

UCI Donald Bren School of
Information & Computer Sciences



2023



An Outsized Welcome

In September 2023, ICS gave a warm welcome to more than 1,380 new students – its largest class yet! The bulk of the incoming cohort is the roughly 1,050 undergraduate students, with around 715 first-year and 330 transfer students. ICS also welcomed almost 340 students into its graduate research and professional programs.

Read the full story on page 8.



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ON THE COVER

Fourth-year computer science majors Dylan Vu (left) and Casey Tran at Hack at UCI, the largest collegiate hackathon in Orange County. Hosted by the ICS student club Hack at UCI, the February 2023 hackathon had more than 400 students participate, creating projects for entertainment, health, student success and more. Vu is holding the prototype of a device that will create real-time captions for people who have difficulty hearing or who want live translation during a conversation. The photo was taken by Lee Bahir, the club's graphics leader last year. Bahir graduated from ICS in 2023 with a B.S. in computer science and is now an associate software engineer at Northrop Grumman. Learn more about Hack at UCI at hack.ics.uci.edu.

ICS REVIEW

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From the Dean

Stronger and larger than ever before, the ICS community continues to be driven by its passion for positive change in the world through computing.

Our undergraduates stand out at ICPC, the marquee collegiate programming competition, receiving a bronze medal in the 2023 North America Championship and earning a chance to compete in the upcoming World Finals. Our researchers advance human-centered artificial intelligence through global partnerships; keep the Internet safe for billions of users through the adoption of their innovations by tech industry giants; and offer insights into human-technology interactions that restore balance, happiness and productivity. Our instructors excel in the classroom, receiving campuswide recognitions, and lead exciting summer outreach programs that promote a more inclusive computing community. Our junior faculty are routinely recognized through young investigator awards, while our senior faculty catalyze interdisciplinary research collaborations and receive prestigious international recognitions. And our alums shine through their entrepreneurial accomplishments and their leadership in academia and industry.

Not surprisingly, student interest in our School continues to grow unabated. More than 26,000 applicants sought admission into ICS for Fall 2023, a record high. For academic year 2023-24, we have welcomed the largest ever cohort of new students in our School, and total enrollment exceeds 4,500 students, with more than 3,500 undergraduate and close to 1,000 graduate students enrolled in our programs. Furthermore, new faculty have joined our ranks in the areas of interpretable machine learning, security and computer science education.

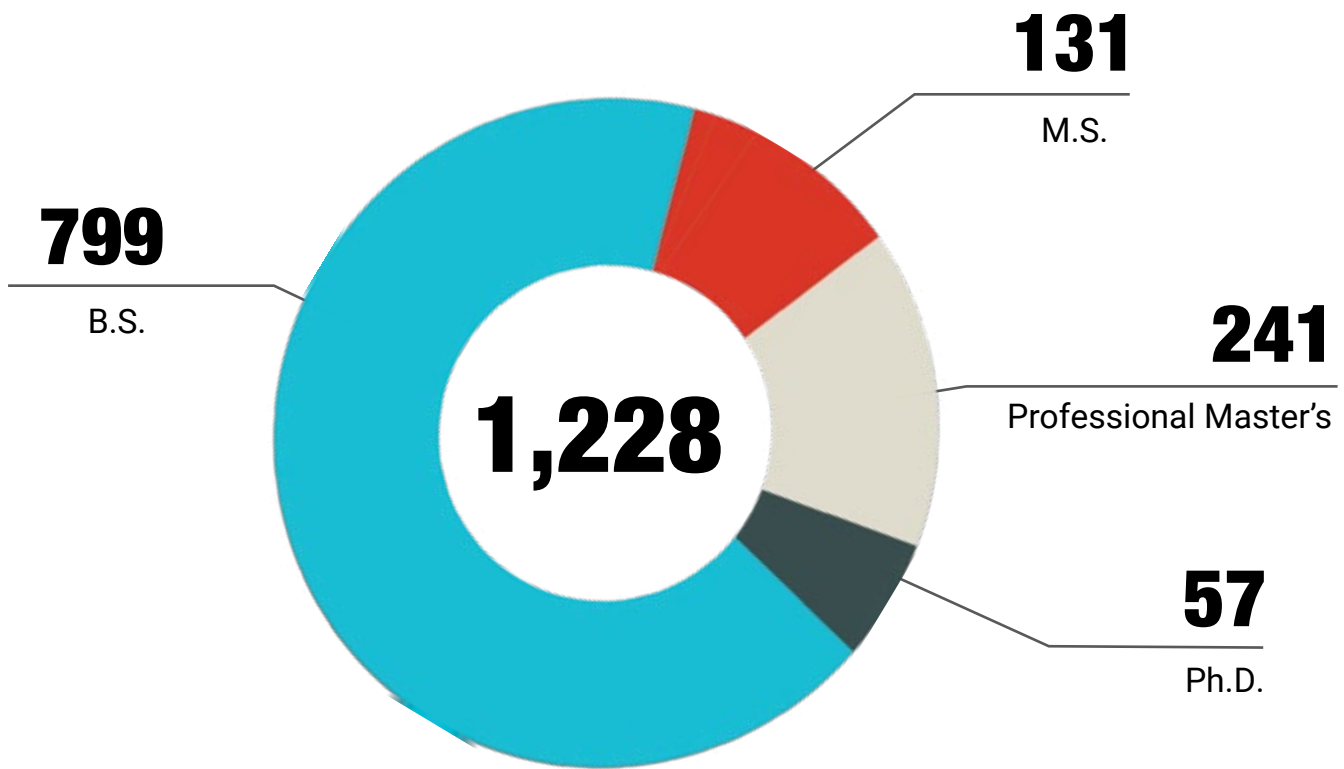
I look forward to another exciting year for ICS and welcome your thoughts and insights as we work together to advance our world through computing.

Marios C. Papaefthymiou
Professor of Computer Science
Ted and Janice Smith Family Foundation Dean

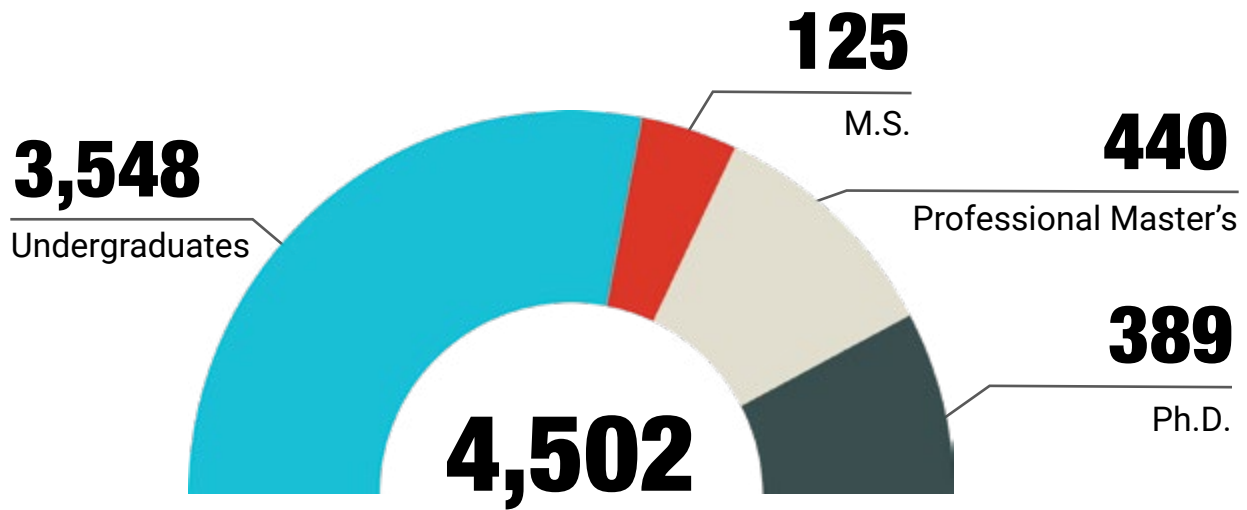


ICS By the Numbers

Degrees Granted 2022-23



Total Student Enrollment Fall 2023



28% Female Undergraduates

35% Female Graduate Students

14% Underrepresented Undergraduates

| Tenure-Track Faculty | U.S. News & World Report | CSRankings.org |
|----------------------|--|--------------------------------------|
| 97 | #7 Game/Simulation Development undergraduate program | #2 Design Automation |
| | #9 Software Engineering undergraduate program | #7 Databases |
| | #10 Computer Science undergraduate program among public universities, #27 overall | #7 Software Engineering |
| | #17 Computer Science graduate program among public universities, #31 overall | #9 Human-Computer Interaction |
| | #18 Statistics graduate program among public universities, #27 overall | #11 Systems |
| | <small>2022-2024</small> | <small>2019-2023</small> |



An Outsized Welcome

ICS, welcoming its largest class ever this year, is now home to more than 4,500 students.

Last fall, the Donald Bren School of Information and Computer Sciences (ICS) gave a warm welcome to more than 1,380 new students — its largest class yet! The bulk of the incoming cohort is the roughly 1,050 undergraduate students, with around 715 first-year and 330 transfer students. ICS also welcomed almost 340 students into its esteemed graduate research and professional programs.

At the new student orientation, Dean Marios Papaefthymiou was excited to greet everyone. “It’s great to have you here,” he said. “It’s the largest class we’ve ever had in Information and Computer Sciences, so we’re really excited!”

Graduate Research and Professional Programs

Research graduate students attended an open house breakfast in the outdoor quad of the Interdisciplinary Science & Engineering Building on Sept. 25, 2023. They got to know one another and were able to speak with Madhu Reddy, the associate dean for Graduate Affairs. They also met with staff from the Graduate Student Affairs office. The professional programs held their own orientation the following day.

The graduate student cohort includes 72 master’s and 57 Ph.D. students, spread across research programs in computer

science, informatics, networked systems, software engineering and statistics. The cohort also includes 210 professional master's students in the following programs: Master of Computer Science (MCS), Master of Data Science (MDS), Master of Human Computer Interaction and Design (MHCID), Master of Software Engineering (MSWE), and Master of Embedded and Cyber-Physical Systems (MECPS – a joint program with the School of Engineering).

This select group of students was admitted from more than 6,000 applications.

New Undergraduate Students


Undergraduate students attended their welcome session on Sept. 26, 2023, in a more traditional campus setting with transfer students gathering in a lecture hall and first-year students meeting in the UCI Student Center.

"We are looking forward to watching this cohort tackle their goals and take advantage of all that ICS and UCI have to offer," says Neha Rawal, director of Undergraduate Student Affairs in ICS. At the orientation sessions, students learned all about such offerings, including the wide variety of ICS undergraduate student organizations.

In fact, Dean Marios referred to ICS as a "candy store" of offerings. "Academics is obviously a priority, but you will be really remiss if you [don't] take advantage of all these things happening outside the

classroom," he said to students, also highlighting the ICS Industry Showcase event. "It's never too early to talk to recruiters!" he stressed. He also suggested joining the Butterworth Product Development Competition or, for students more interested in research, applying for the ICS Honors Program. Students can also visit UCI's Division of Career Pathways (DCP) for various professional development activities.

Dean Marios also told students to prepare to be challenged and praised them for their ability to succeed. He assured them there's a reason they were selected from more than 20,000 people who applied, so he knows they're up to the challenge! However, he reminded them they're not alone if they start to feel overwhelmed. "Seek the help of instructors... they're there for you," he said. "Take advantage of our staff. The Student Affairs Office is dedicated 100 percent to helping you." He also advised students to take care of themselves. "Sleep well, eat well and exercise. This is so unbelievably basic, you don't realize it," he said, "but it will be enormously helpful."

After driving home the message of campus engagement and student well-being, Dean Marios wrapped up his welcome: "I wish you all the best during your time at UCI ICS!" 

Dean Marios Papaefthymiou welcomes first-year students to the School of ICS, holding up the UCI ICS T-shirt each student received.





Competing on a Global Scale

UC Irvine makes it to the 2023 World Finals of the International Collegiate Programming Contest.

UC Irvine, after earning a bronze medal in May 2023 at the North American Championship of the International Collegiate Programming Contest (ICPC), qualified for the World Finals. ICPC, the oldest and largest programming contest, advertises the competition as follows: “Each year, an elite group of the brightest collegiate problem solvers on the planet comes together to compete [at] the ICPC World Finals.”

For 2023, that elite group included three ICS students:

- computer science freshman Elijah Huang,
- computer science junior Jerry Li, and
- computer science and math (double major) sophomore Thomas Neill.

“When the results of each teams’ final submissions were revealed and it became

clear that we were bronze medalists, it was incredibly exciting,” says Neill. “It was rewarding to see our hard work preparing pay off and to proudly represent UCI with a solid result.”

Associate Professor of Teaching Michael Shindler, who helps organize the various UCI teams competing in ICPC – including this award-winning UCI Map team – was impressed by the results. “The credit really goes to the students; they put in the work and it showed with their impressive performance.”

The North American Championship

The students are thrilled to continue their ICPC journey, which started back in February 2023 at the Southern California Regional competition and took them all the way to Orlando in May for the North

- ◀ *Team UCI Map celebrates its win: (from left) Jerry Li, Thomas Neill and Elijah Huang with computer science Ph.D. student Pooya Khosravi, one of their coaches.*

American Championship.

"Honestly, our goal was just to qualify for the World Finals, which is top 18," says Huang. The team exceeded its own expectations with its sixth-place bronze medal finish.

"Being able to not only qualify for World Finals but also get a bronze medal was beyond surprising for me," admits Li. "We were extremely happy when we found out how well we did."

The students credit effective teamwork for their success. "A lot of what I learned was about teamwork and how effectively working together allows the team to achieve things that one single person would not have been able to," says Li. They took a "divide and conquer" approach for the easier problems and collaborated on the more difficult ones.

"One strategy was effectively delegating problems based on our relative strengths: implementation for Thomas, graphs for Jerry, and math for me," says Huang. This helped the team save time, which gave them the edge in tiebreakers between teams that had solved the same number of problems.


"Competing at NAC was a great experience!" says Neill. "It was amazing to meet some of the best problem solvers in North America, to learn some new algorithmic tricks at the programming camp, and, of course, to participate in the next stage of the ICPC."

Prepping for the World Finals

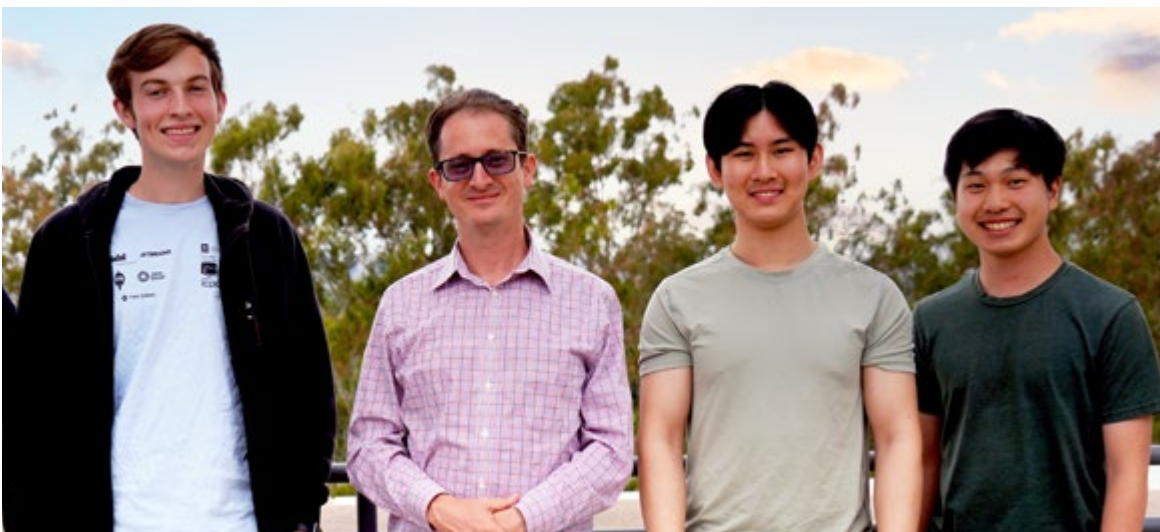
ICPC training at UCI is typically run through the ACM@UCI student club, where Li serves as president and Neill is internal vice president. Prepping for World Finals over summer while school is out was a new undertaking.

"For the summer, since we were all separated geographically, we practiced individually, honing each of our skills," says Li. "When school started back up in the fall, we started doing team contests to make sure that [our] teamwork and flow remained strong."

They kept up the hard work all fall and winter. "We do a mock five-hour contest every Saturday, with discussion afterwards to target weaknesses in our strategy," says Li. "Individually, we have also been practicing on popular competitive programming websites such as Codeforces as well as solving the problems that we were not able to solve during our mock contests."

They now look forward to competing in Luxor, Egypt, in April 2024! 

Thomas Neill (left), Professor Michael Shindler, Elijah Huang and Jerry Li.



International Collaboration to Advance AI

The Hasso Plattner Institute hosted a retreat on data and AI in Rheinsberg, Germany, collaborating with faculty and students of the HPI Research Center at UC Irvine.

▼ *Participants of the Hasso Plattner Institute's "Fall Retreat of the HPI Data & AI Cluster."*



2023 was a banner year for artificial intelligence, with generative AI going mainstream thanks to the rise of large language models (LLMs). As AI moves center stage in our daily lives, there's a critical need for cutting-edge research into its foundations, reliability and potential impacts.

The Hasso Plattner Institute Research Center in Machine Learning and Data Science at UC Irvine (HPI@UCI) is well positioned to continue addressing this need (hpi.ics.uci.edu). Established four years ago, the partnership between HPI, based in Germany, and the School of ICS is fostering international collaboration focused on interdisciplinary solutions that put people at the center of AI. In particular, HPI and ICS researchers are working to build innovative AI systems that are adaptive in real-world environments; robust, safe and self-aware; and human-centered, building trust with users.

At a fall retreat hosted by HPI in Rheinsberg, Germany, in September 2023, HPI@UCI faculty and students gathered to explore new research directions for data- and AI-based applications.

"One of the HPI 'research clusters' is in data and AI," says Erik Sudderth, an ICS professor of computer science and statistics who serves as director of HPI@UCI. "That cluster connects really well with the themes of our school," he explains. The expertise of ICS researchers studying machine learning and AI pairs well with HPI researchers exploring other areas such as health data and energy efficiency.

"The retreat helped plant the seeds of collaboration," says Sudderth. "We were able to brainstorm ideas for new directions, building bridges between our various areas of expertise."

HPI@UCI

In its first three years, HPI@UCI funded 16 graduate student research fellows exploring areas ranging from machine learning safety and interpretability, to data analysis in smart spaces. Working with ICS faculty members, they produced more than 50 research papers.

HPI recently extended its initial three-year partnership with ICS, and HPI@UCI now has 15 fellows after welcoming seven new students into the program in 2023:

- Sakshi Agarwal, studying inference in deep generative models;
- Yuxin Chang, interleaving deep learning and statistical techniques;
- Kyungmin Kim, studying reinforcement learning and computer vision;
- Preethi Seshadri, working to advance trustworthy, safe and fair machine learning;
- Tamanna Hossain, developing trustworthy natural-language processing (NLP) systems aligned with human values;
- Kushagra Pandey, exploring deep generative models and unsupervised representation learning; and
- Vishal Chakraborty, studying data management with a focus on privacy methods, access control and the Internet of Things.

Agarwal, Seshadri, Hossain and Chakraborty joined seven other HPI@UCI fellows at the Fall Retreat of the HPI Data & AI Cluster. "I found the HPI retreat to be a highly enriching experience," says Seshadri. "I had many engaging conversations about research and formed meaningful connections."



▲ 2023 HPI@UCI fellows (from left): Sakshi Agarwal, Yuxin Chang, Kyungmin Kim, Preethi Seshadri, Tamanna Hossain, Kushagra Pandey and Vishal Chakraborty.

Accompanying the students to Rheinsberg were five of eight ICS faculty members affiliated with HPI@UCI: Sudderth, co-directors Padhraic Smyth and Stephan Mandt, Roy Fox and Sharad Mehrotra.

Erik Sudderth (second from left) in Rheinsberg with his students (from left) Sakshi Agarwal, Harry Bendekgey and Federica Zoe Ricci. ▶

Data & AI Research Retreat

The four-day retreat opened with Tilmann Rabl of HPI talking about his current research into data engineering systems. The following day, Sudderth gave a keynote on structured prediction with deep generative models. Several HPI@UCI students also gave research talks, including Chakraborty on “Secure Deletion when Data Dependencies are Present” and 2022 fellow Eliot Wong-Toi on “Uncertainty Quantification in Deep Learning.” These were complemented by presentations by two fellows of the 2021 cohort. Glenn Galvizo provided a system demo, “Graphix: Graph Glasses for Apache AsterixDB,” and Gavin Kerrigan offered a tutorial on the state-of-the-art in “Diffusion Generative Models.”

In addition to presentations of research results, HPI@UCI students and faculty were active in creating sessions for exploring new research directions. 2022 fellow Federica Ricci co-organized a session (with Pauline Hiort from HPI) on explainable drug response prediction with multiview networks, and 2021 fellow Harry Bendekgey organized a session on generative modeling for medical data.

“A lot of my lab’s research is focused around generative modeling, and we have looked at health data as an interesting

frontier where ethics and privacy are incredibly important, and the impact of well-trained models would be huge,” says Bendekgey, a fifth-year computer science Ph.D. candidate, advised by Sudderth. “I had many conversations with HPI students who have less experience with these models but are experts in healthcare applications and health data, opening up a big opportunity for collaboration.”

Since the retreat, Bendekgey has followed up with two HPI researchers about potential projects requiring multiple sets of expertise. “This collaboration wouldn’t have been possible without the visit and getting the opportunity to learn about others’ research,” he says, adding that he gained “new perspectives with which to approach these collaboration conversations.”

Seshadri, who participated in a panel session on the impacts of large language models, appreciated the diversity in both content format and topics.

“We had several structured talks and presentations as well as panel discussions, hands-on tutorials and interactive brainstorming sessions,” she says. “We also covered a wide variety of research, from applications and limitations of large language models, to interpretable machine learning for regulatory genomics, to resource-aware deep learning. It was great to witness the breadth and range of research directions.”

It was also great to connect in person. “Beyond research, the retreat fostered bonding on a personal level, from a competitive trivia night to several game nights,” adds Seshadri. “I came out of my visit with friends that I continue to keep in touch with.”

Hossain, who also participated in the LLM panel discussion, similarly appreciated the retreat. “I really enjoyed my first experience being a panelist. We chatted about the rise of LLMs like ChatGPT, their societal impacts and what lies ahead,” she says. Since the retreat, she has maintained contact with some of the researchers she met to discuss

“**We were able to brainstorm ideas for new directions, building bridges between our various areas of expertise.**”

- Erik Sudderth
Professor of Computer Science and Statistics




papers and explore potential research directions. “I’m thankful for the opportunity to expand my professional network and make new friends.”

Ongoing Collaborations

Connections weren’t made only at the retreat. In addition, Mandt hosted an HPI student, Robin van de Water, at UCI for three months in Fall 2023. Working closely with both Mandt and Smyth and their respective research groups, van de Water is now back in Germany, exploring data imputation and modeling electronic health data.

Another HPI student, Martin Boissier, visited Mehrotra’s database group from Fall 2023 through Winter 2024, researching a system to integrate data generators (such

as simulators) into databases in support of interactive exploratory data analysis. “The project, which has turned into a collaboration with Professor Rabl at HPI, is expected to lead to a new direction of data management research,” says Mehrotra. Collaborating with another ICS Ph.D. student, Sriram Rao, they have developed a prototype system. The goal is to improve data processing workflows in systems that use simulators, such as fire spread models, to understand the impact of such events on disaster preparedness.

“We look forward to the advances in human-centered AI and data science that will arise from these new collaborations,” says Sudderth, “as well as future interactions with our HPI colleagues at events in both Irvine and Germany.” 



The Road to Excellence

The ICS Office of Outreach, Access & Inclusion helps students thrive, regardless of where they are on their journey to excellence.

▲ OAI tutors (from left) Bhuvan Chandra, Ananya Jajoo and Elijah Isaiah Tavares.

“Prepare to be challenged” was the message at the new student orientation for the School of ICS — but that doesn’t mean students have to go it alone. “Excellence is the bar that we set for our students,” says Vinh Luong, outlining the rigors of earning an undergraduate or graduate degree in ICS at UC Irvine. However, as assistant director of the ICS Office of Outreach, Access & Inclusion (oai.ics.uci.edu), he wants students to know that OAI is here to help.

The Office of Outreach, Access & Inclusion

Historically, the Stacey Nicholas Office of Outreach, Access and Inclusion covered both the School of ICS and the Samueli School of Engineering. Then, recognizing the unique needs of students in each school, the office reorganized in 2022 to better serve students while still coordinating on areas and initiatives of shared interest.

As outlined in its vision statement, the new ICS OAI focuses on “diversifying the tech sector and making all areas of computing inclusive across the

intersections of gender identification, race, ethnicity, socioeconomic status, sexual orientation, and disability status.”

“It’s important that you look at things through an intersectional lens,” says Luong, referring to a concept first coined by Kimberlé Crenshaw. “It’s a messy thing when you’re talking about identity in computing.”

As of 2022, in the U.S., *Code.org* reports that Black, Hispanic/Latino, Native American and Pacific Islander students make up only 17 percent of computer science majors. According to a National Science Foundation report, only 20 percent of computer science undergraduate degrees in the U.S. go to women; when you look at Black women, that number dwindles to less than 3 percent. Studies have also shown that the tech industry can be a dangerous and unwelcoming place for LGBTQ employees, and there are countless barriers for people with disabilities.

“Underrepresentation in computing is a systemic issue,” says Luong. “The programs, services and resources that our office provides are open to all ICS students,

but we need to make sure that the students who face the most challenges in computing are the ones who are being specifically targeted in our outreach efforts.”

Targeted Outreach

The biggest hurdle to helping students is building awareness. “We’re on a mission to make sure that students understand the services and opportunities that this office provides,” says Luong. Such services include the following:

- free tutoring,
- mentoring programs,
- workshops and conferences,
- professional development services, and
- community-building activities.

To advertise these programs to students most in need, Luong leverages ICS data, identifying low-income and first-generation students as well as students coming from underrepresented backgrounds. “Targeting very specific students so they know that we exist is really important.”

Expanding Access

The overall goal is to expand access to all of the opportunities available to ICS students. “We want to expand access to recruiters, internships, tutoring programs — you name it!” says Luong. “And it’s for all of our students. Our outreach is focused, but the programs are open to everyone.” To that end, OAI is fostering a culture where students feel empowered to ask for help and to support each other in overcoming challenges.

Another way OAI is expanding access is through its K-12 outreach. “There’s value in early exposure,” says Luong, “in giving kids the chance to explore topics in computing at an early age.”

In 2022, OAI hosted the inaugural ICS Summer Academy for high school students, offering a two-week camp on data science and analytics, led by distinguished ICS faculty. In 2023, the academy expanded its course offerings to include machine learning, and this year, it’s adding cryptography and software engineering courses. Scholarships are available to students based on financial need, removing barriers to this unique UCI experience.

Inclusive Excellence

Inclusion is the overarching message of this work, but Luong realizes it can come across as an abstract concept. “We often hear the words ‘inclusive excellence’ on this campus, but what do we, as a school, mean when we say that?” asks Luong, before providing his own interpretation.


“Across the board, the bar is excellence,” he explains. “The inclusive part is where we come in. It’s the understanding that you, depending on your background, may need more support than another student.” Not all students have the same math or programming background, the same exposure to technology, or the same access to mentors or tutoring services.

“We know that it’s an unlevel playing field,” says Luong, “but we want all students to get to that level of excellence.”

In building the support needed, Luong is creating partnerships across campus. “UCI’s Office of Inclusive Excellence, the Medical Center, Physical Sciences, Humanities, the School of Business — they’re all talking about inclusive excellence. The fields and the domains are different, but the strategies for getting more underrepresented students into your orbit can be shared.” He is also looking to national organizations, such as the National Center for Women & Information Technology (NCWIT) and the Computing Alliance of Hispanic-Serving Institutions (CAHSI). “They’ve been around for 20-plus years, which means that they come with ideas and strategies that have been tested. We want to bring those to our campus and contextualize it for our needs.”

Diversifying the Tech Industry

Luong is excited to be building sustainable, foundational support programs for ICS students and local youth, but the road to excellence doesn’t end with a degree. When looking back in three to five years, he aims to see continued increases in ICS student-body diversity, slowly but surely translating into a diversified tech industry, producing more innovative and inclusive technology solutions.

“When you don’t have a diverse workforce building the AI tools that you’re using, the whole of society isn’t represented, because baked into these algorithms are biases,” he says. “That’s why it’s so important that the technology that we use is being built by people coming from different lived experiences.” 



Summer Engagement

ICS summer programs offer something for everyone, from high school students to undergraduate scholars to college instructors.

▲ *High school students Zeina Harden and Vitoria Mendez at the Data Science 4 All summer camp.*

If “beach days” and “learning loss” is all that comes to mind when you think of summer break in Southern California, then you haven’t visited the School of ICS in July or August. A unique blend of summer programs offered at a variety of levels keeps both students and instructors engaged in yearlong learning.

High School Outreach

ICS hosted two programs in summer of 2023 designed to introduce computing and hands-on research to high school students. Both were

two-week camps held on weekdays from 9 a.m. to 4 p.m.

The Data Science 4 All (ds4all.ics.uci.edu) program took place July 10–21, 2023, with 10 high school students, in teams of two, conducting data analysis. Did people enjoy the movie “Spider-Man: No Way Home”? How did red states versus blue states view the 2020 election? How popular is high school football?

These are some of the questions students analyzed, exploring related tweets using Texera, an open source platform for collaborative data analytics. The platform is

being developed by ICS Computer Science Professor Chen Li, who led the summer program in collaboration with Professor Wei Wang of UCLA.

Thanks to funding through the National Science Foundation (NSF) Broadening Participation in Computing (BPC) program, the summer camp (which included lunch) was free. Instructors were both UCI and UCLA professors as well as Ph.D. students with expertise in data management, data science and machine learning.

The goal was to leverage the Texera platform in teaching students – particularly those with a limited background in computing – data science and machine learning techniques, including basic concepts about data wrangling, ML training, data classification, sentiment analysis and visualization.

“It’s amazing that these students, despite their various backgrounds, within one day were able to become familiar with Texera and then use the system to do data wrangling and data preparation steps,” says Li. “We were pretty happy to see the students learn how to use the system so quickly.”

A second program, the ICS Summer Academy (summeracademy.ics.uci.edu), hosted 45 local high schools students. First launched by the ICS Office of Outreach, Access and Inclusion in 2022 with the “Data Analytics: Theory & Applications” course, the

academy exposes high school students to the ever-growing field of computing and its variety of topics and practical applications. In 2023, it added a course on “Artificial Intelligence (AI) and Machine Learning (ML).”

So from July 10–21, 2023, students in Session I learned about data processing, data visualization and statistical modeling, and from July 24–Aug. 4, students in Session II (with 80 percent of students attending both sessions) learned about basic ML/AI concepts such as classification, clustering, tree-based modeling, Bayesian networks, and AI and games.

At the concluding symposium on Aug. 4, students gave group presentations on a research question related to better understanding Alzheimer’s disease. During the symposium, Computer Science Professor Magda El Zarki, who serves as director of the academy, praised the students. “I’m amazed by the pool of students we had here,” she said. “They exceeded all our expectations in their learning abilities.” The students presented on topics ranging from “Analyzing the Impact of Alzheimer’s Disease” to “Indicators of Diagnosis” to “Alzheimer’s Mental Illness & Socio-Demographic Factors.” The presentations exemplified the students’ understanding of complex topics as applied to a real-world dataset.

ICS Summer Academy students from Session II and some of their instructors.



Undergraduate Research Training

Another pair of programs supported undergraduate research.

The first started out as a proposal called “Cultivating the IoT-enabled Smart Community” (IoT-SITY; sites.uci.edu/iotsity), which aimed to set up an NSF Research Experiences for Undergraduates (REU) site at UCI. Led by ICS Computer Science Professor Nalini Venkatasubramanian, the site was established in 2017, and that summer, nine undergraduate students from across the nation spent eight weeks at UCI.

Since that first cohort in 2017, a total of 54 undergraduates from 35 institutions have participated – including nine students during summer 2023. Students worked on projects ranging from a Smart Water Data Exchange to a Testbed for IoT-based Privacy-Preserving Pervasive Spaces.

Ilana Nguyen, a second-year computer science student at Brown University, worked on building a deep learning classification model for fall risk assessment. “We used a large language model called Bio-Clinical BERT and then we trained it on free-form nurses’ notes, which we labeled as high, medium or low fall risk,” says Nguyen, who presented the work at the MIT Undergraduate Research Technology Conference (MIT URTC) in October.

“This program is uniquely positioned,” says Venkatasubramanian, “to train a diverse group

The 2023 IoT-SITY participants (clockwise from top left): Anton Dmitriev, Swagnik Roychoudhury, Hector Anaya, Ilana Nguyen, Rebecca Agyapong, Jayci Wimmer and Isabella Villarente (not pictured: Justin Chen and Celeste Penney).



▲ *ISI-BUDS students taking a break from their research for a kayaking outing.*

of next-generation scientists who have the expertise needed to manage and navigate this emerging world of data and devices for the benefit of society.”

The second undergraduate research program offered for the summer of 2023 was the Irvine Summer Institute in Biostatistics and Undergraduate Data Science (ISI-BUDS; isi-buds.github.io/website). For the second year in a row, UCI was one of only 10 universities in the U.S. to host this free six-week program to train undergraduate students in the fundamentals of biostatistics, data science and computing. Fifteen students from across the nation came to UCI for hands-on experience in conducting cutting-edge biomedical research and learning about careers and graduate school opportunities in biostatistics.

The institute is part of the Summer Institute in Biostatistics program offered through the National Heart, Lung, and Blood Institute (NHLBI). ISI-BUDS is the only institute also supported by the National Institute of Allergy and Infectious Diseases (NIAID). “Our product is the success of our student participants,” says Statistics Professor Volodymyr Minin, who co-directs the program with ICS colleagues Dan Gillen, Babak Shahbaba and Mine Dogucu. “We want to increase interest in and access to advanced degrees in biostatistics and related career opportunities to address the growing demand for biostatisticians and data scientists. Careers in biostatistics often require at least a master’s degree, so seeing ISI-BUDS alumni applying to and getting accepted into statistics and biostatistics graduate programs tells us that we are succeeding in our mission.”



▲ BATS program directors and boot camp attendees standing in front of Donald Bren Hall.

Instructor Support

It wasn't just students who took advantage of the ICS summer offerings. On July 10, 2023, 17 instructors from all around the country arrived at UCI for a weeklong boot camp aimed at advancing Bayesian Thinking in STEM (BATS; stat.uci.edu/bayes-bats).

The wide range of applications for Bayesian statistics — from supply-chain management to climate change adaptation — was part of the motivation for creating the BATS program.


"There is such a need for this kind of training," says Statistics Professor Mine Dogucu, who led the BATS program in collaboration with Jingchen (Monika) Hu of Vassar College and Amy Herring of Duke University. The program stems from a paper Dogucu and Hu wrote in 2022: "The Current State of Undergraduate Bayesian Education and Recommendations for the Future."

As outlined in the paper, their review of 150 colleges across the U.S. revealed that only 46 offered a Bayesian course, and in all but four, it was an elective — not required — course. "UCI was one of only four that required the course [for its data science major]," says Dogucu.

“ We have a lot of programs designed for students, but there's very, very few opportunities for faculty training after people get their Ph.D. ”

- Mine Dogucu

Assistant Professor of Teaching; Vice Chair of Undergraduate Studies

Based on the findings — and with funding from an NSF program aimed at improving undergraduate STEM education — Dogucu, Hu and Herring designed a program to broaden the reach of Bayesian learning through instructor training. "We have a lot of programs designed for students," says Dogucu, "but there's very, very few opportunities for faculty training after people get their Ph.D." The ultimate goal is to strengthen undergraduate-level statistics education for improved scientific outcomes. 



Celebration of Teaching

At the 2023 UCI Celebration of Teaching, Shannon Alfaro was named Lecturer of the Year.

On Sept. 21, 2023, UC Irvine held its 31st Annual Celebration of Teaching, recognizing excellence in undergraduate teaching. Three faculty members from ICS were among those honored, including Shannon Alfaro, who was named Lecturer of the Year. In addition, Anne Marie Piper was named a Digital Accessibility Innovator, and Constance Steinkuehler was recognized as a Dean's Honoree for Excellence in Undergraduate Teaching.

"This is our third Lecturer of the Year award in the past seven years," said Alfaro, noting that Ray Klefstad and Alex Thornton won in 2017 and 2019, respectively. (Also, Matthew Bietz earned an honorable mention this year.) "I think the high propensity of winners is a testament to the high-quality instruction that's taking place here in the School of ICS."

Lecturer of the Year

Alfaro, a lecturer in the Department of Computer Science, stresses that she and her colleagues are constantly striving to find ways to support ICS students. "We focus on advancing our pedagogical skills using the most effective techniques to ensure students not only know the material but are also prepared for success."

For example, many computer science majors start with ICS 31, the first of three

▲ *Shannon Alfaro speaks with a student after class.*

lower-division courses in UCI's "Introduction to Programming" sequence. "My goal in teaching 31 is to make sure the students are prepared to succeed not just in 31 but throughout the series," says Alfaro. "So I track our fall quarter majors." Working with other instructors in the series, she identifies where students are struggling and makes adjustments as needed in ICS 31 to ensure she's providing a solid foundation to meet the rigor of future courses.

Alfaro explains that she works from "whole person" perspective. "Something that I do at the beginning of class, particularly if I have first-year students, is I share my own undergraduate experience," she says. "I talk about my mental health crisis when I was a junior in college and the resources I used." She explains that this helps "normalize struggling" while emphasizing ways to seek support, as she shares the various resources available at UCI, such as the Basic Needs Center, the Counseling Center and the Division of Career Pathways.

Alfaro also teaches the "ICS 90: New Student Seminar" course to help students better navigate the college experience. "There's this whole hidden curriculum," she says. "So we cover everything from how to create a four-year plan and apply for internships to how to deal with setbacks."

Digital Accessibility Innovator



Anne Marie Piper

Piper, an associate professor in the Department of Informatics who studies human-computer interaction and accessible computing, is also always looking

to help students succeed, particularly students with disabilities. Receiving the Digital Accessibility Innovator award (along with Amalia Herrmann of the School of Humanities), Piper follows in the footsteps of her colleague Stacy Branham, who earned the aural title in 2022.

This past spring, Piper taught an Informatics graduate seminar on Accessible Interaction. “We started the very first class with a discussion of what it would take to make class accessible to all [and] whether that’s even possible,” she says. They delved into a variety of issues, ranging from social acceptance of disability in higher education to requesting accommodations from advisors who often don’t understand accessibility. The course also featured guest speakers.


“We have a long way to go toward realizing a vision where disabled students are able to move fluidly within and between physical and digital classroom spaces, research environments, and the myriad digital tools and materials required for succeeding at an academic institution,” says Piper.

Dean’s Honoree



Constance Steinkuehler

Steinkuehler, a professor in the Department of Informatics, was selected from ICS as the Dean’s Honoree for Excellence in Undergraduate

Teaching. As codirector of the Games+Learning+Society (GLS) Center, Steinkuehler studies culture, cognition and learning in the context of multiplayer online videogames, and she teaches courses on games and society, visual design, and research methods. 

The Dean’s Faculty Awards

Each year, the Dean’s Faculty Awards recognize ICS faculty who distinguish themselves through their innovative research, dedicated service, exemplary student mentorship and exceptional teaching. The 2023 Dean’s Faculty Awards recognized the following:

- **Excellence in Research: Daniel Gillen**, Chancellor’s Professor and chair of the Department of Statistics. Gillen’s research addresses challenges in survival statistics, longitudinal data and the methodology of clinical trials.
- **Excellence in Mid-Career Research: Mizuko Ito**, director of the Connected Learning Lab (CLL). Ito’s research area is in digital media and learning and, more specifically, the new ways youth learn in a networked generation, including aspects of social computing and computer games.
- **Excellence in Service: Jennifer Wong-Ma**, associate professor of teaching, Department of Computer Science. Wong-Ma mentors and supports ICS faculty in teaching large courses and training new staff members. She is also an advisory board member for UCI Women in Technology (WiT), a co-advisor for Women in Information and Computer Science (WICS) and an advisor for UCI Commit The Change (CTC).
- **Excellence in Graduate Student Education and Mentoring: Yunan Chen**, associate professor, Department of Informatics. Chen has demonstrated excellence in mentoring, being mindful to publish with her students. On three occasions recently, her students were finalists in the Student Paper Competition sponsored by the American Medical Informatics Association.
- **Excellence in Undergraduate Teaching: Sergio Gago-Masague**, assistant professor of teaching, Department of Computer Science. Gago-Masague has demonstrated exceptional teaching abilities and a dedication to preparing his students beyond the standard curriculum.

FACULTY HIGHLIGHTS

Zhao Receives NSF CAREER Award



Shuang Zhao received a Faculty Early Career Development (CAREER) award, a prestigious National Science Foundation (NSF) award for early-career faculty serving as role models in research and education and leading advances

in their field. As an assistant professor of computer science, Zhao is developing numerical algorithms with applications in many areas, including computer vision, computational imaging, robotics, and virtual/augmented reality. In particular, this five-year, \$600,000 NSF award supports his Physics-Based Differentiable and Inverse Rendering project, which involves developing new computational tools to infer physical parameters from images.

Informatics Researchers Improve Software Developer Mental Well-Being and Productivity with \$1.6M NSF Grant



“Software development can be a very stressful endeavor, with serious negative consequences on one’s mental well-being,” says Informatics Professor André van der Hoek, who is the principal investigator on a new \$1.6 million grant from the National Science

Foundation: “Improving the Mental Well-Being and Productivity of the Software Development Workforce of Tomorrow.” His co-investigators are two Informatics colleagues, Iftekhar Ahmed and Madhu Reddy, and Stephen Schueller from the School of Social Ecology.

Dechter Leads ICS Team in Multi-University \$5M NSF Grant on AI-Based Causal Decision Making



Computer Science Professor Rina Dechter is one of five co-principal investigators for a \$5 million, multi-institutional NSF grant titled “Causal Foundations of Decision Making and Learning.” The grant, which aims to revolutionize AI decision-making by

advancing the science of causal inference, is led by Elias Bareinboim of Columbia University. In addition to co-PI Dechter and ICS investigators Roy Fox and Alexander Ihler, the project includes co-PIs and investigators from four other institutions. “When you’re talking about AI, decision-making is everywhere,” says Dechter. “This will be theoretical, foundational work, but it is applicable to everything, because causality is how people understand the world.”

Imani Receives DARPA Young Faculty Award



Mohsen Imani received the DARPA Young Faculty Award, which recognizes “rising stars” in research positions to support work in the context of national security needs. Imani, an assistant professor of computer science, has been granted \$1 million to spearhead research on

hyperdimensional computing as a neuro-symbolic AI technique, aiming to facilitate transparent and efficient learning and cognitive computation.

Epstein Earns NSF CAREER Award to Explore Self-Tracking Engagement



Daniel Epstein received the NSF CAREER award to advance his research into meaningful self-tracking experiences. “For the past decade, I’ve been doing work on personal tracking technology,” says Epstein, assistant professor of informatics. “But over

that time, there’s been this evolution. At first, people were so excited to keep track of the number of steps that they take... but abandonment of these sorts of technologies is really high.” Epstein hopes to reverse this trend with his NSF project, “Advancing Personal Wellbeing through Everyday Meaningful Self-Tracking Experiences.” The five-year funding of \$616,000 will support Epstein and his Ph.D. students as they explore how best to design tracking technology to improve data engagement.

Piper to Create Accessible Collaborative Work with \$2M NSF Award




Anne Marie Piper and some of her UCI colleagues received a \$2M NSF award for their project, “Building an Inclusive Future of Work: Accessible Collaboration for Visually Impaired Information Workers,” which aims to develop more equitable and inclusive collaboration tools. The project is a joint effort between Darren Gergle and Eleanor O’Rourke of Northwestern University and researchers at UCI, including Piper and her ICS colleagues, Stacy Branham

and Erik Sudderth, and Sharon Koppman of the Paul Merage School of Business. Over the next four years, the team will explore AI-augmented collaboration tools for information workers, focusing on how such tools can better support job-related skill development, worker self-efficacy and inclusive teamwork. “The ability to effectively use digital collaboration tools is a prerequisite for a range of entry-level and higher-skilled information jobs, such as project managers and technical writers,” says Piper. “Existing gaps in labor market participation and income will continue to widen if we don’t create a future of information work that is accessible for all.”

Interdisciplinary Team Awarded \$1.2M to Explore the Future of Risk Prediction in Fire Departments



Informatics Professor Yunan Chen is part of an interdisciplinary team working to help fire departments better

analyze data and apply prediction information technology (IT) for community risk reduction (CRR). The work is being supported through a \$1.2 million NSF grant, “Understanding the Present and Designing the Future of Risk Prediction IT in Fire Departments.” Chen is collaborating on the grant with her colleague Melissa Mazmanian, Chancellor’s Fellow and chair of the Informatics Department; Mauricio Mejía and Kathleen Pine of Arizona State University; and Myeong Lee of George Mason University. With ICS Ph.D. student Rachel Warren, the team conducted an empirical exploration of community-oriented risk work performed by fire personnel in California, Arizona and Virginia. 

FACULTY ACCOLADES

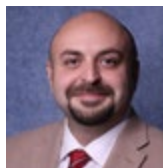


Distinguished Professor of Computer Science **Gene Tsudik** was honored with the ACM SIGSAC Outstanding Innovation Award, recognizing his seminal research

contributions to security and privacy for the Internet, anonymous and censorship-resistant communication, mobile networking, cloud computing and storage, databases, and the Internet of Things.



Computer Science Professor **Sandy Irani** was named an ACM Fellow for contributions to the theory of online algorithms and quantum complexity theory.



Mohammad Moshirpour, an associate professor of teaching in the Department of Informatics, received the 2023 APEGA Summit Award for Excellence in Education

for exemplary contributions to teaching and learning.



Assistant Professor of Computer Science **Mohsen Imani** was honored with the Office of Naval Research (ONR) Young Investigator Program (YIP) award for his

research on hyperdimensional computing as a neuro-symbolic AI technique.



Distinguished Professor Emeritus **Ramesh Jain** received the ACM Distinguished Service Award for establishing SIGMultiMedia, and for outstanding leadership and

persistent service to ACM and the computing community for the past four decades.



Distinguished Professor of Computer Science **Vijay Vazirani** was awarded the 2022 INFORMS John von Neumann Theory Prize for sustained and significant research into the

design of algorithms, including approximation algorithms, computational complexity theory, and algorithmic game theory.



Distinguished Professor of Computer Science and Statistics **Padhraic Smyth** was named an IEEE Fellow for his outstanding contributions to machine

learning and data science.



Associate Professor of Computer Science **Stanislaw Jarecki** was named a fellow of the International Association for Cryptologic Research (IACR) for fundamental

contributions to distributed cryptography and efficient secure computation.

INTRODUCING OUR NEW FACULTY FOR 2023



Habiba Farrukh

Assistant Professor, Computer Science
Ph.D., Computer Science, Purdue University

Farrukh's research interests broadly lie in the areas of mobile computing and security and privacy. The advanced computing and sensing capabilities of mobile systems make them attractive targets for attackers, threatening users' security and privacy. Farrukh's research combines system design, signal processing, computer vision, and machine learning methods to investigate these threats and propose methods for securing modern mobile and IoT devices and protecting users' privacy. She works on practical solutions to the security limitations of existing systems and emerging computing platforms. She also investigates the impact of these limitations on developers and end users and proposes secure systems that address the challenges of these new platforms. She joined the ICS faculty in September 2023.



Ana Kenney

Assistant Professor, Statistics
Ph.D., Statistics and Operations Research, Penn State University

Kenney's research interests are at the interface of interpretable machine learning, computational statistics, and optimization, particularly as applied to the "Omics" sciences. She develops techniques that leverage modern optimization tools to analyze large, complex and often noisy data. Working with statisticians, biologists, bioinformaticians and health experts has instilled a very pragmatic edge to her work, and she emphasizes stability, robustness, computational efficiency and practical relevance when approaching each project and technique she develops. Additionally, she has specialized training in tackling challenges posed when working with large amounts of sensitive, biomedical data – challenges such as scalability and data privacy. She joined the ICS faculty in September 2023.



Thomas Yeh

Assistant Professor of Teaching, Computer Science
Ph.D., Computer Science, UCLA

Before returning to academia in 2020, Yeh worked in industry, with roles spanning research, architecture, design, verification, marketing and management. His research interests include computer architecture, acceleration of machine learning, and computer science education. His specialties include parallel programming, processor microarchitecture, multi-core/many-core processors, physics-based animation, interactive entertainment, and computer arithmetic. His research has been published at the International Conference on Machine Learning (ICML), the International Symposium on Computer Architecture (ISCA), the IEEE/ACM International Symposium on Microarchitecture (MICRO), and in the ACM Transactions on Graphics (TOG). He joined the ICS faculty in July 2023.

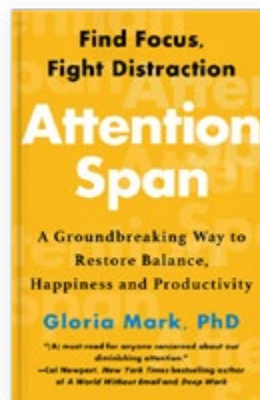
Regaining Focus in a World of Digital Distractions

Chances are, you're going to look away in less than a minute. Gloria Mark's recent book is a weapon in the fight against daily distractions.



In a society that quickly loses focus, the media has been paying a lot of attention to Gloria Mark and her new book, *Attention Span: A Groundbreaking Way to Restore Balance, Happiness and Productivity* (Hanover Square Press, 2023). The book reports that people spend an average of just 47 seconds on any one screen before shifting their attention elsewhere. In terms of how often we switch projects, readers learn why it can take up to 25 minutes on average to return our attention to a project after an interruption.

"There's been a lot of media interest in the book, more than I could ever have imagined," says Mark, Informatics Professor Emerita in the School of ICS. "But it's because people have trouble staying focused. It's just



such a common phenomenon." With a Ph.D. in psychology and decades of experience in studying how people interact with technology, Mark is now broadly sharing her findings about attention spans in the digital age. Breaking down

myths and offering strategies for individuals, organizations and society at large, she is calling for a cultural shift that will help us regain our ability to focus.

Did it surprise you how often we shift our attention?

It did! I started studying attention spans with my student, Victor Gonzalez, back in 2004, and at the time, we found that people were spending two and a half minutes on a screen. So this was a considerable decrease, and yes, I was surprised, though I too had had felt myself switching attention a lot. But remember, this is an average. Sometimes we can stay focused for longer, but the median length of time in the last five years is only 40 seconds. That means half of all our observations are less than 40 seconds on any screen. And this has been replicated by independent studies as well. The idea that we're shifting our attention so rapidly is what I refer to in the book as kinetic attention.

You also report that we're self-interrupting 49% of the time. Should we change our behavior?

Yes, but we need to think about it as a cultural shift. In the book, I talk about how change has to come at three levels.

First is individually. I think people can develop their own agency to control their attention better. There's a lot of software on the market to help people self-regulate, but I argue that it's better for people to learn self-efficacy on their own.

Then, on the organizational level, some companies have proposed batching emails, which is sending email out only two or three times a day. But my research shows that's not a silver bullet, because it really doesn't lower stress or increase self-reported productivity. We find that people check email, on average, 77 times a day. So batching can help rewire people's expectations, so maybe they check email only three times a day, but a better strategy is to do either an email-free day or to restrict the window of time when electronic communications can be sent, to change people's conditioning for constantly checking. Of course there needs to be exceptions made, but I think that's the right direction to go.

But on a societal level, there are also things we can do. Some countries have enacted what's called the "right to disconnect" law, so employees aren't penalized for not answering emails before

and after work hours. France has the El Khomri Law, Ontario has its Workers Act of 2021 and Ireland has its Code of Practice Act. These are good models to consider.

Can you talk about the four myths presented in the book?


One myth is this idea that we should be focused nonstop for hours when we're on our devices. A popular narrative is "let's be as focused as we can for as long as we can," but it's just not realistic. We can't lift weights all day without getting exhausted. People need to take breaks.

Another myth is that so-called mindless activity is terrible. And the short answer is, yes, it's not good to get into a trap where you're stuck on social media or playing a mindless game for hours. But if we can use these kind of activities strategically and briefly to help us take a break and let our minds settle, that's not a bad thing.

Another myth relates to "flow," which is when you're at an optimal point of creativity and lose track of the passage of time. If you're an artist or musician, or if you play sports, people commonly get into the flow of what they do. Everyone says, "Oh, yes, we should strive to be in flow most of the time," but it turns out that for the kind of work that many of us do, knowledge work, flow is just not realistic. I would say that instead of striving to get into flow, let's instead strive to be aware of our natural rhythms of when we can be in peak focus.

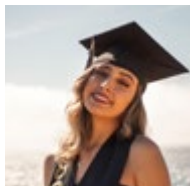
The last myth is that notifications and targeted algorithms are solely to blame for our lack of attention. They absolutely play a role, but we're nearly as likely to interrupt ourselves (say, to check email or surf the web) as to be interrupted from some targeted or algorithmically designed notification.

What do you hope is the main takeaway from reading your book?

I hope the book gets people to develop conversations about our behavior — our attention behavior in our digital culture — and to understand the science behind the distractions. I'd like people to start thinking about how we can make a cultural shift, and what I'm introducing is a new language for thinking about that phenomenon. 

STUDENT HIGHLIGHTS

Magana-Ramirez Awarded NSF Graduate Research Fellowship



Christina Magana-Ramirez, a Ph.D. student, was one of 12 students to receive a 2023 National Science Foundation Graduate Research Fellowship in statistics.

Her research has involved exploring how to better recruit minority groups for Alzheimer's disease clinical trials. Her NSF Fellowship research proposal narrows in on sequential testing, which can reduce costs, increase the number of available participants, and improve the participant experience.

Dr. Johnson and Dr. Williams: An Important First in Informatics



In June 2023, UCI celebrated Jazette Johnson and Lucretia Williams as the

first Black women to earn their Ph.D. degrees in informatics from the School of ICS. Johnson's dissertation explored how young caregivers of people living with dementia use social media as a form of support. What she found was a need to expand people's views of the term "caregiver" and to find new ways to offer a sense of community. Williams focused on designing and evaluating digital mental health technologies for cultural responsiveness.

Dunkel Heads to Seoul as Fulbright Fellow



"How does play become industrialized as part of the larger practice of a culture industry?" This question is central to the research of William Dunkel, an informatics Ph.D. candidate in ICS. Thanks

to the Fulbright U.S. Student Program, Dunkel is spending the 2023-24 academic year in Seoul, collaborating with Dr. Young Yim Doh, a distinguished expert in the Games & Life Lab at KAIST.

Jo Awarded 2023 Google Fellowship



On Oct. 13, 2023, Google announced the recipients of its North American and European Ph.D. Fellowships. Eunkyung Jo, who is earning her Ph.D. in informatics, was one of eight students in the area of human-

computer interaction to receive the prestigious fellowship. Jo's work focuses on personal informatics systems for mental health.

Ibrahim Awarded Link Foundation Fellowship



Muhammad Twaha Ibrahim has been awarded the Link Foundation Fellowship for Modeling, Simulation and Training. The fellowship aims to foster advanced-level research in modeling,

simulation and training by enabling Ph.D. students to work on their research full time and disseminate the results, supported by \$34,000 in funding. "With the support from this fellowship, I can focus more time on developing and enhancing my current research, which is on Dynamic Spatially Augmented Reality, or DynaSAuR for short," says Ibrahim.

Zhang Receives Outstanding Doctoral Dissertation Award



On June 11, 2023, ACM SIGGRAPH announced the recipient of the 2023 Outstanding Doctoral Dissertation Award, recognizing Cheng Zhang

"for a dissertation presenting significant advances in physics-based rendering and providing both practical tools and theoretical foundations for future differentiable rendering algorithms." Zhang earned his Ph.D. in computer science in June 2022 and is now a research scientist at Meta Reality Labs.

Ramanathan Named Internet Society Pulse Research Fellow



On May 8, 2023, the nonprofit Internet Society announced its inaugural cohort of Pulse Research Fellows, and Alagappan (Ashwin) Ramanathan was among the select few named. As a computer science Ph.D. student, Ramanathan is researching Internet resilience through measurement studies. His fellowship project, “Analyzing Cross-layer Resilience of the Internet under Catastrophic Natural Disasters,” proposes a novel method for mapping the Internet at the physical and network layers with a connection to climate and natural disasters.

Liu Named a 2023 Rising Star in Cyber-Physical Systems



Computer science Ph.D. student Fangqi Liu, whose research focus includes cyber-physical systems (CPS), was one of 32 students selected to attend the CPS Rising Stars 2023 Workshop. The workshop aims to mentor exceptional Ph.D. students and postdocs pursuing academic careers related to CPS. Liu’s research interests encompass vehicular ad hoc networks, mobile sensing, data collection in Internet of Things applications, and CPS for monitoring emergency scenarios.

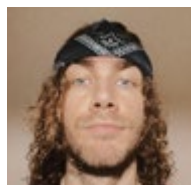
Two ICS Students Win Grad Slam 2023



Two ICS graduate students perfected a three-minute pitch about the practical applications of their research to take first and second place at UCI’s Grad Slam 2023. Informatics Ph.D. student Emani Dotch, whose assistive technology helps children with autism, won \$2,500 and tied for second place. Computer science Ph.D. candidate Muhammad Twaha Ibrahim was named the champion after explaining how a spatially augmented reality system can support remote surgical assistance. His first-place win earned him \$6,000 and the opportunity to represent UCI at the Grad Slam Systemwide Finals.

Two ICS graduate students perfected a three-minute pitch about


New Findings on CAPTCHAs Attract Worldwide Attention



Research by Andrew Searles, a computer science Ph.D. student, is garnering a lot of attention. Searles shared his work at the 32nd USENIX Security Symposium, with his paper, “An Empirical Study & Evaluation of Modern CAPTCHAs.” He co-authored the paper with his Ph.D. advisor, Distinguished Professor of Computer Science Gene Tsudik; recent ICS alumni Ercan Ozturk (now at META Research), Yoshimichi Nakatsuka (ETH Zürich), and Ai Enkoji (Lawrence Livermore); as well as Andrew Pavard (Microsoft Research). The results, which suggest that bots outperform humans across a wide variety of CAPTCHA types, have appeared in publications ranging from *New Scientist* to *PC Gamer*, and a related tweet from Elon Musk has more than 24 million views.



Cyber@UCI Team Wins Hivestorm

On Oct. 14, 2023, members of the ICS student organization Cyber@UCI (cyberuci.com) won Hivestorm, a collegiate cyber defense competition. Team members Akshay Rohatgi, Charles Wu, Joshua Change and Payton Erickson beat hundreds of schools across the nation, including RIT and the U.S. Air Force Academy. 



Inspiring Diversity in STEM

Stephanie Saldana, who served as an ambassador for the Master of Data Science program, is a role model for underrepresented minorities in STEM.

“I am passionate about diversifying tech and amplifying the voices of underrepresented minorities,” reads the LinkedIn page of Stephanie Saldana, a recent graduate of UC Irvine’s Master of Data Science (MDS) professional program. “My goal is to be a shining voice for my community as a first-generation, Mexican-American and inspire the younger generation to find their place in STEM.”

Saldana is already serving as a source of inspiration. After earning her bachelor’s degree in civil engineering from Ohio State University in 2022, she transitioned into the field of data science and then served as an MDS program ambassador for the School of ICS. The GEM Fellowship recipient completed a summer internship at Cox Communications in 2023 and took on the role of graduate co-chair for the Society of Hispanic Professional Engineers at UCI (SHPE UCI). Here, she talks about struggling to find her place in STEM, connecting with a supportive community, and encouraging others along the way.

What first prompted your interest in data science?

My journey with data science is still relatively new, but it’s been an incredibly rewarding experience so far. My background is in engineering, where I really fell in love with problem-solving and taking ideas from the concept phase to implementation. In my undergraduate engineering program, I was introduced to basic programming and data analysis, and I found myself very interested in exploring that further. Data science seemed to be the perfect intersection for me to channel my passion for problem-solving while also diving into programming, analytics and data-driven decision-making.

Why did you decide to join MDS?

I chose the MDS program at UCI because I was looking for something that offered a blend of both theoretical knowledge and practical skills. One of the big deciding factors for me

was the presence of a capstone project, which I knew would be a great learning opportunity and something that would prepare me for working in industry. Additionally, there were many resources available to students within the program, and that also helped me decide on the MDS program.

Can you talk about finding your place in STEM?

For a while, I struggled with feeling imposter syndrome. I even almost talked myself out of doing engineering when I was a freshman in college. I am so glad that I decided to stick with it because it has really changed my life for the better.

A big reason I stayed in STEM was my involvement with the Society of Hispanic Professional Engineers (SHPE). For the first time in my life, I was surrounded by other people who had similar stories to mine. Many of my friends in SHPE were also first-generation college students trying to navigate college on their own. I saw them getting job offers at companies such as Apple, IBM, Texas Instruments, etc., and it really inspired me to keep going. Finding a community of such amazing people was key for me to find my place in STEM, so it is my hope that I can help others do the same.

Can you share ways you got engaged with the campus community?

When I wasn't in class, I loved involving myself on campus. I spent the majority of my time working as a peer tutor/mentor within the Office of Access and Inclusion. I helped with MATLAB, statistics, some civil engineering classes and data science classes.

After that, I'd spend a bit of time with SHPE UCI. A friend and I served as the graduate co-chairs, and we really focused on building up a community for graduate students within STEM here at UCI.

As an ambassador for the MDS program, we mainly helped with recruiting events and with research on how to improve our program. I met a lot of amazing people through the ambassador program, so if there is anyone reading this that is interested in the MDS program, I highly encourage them to also apply to be an ambassador.


All in all, I loved being involved on campus. It made me feel like I had the opportunity to give back to the school that had given me so much opportunity.

What are your future plans?

I graduated in December and have secured a position as a product manager in the financial industry. However, maybe 10 years down the line, I also see myself taking some sort of role that involves outreach for either high school or college students.

Do you have advice for students interested in STEM?

One of my mentors once told me, "You don't get a gold star for accomplishing something on your own." That stuck with me, because for a while, I thought that I had to do everything on my own and "tough it out." But after hearing that, I realized that it is 100 percent OK to ask for help; life gets a bit easier to manage when you have people backing you up. So don't be afraid to ask for help, because you never know what could come out of it.

Also, if there are any students currently at UCI who are in engineering or computer science, I encourage them to visit the OAI Student Center where I served as a tutor. They offer free tutoring in different classes, so it is worth checking out. 

ICS students can contact the Office of Outreach, Access & Inclusion (oai.ics.uci.edu) regarding ICS tutoring and other OAI programs.



◀ Stephanie Saldana at UCI, walking with fellow MDS ambassadors Linh Trinh (left) and Anshuman Sharma (right).

EVENT HIGHLIGHTS

ICS Commencement: Centering Humanity

On June 20, 2023, UC Irvine held its final graduation ceremony as ICS students started their procession into the Bren Events Center. The ICS Commencement Ceremony was a celebration of roughly 815 undergraduate degrees, 160 graduate degrees, and 275 professional master's degrees. The Class of 2023 heard from classmate Nadia Etemadi, who spoke of her journey to becoming a software developer. They also heard from featured speaker Julia White, chief marketing and solutions officer at the enterprise software company SAP, who inspired the next generation of tech leaders to use their knowledge and skills to improve society, prioritizing responsible and ethical development. "Tech will always advance," said White. "Let your values and ethics be the constant in an ever-changing world."



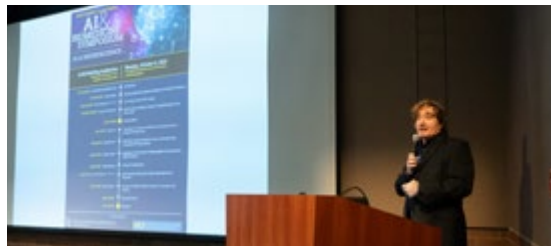
Butterworth Product Development Competition

Sixteen teams participated in the ninth annual Butterworth Product Design Competition, with industry specialists, entrepreneurs and UCI faculty serving as the judges. The six-month contest, sponsored annually by UCI alumnus Paul Butterworth, includes multiple design and coaching workshops and a demo day, where the teams present their prototypes. The first-place winner was Eupnea, an AI-based app for diagnosing tuberculosis. The second-place prize went to Nibble, an app tailored to make dining recommendations for groups based on the individual users' preferences. ChewRank, a system for ranking restaurants, placed third.



Southern California AI & Biomedicine Symposium

The annual AI & Biomedicine symposium, held on Oct. 9, 2023, was co-sponsored by the UCI Institute for Genomics and Bioinformatics (where Professor Pierre Baldi serves as director) and the UCI Center for the Neurobiology of Learning and Memory. This year's symposium focused on "AI & Neuroscience" and featured ICS alumnus Peter Sadowski as a guest speaker. Sadowski, now an associate professor of information and computer sciences at the University of Hawaii at Mānoa, discussed his work on AI systems that detect tumors from breast ultrasound imaging.





Southern California Software Engineering Symposium

Around 100 people gathered at UCI on May 26, 2023, for the Southern California Software Engineering Symposium (SuCSES 2023). The half-day event, hosted by the Institute for Software Research (ISR), brought together industry leaders, technical practitioners and researchers to discuss software engineering trends and potential research collaborations. “The key topic was AI in software engineering, with a lot of attention to ChatGPT and its impact on software engineering research and education,” says Informatics Professor Mohammad Moshirpour. He collaborated with his colleagues, Informatics Professors Crista Lopes and Iftekhar Ahmed, to organize the event, which featured a poster session, faculty talks and a keynote on AI-assisted coding by Erik Meijer, a senior director of engineering at Meta.



Innovation Takes Center Stage at Hack at UCI 2023

Hack at UCI 2023, the largest collegiate hackathon in Orange County hosted by the club Hack at UCI, took place Feb. 3-5. More than 400 students participated in the hackathon and created projects for entertainment, health, school and more, competing for over \$5,000 worth of prizes. Hacks were judged based on technology, quality and purpose. The Best Overall Hack award went to IrvineSweeper, a Minesweeper-inspired game where users are given a starting balance of \$10,000 to explore the city of Irvine. The team used the Google Maps Platform APIs to gather the location data of properties ranging from residences to offices and construct the city. IrvineSweeper was created by ICS students Yasper De Jong, Sean Fong and John Lorenzini. 🧩



Supporting the Tech Talent Pipeline

The third annual ICS Project Expo showcases ICS talent and innovation.

On May 25, 2023, local industry leaders saw more than 40 projects on display at the third annual ICS Project Expo – including innovative medical solutions, education technology for improved learning outcomes, and projects that could one day spark startups. These capstone projects, developed over 20 weeks, showcased the knowledge and skills of students in UCI’s Donald Bren School of ICS.

The Expo exemplifies how ICS leverages corporate partnerships and alumni relations in educating the next-generation of computer scientists, software designers, game developers and tech experts, ensuring students have the hands-on training and real-world experience needed to excel after graduation.

“ICS is raising the bar every year, always thinking outside the box when it comes to providing the technical expertise and skillsets students need for success,” says ICS Director of Corporate Relations Jason King. “And we could not do this without our industry partners, who offer unique opportunities for professional development and mentorship.”

▲ Top teams (clockwise from top left): Upside Down Squire, Team SAP, Spelling Dystance and honors student Zhengran Ji.

The Capstone Experience

The projects were completed for undergraduate capstone courses in informatics, computer science, and game design; for the ICS Honors Program; and for the Butterworth Product Development Competition. Through these programs, students gain opportunities for practical application and for developing soft skills, while program partners gain recruitment opportunities and support for under-resourced projects.

“Projects covered domains ranging from web development and social media, to AI and machine learning, to all the hot topics of the day,” says Informatics Professor Hadar Ziv, who directs the ICS capstones program. “In fact, two of the three winning projects for informatics were in the medical field, with a direct impact on society.” These projects were BeatingMelanoma.com, sponsored by Hoag, and Memory Air, which enhances memory-recall through the sense of smell.



“ We’d love to make capstone projects another key element of our ongoing collaboration with UCI. ”

- Tobias Schimmer
Head of Developer Experience at SAP

There were also novel games on display. “In game design, we talk a lot about polish – making those small adjustments that take a game from good to great. Capstone is the class where they get to see a project all the way through,” says Informatics Professor Kurt Squire, who led the capstone projects for the Game Design and Interactive Media major.

Computer Science Professor Sergio Gago-Masague, who leads the capstone course for the Department of Computer Science, also highlights the benefits for students. “The program gives students the opportunity to apply their computer science skills and knowledge to real-world problems, and to closely work with industry partners to develop innovative solutions,” he says. “It is a great opportunity to learn and grow, and the ICS Project Expo really is the culmination of these efforts.”

With more than 300 attendees – including students and faculty, project and corporate partners, and alumni – the event excelled in uniting a variety of industry and academic stakeholders.

Award-Winning Projects

New to this ICS Project Expo was the chance for each team to win up to \$2,300 for the top awards. A group of industry leaders, ICS alumni and faculty used the RocketJudge app to score all of the projects, with the top awards going to the following teams:

- Computer science: the SAP team (Chloe Chau, Karen He, William Hsu, Athena Rubio and Junyan Wu).
- Game design: Upside Down Squire (Benedict Hsueh, Srayan Jana, Matthew Knight, Nathan More, and Ed Slee).
- Informatics: Spelling Dystance (Aaron Luevano, Drew Anzalone, Andrew Le, Jonas Chen and Orviel Alzate).

The award for the top honors project went to math and data science double major Zhengran Ji, whose project applied machine learning to predict the oxidation state of iron elements from microscope spectrums. “I believe what I am doing is essential in developing the next-generation intelligent

electron microscope,” says Ji, adding that he was honored to win the first-place prize for the ICS Honors Program.


“The caliber of students and their projects, the level of complex creativity, and the technological ingenuity showcased in these remarkable projects was truly impressive and inspiring,” says Pooja Lohia Pai, an independent business consultant and ICS Alumni Chapter board member who served as a judge.

Tobias Schimmer, head of developer experience at SAP, agrees. SAP sponsored both an undergraduate and a master’s level project. “The collaboration with both teams was truly inspiring for our engineering teams and executives in Newport Beach,” he says. “We’d love to make capstone projects another key element of our ongoing collaboration with UCI across different ICS programs and even schools for certain topics.”

Developing a Tech Talent Pipeline

Another Expo attendee, Mark Percy, president of the CEO Leadership Alliance of Orange County (CLAOC), also hopes to encourage more corporate sponsorships. With CEO members representing a good cross section of large, medium and small employers in the region, CLAOC is working to grow OC into a “tech talent” hub.

“I was incredibly impressed and found the program introductions valuable to understand the breadth and depth of talent within ICS,” says Percy. “I hope to encourage more of our members to undertake future projects and mentor the ICS students,” he says. He similarly plans to encourage ICS students to look for job opportunities in Orange County. “All of our CLAOC members want to invest in local talent, and most are developing a tech talent pipeline right here.”

The ICS Project Expo highlights how UCI is instrumental in supporting that pipeline and keeping local companies on the cutting edge of technological advances. “The ICS capstone program is only growing,” says Ziv. “The future trajectory is exciting.” 

Recruitment & Research Tailored to Tech

The ICS Industry Showcase continues to grow, catering to industry needs.

In 2019, ICS hosted its inaugural Industry Showcase. Five years later, interest in the event was higher than ever. The 5th Annual ICS Industry Showcase, held Oct. 10 and 11, 2023, was the largest one yet, with more than 2,500 students and 35-plus companies participating.

"We're large enough to have our own tailored event, and companies really appreciate that model," says Jason King, Director of Corporate Relations. He stresses that the event is more than just a recruitment

▲ *The ICS Recruitment Fair during the 5th Annual ICS Industry Showcase.*

fair. "ICS is a 'one-stop shop' for tech industry needs, so the Showcase acts a springboard for companies – from startups to those more established," he explains. "They get a taste of all that ICS has to offer in terms of talent for internships, expertise for research collaborations, and opportunities for further engagement."



“ **A few weeks after the event, I got a summer 2024 internship from Adobe!** ”

- Farrin Marouf Sofian
Master's Student

Tailored Recruitment

As one of the few stand-alone computer science schools in the nation, ICS offers access to up-and-coming tech talent. It is home to 3,500 undergraduates and nearly 1,000 graduate students, spread across the Departments of Informatics, Computer Science, and Statistics. Students have skills in areas ranging from software development and game design, to AI and machine learning, to data science and analytics. So unlike a more general recruitment or STEM fair, the Industry Showcase caters to a targeted audience.

“This was by far the most successful recruitment fair we’ve ever attended,” says Elaine Pantleo, a technical recruiter for Codazen. “We are a software engineering company in Irvine, so we’re looking for computer science students. We met so many qualified potential hires — I was floored.” Alongside Pantleo, Codazen was represented at the Showcase by UCI alumnus Zejin (Jimmy) Xu, a recent graduate of the ICS Master of Software Engineering professional program. “We just hired Jimmy in July but he has ramped up so quickly and was able to connect with the students,” says Pantleo, noting that they were both impressed by the turnout. “There was a steady flow of high-caliber students all day long, and so many are already using half of our tech stack!”

While Codazen was specifically looking to hire recent graduates, the fair also offered internship possibilities as well as general professional advice. “Even as a freshman, there were plenty of opportunities for me,” says David Culciar, a first-year computer science and engineering major. “The companies that weren’t looking for freshmen gave me guidance on what they’re

looking for and how to perfect my elevator pitch, and one even helped me further refine my resume,” he says. “I was able to use what I learned the first day and apply it the second day.”

Culciar also appreciated the corporate information sessions offered each day before the recruitment fair. On the first day, CoreLogic and Northrop Grumman presented; on the second day, Google and SAP. Culciar was one of hundreds of students attending each session, which he said offered a great introduction to the companies and what they are looking for in applicants.

Graduate-Level Networking

On the other end of the student experience spectrum was Farrin Marouf Sofian, who is earning her master's degree in computer science. Sofian also enjoyed the corporate information sessions, but she had an even greater appreciation for the networking receptions for graduate students — one for master's students on Oct. 10, and another for Ph.D. students on Oct. 11. Held on the sixth-floor patio and conference room of Donald Bren Hall, these receptions offered a more intimate environment for conversations among students, recruiters, faculty and alumni.

“At the master's networking reception, I had rewarding interactions, gaining valuable feedback on my resume and insights into the U.S. recruitment process — super helpful since I'm quite new to the system,” says Sofian, who recently graduated with a B.S. in computer engineering from Koç University in Istanbul. During the networking event, she met with an Adobe representative and later lined up an interview. “A few weeks after the event, I got a summer 2024 internship from Adobe!”



“ **This was by far the most successful recruitment fair we’ve ever attended!** ”

- Elaine Pantleo
Codazen



▲ Adobe recruiters speak with students during the Ph.D. networking reception.

Computer science Ph.D. and M.D. student Pooya Khosravi similarly enjoyed the Ph.D. networking reception. “I appreciated the opportunity to talk to industry representatives about software engineering and research positions at the companies, what their day-to-day work is like, and what made them decide to go into industry instead of academics,” he says. “I also enjoyed networking with ICS alumni and talking to multiple ICS faculty about research.”

According to Mauro Blardony, a senior technical talent scout at Adobe who attended the Ph.D. event, the atmosphere was just right. “It wasn’t too crowded or hectic. There was just the right amount of students to learn about us as well as for us to learn about them professionally and their desired career growth,” he says. “It was amazing. The student conversations were very fruitful.”

Long-Term Engagement

ICS values partnering with companies and is always looking for new forms of engagement. For example, this year’s Showcase introduced a Game Industry Meet & Greet event.

“Hundreds of students got to meet leaders from the local gaming industry to discuss studio cultures, get insight into how to break into the industry, and learn

about job opportunities,” says Tyler Cushing, a lecturer in ICS who teaches courses for the Game Design and Interactive Media major. “Orange County is one of the largest gaming industry hubs in the nation and seeing that reflected at the Industry Showcase was awesome. We hope to strengthen these local bonds in the years to come.”

Opportunities abound for further engagement between ICS and industry, such as through student capstone projects, cutting-edge research collaborations, and targeted recruitment and networking events. “The Showcase isn’t just a one-off,” says King. “It offers a roadmap for continuing the conversation and building long-term, mutually beneficial partnerships between academia and industry.” 



▲ A recruiter from MobilityWare talks with a student during the recruitment fair.

Corporate Partners

The Corporate Partners Program enables companies to grow their relationships with ICS, while also being highly visible collaborators in moving the ICS mission forward. For more information, contact Director of Corporate Relations Jason King at jason.king@uci.edu or (949) 824-3088.

Cryptographic Password Authentication

On the road to Internet adoption, a cryptographic protocol helps secure two billion WhatsApp users.

Internet security is getting a bit of a boost, in part thanks to cryptographic research started by Stanislaw Jarecki more than five years ago.

Back in 2018, Jarecki, an ICS associate professor of computer science, published a paper with ICS Ph.D. student Jiayu Xu in collaboration with Hugo Krawczyk of IBM Research. Their work, presented at the 37th Annual International Conference on the Theory and Applications of Cryptographic Techniques (Eurocrypt 2018), proposed a new Password Authenticated Key Agreement (PAKE) protocol called OPAQUE.

“There is this huge disconnect between the way we are using passwords on the Internet and what cryptographers were suggesting and designing up to now,” says

Jarecki, “because the cryptographic models were never exactly matching what is needed in practice.” The models were secure, but companies weren’t using them because they didn’t conform to the real-world deployment of the client-server setting. “Basically, this was the first paper that showed how to bridge this gap.”

As cryptographer Matthew Green wrote in a blog that year, “Let’s talk about PAKE,” the OPAQUE protocol showed a lot of potential. “So in summary, we have this neat technology that could make the process of using passwords much easier, and could allow us to do it in a much more efficient way — with larger hashing parameters, and more work done by the client? Why isn’t this everywhere? Maybe in the next few years it will be.”

The Road to Internet Adoption

Green wasn't the only person to notice OPAQUE's potential. In 2019, the Internet Engineering Task Force (IETF) Crypto Forum Research Group (CFRG) ran a PAKE competition for symmetric (person-to-person) and asymmetric (client-to-server) settings. The winner for the asymmetric (aPAKE) category was OPAQUE.

"This was a big win," says Jarecki. "The IETF engineers started recognizing that it's no longer the case that the cryptographic PAKE protocols can't be deployed. They can be deployed, so IETF CFRG created this task force for standardizing the cryptographic password-authentication protocols to pick the good ones."

This has been an ongoing effort, with countless interactions between Jarecki and IETF-CFRG reviewers to specify detailed proofs, identify implementation variants and address different security concerns. Currently, IETF is exploring how to integrate OPAQUE with the transport layer security (TLS) protocol.

"It's important to understand that this is just about the road to Internet-wide adoption; the actual adoption hasn't yet happened," stresses Jarecki. "We are making the tools and working with engineers who want to get this protocol adopted, but that's a different thing from actual adoption of these methods by Internet giants, i.e. actual integration of these new authentication methods with TLS as implemented in Internet browsers and servers."

WhatsApp Adopts OPAQUE

Another person who noticed OPAQUE's potential early on was Kevin Lewi, a research scientist at Meta who came across the Eurocrypt 2018 proceedings as well as Green's blog post. At the time, WhatsApp was building a backup feature for encrypted chat logs, and OPAQUE seemed the perfect choice for secure user authentication.

"The main selling point of OPAQUE for us is that it allows a client to authenticate to a server using a password, in a way for the password to never actually be exposed to

“ There is this huge disconnect between the way we are using passwords on the internet and what cryptographers were suggesting and designing up to now. ”


- Stanislaw Jarecki
Professor of
Computer Science

the server," says Lewi. "This is in contrast to previous works and other methods which do leak the password to the server. This extra amount of privacy ended up being very important to the security of our system as a whole."

The OPAQUE-authenticated backup storage now services 2 billion WhatsApp users, and Jarecki is thrilled to see the protocol already having such a widespread impact.

"Their system is very impressive [and its] scale is mind-boggling!" he says. "It's live now: Take your WhatsApp on your phone, go to settings, turn on 'secure backup,' and you are triggering encryption of all your backup data via keys which are retrievable only from the OPAQUE-authenticated 'key locker.'"

Furthermore, Meta has shared the open source code for their WhatsApp approach. "We decided to open-source our implementation of OPAQUE to the public," says Lewi, "in hopes that other companies and people who might want to use OPAQUE in the future could do so easily."

Jarecki views this as a significant accomplishment. "You can write a standard, but no company implements it," he says. "But in our case, Meta implemented it!" Meta is also sharing it, exemplifying the protocol's power as it continues its journey toward Internet-wide adoption. 



HALL OF FAME CELEBRATION 2023

The weather cleared in time to reveal a beautiful blue sky on the evening of May 5, when nearly 200 UC Irvine engineering and information and computer sciences (ICS) alumni, faculty and friends gathered at the Inn at Mission San Juan Capistrano to celebrate six alumni for the 2023 Hall of Fame.

Three people from each school were inducted. The alumni were selected for making a significant impact on their profession or bringing distinction to their

Dean Marios Papaefthymiou (left) with Hall of Fame Inductees Fritz Onion and Nenad Medvidović (Leysia Palen not pictured).

alma mater. Sixty-one engineering alumni and 49 ICS alumni have now been named Hall of Famers since it was established in 2015 to coincide with UCI's 50th anniversary. Learn more about the ICS Hall of Fame at halloffame.tech.uci.edu.

Nenad Medvidović

Ph.D. 1999, M.S. 1995, Information and Computer Science



Medvidović is a global leader in software engineering and chair of the USC Department of Computer Science. He served a five-year term as editor-in-chief of his field's leading journal, *IEEE Transactions on Software Engineering*. He chaired the Association for Computing Machinery (ACM) Special Interest Group on Software Engineering and the steering committees for two premier conferences: the International Conference on Software Engineering and the Symposium on the Foundations of Software Engineering. Medvidović has been the recipient of the NSF CAREER Award, the Okawa Foundation Research Grant, the IBM Real-Time Innovation Award, the USC Mellon Mentoring Award, the OCEC

Distinguished Engineering Merit Award, and the ACM SIGSOFT Distinguished Service Award. Medvidović is an ACM Distinguished Scientist and an IEEE Fellow.

Fritz Onion

M.S. 1993, Computer Science

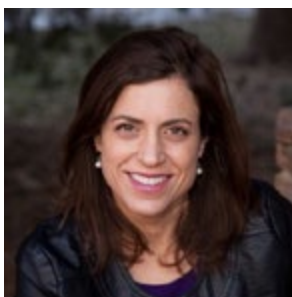


Onion is a Maine-based philanthropist and angel investor with a focus on the environment, green technology and the arts. After earning a bachelor's degree at Harvard University, Onion came to UCI and studied parallelizing compiler technology with Distinguished Professor of Computer Science Alexandru Nicolau. He then pursued a career in software consulting and teaching with DevelopMentor, a startup co-founded by fellow alumnus Don Box (M.S. '91). In 2004, Onion co-founded the classroom-based technology training business Pluralsight, which by 2013 had transitioned into a high-growth online subscription-based company, training software developers and IT professionals worldwide. The company went public in 2018 and


was purchased and taken private again in 2021 by Vista Equity Partners. Onion and his wife, Susan, created the Onion Foundation as a grant-making organization that connects people in Maine with meaningful experiences in the arts and the natural environment. They then helped launch Pluralsight One as a philanthropic arm of the company with a mission of increasing access to technology skill development and promoting diversity in the technology workforce around the world.

Leysia Palen

Ph.D. 1998, M.S. 1995, Information and Computer Science



Palen is a crisis informatics pioneer and the founding chair of the University of Colorado Boulder's Department of Information Science. She brings her training in human-computer interaction (HCI), computer-supported cooperative work and social computing to bear on understanding and advancing socio-technical issues of societal import. In the advancing arena of large-scale online interaction (the big data of crisis response), she adapts quantitative techniques that then allow the application of qualitative methods and an ethnographic eye to closely observe and describe social structures in technology-mediated situations. She was recognized for this work by the Association for

Computing Machinery with the 2015 Computer Human Interaction Social Impact Award. In 2016, she was elected to the ACM CHI Academy, an honorary group of individuals who have made substantial contributions to the field of human-computer interaction. 



Paul and Jo Butterworth Receive Extraordinarius Award

▲ Paul Butterworth, Jo Butterworth and Dean Marios Papaefthymiou at the 2023 Lauds & Laurels event.

The UC Irvine Alumni Association celebrated 24 accomplished Anteaters on Oct. 26, bestowing its highest honor, the Extraordinarius award, on alumni couple Paul Butterworth '74, M.S. '81, and Jo Butterworth '75, for their exemplary service and contributions to the university and community.


"We are delighted to recognize the Butterworths for their exceptional leadership and remarkable dedication to their alma mater," said Brian Hervey, vice chancellor for university advancement and alumni relations and president of the UCI Foundation. "They not only inspire our current students, but also embody the core values of UCI by demonstrating the potential of education to create meaningful and lasting impact."

In February 2023, the Butterworths made a \$35.5 million estate gift to UCI. Their support will create countless opportunities for students and faculty through awards,

scholarships and fellowships, as well as fund new research initiatives and faculty chairs in the Donald Bren School of ICS.

"Our experience as students at UCI has had an enduring impact on our lives," Paul Butterworth said. "Receiving a scholarship was central to my success, and it's the reason Jo and I passionately believe in supporting education and in the importance of investing in future generations."

In addition to the couple's extraordinary philanthropy at UCI, Paul Butterworth holds prominent volunteer leadership roles at the university. He has been a member of the UCI Foundation board of trustees since 2011 and has served on the Dean's Leadership Council for the Donald Bren School of ICS since 2005.

Paul Butterworth earned a bachelor's degree in 1974 and a master's in 1981 in computer science. Jo Butterworth graduated from the School of Social Sciences in 1975 with a bachelor's degree. 

Steve Acterman Enjoys Giving Back to UCI

As an active alumnus of both the School of ICS and the Paul Merage School of Business, it should come as no surprise that on Oct. 26, 2023, Steve Acterman was one of 16 accomplished individuals that the UCI Alumni Association honored in recognition of outstanding service to the community, professional excellence, and campus involvement. Acterman received both his B.S. in computer science ('86) and his MBA ('99) from UCI and is now director of IT Vendor Management with Edwards Lifesciences, where he leverages his technical and business degrees every day. He also makes time to support ICS and UCI, drawing on his diverse experiences in information technology, vendor management, and IT leadership positions held at various companies, including DIRECTV, Capital Group, Raytheon, Volt Information Sciences, Hughes Aircraft and AT&T.

What sparked your interest in computer science?

When I was in elementary school, I'd flip on the TV after school and watch endless reruns of the original "Star Trek" television series. I became fascinated by the bridge of the Enterprise. All of those futuristic control panels, and the fact that you could talk to the computer, was just fascinating to me. A few years later, when I encountered an early "home computer," I was hooked.

What first led you to UCI?

There are a lot of great schools in California, but what makes ICS unique is its independence and interdisciplinary outreach. When I researched other schools, most of the computing programs were either buried inside of engineering or math. At UCI, the ICS program seemed highly focused on



◀ Dean Marios Papaefthymiou (right) honoring Steve Acterman as a Distinguished Alumnus at UCI's 2023 Lauds & Laurels ceremony.

computing as an emerging independent discipline, and it was actively collaborating with many other areas of academic inquiry. This more forward-thinking approach certainly appealed to me. And it was just a wonderful coincidence that UCI was also geographically desirable, because I grew up in Orange County. So, choosing UCI and ICS was a surprisingly easy decision.

Can you talk about your role at Edwards Lifesciences?

I'm the director of IT vendor management for the Edwards Global IT organization. It's a challenging mashup of both technical and business responsibilities, and fortunately, I'm uniquely suited for the role with my UCI computer science degree and MBA. I really enjoy being able to dig into the technology, assisting with technical requirements as well as solutions, while also optimizing the business side, particularly with enterprise software licensing and contract negotiations.

What motivates you to stay engaged with UCI?

I like to tell people that the best reason for continued engagement is enlightened self-interest. It's actually much more than that, but supporting your alma mater can increase the value of your degree. You can recruit the best students, help raise the public profile of the university, and donate and increase the school's resources. All of these factor into the rankings, which in turn increases the profile of our school.

I've also always tremendously enjoyed volunteering. Both of my parents were public school teachers, so there was already a strong predisposition to public education and service in our family. I was only a year or two out of school when Essie Lev from the ICS Undergraduate Counseling Office reached out to me. "I've gotten a couple of inquiries from ICS alumni asking if we have a group for them," she said, so we met up with a couple of interested alums and came up with a game plan to create the ICS Alumni Organization. That


eventually led me to get involved in many other areas of campus life. The satisfaction you get from giving back and helping current students is incredible.

So I encourage fellow alumni to stay connected and stay involved. There's an opportunity for everyone: Maybe you want an outlet to practice soft skills or to take on a volunteer leadership position, or perhaps you'd like to recruit promising students at a career fair. Just find the channel you are excited about. It can do wonders for you personally as well as professionally.

What about words of advice for ICS students?

It's easy to be overwhelmed by the plethora of choices for extracurricular activities. I suggest starting with just one club or student organization that you find intriguing. There are plenty of great student groups affiliated with ICS, and they're beneficial for both your personal relaxation as well as for developing the soft skills that you're going to need to stand out from the crowd when you begin looking for a career job.

As for career advice, I'm a great example of how following a non-standard career path can take you where you didn't know you wanted to go. Computing has evolved into an amazingly diverse domain. I came to ICS thinking that I was going to be a software engineer, but I found that as unexpected opportunities presented themselves, I began to refocus on computer system management for large-scale software development projects. This eventually led to working with an array of commercial technology vendors. So, I ended up in a very different — but still related — career.

You can use your computer science degree as a foundation for many different roles in any industry or domain in the public or private sector. There's virtually no enterprise that doesn't extensively utilize computing technology now. You really can take your ICS degree and go anywhere you want with it. So be open to alternate career paths (and unlikely employers) that might leverage your ICS degree in a way that you never could have imagined! 

UCI Donald Bren School of
Information & Computer Sciences

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Join other alumni and friends by making a meaningful contribution to UCI's Donald Bren School of Information and Computer Sciences. The support of ICS alumni and friends like you allows ICS to offer scholarships, develop new programs and support impactful research, ensuring that it remains one of the best computing-focused schools in the world.



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Dancing with Data

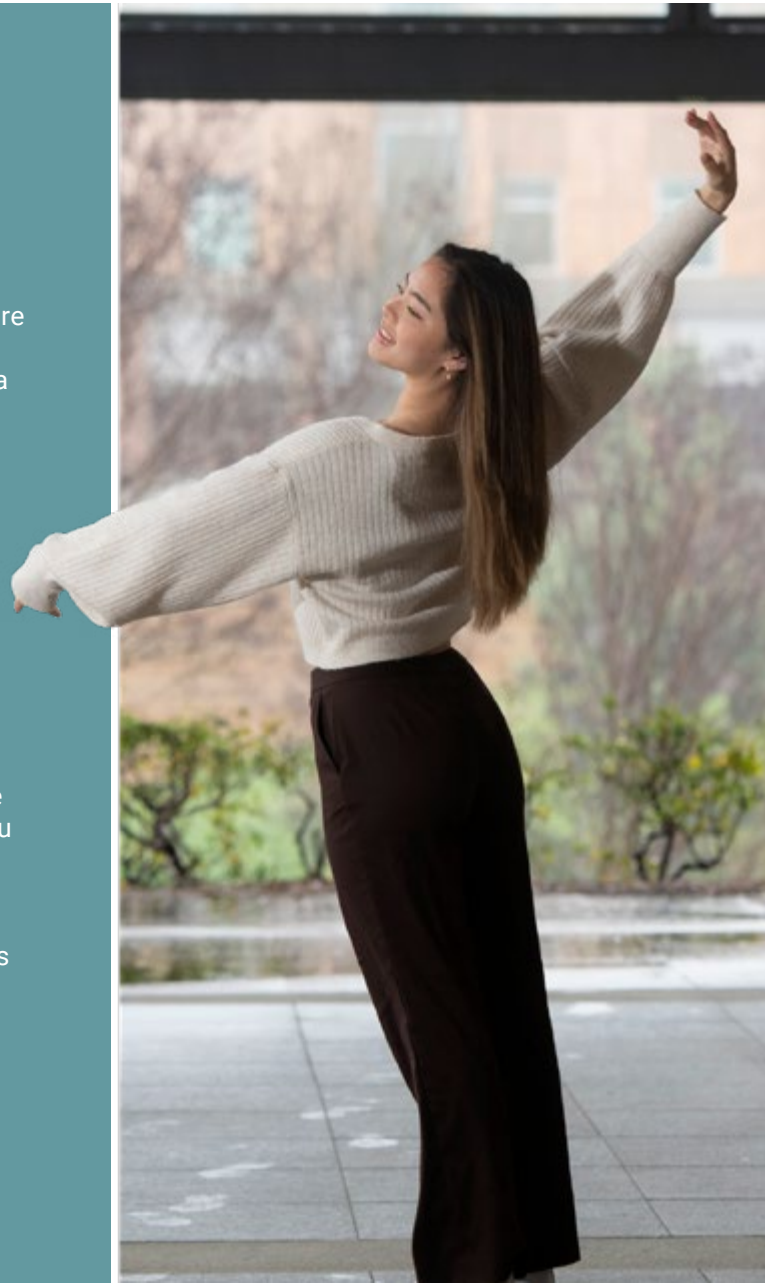
Emily Truong is not one to give up on her passions. She has been dancing since she was 6 years old and, though she knew she wanted a career in healthcare, which would require intensive study and focus, she didn't want to abandon the joyful activity during college. Now, as a double major in dance and data science (with an eye toward biomedical data analysis), Truong pursues both of her passions at UCI.

"Being a dancer and having seen injuries around me really inspired my interest in healthcare," says the Los Angeles native.

Originally planning to become a physician, Truong entered UCI as a dance and biological sciences major. But after taking data science courses in her first year, she changed her second major to data science, with a minor in bioinformatics.

"I like the idea that with data science, you can impact people's lives at a larger scale," says Truong, who's in the Donald Bren School of ICS's honors program. "The work physicians do is really great because they're able to directly impact their patients every day. But with data science, although you're not seen by the patients, but you're still impacting them behind the lines. And you can do that for a lot of patients at the same time."

Truong received the 2022-23 Billy Steckler Endowed Scholarship, an undergraduate award for ICS students. "I aspire to complete a master's degree in data science," she says, "so this scholarship will go a long way in helping me take that journey."



Read Emily Truong's full story online:
bit.ly/uci-dancing-with-data