

ILLINOIS COMPUTER SCIENCE

IMPACT

FY22 REPORT

AT THE
FOREFRONT
OF
COMPUTING
INNOVATION





WHAT IT MEANS TO BE AT THE FOREFRONT OF COMPUTING INNOVATION

There is no possible way to condense down a year’s worth of achievement at Illinois Computer Science to a single moment. That’s because so many of our researchers consistently shift the ground that computing stands on. At the same time, our classrooms are filled daily with gifted students absorbing the knowledge faculty passionately share to prepare them to shape the future of technology. When we combine this enthusiasm for cutting edge research and life changing education with collaborative and interdisciplinary partners, it becomes about something much more than a single moment.

Over the past year, a few examples of this amazing effort do stand out. The Mind in Vitro NSF Expeditions in Computing provides \$15 million over seven years to develop the science and technology to design, fabricate and program computing systems based on programmable biological neural processors. We have started nearly 15 research projects in the 10-year, \$200 million IBM-Illinois Discovery Accelerator Institute. The expansion of our Broadening Participation in Computing program is supporting a representative, inclusive, and caring community – as evidenced by the CS STARS program that encourages undergraduate students to become active in research and departmental engagement activities. We have continued to innovate the way CS education is delivered to ensure students can reach their learning potential.

Every story you’re about to read doesn’t only showcase these amazing moments here at Illinois CS; they demonstrate how we are *at the forefront of computing innovation*.

Nancy M. Amato (PhD CS '95)
Abel Bliss Professor
Department Head

ILLINOIS COMPUTER SCIENCE

GROUNDBREAKING RESEARCH

THIS REPORT HIGHLIGHTS THE INNOVATIONS OF OUR STUDENTS, FACULTY, AND ALUMNI, AND IT RECOGNIZES THEIR CONTRIBUTIONS TO COMPUTING. SEE HOW THE ILLINOIS COMPUTER SCIENCE COMMUNITY IS LEADING THE WAY.

NSF EXPEDITIONS IN COMPUTING: MIND IN VITRO – COMPUTING WITH LIVING NEURONS



On April 25, **National Science Foundation Director Sethuraman Panchanathan** and **United States Senator** from Illinois **Dick Durbin** visited the University of Illinois Urbana-Champaign. They announced awards to Illinois Computer Science and the National Center for Supercomputing Applications totaling \$40 million. Specifically, an award of \$15 million over seven years went to a collaborative project involving Illinois CS faculty, funding the **Expeditions in Computing: Mind in Vitro** project, co-directed by **Mattia Gazzola**, Mechanical Science & Engineering; **Nancy M. Amato**, Computer Science; and **Taher Saif**, Mechanical Science & Engineering.



The MIV team includes several other CS faculty - **Lawrence Rauchwerger**, **Josep Torrellas**, and affiliate faculty member **Lav R. Varshney** – who will develop science and technology to fabricate, model, program, scale, and embody biological processors. “This Expedition captures the imagination, and I’m sure it will

accelerate interest in STEM fields in general—and computing in particular,” said **Susan A. Martinis**, Vice Chancellor for Research and Innovation at UIUC.

ILLINOIS, IBM READY TO PUSH THE BOUNDARIES OF WHAT'S POSSIBLE IN COMPUTING



Left to right: Klara Nahrstedt, Gang Wang

This past year, The Grainger College of Engineering launched the **IBM-Illinois Discovery Accelerator Institute**, which will further advance technology spanning the hybrid cloud and AI, materials discovery, quantum computing, and more. The 10-year, \$200 million research collaboration already includes nearly 15 CS-related projects.

“The IBM-Illinois Discovery Accelerator Institute enables close collaboration opportunities between university researchers and tech industrial scientists and engineers, which are not possible only within academia.”

– Klara Nahrstedt, *Grainger Distinguished Chair in Engineering*

“We are very excited about the new academic-industry partnership model. Working with IBM researchers allows us to easily connect our research exploration with emerging security and resiliency problems in real-world systems.”

– Gang Wang, *Assistant Professor*

USDA FUNDS THE 'FARM OF THE FUTURE'



The **U.S. Department of Agriculture (USDA)** announced funding to one program that will create an integrated farm of the future in the U.S. Midwest. Titled **“I-FARM: Illinois Farming and Regenerative Management,”** this \$3.9 million, three-year project is led by professor **Girish Chowdhary**. It will develop an 80-acre agricultural testbed, where commodity crops (corn and soybean) and livestock are farmed using synergistic and sustainable practices.

Additionally, Chowdhary’s company, **EarthSense**, received the Innovation Award from the **Illinois Innovation Network (IIN)**. EarthSense enables the creation of highly productive, resilient and sustainable crops, and fundamental improvements in farm profitability.

ABDELZAHER LEADING \$5.8M DARPA EFFORT IN INFLUENCE MESSAGING



There’s no end to the variety of bizarre rumors circulating about several topics, including COVID-19 vaccines. In August 2021, for example, Facebook uncovered a huge, Russia-based anti-vaccination campaign.

Such misinformation campaigns have become a worrisome feature of the modern threat landscape, and the **Defense Advanced Research Projects Agency (DARPA)** awarded \$5.8 million to a team led by Illinois CS professor **Tarek Abdelzaher** as part of DARPA’s **INfluence Campaign Awareness and Sensemaking (INCAS)** program. This work will characterize how different foreign populations respond to influence campaigns as a first step toward the development of effective countermeasures.

This is the fifth edition of the Illinois Computer Science Impact Report. Produced annually, it showcases the innovations of our faculty, students and our alumni and inspires our partners and peers in the field of computer science.

Read more at: cs.illinois.edu/news.

Editorial Board: Annie Adams, Shelby Blacker, Aaron Seidlitz and Michelle Wellens.

Contact us: communications@cs.illinois.edu



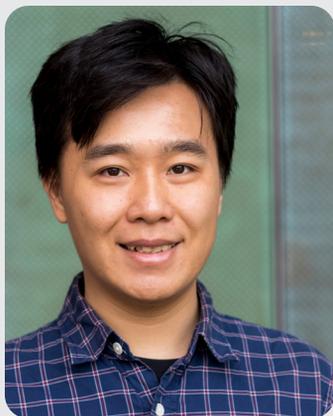
NSF GRANT BOLSTERS ILLIXR FOR EXTENDED REALITY RESEARCH

When professor **Sarita Adve** introduced the **Illinois Extended Reality (ILLIXR)** testbed and consortium, she knew that funding for such a unique project might be a little harder to come by. Adve explained that funding goes primarily to research, not initiatives that build the infrastructure needed to produce great research projects.



But that's exactly what makes ILLIXR groundbreaking. It's a first-of-its-kind open-source testbed and consortium for the broad Extended Reality (XR) community, which encompasses virtual

(VR), augmented (AR), and mixed reality (MR). Its funding will come from a \$1 million community research infrastructure grant from the NSF.



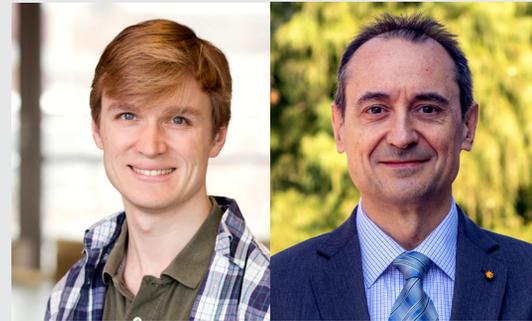
JIANG IS PART OF THE NATIONAL AI INSTITUTE EXPLORING THE SYNERGIES BETWEEN NETWORKING AND AI

Illinois CS professor **Nan Jiang** will collaborate with researchers from 10 other universities as part of the new **AI Institute for Future Edge Networks and Distributed Intelligence (AI-EDGE)**. The institute is one of 11 new National Artificial Intelligence (AI) Research Institutes announced in 2021 by the **National Science Foundation**. One year prior, the University of Illinois led two of the seven institutes funded.

“Computer networks are inherently complex dynamical systems, where decisions made often have delayed consequences,” *Jiang said.*

Jiang, who is an expert in reinforcement learning (RL), will focus his efforts on exploring how AI can help optimize computer network operations. “RL is a promising paradigm for controlling and optimizing such dynamical systems in a data-driven manner,” said Jiang.

FLETCHER, TORRELLAS BECOME MEMBERS OF INTEL'S NEW RESEARCH CENTER



Left to right: Christopher Fletcher, Josep Torrellas



Intel Labs' **University Research & Collaboration Office (URC)** announced

the opening of a new multi-university research center called **Resilient Architectures and Robust Electronics (RARE)**. One project, entitled “Scaling Processors to Hundreds of Security Domains,” includes Illinois CS professors **Christopher Fletcher** and **Josep Torrellas**.

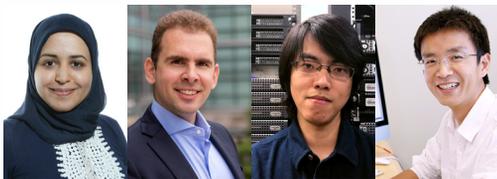
The center will focus on assessing and improving the resiliency, reliability, and security of Intel® hardware and software, including the security of Intel® silicon integrated circuits. And the Illinois CS-led project proposes many-domain architectures - from programming models down to micro-architecture - to securely multiplex hundreds of concurrent security domains in modern applications.



RESEARCHERS IN SOFTWARE ENGINEERING SHARE EXPERTISE TO DELIVER EXCELLENCE

After 16 years as a faculty member, professor **Darko Marinov** can point to several reasons for the success of Illinois CS software engineering researchers. Not a single reason is more important, though, than the people who surround him in the offices and classrooms at the Thomas M. Siebel Center for Computer Science.

SOFTWARE ENGINEERING FACULTY



L to R: Reyhaneh Jabbarvand, Sasa Misailovic, Tianyin Xu, Lingming Zhang

“Software engineering is about teams organizing to handle specific responsibilities for an associated project. How do we write code? How do we test code? How do we deploy code?” Marinov said. “This combination of practical and intellectually stimulating work done here on a consistent basis proves academic relevance.”



HOCKENMAIER EXPLAINS THE FUTURE OF NATURAL LANGUAGE PROCESSING

Natural language processing represents an emerging opportunity for AI researchers looking to improve industry work, in general. Professor **Julia Hockenmaier**, an NLP expert and CS professor since 2007, discussed the future of her field.

“In working with industry people, we’re constantly asking what would be a useful application? What’s a useful task, what’s a feasible task, and how do we actually get data to attack those?” Hockenmaier said.

“Whatever we’re learning can be applied to other areas as well, even if they have their own specific tasks and problems. And as educators, we want to train enough people to be able to work in the industry.”

QUANTUM ALL-STAR: DAKSHITA KHURANA



As the new world of quantum information science comes into being, it’s showing enormous potential to solve old challenges in novel ways. Professor **Dakshita Khurana** has found herself exploring an especially exciting piece of that fast-developing scene: quantum cryptography.

The inherent properties of quantum phenomena provide opportunities for keeping information secret; indeed, with quantum cryptography, one can achieve cryptographic goals that would be unattainable in classical cryptography. For example, Khurana hopes to use a quantum information approach to achieve “provable deletion,” which would be impossible outside the quantum context.

“If I give you a quantum state, which is the quantum analog of writing on a piece of paper ... you can keep it with you, but you cannot actually copy it,” Khurana said. “And, moreover, there are ways that I can ask you to return it to me, and I can even check that you deleted it. This is really cool from a privacy point of view!”

**PADUA, WARNOW
ELECTED FELLOWS
OF AAAS**



Left to right: David Padua, Tandy Warnow

Fourteen University of Illinois Urbana-Champaign faculty members were elected **2021 Fellows** of the **American Association for the Advancement of Science**. The two faculty members from Illinois Computer Science include professors **David Padua** and **Tandy Warnow**.

Padua, a Donald Biggar Willett Professor Emeritus in Engineering, has devoted much of his career to the study of languages, tools, and compilers for parallel computing.

Warnow is the Grainger Distinguished Chair in Engineering and Associate Head for Research and Faculty Development with Illinois CS. Her main research focus is on the development of algorithms for statistical estimation problems in computational biology and historical linguistics.



Clockwise from top: Klara Nahrstedt, Ruzena Bajcsy, Nancy M. Amato

**NAHRSTEDT PART OF FIRST
MOTHER-DAUGHTER PAIR
ELECTED TO THE NAE**

In February, **Klara Nahrstedt**, the Grainger Distinguished Chair of Engineering and director of the Coordinated Science Laboratory, was elected to the **National Academy of Engineering (NAE)**. Then, just a few short months later, Nahrstedt took to an auditorium stage right next to her mother, **Ruzena Bajcsy**, to discuss how they became the first mother-daughter pair to earn entry to the prestigious entity.

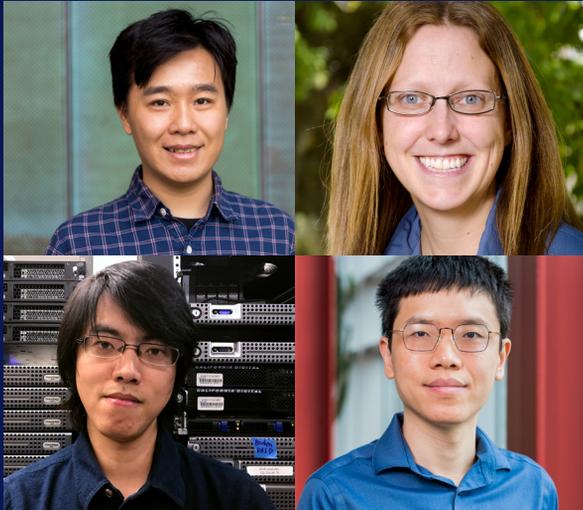
“In some ways, this really was amazing to me. I feel as though I am where I am currently because of a tremendous support network that not only includes the actions of others, but my genes,” Nahrstedt said. Then it was Bajcsy’s turn. A broad smile suddenly lit up her face, and, her arms outstretched, she exclaimed simply but powerfully: “I’m a proud mother, and I’m thrilled to have been in this profession we have both shared.”

**CELEBRATION OF EXCELLENCE
BROUGHT CS AWARD WINNERS
TOGETHER**

Following another academic year in which Illinois Computer Science students, faculty, staff, and alumni again proved what they were capable of as a community, a ballroom at the Illini Union was filled to capacity to honor the achievements of this remarkable collective at the **2022 Celebration of Excellence**. About 60 Illinois CS undergraduate students, 90 graduate students, 30 faculty members, five staff members, and five alumni were honored. In total, approximately 300 guests attended the event, which marked the first time the department celebrated all award winners in one amazing evening.



FOUR NSF CAREER AWARDS SHOWCASE RESEARCH STRENGTHS SPANNING COMPUTING



Clockwise from top: Nan Jiang, Colleen Lewis, Ling Ren, Tianyin Xu

Four Illinois CS professors earned **NSF CAREER Awards** in 2022, a recognition designed to honor early-career faculty who have the potential to serve as academic role models in research and education and to lead advances in the mission of their department or organization. Approximately 500 faculty receive the NSF CAREER Award annually, which also provides five-year financial support. These awards went to professor **Nan Jiang**'s project entitled "Theoretical Foundations of Offline Reinforcement Learning"; professor **Colleen Lewis**' work "Physical Representations of Programming Concepts"; professor **Ling Ren**'s effort entitled "Algorithms Foundations of Blockchains"; and professor **Tianyin Xu**'s work on "Rethinking Configuration Management for Cloud and Datacenter Systems."

ZHAI REFLECTS BEFORE LOOKING FORWARD AGAIN AFTER EARNING GERARD SALTON AWARD



Illinois CS professor **ChengXiang Zhai** – typically a researcher with an eye toward the future – couldn't help but look back upon years of collaborative research efforts. The reason for his shift in mindset came from learning that he had won the **Gerard Salton Award** from the Association of Computing Machinery Special Interest Group on Information Retrieval (ACM SIGIR).

To Zhai, humans invented tools like the computer to better understand our world. "The computer is just one of these tools, and I've always had a goal to build applications using this tool that can impact many people by bettering their lives," Zhai said.



BO LI NAMED 2022 SLOAN RESEARCH FELLOW

Professor **Bo Li** is among 118 recipients of the **2022 Sloan Research Fellowships** from the Alfred P. Sloan Foundation. The award "honors extraordinary U.S. and Canadian researchers whose creativity, innovation, and research accomplishments make them stand out as the next generation of leaders."

Li's research focuses on trustworthy machine learning, information theory, game theory, artificial intelligence, computer security, and privacy. "We are extremely proud of her accomplishments, and we are confident that she will continue to grow as an outstanding researcher and leader in the department of computer science," said **Andreas Cangelaris**, former vice chancellor for academic affairs and provost at Illinois.

MARINOV'S UNDERGRADUATE RESEARCH MENTORSHIP AWARD INDICATIVE OF AN INCLUSIVE APPROACH



As a professor with Illinois Computer Science since 2005, Darko Marinov has built up a firm knowledge base of the research process in software engineering and, beyond that, how

to cultivate interest in the research process among undergraduate students. In February, his efforts were acknowledged by the **CRA-E** when he earned its **Undergraduate Research Faculty Mentoring Award**. "Undergraduate students are at a stage in life where they're just exploring, and probably the biggest option they have in front of them is whether they should join industry or go to graduate school," Marinov said. "My first goal is to help them reach a decision on that."

BY THE NUMBERS (FY22)

120+

WORLD-CLASS FACULTY

24 NEW FACULTY

DEPTH & BREADTH
FACULTY BY RESEARCH AREA

(Counts recognize faculty doing research across multiple areas.)

Architecture, Compilers, and Parallel Computing	16
Artificial Intelligence	29
Bioinformatics and Computational Biology	11
Computers and Education	19
Data and Information Systems	12
Interactive Computing	9
Programming Languages, Formal Methods, and Software Engineering	18
Scientific Computing	10
Security and Privacy	17
Systems and Networking	17
Theory and Algorithms	19

18,595 Degrees CONFERRED TO 17,100 ALUMNI

BS 11,021	MS 5,986	PhD 1,588
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18
ACM
Fellows

#5

47
NSF CAREER
Awards

23
Endowed Chairs
and Professorships

11
Sloan Research
Fellows

20
IEEE
Fellows

Computer Science
Undergraduate and
Graduate Ranking,
U.S. News & World Report

MORE NSF FUNDING

Illinois remains one of top NSF Funding recipients in the nation

ENDOWMENT

\$24.8 MILLION*

\$870,441 INCOME

Funds student awards, scholarships, and fellowships; faculty chairs, and professorships; lectureships, research, and general operations.

*Market value.

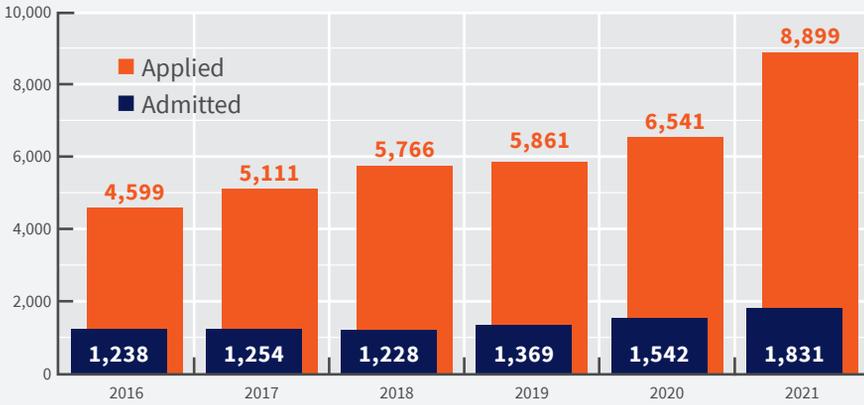
NEW GIFTS & COMMITMENTS

\$3.3 MILLION

\$2.7 MILLION
in New Current
Use Gifts and
Commitments

\$505,364
in New
Endowment Gifts
and Commitments

CS ENGINEERING & BLENDED DEGREES – UNPRECEDENTED UNDERGRADUATE DEMAND, TALENT, & DIVERSITY



ENROLLED FRESHMEN, FALL 2021

- 31 States (and Puerto Rico), 18 Countries Represented
- 34.3 Incoming ACT (Composite Average)
- 68.2% Male / 31.8% Female
- CS Engineering only: 61.3% Male / 38.7% Female
- CS + X Admission Rate: 25.4%
- CS Engineering Admission Rate: 6.7%

ILLINOIS ADMISSIONS RATES

CAMPUS: 44.8% (TOTAL), 37.1% (FIRST-CHOICE MAJOR) / ENGINEERING: 23%

Average Starting Salaries for Illinois CS Graduates who Graduated during 2020-2021

BS: **\$113,978**

MS: **\$119,978**

PhD: **\$138,536**

FALL 2021 FEMALE ENROLLMENT ON CAMPUS

27.6% Undergraduate

21.1% Graduate



FALL 2021 ENROLLMENTS

UNDERGRADUATE CS ENGINEERING & BLENDED DEGREES

Computer Science	1,260
Mathematics & Computer Science	275
Statistics & Computer Science	313
CS + Advertising*	39
CS + Anthropology*	15
CS + Astronomy*	50
CS + Chemistry*	31
CS + Crop Sciences*	15
CS + Economics*	137
CS + Geography and GIS*	13
CS + Linguistics*	88
CS + Music*	28
CS + Philosophy*	59
Total Undergraduate Enrollment	2,329

*CS + X students are admitted by partner Colleges/Programs

GRADUATE DEGREES

PhD	460
MS and BS-MS	125
On-campus MCS and BS-MCS	255
Online MCS / MCS is Data Science	1,258
MS Bioinformatics	11
iCAN	14
Total Graduate Enrollment	2,123

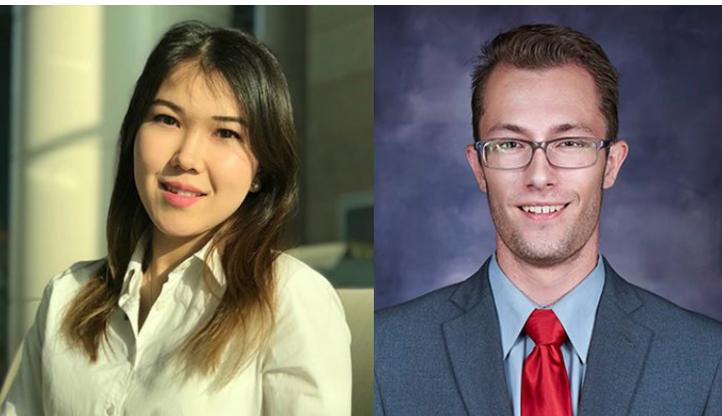
STATE OF ILLINOIS SUPPORT – FY21

\$22.6 MILLION



RESEARCH EXPENDITURES – FY21

\$33.3 MILLION



Left to right: Azhar Karypbayeva, Jackson Ward

FIRST TWO ICAN GRADUATES FIND A NEW FUTURE IN COMPUTING



The **Illinois Computing Accelerator for Non-Specialists (iCAN)** was introduced in 2020 with

a mission to broaden participation in computing through a program for college graduates without a computer science background. Two students from the first iCAN cohort, **Azhar Karypbayeva** and **Jackson Ward**, epitomize the program’s mission. After completing the iCAN program, each gained acceptance and enrolled in the Master of Computer Science (MCS) program at Illinois CS.

“From the very beginning, Azhar and Jackson remained clear about their interest in computing and made space in their lives to be successful,” said **Tiffani L. Williams**, professor and Director of Onramp Programs.



SILVA LEADS TEAM STUDYING INTERCONNECTIONS BETWEEN ONLINE LEARNING, EQUITY, AND ACCESS

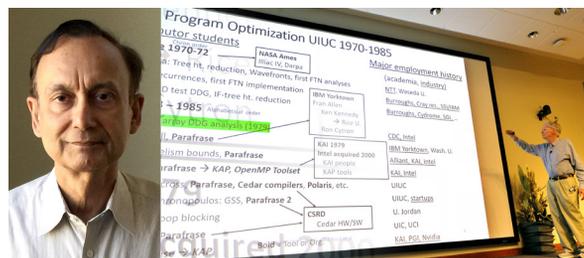
Professor **Mariana Silva** leads a team that received a \$300,000 grant from the **NSF’s Division of Undergraduate Education** to explore the interconnections between online learning, equity, and access.

Instructional activities where two or more students learn something together are associated with increased student persistence, learning outcomes, and retention. COVID-19 exposed the need to adapt these collaborative learning activities to fit a variety of delivery modes. Silva, with fellow Illinois CS professor **Geoffrey Herman** and Mechanical Science & Engineering professor **Matthew West**, plans to explore the impact of students’ choice of synchronous or asynchronous classes on their learning goals, sense of belonging, and satisfaction.



INAUGURAL BANERJEE LECTURE DELIVERS UPON ITS NAMESAKE’S LEGACY

When **Sanchita Banerjee Saxena** followed Illinois CS Department Head **Nancy M. Amato** to the podium, she marked the end of a nearly five-year process to honor her father and Illinois CS alumnus **Utpal Banerjee** (MS '76, PhD '79), who died in 2017. The inaugural **Utpal Banerjee Distinguished Lecture in High Performance Computing** honored his long-lasting success that included a nearly 20-year career at Intel in the Software Solutions Group.



Left to right: the late Utpal Banerjee, David J. Kuck. Top: Sanchita Banerjee Saxena

Saxena relished the moment to describe her father’s importance to the Illinois CS community, while her two sons stood beside her understanding a bit more about their grandfather’s technical accomplishments. Then CS Professor **Lawrence Rauchwerger** introduced Illinois CS professor emeritus and Intel Fellow **David J. Kuck**, who was Banerjee’s doctoral advisor, as the first lecturer.

BROADENING PARTICIPATION IN COMPUTING



NEW GRANT HELPS ILLINOIS CS DEVELOP PROGRAMS TO SUPPORT UNDERGRADUATE WOMEN IN CS

For years, Illinois CS has made **Broadening Participation in Computing (BPC)** one of the department's core values. However, Department Head **Nancy M. Amato** noted that financial support for this goal from external resources was rare to come by. That changed in May 2021, as the department was awarded a two-year grant worth \$929,500 from the **Center for Inclusive Computing (CIC)** at Northeastern University – representing the most substantial source of funding the department has received to date for BPC.

THE CIC GRANT HAS BEEN PUT INTO ACTION THIS YEAR THROUGH PROGRAMS LIKE ILLINOIS CS KICKSTART AND CS STARS.

KICKSTARTING THE BELIEF THAT MORE WOMEN CAN DO GREAT THINGS IN COMPUTING



Left to right: Ananya Barman, CS Kickstart participants

The **Illinois CS Kickstart** program provided a meaningful start to the semester for 30 first-year students like **Ananya Barman**. According to Barman, the four-day program – designed to create an inclusive community among recently admitted undergraduate students – achieved its mission to introduce her to campus life and the learning experience at Illinois CS. “The CS Kickstart program helped me understand what is possible here through a sense of community,” Barman said.

MAKING THE MOST OF THEIR EDUCATIONAL OPPORTUNITIES THROUGH CS STARS



Left to right: CS Stars participants, Melissa Chen

When students like senior **Melissa Chen** joined **CS STARS**, they gained access to a community of women interested in pursuing undergraduate computer science research as well as departmental engagement, outreach, and recruitment. Through the group's weekly meetings, Chen was introduced to Illinois CS professor Brian Bailey and became a part of his research group, Orchid. “I felt like I could understand how my passion for computing could make a difference,” Chen said. “This has been huge for me, and it never would've happened without CS STARS.”



WILLIAMS CONTINUES EFFORTS TO IMPACT INCLUSIVITY OF COMPUTING AND ENGINEERING EDUCATION

There are two compelling reasons, amidst a comprehensive effort, as to why Illinois CS professor **Tiffani L. Williams** recently accepted a new position as a **Dean's Fellow in Inclusion, Belonging, and Engagement** with The Grainger College of Engineering.

First, she will help Grainger Engineering scale the **CS CARES Committee** – an outlet that proves the department's commitment to fostering an open and inclusive community for all, as defined in our CS Values and Code of Conduct. Second, Williams will expand Grainger Engineering's “interaction and engagement in Chicago with efforts focused on expansion of our computing ecosystem in the city and our partnership with Discovery Partners Institute (DPI).”

AI IN CONSTRUCTION WORKSHOP PIECES IT ALL TOGETHER



Left to right: David Forsyth, Julia Hockenmaier, Derek Hoiem

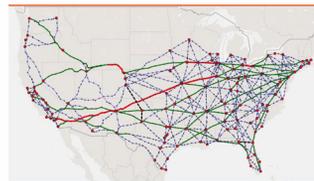
Over the past year, the continued development of a first-of-its-kind institute for **Artificial Intelligence (AI) in Construction** led to the AI in Construction Workshop. Formed by **Mani Golparvar-Fard**, a professor with Civil & Environmental Engineering and CS affiliate faculty member, as well as nine other organizers from the Institute – including Illinois CS professors **David Forsyth**, **Julia Hockenmaier**, and **Derek Hoiem** – more than 170 targeted participants joined this workshop.

The effort furthered collaboration between industry leaders from more than 85 organizations – like Microsoft, Facebook, Amazon, Turner Construction, Aon Insurance, Autodesk, Nemetschek, Oracle, etc. – researchers at the Institute, and entrepreneurial collaborators throughout the University of Illinois Urbana-Champaign.



GODFREY'S TEAM DESIGNS A PARALLEL INTERNET WITH SPEED-OF-LIGHT LATENCIES

About eight years ago, professor **Brighten Godfrey** and collaborators formed a research team to dramatically increase the speed of the internet. At its core, Godfrey and this team believed they could develop close to speed-of-light latency. Their idea represented an overhaul to the way the internet operates and how it is built.



Godfrey and his collaborators believe the resulting service could be deployed in 120 of the largest US cities, providing 85% of Americans a much faster internet connection.

Sustaining an energy and belief that internet latency could be greatly improved, Godfrey and the team presented a paper that proved their theory possible. “This project is about as fundamental and architectural as you can get,” Godfrey said. “It’s saying, ‘Let’s build a whole new internet.’”



NAHRSTEDT'S AUGMENTED REALITY SYSTEM TO HELP SHAKE OFF ZOOM FATIGUE



The COVID-19 pandemic forced hundreds of millions of people to interact with each other over online videoconferencing systems instead of meeting face-to-face. While making the pandemic easier to cope with, such services provide only an unnatural-seeming meeting environment that emphasizes participants' isolation and potentially leaves them feeling marginalized, unseen, uncomfortable, and less able to focus.

Now, under a new grant from the **National Science Foundation**, Illinois CS professor **Klara Nahrstedt** will lead a timely effort to create a next-generation, mixed-reality, immersive meeting environment that offers attendees a vivid experience that better simulates the feeling of in-person conversations.

WITH **I** | THE CAMPAIGN FOR ILLINOIS

Over 12,200 alumni, faculty, staff, corporations, foundations, and friends surpassed our goal of raising \$550 million. Over \$665 million in support was contributed to our bold plans for the future and matchless education that is training tomorrow's world-changing leaders, today.

During the **With Illinois** campaign, we made investments in our facilities, embarked on exciting new initiatives, strengthened existing programs, and significantly grew our Engineering Visionary Scholarship endowment.

CS GIFTS IN ACTION

EXPANDING POSSIBILITIES IN COMPUTING LEADS TO LOAR'S ICAN SUPPORT



Inspired by his new career in data privacy, alumnus **Matt Loar** (BS CS '07, JD '17) decided to give back. His \$5,000 gift will benefit scholarships for the **Illinois Computing Accelerator for Non-Specialists (iCAN)** program and speaks to the deeper connection that he's found with computing over time.

iCAN's mission to provide non-computing college graduates with an accelerated program of CS study synched up perfectly with Loar's motivations. "I've come to believe that we shouldn't practice CS in isolation. Instead, the power of CS is about applying lessons learned to better other areas of the world around us," Loar said. "What appealed to me about the iCAN program, is that it seemed to be addressing that very idea, just from a different direction."

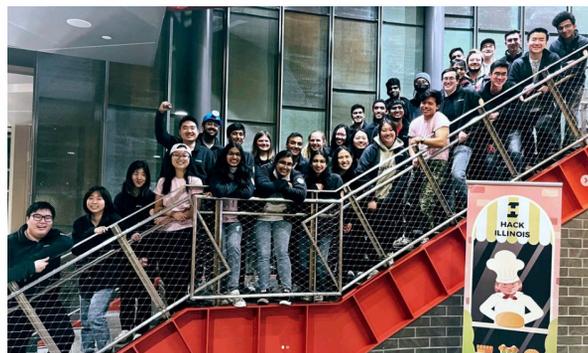
SUBRAMANIAN SUPPORTS STUDENTS WITH AN OPEN MIND, THIRST FOR KNOWLEDGE



When he came to the University of Illinois with a dream about opportunities, **Umesh Subramanian** said his experience matched his goals. He thrived in a collaborative research environment as a Mechanical Science & Engineering graduate student. That feeling became the driving force behind his recent scholarship fund

designated to an undergraduate student from out of state in Computer Science.

"I strongly believe in removing obstacles and creating pathways for people to achieve their potential. I think this scholarship would be a success if a person collects a similar sense of pride and feeling of accomplishment from attending Illinois," Subramanian said.



STUDENT EVENTS BRIDGE THE GAP WITH THE CORPORATE WORLD

Every year, Illinois CS students make the most of corporate connections to balance what is learned in the classroom with what is practiced in industry, national research labs, and in academia. Several student-centered events bridged this gap successfully.

HackIllinois student co-directors **Raghav Saini** and **Yi Shian Ho** understood that there is something at the heart of the University of Illinois Urbana-Champaign's premiere hackathon: the way everyone works together. Meanwhile, student co-directors **Jasneet Thukral** and **Shagun Varma** both approached this year's **Reflections|Projections** event focused on the unique power technology can have on the good. Additionally, sophomore **Drishika Asher** conducted a tech talk with Reddit Chief Technology Officer **Chris Slowe**.



CELEBRATING EXCELLENCE – CS ALUMNI & STUDENTS

Nearly 200 of the department's amazing students, alumni, faculty, and staff were recognized during the 2021-2022 academic year with awards, scholarships, or fellowships. Many of these recognitions provide financial support thanks to generous donations from friends and alumni. Thank you for your support!

See the list at cs.illinois.edu/celebration.



When Illinois Computer Science alumna **Parisa Tabriz** (BS '05, MS '07) took the stage at the State Farm Center as speaker for the **2022 Grainger College of Engineering Convocation**, she sensed something special and unique to the college community as approximately 1,600 graduates watched on. "I could see many tiny acts of happiness, pride, and connection across the auditorium," said Tabriz.

The "Browser Boss" and "Security Princess" is now a Vice President at Google. Tabriz then shared her approach to conquering uncertainty for any of the new graduates who might encounter it as they begin their lives after college.



RECENT ALUMNUS VIVEK NAIR JOINS 2022 CLASS OF PRESTIGIOUS HERTZ FELLOWS



Recent alumnus **Vivek Nair** (BS, MCS '21) can recall many integral moments on his academic path to impactful research in cybersecurity. These moments all led up to May, when he received the prestigious **Hertz Fellowship** for 2022. And one moment stands out more than anything else.

"I still recall when I first visited the University of Illinois, I ended up knocking on the door of now professor emeritus Roy Campbell," Nair said. "Much to my surprise, he answered and welcomed me in. His interest in my work and the way he spoke about the department is a primary reason I chose to study at Illinois CS."



ALUMNUS JASON CONG'S NOYCE MEDAL REPRESENTS AN IMPACTFUL COMPUTING CAREER

Alumnus **Jason (Jingsheng) Cong's** (MS '87, PhD '90) impact in the design of integrated circuits for major improvements in speed,

energy efficiency, scalability, customized computing, and quantum computing has become quite clear. Cong conducts this work as director of the UCLA Center for Domain-Specific Computing and the VAST (VLSI Architecture, Synthesis, and Technology) Laboratory and has also received several significant career recognitions.

The most recent being the **2022 Robert N. Noyce Medal** from the **Institute of Electrical and Electronics Engineers (IEEE)**. A fantastic list of previous winners, honored for electronic design automation and FPGA design methods, left Cong feeling honored by the achievement.



ILLINI MOTORSPORTS: NATIONAL CHAMPIONS!

For the first time in the University of Illinois Formula SAE 40-year history, its team won both competitions that comprised the **2022 Formula SAE National Collegiate series**—finishing as the national champions. As she prepares to enter her second year as both an Illinois Computer Science student and team member for Illini Motorsports, **Labdhi Jain** reflected on this past year’s winning team and overall experience.



“I loved working on the electronics subsystem because I learned more about electronics – something I have always been fascinated by – and I was able to apply my CS skills in a different engineering field,” Jain said.

ILLINOIS EARNS FIRST-EVER MEDAL IN ICPC WORLD FINALS



For the first time in school history, a University of Illinois Urbana-Champaign team medaled at the **International Collegiate Programming Contest (ICPC) World Finals**. By taking 11th place in Moscow, the team “Must Pass” earned a bronze medal. Graduate students **Zihan Wang** and **Zhuolin Yang**, as well as undergraduate student **Yen-Hsiang Chang**, composed the team, and professor **Mattox Beckman** and PhD student **Peiyao Sheng** coached them.

ICPC is an enormous competition in scope, as it includes more than 50,000 students, more than 3,000 universities, and 400 on-site rounds per year. The finals alone had more than 100 teams.

NSF GRADUATE RESEARCH FELLOWSHIP PROGRAM ENCOURAGES LEE, RUFFIN TO CONTINUE RESEARCH SUCCESSSES



Left to right: Jaewook Lee, Margie Ruffin

Two Illinois CS students will benefit from the **NSF Graduate Research Fellowship Program (GRFP)**, which provides three years of financial support designed to ensure the quality, vitality, and diversity of the scientific and engineering workforce of the United States.

After earning his bachelor's degree this past spring, Illinois CS alumnus **Jaewook Lee** will utilize the GRFP to begin his PhD in the Makeability Lab at the University of Washington. Meanwhile, PhD student **Margie Ruffin** continues to successfully delve further into the information security research focus. “Receiving (the NSF GRFP) not only offers validation in my research but the support to keep conducting said research,” Ruffin said.

WE DO THE IMPOSSIBLE EVERY DAY.

GROUNDBREAKING RESEARCH. INNOVATIVE EDUCATION.

WE'RE TACKLING TOUGH SCIENTIFIC CHALLENGES - FROM DEVELOPING THE TECHNOLOGY BEHIND BIOLOGICAL PROCESSORS, TO ENHANCING THE USE OF DIGITAL AGRICULTURE TECHNOLOGIES, DELVING INTO QUANTUM CRYPTOGRAPHY, AND DESIGNING AN INTERNET WITH SPEED-OF-LIGHT LATENCY. AND WE'RE BROADENING PARTICIPATION IN COMPUTING BY PROVIDING ACCESSIBLE PROGRAMS FOR STUDENTS, HELPING FORM A SENSE OF COMMUNITY AND PURPOSE. ILLINOIS COMPUTER SCIENCE STUDENTS, FACULTY, STAFF AND ALUMNI ARE AT THE FOREFRONT OF COMPUTING INNOVATION.

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