our efforts to make our computing program welcoming and inclusive, through support for student success programs and faculty development," said Mary Hall, professor and direc-



tor of the School of Computing.

Since the creation of the CS "program" in 1964, the School of Computing has been a center of excellence and innovation, helping to lead a revolution in the use of computers for graphics, data visualization, and human interface. The school housed one of the first four nodes of the ARPANET, the forerunner to the internet. Today, the school is one of the fastest-growing on campus, with the number of students pursuing degrees or courses up 47 percent in five years. Nearly half of computer science degrees awarded by universities in the Utah System of Higher Education each year are from University of Utah.

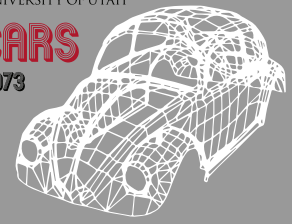
"At a time of rapid technological change, and when others are competing for talent, Utah can continue to make major contributions in computing and many other fields," said Edwin Catmull, retired President, Walt Disney & Pixar Animation Studios, "By securing the School of Computing's future financially, The Kahlert Foundation is helping to ensure that we will continue to make the U a foundational school for the advancement of technology, its applications, and impact on local businesses."

The School of Computing continues to build upon its stellar reputation by conducting leading-edge research across a broad range of computer science fields, including AI and machine learning, computer architecture, robotics, high-performance computing, human-centered computing, data science, cybersecurity and wireless communications.

About The Kahlert Foundation

The Kahlert Foundation's mission is to provide grants to non-profit organizations to improve the quality of life and well-being of the community in the areas of health care, education, youth programs, veteran organizations, and human services. The Kahlert Foundation has five main areas of focus: health care, education, youth programs, veteran organizations, and human services, mainly providing funding in the states of Maryland and Utah. Funding is intended to improve organizations' capacity to make a positive impact on the local communities and their citizens.





What skiing, a teapot and a virtual network sandbox have to do with the world's best computer technology by Amy Choate-Nielsen

In the beginning, there was no Wi-Fi, no World Wide Web, and certainly no personal computers. In 1964, when William Viavant created the U's first computer science program as part of the electrical engineering department, the world was different. This kind of technology was an entirely new frontier, and with a rare node on the ARPANET – the precursor to the modern internet – the early computer science faculty at the U were its pioneers.

Back then, the U had one of only 11 undergraduate computer science programs in the country. A year later, David Evans was recruited as director of the computer science division to establish a center of excellence in computer graphics and interactive computing. Since that time, what is now called the Kahlert School of Computing has helped shape the country's computer science curriculum, laid the groundwork for advances in cloud networking, and produced game-changing research in graphics and computer animation. With notable alumni going on to be leaders and creators of technology used at the country's largest computer companies, including Apple Computers, Adobe Systems, WordPerfect, and Pixar Animation Studios; inventing the ATM machine; or even consulting on the Watergate audio tapes, the school has seen success.

Now in its 50th year, the history of the Kahlert School of Computing is an essential part of its future. In the beginning, one futuristic node launched the U on a journey to new discoveries that placed Utah square on the map of computer history – from there, anything is possible.

Making History - When Al Davis was finishing his undergrad degree at the Massachusetts Institute of Technology, two things made him decide to pursue his doctorate at the U. First, the legendary Ivan Sutherland, one of the most influential figures in computing, visited his class and delivered a compelling presentation about how wonderful it would be to go to the U to earn a graphics degree. Second, Davis loved to ski.



In the fall of 1969, he arrived on campus to find a cohort of colleagues who were equally obsessed with the creativity of computing and in love with the mountains. At school, they experimented with graphics and carried around briefcases full of computer parts so they could practice building new machines. On the weekends, they hit the slopes. There were no curriculum requirements, and students could study what they wanted.

"Dave (Evans) said talk to every professor and take a class from everyone you think you might want to form a relationship with," said Davis, a computer science alum who worked as a professor at the U from 1977-1982 and 1993-2014 and served as Director of the

School of Computing. "The creativity was not constrained at all, and I think that was the key."

Another key to the success of the U's computer science program was Bob Barton. Evans

recruited the world-class computer architect to join the U in 1968 and teach students how to design machines. At the U, he was known as much for his dedication to his students and conversational style in the classroom as he was for winning the first prestigious Eckert-Mauchley Award from the Institute of Electrical and Electronics Engineers.

"He became my 'Dr. Father,' " said Duane Call, one of Barton's former students. "He became my mentor for the rest of his life. He stuck with us for years, even after we got out of graduate school."

By the mid-1970s, Utah also soared in graphics. Students Ed Catmull, Bui Tuong Phong, Henri Gouraud and John Warnock, among others, created methods for shading, rendering, animation, visualization and virtual reality, some of which remain the industry standard today. The students successfully rendered virtual 3-D objects of real things, like Sutherland's wife's Volkswagen Beetle, and an old-fashioned teapot that belonged to student Martin Newell. Newell's Utah Teapot set the standard for curved surfaces at the time, and is an iconic image in computer graphics. "It was a magical time," Davis said. "We all felt pretty lucky. We were free spirits with the right people together at the right time with the right set of leadership."

Forging a Path - While the 1964 CS degree created by Viavant was derivative of electrical engineering, Viavant co-authored the community-led Curriculum 68 report, which established the cornerstones of the CS curriculum that are reflected in today's CS degree. As the program grew and time passed, the school's curriculum and degree paths started to take shape under the guidance of Elliot Organick, who joined in 1971.

Organick, who wrote 19 expository books and founded the Association for Computing Machinery's Special Interest Group on Computer Science Education (SIGCSE), influenced the education of future computer scientists into the 1980s and beyond. Both Organick and Viavant received SIGCSE's Outstanding Contributions to Computer Science Education award for their early efforts to shape computer science education.

As more and more students grew interested in becoming computer scientists and designers, it became harder to join the program. Dave Hanscom – electrical engineer and cross-country skier – joined the college in 1982 to shepherd students as the department's director of undergraduate studies and computer engineering. During his tenure, the numbers of students admitted each year steadily grew from 70 to 80, then 100, and more. The Kahlert School of Computing is now one of the largest majors on campus, offering four undergraduate degrees with 20 graduate research areas and more than 2,000 students.

"I never really had to work to convince people of the value of a computer science degree," said Joseph Zachary, a U professor who taught from 1987 to 2020. "It has always been in demand."

Nodes to Networks - In the mid-'90s, one foundational faculty member, Jay Lepreau, had the idea to build on the U's ARPANET legacy and create connections in a new way. He established a lab that evolved so quickly they called it the Flux Research Group so it could always adapt and change. Here, he laid the groundwork for a whole new kind of technology that could gather and tap into the power of multiple computers from somewhere far away, like a cloud.

Long before cloud technology existed, Lepreau conceived the vision for Emulab, short for

emulation laboratory, which would provide remote access to research conditions that could experiment on expanding networks and storage systems. Emulab changed the nature of networking research and systems through providing a way where results could be tested and recreated as users from around the world dropped in on a network of computers in campus, and isolated cellular networks.



Today, the projects Powder and CloudLab continue to push the possibilities in how computers and cell phones operate on shared systems. "Thousands of research papers have been published that incorporate experiments performed on Emulab or CloudLab or Powder," said Eric Eide, co-principal investigator of the CloudLab and Powder projects, and associate professor in the Kahlert School of Computing. "These facilities are in constant use by people around the world who rely on them to perform experiments that will lead to the next advancements in wireless systems."

Looking Forward - These days, Erin Parker looks back at the beginnings of computer science at the U with a mixture of pride and pragmatism. Much has changed since the 1960s, but the dedication to excellence remains. Back then, only the most passionate and focused students found

their way to studying the little-known and futuristic field of computing. Now, computing is everywhere, and Parker wants to see the discipline expand even more.

"We want to bring in students of all different backgrounds and attract a very diverse representation of people who are working in computing – because everybody needs computing," said Parker, a professor and associate director for academic affairs for the School of Computing. "I see us continuing to widen the definition of what we consider computer science and computing, and what we want to offer not just the students at the U, but the greater community, making our courses even more accessible."

When the computer science department first branched out from the electrical engineering department at the U, there were two emphases for students: hardware and software. Everyone who followed this path received a degree in computer science, but some focused on being architects of the machine, and others focused on the code that made it function. Together, those concepts laid the foundation for technology that has changed the way we now see the world. It all started with a node, an idea, and research that led to creation.

"Sometimes students come and they don't even know just how historic the place they are studying in is," Parker said. "From advancing technology to being on the forefront of developing computer science curriculum, University of Utah faculty and students have been innovators."

Photos courtesy of: Special Collections, J. Willard Marriott Library, University of Utah

On March 23 and 24, the Kahlert School of Computing celebrated 50 years of computer science at the University of Utah, and received the IEEE Milestone with a plaque commemorating this historical event. Faculty pioneers from the early days of our school came together to reminisce and tell their stories. **The full two-day program is available to watch on our website: www.cs.utah.edu**

50th Anniversary Event - March 23, 2023

Panel Discussions:

Leading the Way in Computer Science Education with Emeritus Professors Dave Hanscom and Joe Zachary (moderated by Erin Parker)

Foundations for Creativity: Utah Computer Science, the Early Years with Chuck Seitz, formerly Myricom, Caltech, Utah; Al Davis, Nvidia; formerly HP, Utah; and Duane Call, formerly Vinca Corporation, BYU (moderated by Rajeev Balasubramonian)

Impact of Networking Research, From ARPANET to Emulab and Beyond with David Andersen, CMU and Cody Cutler, Amazon (moderated by Rob Ricci)

Keynote Presentations:

The Future and Promise of Technology - Innovations from Extraordinary Women with Telle Whitney, Co-Founder, Grace Hopper Celebration of Women in Computing and former CEO of Anita Borg Institute

Utah and the Frontiers of Computing with Steve Parker, Vice President of Professional Graphics, Nvidia

Single Flux Quantum (SFQ) Digital Electronics (Digital circuits totally distinct from Quantum Computing) with Ivan Sutherland, 1968-74 Utah Professor, 1988 ACM Turing Award Laureate



IEEE Milestone Event - March 24, 2023



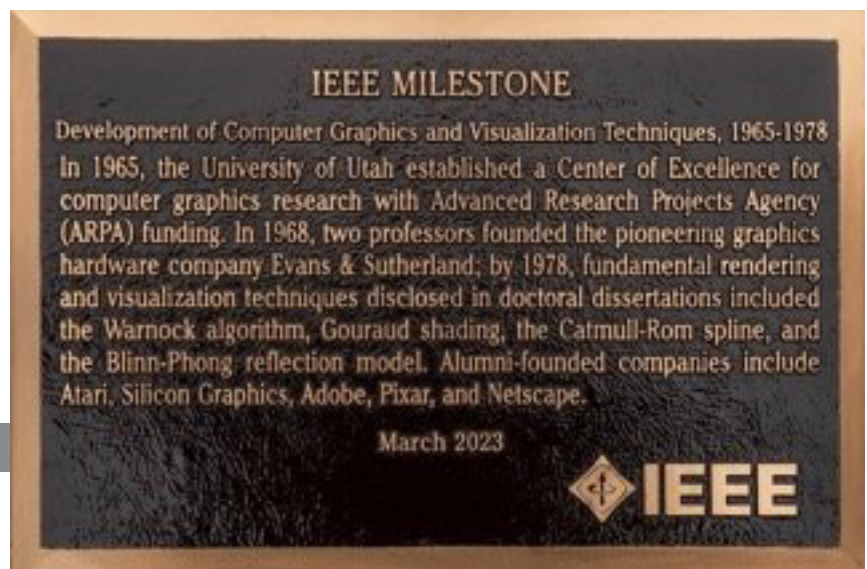
It was like The Beatles reuniting...but for the world of computing.

Ed Catmull. John Warnock. Jim Clark. Alan Kay. Ivan Sutherland. Martin Newell. Jim Blinn. Henri Gouraud. They are just a few of the luminaries in the late 1960s and 1970s who revolutionized computer graphics by inventing technologies that have aided and shaped countless industries today. For the first time ever, these and other legends of that time reunited on the U of U campus on March 23 and 24 to commemorate their roles as 3D graphics pioneers and to celebrate the 50th anniversary of the U's Kahlert School of Computing.

Led by then computer science professor Ivan Sutherland and David Evans, the University of Utah's first computer science research program in graphics and interactive computing, these trailblazing graduate students researched and developed ground-breaking innovations in 3D objects and computer animation decades before "Toy Story." Many have later called this nascent period at the U the "Camelot Era."

During the event audience members heard amazing stories of how these then U researchers developed technologies that would later become part of our everyday world in both work and entertainment. Also included were talks from some of the Kahlert School of Computing's current faculty and former researchers about more recent work in fields including networking, cloud computing and newer graphics technologies.

The celebration's bronze plaque, located outside the Merrill Engineering Building, tells the story of Utah's worldwide impact on computer graphics and visualization to all future generations that walk through our doors.



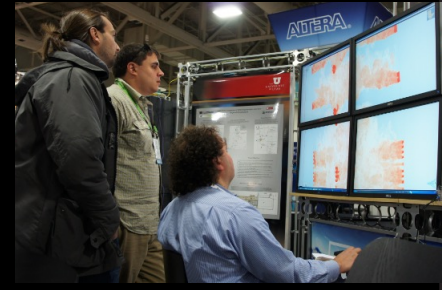
GRAPHICS EVENT SPEAKERS

- James Blinn, Ph.D., 1978** – Created specular lighting models, bump mapping and environment mapping for surface textures in graphical images.
- Ed Catmull, Ph.D., 1974** – Pioneer in computer animation who co-developed RenderMan rendering software. Co-founder of Pixar Animation Studios and winner of five Academy Awards.
- Jim Clark, Ph.D., 1974** – Rebuilt the head-mounted display and 3D wand to see and interact with 3D graphic spaces. Founder of Netscape and Silicon Graphics.
- Henry Fuchs, Ph.D., 1975** – Innovator in high-performance graphics hardware, 3D medical imaging and head-mounted display and virtual environments.
- Henri Gouraud, Ph.D., 1971** – Created the Gouraud shading method for polygon smoothing – a simple rendering method that dramatically improved the appearance of 3D objects.
- Alan Kay, Ph.D., 1969** – Envisioned the windowing graphical user interface at Xerox PARC, which led to the design of Apple MacIntosh and Windows computers.
- Martin Newell, Ph.D., 1975** – Developed procedural modeling for 3D object rendering (Utah teapot), co-developed the Painter's algorithm for surface rendering.
- Rodney Rougelot** – Former president and chief executive officer of Salt Lake City-based Evans & Sutherland, which then developed military and aviation simulators with 3D graphics.
- Robert A. Schumaker** – An engineer with Evans & Sutherland who conceived a new architecture for rendering complex, high-quality 3D images for its flight simulators.
- Alvy Ray Smith** – Co-founder of Pixar Animation Studios, first Director of Computer Graphics for George Lucas' Lucasfilm.
- Ivan Sutherland**, U Computer Science Professor, 1968-1974 – Inventor of Sketchpad, the first interactive graphics program with geometric constraints. Co-founded Evans & Sutherland with David Evans.
- John Warnock, Ph.D., 1969** – Developed the Warnock recursive subdivision algorithm for hidden surface elimination. Co-founder of Adobe, which developed the Postscript language for desktop publishing and is now one of the largest software brands in the world.





Valerio Pascucci, John R. Parks Inaugural Endowed Chair, receives 2023 Distinguished Researcher Award



The Office of the Vice President for Research (VPR) has selected SCI faculty member Valerio Pascucci as a 2022-2023 Distinguished Research Award (DRA) recipient. The DRA is designed to shine a spotlight on the outstanding achievements of University of Utah research faculty. “Valerio is an outstanding scientist, leader, and mentor. He is integral to the vision and mission of the SCI Institute. He has made significant research contributions and long-lasting scientific and societal impacts,” said SCI Director, Manish Parashar. “We are delighted that the University of Utah has recognized Valerio’s contributions by awarding him the Distinguished Research Award.”

Nominees are evaluated on the impact of their research, transformative achievements and innovation. Valerio will be recognized this May during the General Commencement. Valerio is being recognized in part for his seminal contributions to using topology for data visualization and analysis. He has pioneered the effective use of topology and analysis to visualize and understand many different types of data including scalar fields, vector fields, and high dimensional data.

“I am incredibly honored to receive this recognition from the University of Utah, where I have found fertile ground to try new ideas without (too much) fear of failure,” says Valerio Pascucci. “I want to share this award with all my colleagues, collaborators, and friends who welcomed this migrant into an environment infused with high intellectual stimulation and deep personal and professional support.”

Pascucci is the John R. Parks Inaugural Endowed Chair of the University of Utah, a professor of Computer Science in the Kahlert School of Computing, a faculty member of the Scientific Computing and Imaging Institute, and the Founding Director of the Center for Extreme Data Management Analysis and Visualization (CEDMAV) at the University of Utah. He received his Ph.D. in computer science from Purdue University after moving from Italy to the United States. His Ph.D. research was titled “Multi-dimensional and multi-resolution geometric data-structures for scientific visualization” and investigated the effective use of visualization techniques to enable the interactive, intuitive exploration of big scientific data.

Valerio has pioneered the effective use of topological analysis for visualization and analytics for many different types of data, including scalar fields, vector fields, and high dimensional data with applications ranging from clean energy and climate modeling to cosmology and nuclear engineering. Valerio’s topology research started in 1998 (as a Ph.D. student) with his work on “Visualization of scalar topology for structural enhancement” presented at the IEEE VIS conference (formerly SciVis, InfoVis, and VAST) where he has continued to publish every single year for over 25 years. This body of work has been recognized with seven Best Paper Awards and the 15-year Test of Time Award for his 2002 SciVis paper on “Efficient computation of the topology of level

sets." Overall, Valerio published 6 edited books and over 250 refereed papers (107 in journals, 129 in conferences proceedings, and 25 as book chapters) that involve a breadth of the work including the theoretical foundations of topological data analysis, its robust implementation in software packages, and its direct use in science and engineering. In addition to topology, Valerio has focused a major portion of his research on the development of techniques to manage and visualize massive scientific data. The results have been mainly implemented in the OpenVisus library (visus.org) and deployed via the National Science Data Fabric initiative.

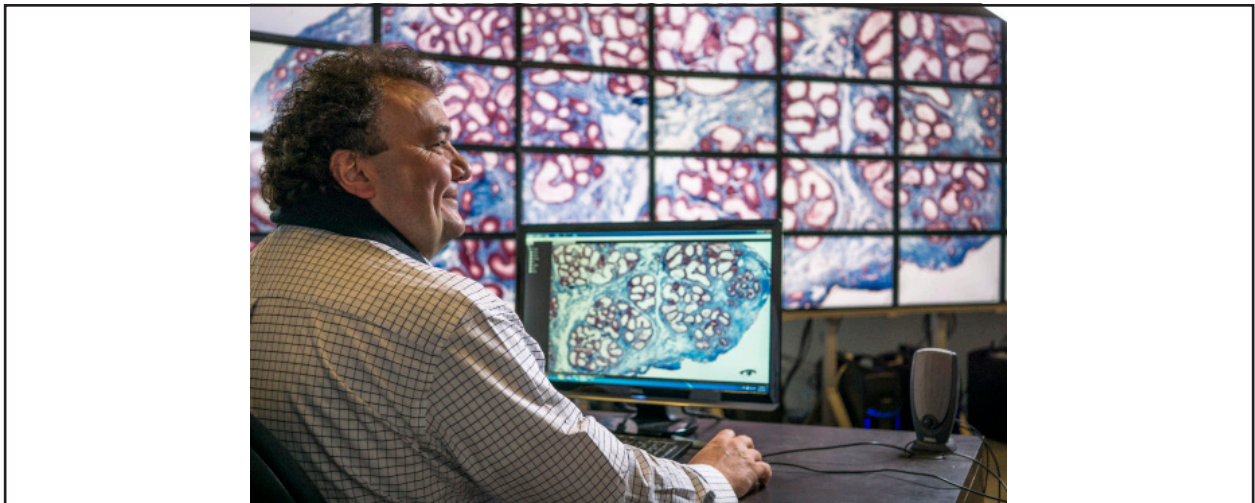
His work has been used in several commercial applications, such as in the oil and gas industry, to better understand and label seismic data, in the aerospace industry, to design new light materials with improved performance, and in agriculture, to facilitate fast collection of massive data sets from drones. This work also led to significant outreach activities, including the presentation of the topological analysis of combustion simulations in a year-long (2018-2019) Exhibit of Fire at the top museum of science in Europe (Cité des Sciences in Paris) and the live demonstrations of virtual reality neuroscience tools at the Leonardo Museum of Science in Utah (2019-2020).

Valerio's devotion to teaching and mentoring was recognized with the 2016 Distinguished Mentor Award from the Graduate School of the University of Utah for introducing topology methods and visualization techniques in the classroom and for advising and supporting many Ph.D. students and postdocs.

Valerio Pascucci has demonstrated exemplary service to the visualization community. As a general chair of IEEE VIS 2020, he navigated successfully through the COVID-19 pandemic, turning it into an opportunity to grow the conference's reach to an unprecedented number of community members. Valerio also served twice as an Associate Editor of the IEEE TVCG journal and organized seven other major meetings: IEEE eScience 2022, ACM SoCG 2010, TopoInVis 2013 and 2009, IEEE Volume Graphics 2008, Dagstuhl Perspective Workshop 2014, ACM SIGHPC Workshop on Visual Performance Analysis (with SC14) 2014.

Outside of his main academic job, Valerio is the founder of Data Intensive Science, a 501(c) nonprofit providing outreach and training to promote the use of advanced technologies for science and engineering, he is the Founding President of ViSOAR LLC, a University of Utah spin-off, and he is a co-founder of Leggera Romana, a Utah corporation whose mission to popularize gourmet Pinsa, the roman ancestor of pizza, outside Italy.

"I feel blessed to be a member of the SCI Institute and the University of Utah, and I hope that I will be able to give back to our community as much as I have received, especially to all the students that I am fortunate enough to meet in my journey," he said.



UTAH DATA SCIENCE DAY

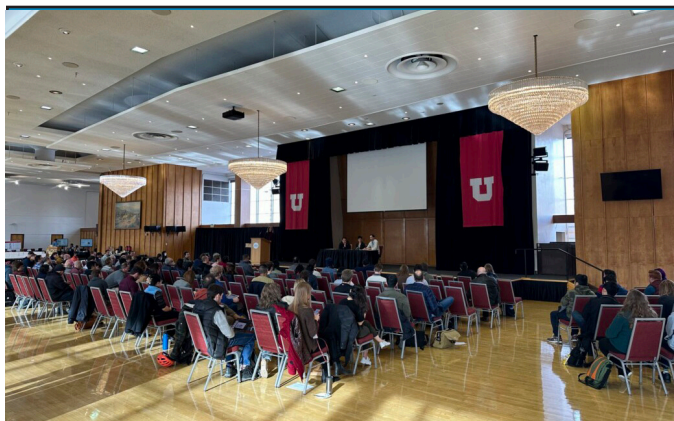
On January 13, the Utah Center for Data Science hosted at least 280 participants at Data Science Day, making this perhaps the largest data science event ever at the University of Utah. The event was a gathering of all those interested in data science around campus, including students, researchers, and faculty — as well as data scientists from local industry and prospective data scientists from around the Salt Lake City area. This year, Data Science Day was held in the Union Ballroom on the University of Utah campus.

An exciting aspect of the event was the chance for those interested in data science from around the university to gather and meet each other — especially after a few years of mostly online meetings during the COVID-19 pandemic. This was exemplified by the Research Expo part of the day, which saw dozens of research posters, demos, and information booths. The Research Expo provided a forum for researchers of all levels to show off their recent results and for institutes and centers to showcase the services they provide.

A highlight of the day was the research talks, especially the inspiring keynote by Jeff Leek, the chief data officer at the Fred Hutchinson Cancer Center in Seattle. His talk told the story of how he launched a massive online course in data science, and wherein the resulting curriculum has served more than 8 million students. He then described how he leveraged this towards designing and running a version of the curriculum, DataTrail, as an educational springboard for the underserved low-income communities of Baltimore and beyond. This work stimulated much discussion, including how it related to the maturing data science curriculum here at the University of Utah.

Another engaging part of the day was an industry panel staffed by local data scientists that provided great insight into the trade-offs of in-person versus remote work, especially as it pertains to new data scientists.

The event also provided a great opportunity for many to interact with local industry. This included a career fair with participation from the event's sponsors: Sorenson, Recursion, and bioMérieux. The organizers would also like to thank the Office of the Vice President of Research and the National Science Foundation for financial support and the One Utah Data Science Hub and Kahlert School of Computing for organizational support. The day was a great success, and there is excitement to do it again.



UTAH DATA SCIENCE DAY 2023

FRIDAY, JANUARY 13 | UNION BALLROOM

9:00 - 10:00 AM - EVENT REGISTRATION & BREAKFAST

10:00 - 10:45 AM - RESEARCH HIGHLIGHTS

- Kate Isaacs**, Associate Professor, SCI Institute & Kahlert School of Computing
"Visualizing Environmental and Socioeconomic Data to Combat Health Disparities"
- Jacob Hochhalter**, Assistant Professor Mechanical Engineering
"Scientific Machine Learning for Interpretable Material Models"
- Nina DeLacy**, Assistant Professor, Huntsman Mental Health Institute & Department of Psychiatry
"Addressing the mental health crisis: From data to information"

10:45 - 11:30 AM - INDUSTRY PANEL

**Levi Thatcher, PhD**
Senior Director, Data Science
Pluralsight

**Peter McLean, PhD**
Director, Data Science
Recursion

**Jes Ford, PhD**
Senior Machine Learning Engineer
Cash App

11:30 AM - 12:00 PM - LUNCH

12:00 - 1:00 PM - KEYNOTESPEAKER: JEFF LEEK



Jeff Leek is Chief Data Officer, Vice President, and J Orin Edson Foundation Chair of Biostatistics at the Fred Hutchinson Cancer Center. His group develops statistical methods, software, data resources, and data analyses that help people make sense of massive-scale genomic and biomedical data. He also helped to develop massive online open programs that have enrolled more than 8 million individuals.

1:00 - 3:00 PM - RESEARCH EXPO

- Dozens of posters, demos, and information booths
- Learn about ongoing projects, find collaborators

2:00 - 5:30 PM - CAREER FAIR

- Companies include our event sponsors: **Sorenson**, **Recursion**, **BioMérieux**, **TaxBit**



SCAN THE QR CODE TO REGISTER AT: shorturl.at/gCDOT

Sponsored by Sorenson, Utah Center for Data Science (UCDS) and the One Utah Data Science Hub. The Hub is a university-wide effort designed to enhance research, training, and infrastructure focused on data science. In line with One Utah goals, the Hub unites expertise from across campus to create new connections, teams, and synergies.

Faculty News

U of U air quality researchers, along with the Salt Lake County Health Department, received a Smart Cities North America Award for its Air Quality and You project. Computer Science [Professors Ross Whitaker and Miriah Meyer](#), collaborated on building a network of air quality sensors deployed throughout the county that monitor air pollution in real time with Chemical Engineering Professors Kerry E. Kelly, Tony Butterfield, and Computer Engineering Professor Pierre-Emmanuel Gaillardon.

The National Science Foundation has awarded a prestigious new research experience for undergrads (REU) site to the Kahlert School of Computing entitled Trust and Reproducibility of Intelligent Computation (TREU). Led by Principal Investigator [Professor Ganesh Gopalakrishnan](#) and Co-Principal Investigator and School Director [Professor Mary Hall](#), the TREU REU site will train undergraduate students over 10 weeks during each of its three years. The selected students will learn valuable technical and communication skills to help them become future leaders in the field of intelligent computational research.

[Assistant Professor Jason Wiese](#) has received a \$60K Google Research Award for Inclusion Research aimed at developing personal tracking technology that addresses a major challenge faced by power wheelchair users: avoiding pressure ulcers. Wiese and PhD student Tamanna Motahar will explore solutions for detecting pressure reliefs as well as providing users of power wheelchairs with real-time context-aware reminders and feedback.

[Assistant Professor Alan Kuntz](#) and recent PhD graduate [Michael Bentley](#) from the Kahlert School of Computing and Robotics Center, have won the 2022 IEEE Access Best Video Award. The video and research paper is based on meaningful steps towards answering the primary question: "Can flexible, tentacle-like robots make medical interventions and surgery less invasive."

[Assistant Professor Marina Kogan](#) has received a \$99K grant through the Foundational Integrity & Social Impact Research Program of Meta to investigate emotionally-driven, meme-based campaigns for countering online propaganda.

[Assistant Professor Mu Zhang](#) has received a \$65K Cisco grant to enhance the security of smart contracts (autonomous computer programs running on top of blockchain technology) in Fintech.

Student News

[HPC and Visualization Ph.D. student Masado Alexander Ishii](#) has received the 2022 ACM-IEEE CS George Michael Memorial HPC fellowship. Ishii is the main developer for the University of Utah's Dendro-KT framework for four-dimensional adaptivity and parallel in time formulations. Working with collaborators, Ishii has also been involved in developing methods and codes for large-scaled fluid simulations around complex objects, including a case with multiple complex objects to evaluate COVID-19 transmission risk in classrooms.

[Ph.D. student Noelle Brown](#) was the sole student invited to present her work on ethics and technology at Stanford's Embedded Ethics Conference. Brown presented a work-in-progress lightning talk, in which she discussed how researchers have reported on teaching ethics within computing over the past 40 years.

Sasha Singh **Bachelor of Science in Computer Science**



What sparked your interest in computing?

I started as a Biology major when I first came to the U. I always knew I wanted to be a woman in STEM and when every door was pointing in the direction of becoming a pre-medical student, I took the opportunity. I spent two semesters in science and math classes only to realize that there was a lack of practical knowledge and outside-of-the-box thinking. That's when COVID hit and we were all confined to our homes. Both of my parents are in tech and urged me to take one programming class and put my heart into it. The first video I ever watched in that course said something that stuck with me, "When you write a piece of code, a line of a function-you are the creator, the innovator, you hold the power of what it does, why it does it, and how it does it". You have the power to "code" a solution to someone's problems, and I was finally allowed to question dogma. I took a few more online courses over the summer, and in the Fall of 2020, I decided to switch my career path to study computer science. What can I say? It's in my genes!

How did you choose the U of U?

I have spent countless summers at the U every summer since I was 14! Whether that be taking a creative writing class, ACT prep sessions, representing Utah's STEM Ambassadors, Campus Tours, Red&White Day, or the University of Utah Science and Engineering Fair. So when I received my Associate's degree my senior year, it was obvious that I would be joining the U of U, or more like returning to the place where it all began!

How has your experience at the SoC been so far?

Switching to a new major seemed very daunting especially because I had never even been to the Warnock Engineering Building! I can't stress it enough that as a first-generation South Asian immigrant woman in STEM, I have never felt more supported by my professors, advisors, and peers. I have had the opportunity to connect with my professors with their open-door policies, attended town hall meetings with the director of the SoC about the issues that students face, hosted a LinkedIn workshop to help my peers land their dream internship roles, and had the chance to promote computing through the Inclusion and Diversity program to other young girls in high schools, especially those that come from immigrant backgrounds just like me!

Who are your mentors?

I think of mentors as people who are not only your biggest supporters but also your biggest critics. My parents, Vijay and Annie, have always pushed me to push down doors that seemed too hard to conquer at first, and they are the reason that I am confident in where I stand today and in my skills. My dad always says that out of all the people I meet and the friends I make, very few will offer me real advice about when I have gone wrong and what I can do to better myself-and he will always be the most real one in my journey to success!

What is your favorite class?

Software Practices 1 taught by Professor James de St. Germain and Database Systems taught by Professor Daniel Kopta. The classes weren't just interesting and challenging, but they are my favorite because of the instructors and their dedication to the learning of their students. Both professors have always inspired me with their passion for computing, and I am grateful for their constant support. Another class I loved exploring was World Religions, this is a great way to learn about the values, ethics, and morals of the people on this planet!

What do you like to do during your free time?

While it is usually meant negatively, I really do think the best way to describe the things I like to do in my free time is “The Jack of all Trades, Master of None”! I have always loved to sing and dance, and I usually combine this with my obsession with fitness- and am currently looking to get Zumba certified! I wish to teach a class where I promote healthy habits, a mashup of my favorite pop and Indian music, and build a community of self-love. I also create beauty, skincare, and lifestyle content on Instagram where I speak up about my struggle with cystic acne and body image. I believe in providing organic, authentic content to my audience. I also love to read and write about everything from how to land your dream internship to quora answers about how to do better on your ACT exam to how to manifest your best life. And my favorite pastime of all is, daydreaming on Zillow and looking at beautiful houses to interior decorate.

What career would you like to use your degree for?

I take a lot of pride in the work I did to hustle for an internship this past summer and found myself at Oracle, and will be returning there this summer! My dream job would be to work as a Software Engineer at a large tech firm that doesn't just provide a way to grow my technical skill set but also my fascination with human interactive data. Whether that be in the Instagram division of Meta to analyze their explore pages, or at a FinTech that diversifies credit card reward programs based on consumer spending.

Where do you see yourself in 10 years?

I would like to be in a Developer's Advocate role acting as the liaison between a major technology company and its developer community. I am interested in people-facing roles and pursuing executive leadership roles. I would like to use the knowledge I gained with my certification from the Lassonde Entrepreneurial Institute and start my own company in the fitness or beauty industry, revolutionizing holistic healthy living and self-confidence. Finally, I want to return to my homeland, Delhi, and start a scholarship fund for high school students interested in pursuing online computing courses, competitions, and traveling to hackathons all over the world.



Lauryn Hansen **Master of Software Development**



What interested you in pursuing a Master's degree in software development?

I was interested in continuing my education to become a talented software engineer primarily to:

- Expand my technical expertise to be qualified for additional remote academic and professional opportunities including and beyond the industries in which I already have experience.
- Discover convergences between my passions of STEM and social justice via holistic and intersectional problem-solving strategies.
- Push the boundaries of sustainable innovation – specializing my skills to better align with my personal values and professional aspirations to combat climate change.

What is your favorite class in the program?

I've been very interested in all the course content up to this point in the program. It's difficult to choose, but my top favorite courses so far have been Computer Networks + Security and Computer Architecture + Operating Systems.

A big part of why I've felt so engaged in the coursework is because of the program faculty. As a queer woman and first-generation college student, I've experienced multiple roadblocks accessing higher education. It's been a handful of individuals who've supported me in succeeding, who've empowered me to believe in myself in both educational and professional spaces.

I've been very impressed with the MSD faculty and participating in the MSD program by far has been my most positive educational experience up to this point in my life. Being a technical expert and doing research in your field is one thing, but teaching and learning alongside students and making the effort to connect with them in a meaningful way is a unique skill that the MSD faculty practice. I would highly recommend the program to others.

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

One of the MSD program teaching assistants, Jon Hughes, has really made a difference in my experience. He's an alum from the MSD cohort the year before mine. He's known for working with students above and beyond his scheduled TA office hours 1:1 and in groups in our cohort classroom. He's often been the person in moments when I feel in over my head that shows up to help me intuitively understand concepts and work through difficult homework material I get stuck on.

There are many benefits to a condensed 16-month graduate program and a few cons. Because the pace and rigor of the MSD program is so intense, I've had little to no time outside of class and studying to engage in extracurricular opportunities. That being said, I'm a participating member of the University of Utah oSTEM chapter. And I have formal and informal mentors that I've connected to through LinkedIn, Portland Women in Tech and the companies I've previously worked for. Additionally, the intensity of the first two semesters of the program means I'm in the same classroom five days a week with the same students. Our cohort feels like a family of sorts - another unique aspect of the MSD program.

I'm a big proponent of students seeking out mentors who they feel safe to connect with and who empower and inspire them rather than being arbitrarily assigned to a mentor. In the second semester of the program, there is an industry seminar once a week where professionals in the tech industry, many who are MSD alum, come and present to the cohort on a technical topic. This is a great opportunity for students to connect with potential mentors and/or future employers.

How will you use your degree in the future?

I'm excited to re-enter the workforce as a software engineer looking for engaging, diverse and inclusive teams to be a part of and contribute to. And I'm open to exploring opportunities in multiple industries. I intend to use my training in software development to develop a more holistic approach to engineering problems in the realms of artificial intelligence, machine learning and data security. And I will participate in creating access for other marginalized people to have opportunities in STEM. I recognize the importance of scrutiny in how technologies created for public use, such as facial recognition, are engineered and I want to continue using my interdisciplinary background and personal experiences to do so. I will continue to problem solve in ways that serve all people, focusing my energy on populations that have been historically and currently underrepresented in STEM, such as people of color, LGBTQ people and women.

Interesting Fact About Lauryn's Family History:

The MSD program courses for my cohort are all in the Merrill Engineering building on the University of Utah campus. Sperry Rand UNIVAC division had an office in the Merrill Engineering building starting sometime in the late 50's, early 60's. My grandpa was a computer operator for them starting in 1960, on the swing shift. My grandpa is a veteran and went to a 2-year technical school on the GI bill to study programming during that time while also working at UNIVAC. Once he completed the program, Zions Bank offered him a job for \$750/month. He turned it down. He made 2-3 times that amount of money as a house painter - what his father did for a living. He quit his job at UNIVAC in 1971 and took over his father's business. I think UNIVAC went out of business shortly after that with IBM dominating the market. A lot has changed in the world of computing since then. It's interesting and meaningful to me that he worked in the same building I spend 40+ hours a week in for the MSD program, a "coming full-circle" of sorts.



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