

2022-2023

IOWA STATE UNIVERSITY
Department of Computer Science

ATANASOFF TODAY



LETTER FROM THE CHAIR

Greetings, alumni and friends of the Department of Computer Science. I'm delighted to share with you the 2023 edition of Atanasoff Today. I hope in reading these pages, you will share my delight in reflecting on the last year that was so full of accomplishments for our department. As I look back on all we've accomplished in recent years, it invigorates a new sense of excitement for all that is to come.

CONTINUED EXCELLENCE

Our department continues its upward trajectory. Just last year, we added six new faculty, developed two new degree programs (an M.S. degree in Artificial Intelligence and a B.A. degree in Computer Science), and completed a strategic plan for the next decade. Our enrollment has grown by 31%, our female enrollment by 45%, and we have seen a 35% increase in grant funding over the last five years. We also established a National Science Foundation (NSF) training program focusing on dependable data driven discovery, and built a new facility to accelerate research on autonomous systems and robotics. This is a testament to the hard work of our faculty and staff, but also to the continued excitement in computing as a discipline. The new students, along with the new faculty members, get to be a part of the rich history of our department; a legacy many of you undoubtedly contributed to.

In this magazine, you will see our complete 2022-2032 strategic plan. Thank you to Soma Chaudhuri, Gianfranco Ciardo, Myra Cohen (Chair), Wei Le, and Simanta Mitra for their work putting this very important document together. The defined mission and vision will help us set priorities, allocate resources, and ensure that we are all working towards common goals and objectives.

In our department's continued commitment to providing degrees of the future, we have recently received approval for a bachelor of arts degree in computer science. The degree program aims to accommodate students who want to major in computer science but are interested in developing a multi-disciplinary perspective by adding another major such as psychology, music or journalism. We believe that this new degree program is aimed squarely at the interdisciplinary future of computing. Thanks to Soma Chaudhuri and Jack Lutz for their work in making this degree a reality.

FACULTY ACHIEVEMENTS

We've also made incredible strides in research in the last year. Our world-class faculty received several National Science Foundation (NSF) grants and remained actively involved in various centers and institutes, furthering their contributions to academia. This year we cut the ribbon on the Autonomous Systems

Laboratory, which is equipped with hands-on learning opportunities for our students, including a smart city, a driving simulator, and a net for drone flying.

Carl Chang retired from the department last spring after 20 years as a professor and former department chair. Carl certainly left a lasting impression on our department, and I'm sure many of you can attest to that. We are very interested in cementing his legacy in our department, if you are interested in helping us do so, please contact me at hridesh@iastate.edu.

This edition, we are celebrating the life and legacy of former professor Wayne Ostendorf, who passed away in June and who dedicated over 30 years of service to furthering the field of computing at Iowa State University. If you are interested in helping us memorialize Wayne and his legacy in our department, please contact me at hridesh@iastate.edu.

LOOKING AHEAD

As we strive for excellence in our resource-constrained environment, your contributions are more important than ever. We could specifically use your help with hiring and retaining internationally renowned faculty by establishing chairs and professorships in three areas of strategic importance: quantum computing, autonomous and robotic systems, and smart health. We also remain dedicated to recruiting experts to lead initiatives in trustworthy AI, Cybersecurity, and Augmented Reality.

Since its opening in 1969, Atanasoff Hall has served us well; however, the facilities are now in need of significant improvements as the department has grown, both in size and in research activities. Thus, improving our current facilities in Atanasoff Hall continues to be at the top of our agenda. You can view our plan for building improvements on page 20. If you would like to support us in improving our facilities, please contact me at hridesh@iastate.edu.

I hope you enjoy reading about our accomplishments from the last year and I look forward to all that is to come. Your support is always appreciated.

HRIDESH RAJAN

Professor and Chair,
Department of
Computer Science



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AND EVENTS, VISIT
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Computer Science



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ISU Department of Computer Science

CONTENTS



STRATEGIC PLAN

Take a look at the 2022-2032 strategic plan. The plan includes a mission, vision, goals for both undergraduate and graduate education, and much more.



BUILDING RENOVATIONS

An overview of the proposed renovations of Atanasoff Hall. The project focuses on areas of public use such as the hallways, stairwells, and exterior.

2022-2032 STRATEGIC PLAN

- 5 Mission & Vision
- 7 Undergraduate Education
- 8 Graduate Education
- 9 Research & Discovery
- 10 Service, Outreach, & Engagement

INVESTING IN EXCELLENCE

- 11 Faculty Research Grants
- 12 Student Scholarships
- 14 Building Renovations

STUDENT SUCCESS

- 16 Student Entrepreneurship
- 18 Bachelor of Arts in Computer Science
- 19 Women in Computer Science
- 20 Autonomous Systems Laboratory

FACULTY

- 22 Faculty & Staff Awards
- 23 Welcome New Faculty
- 24 Farewell to Carl Chang
- 26 External Advisory Council New Members
- 27 Remembering Wayne Ostendorf

CONTACT

Department of Computer Science
226 Atanasoff Hall
2434 Osborn Drive
Ames, IA 50011

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IOWA STATE UNIVERSITY

Department of Computer Science

DEPARTMENTAL OVERVIEW

NEW FACULTY



MENGDI HUAI
Assistant Professor
Data mining & machine learning



CHENGLIN MIAO
Assistant Professor
Security & privacy



MEISAM MOHAMMADY
Assistant Professor
Differential privacy



ABRAHAM ALDACO
Assistant Teaching Professor
Data science, machine learning



GEORGI BATINOV
Assistant Teaching Professor
User modeling, human-computer interaction



MATTHEW HOLMAN
Lecturer
Programming languages

RESEARCH EXPERTISE

- AI, machine learning, and data science
- Bioinformatics and computational biology
- Human-computer interaction
- Robotics and autonomous systems
- Software engineering and programming languages
- Systems and networking
- Theoretical foundations

1,530*
undergraduate students

*661 Software Engineering

205*
graduate students

*59 M.S.
146 Ph.D.

267*
female students

*50 M.S. & Ph.D.
120 Undergraduates
97 Software Engineering

5-YEAR GROWTH TRENDS

31%

increase in student enrollment

45%

increase in female enrollment

35%

increase in grant funding

MULTIPLE NEW DEGREE PROGRAMS

M.S. in AI

B.A. in Computer Science

B.S. in Data Science

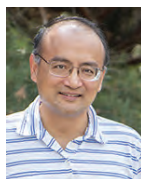
2022-2032 STRATEGIC PLAN

We are thrilled to share with you the strategic plan for the next ten years, which acts as a compass for our department; guiding us into the next decade toward a brighter future. The strategic plan was the culmination of planning and development accomplished by the Strategic Plan Committee.



FULL STRATEGIC PLAN

NSF CAREER AWARD WINNERS



YAN-BIN JIA



WEI LE



ANDREW MINER



MYRA COHEN



HRIDESH RAJAN



GUANG SONG



WALLAPAK TAVANAPONG



JIN TIAN



2022 AWARDEE
NOK WONGPIROMSARN



NEW AUTONOMOUS SYSTEMS LABORATORY





STRATEGIC PLAN 2022-2032

We are thrilled to share with you the strategic plan for the next ten years, which acts as a compass for our department, guiding us into the next decade toward a brighter future.

The defined mission and vision help us set priorities, allocate resources, and ensure that everyone is working towards common goals and objectives, thus providing a roadmap to the future.

MISSION

Our mission is to excel and to be leaders for creating, sharing, and applying computing knowledge in the state of Iowa, and to be nationally and internationally recognized as having student-centric, innovative computer science education, research, service, and outreach. We aim to be the leaders in building computational and dependable intelligent approaches that address emergent needs of society at large.

VISION

Iowa State has been leading computing since Atanasoff's invention of the first electronic computer in 1937. We aim to continue this leadership by being internationally and nationally recognized for our expertise in areas of computing such as Software Engineering, Artificial Intelligence, Data Science, Theoretical Foundations, Computer and Networking Systems, and in areas of national priority such as cybersecurity, quantum computing, robotics, and autonomous systems. We will continue to embrace Iowa State's land grant mission as campus and state leaders, to be trusted partners in cross-disciplinary computing research, forging frontiers in innovation and entrepreneurship. We will inspire and prepare students for lifelong learning and will educate and train a diverse undergraduate and graduate body of students who will have successful careers and thrive in a wide range of rapidly evolving computing disciplines and industries.



"TO BE"

To be **leaders** for creating, sharing, and applying computing knowledge across Iowa and beyond;

To be **trusted partners** in building science and technology that solve grand societal challenges;

To be **nationally and internationally recognized** as having student-centric and innovative computer science education, research, and service;

To be **a diverse, equitable, and inclusive department** where students, faculty, and staff flourish;

To be **proactive in engagement** with educational partners, local industry, and governmental entities.





GOALS

UNDERGRADUATE EDUCATION

Our undergraduate programs are designed to train computer scientists, data scientists, and software engineers for productive, life-long careers. The department offers strong undergraduate programs leading to a B.S. in Computer Science, a B.S. in Software Engineering, and a B.S. in Data Science.

OVERALL GOAL

Continue to offer a high impact ISU experience that produces a globally competitive and diverse body of skilled graduates. These will become the most sought-after recruits for employment or higher education and will strengthen Iowa's technical workforce and excel in diverse work environments.

Objectives (O)

- O1:** Train students to embrace computational thinking and to master theoretical concepts and practical skills of computing which are fundamental to their future career.
- O2:** Provide a foundation from which students can pursue lifelong learning with confidence.
- O3:** Enable students to work collaboratively in a diverse and global environment.
- O4:** Expose and involve students in the creation of new knowledge and cutting-edge research.

Plan

- Increase our recruitment of a diverse body of students and faculty and maintain an inclusive learning environment. (O3)
- Reward teaching and undergraduate research using experiential learning, informed by cutting edge research. (O1, O2, O4)
- Offer multiple paths to a computer science degree by offering a variety of advanced undergraduate courses related to our areas of expertise. (O1-O4)
- Hire and retain internationally renowned faculty in current and targeted areas of research excellence. (O1-O4)
- Increase small mentoring groups and faculty supervised undergraduate research. (O1, O4)

GRADUATE EDUCATION

Our graduate programs offer a graduate curriculum and research-based training leading to M.S. and Ph.D. degrees in Computer Science and an M.S. in Artificial Intelligence. The department also plays a pivotal role in interdepartmental graduate majors and minors such as Bioinformatics and Computational Biology, Cybersecurity, and Human-Computer Interaction.

OVERALL GOAL

To achieve recognition as an international and national exemplar for training graduate students with vision and skills to become scientific leaders who perform innovative research and are influential problem solvers, communicators and educators.

Objectives (O)

- O1:** Train students to perform independent scholarly research, and demonstrate this through publishing in top venues.
- O2:** Mentor students to give quality presentations on technical topics.
- O3:** Enable our graduate students to attain influential positions.
- O4:** Provide opportunities for students to learn foundations of grant writing and entrepreneurship.

Plan

Educate students to recognize and perform high quality research that is appropriate for top venues. (O1-O4)

Provide incentives for students to publish and present in top venues. (O1, O2, O4)

Train students to write external grant applications and engage in startup opportunities. (O2, O4)

Support students in applying to and participating in internships. (O1-O4)





RESEARCH AND DISCOVERY

We are continually expanding our internationally recognized research programs in Computer Science and its interactions with other fields; contributing to fundamental advances in Computer Science needed to address grand challenges in environment, agriculture, health, energy, safety and security, social implications of autonomous algorithms and computing technology; and to increase the economic competitiveness of Iowa and the nation.

OVERALL GOAL

To engage in world-class research and to lead in key areas of computing such as Software Engineering, Artificial Intelligence, Data Science, Theoretical Foundations, Computer and Networking Systems, and in areas of national priority such as cybersecurity, quantum computing, robotics, and autonomous systems.

Objectives (O)	Plan
O1: Improve our departmental rank overall and in key areas of expertise.	Actively recruit and retain exceptional faculty, graduate students, and support staff. (O1-O4)
O2: Expand the size and quality of graduate programs.	Obtain funding (both foundational and cross-disciplinary) from a variety of external sources. (O1-O4)
O3: Increase our impact on industrial computing.	Support faculty and students to present their research at prestigious international venues. (O1, O3)
O4: Successfully engage in cross-disciplinary research and technology transfer.	Build a world class research technology infrastructure. (O1-O4) Increase our expertise and create clusters in key research areas. (O1, O3) Create mechanisms to facilitate and incentivize transdisciplinary research. (O4)

SERVICE, OUTREACH AND ENGAGEMENT (S)

Our department contributes to the community and society at large including from technology transfer, faculty startups, open-source software, partnering with Iowa K-12 teachers and students, partnering with other departments at ISU, broadening participation of underrepresented groups in Science, Technology, Engineering, and Mathematics (STEM) disciplines, and advising industry, government, and non-profits.

OVERALL GOAL

To reach a diverse community beyond computer science, to increase their understanding of and interest in computing, to broaden the participation of underrepresented groups, and to provide an inclusive, synergistic environment.

Objectives (O)

- O1: Encourage and train more K-12 students and teachers to engage in computer science.
- O2: Increase our impact on local industry.
- O3: Participate in setting directions in local, state, and national policies related to computing.

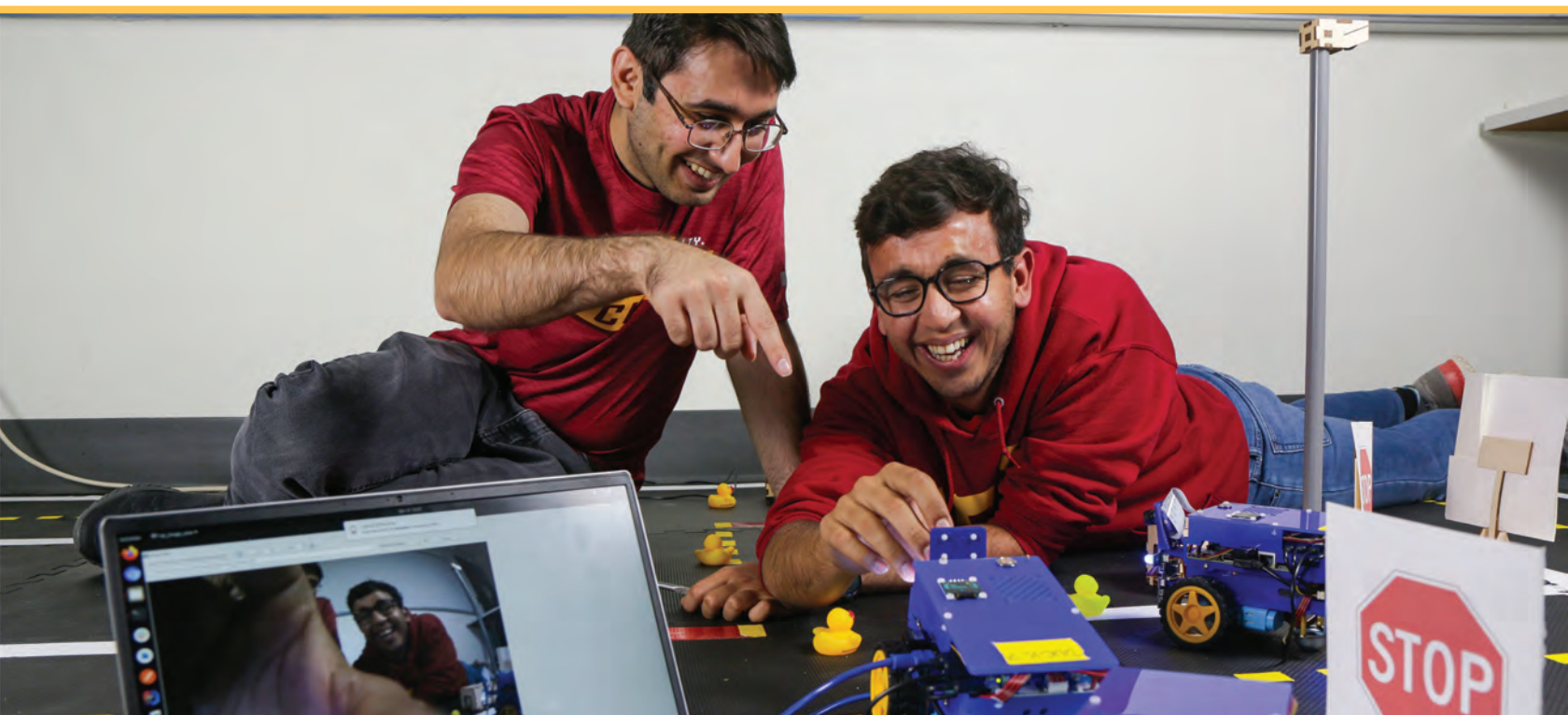
Plan:

Expand outreach programs to promote computational thinking and introductory concepts in computing to traditionally underrepresented groups. (O1)

Serve on national relevant panels and key computer science committees. (O3)

Engage local K-12 schools where our expertise can help increase computing literacy. (O1)

Interact with industry via internships, senior design projects, and startups. (O2)





RESEARCH EXCELLENCE

Research in the Department of Computer Science spans the fundamentals of computation through machine-learning, robotics and other applied technologies. Our faculty, graduate students and even some undergraduate students are expanding the science of computing among interdisciplinary teams at Iowa State, and are collaborating with computer science leaders around the globe.

Some of the grants secured in the past year include:

DEPENDABLE DATA DRIVEN DISCOVERY

Faculty: Wallapak Tavanapong

Funding Amount: \$2,998,973

IMPROVING THE EFFICIENCY AND APPLICABILITY OF DECISION DIAGRAM

Faculty: Gianfranco Ciardo & Andrew Miner

Funding Amount: \$700,000

SHARING THE WORLD WITH AUTONOMOUS SYSTEMS

Faculty: Nok Wongpiromsarn

Funding Amount: \$599,854

MORE MODULAR DEEP LEARNING

Faculty: Hridesh Rajan

Funding Amount: \$580,000

SMART INTEGRATED TUNING OF PARALLEL CODE FOR MULTICORE AND MANYCORE SYSTEMS

Faculty: Ali Jannesari

Funding Amount: \$502,318

MULTI-STAKEHOLDER DECISION MAKING

Faculty: Samik Basu

Funding Amount: \$299,184

TOWARDS VARIABILITY-AWARE SOFTWARE ANALYSIS AND TESTING

Faculty: Robyn Lutz

Funding Amount: \$298,785

SEQUENTIAL DECISION MAKING UNDER UNCERTAINTY WITH SUBMODULAR REWARDS

Faculty: Chris Quinn

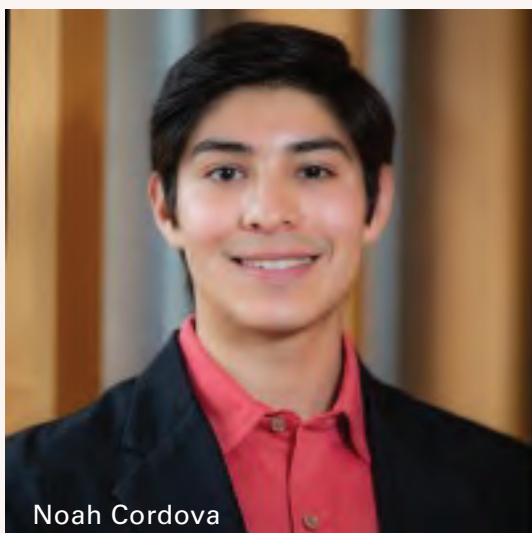
Funding Amount: \$250,000

CASUAL DECISION-MAKING

Faculty: Jin Tian

Funding Amount: \$75,000

SCHOLARSHIP IMPACT

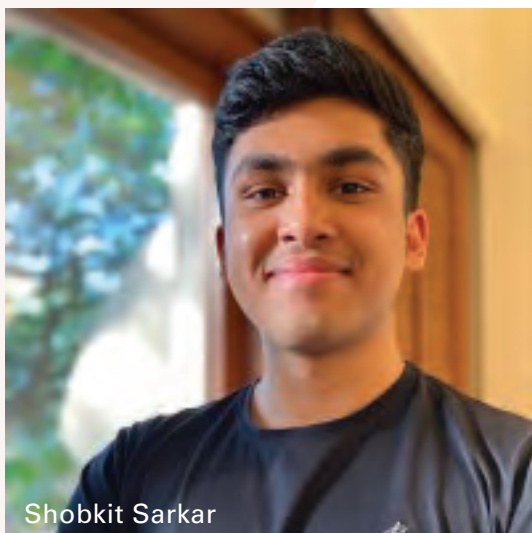


Noah Cordova

Scholarships are an important part of funding for many of our students. These funds enable students to obtain an education they would not have access to otherwise. Hear why our scholarship recipients are thankful for the assistance and what they plan to do with their degrees.

Receiving a scholarship of any kind and of any amount means so much to me, as well as my family. Scholarships provide opportunities. This was true for my parents as first-generation college students, this was true for my older brother who attended this same university, and this is true for me. I am grateful to accept the opportunities that scholarships provide me. With the help of scholarships, each day is like a gift and it is one that I do not take for granted. I hope that my gratitude is evident in my actions, by taking advantage of every opportunity that comes my way and by using them as a means to better myself and the people around me.

-Noah Cordova, Boeing Company Scholarship for Computer Science recipient



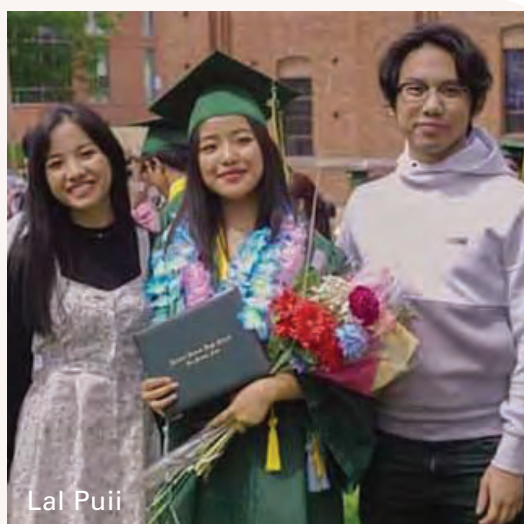
Shobkit Sarkar

Scholarships go a long way in ensuring that I continue to receive the highest quality of education that Iowa State University offers. I never thought that I would be working alongside world-class faculty in quantum computation research. Scholarships allow me to actively participate in many valuable opportunities and ensure that I have opportunities to grow not just my computer science skills, but my interpersonal and intrapersonal skills.

-Shobkit Sarkar, Mark Giese Computer Science Scholarship recipient

Scholarships mean so much to me. I have always been worried about the financial aspect of college, and to be selected as a recipient is an achievement that I can't even describe in words. Scholarships help alleviate the high cost of college that I otherwise would have paid out of pocket, and I am very thankful that I was considered to receive it. Because of my scholarships, I can focus on my education and excelling in my classes rather than spending the majority of my time working. After receiving scholarships, I can now take the classes I need without any worries about the expenses. I am very thankful for the gift of scholarships even though I cannot express my gratitude in words alone.

-Lal Puii, Innovation Maven Scholarship for Women in Computer Science recipient



Lal Puii

“

**I HOPE THAT MY GRATITUDE IS EVIDENT
IN MY ACTIONS; BY TAKING
ADVANTAGE OF EVERY OPPORTUNITY
THAT COMES MY WAY**

”



Linsey Kitt

Knowing I have a scholarship to back up my attendance costs is a great help in allowing me to focus on my studies and motivates me to make sure I'm making the most of my time here. I am currently a junior majoring in computer science with a minor in physics, with plans to take five years to complete this bachelor's as well as a master's in computer science. For my master's thesis, I've been doing research using computer science applied to physics to study neutrinos and their interactions. This interdisciplinary research lets me combine two of my passions, science and technology, and has been one of the many great experiences I've had in college. In addition to this, I'll be president of the Undergraduate Diversity and Inclusion in Physics club for a second year and vice president of Girls Who Compete, a club for women and non-binary people, along with supporters interested in competitive programming or just generally interested in improving their programming skills. Scholarships make me feel both acknowledged for the effort I put into being active in Iowa State's community, and supports me by helping me focus on these activities.

-Linsey Kitt, David and Rebecca Nation Scholarship for Computer Science recipient



Megan Severson

I am a rising senior in computer science at Iowa State University, and I plan on graduating in the spring of 2023 with a bachelor's degree. After graduation, I hope to have a career in software development while also being able to motivate and inspire younger generations of females to pursue a career in the field of technology. Thanks to scholarships, I will be able to stay motivated to achieve those goals without having to worry about paying off student loans.

-Megan Severson, Innovation Maven Scholarship for Women in Computer Science recipient



Griffin Bruns

My biggest dream in life is to become a video game developer and spread the joy and relaxation that video games brought me in high school to the generations that will come after me. To do this, I must gain all the knowledge I can, which means going to college. Paying for college is a big hurdle in my dream, so I cannot thank scholarship donors enough for helping me overcome this hurdle and paving the way to making my dream come true. Any person who wants to help the world can not do so without the help of others along the way, so thank you for helping me and make my dream of helping those younger than me that much closer to coming true.

-Griffin Bruns, Charlie and Barb Hunt Scholarship in Computer Science recipient

“

**SCHOLARSHIPS MAKE ME FEEL
ACKNOWLEDGED FOR THE EFFORT I PUT INTO
BEING ACTIVE IN IOWA STATE'S COMMUNITY**

”

BUILDING RENOVATIONS

Since its opening in 1969, Atanasoff Hall has served us well; however, the facilities are now in need of significant improvements as the department has grown, both in size and in research activities. Thus, improving our current facilities in Atanasoff Hall continues to be at the top of our agenda.

If you have visited Atanasoff Hall in recent months, you may have noticed the addition of whiteboards, additional seating, computer monitors, and work surfaces to the hallways of the building. The new spaces have given students places to work and collaborate, something that has become increasingly more important as we return to in-person activities. Students are able to plug their laptops into the monitors, giving them more space to work on projects and increase collaborative capabilities.

The addition of the workspaces is the first step towards a larger renovation of Atanasoff Hall. We have partnered with the ISU Maintenance

Improvement Committee (MIC) to renovate Atanasoff Hall in areas of public use such as the hallways, stairwells, and the exterior.

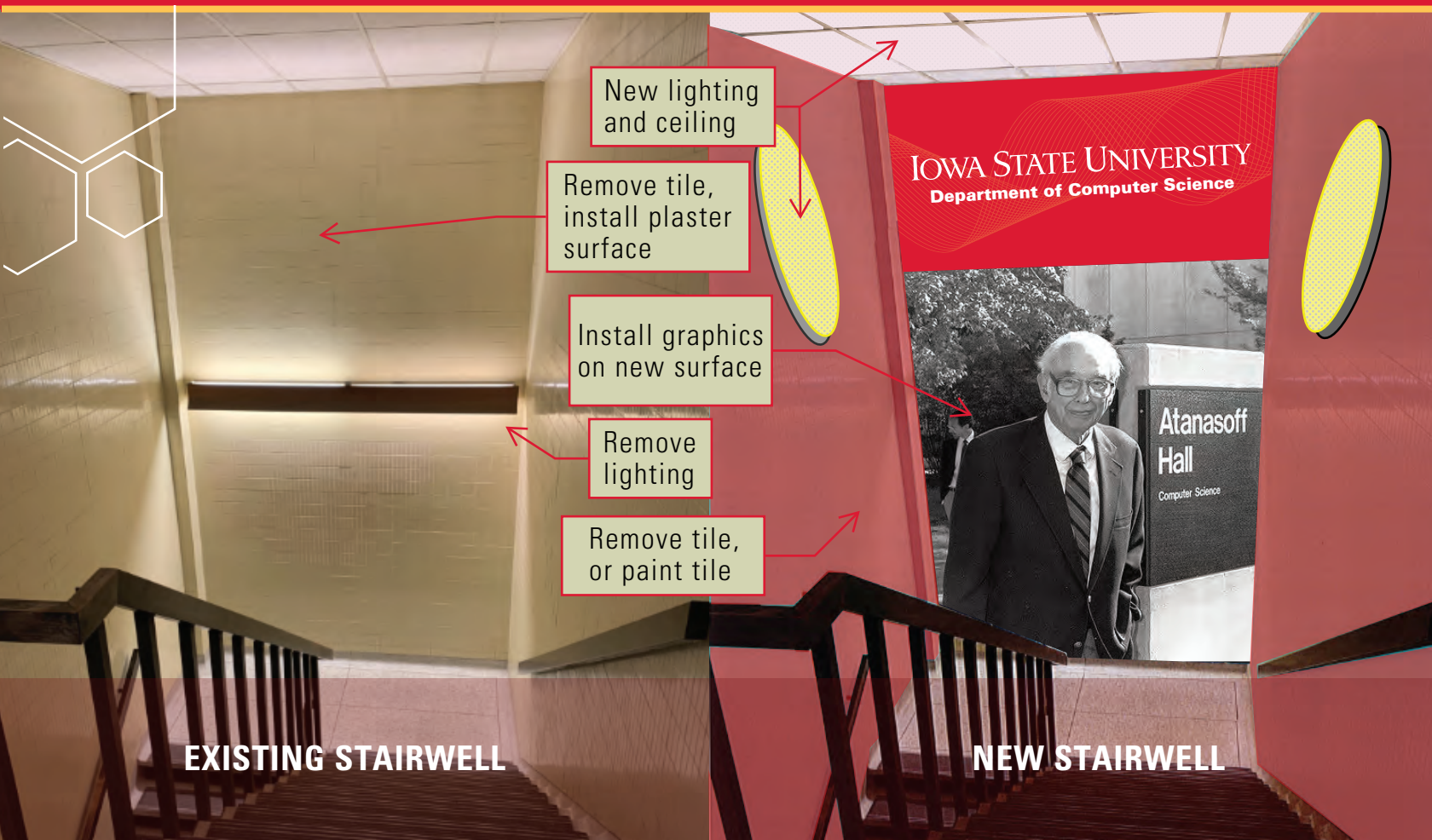
The renovations will allow us to apply upgrades to the areas where they are needed the most.

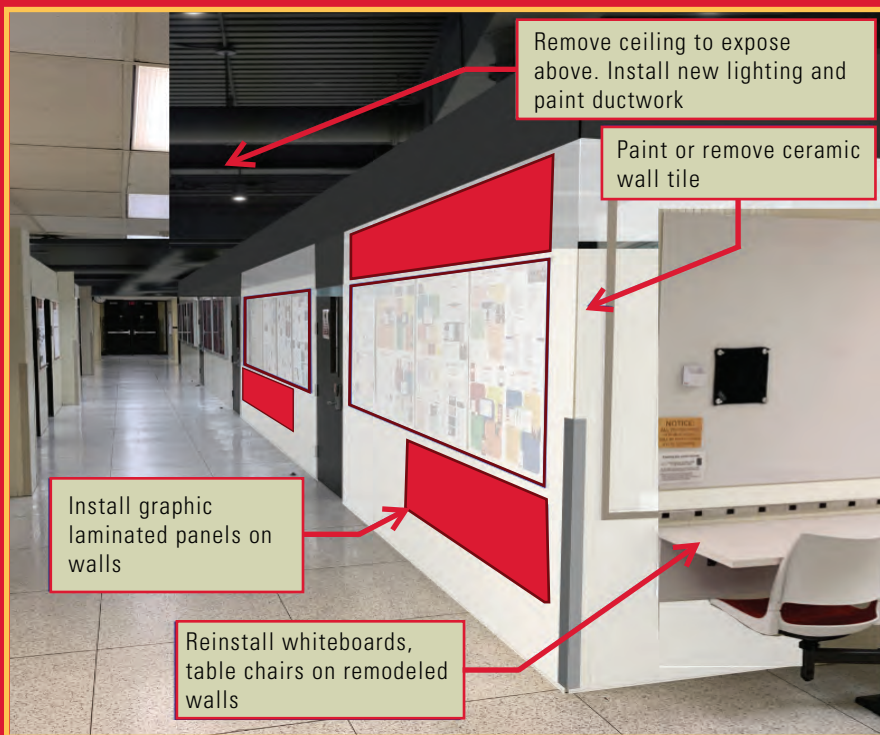
The stairway (Image #1) would receive new lighting, improved ceilings, new paint, and added departmental branding.

The hallways (Image #2) would see new ceilings, new paint, updated lights, and graphic laminated wall panels.

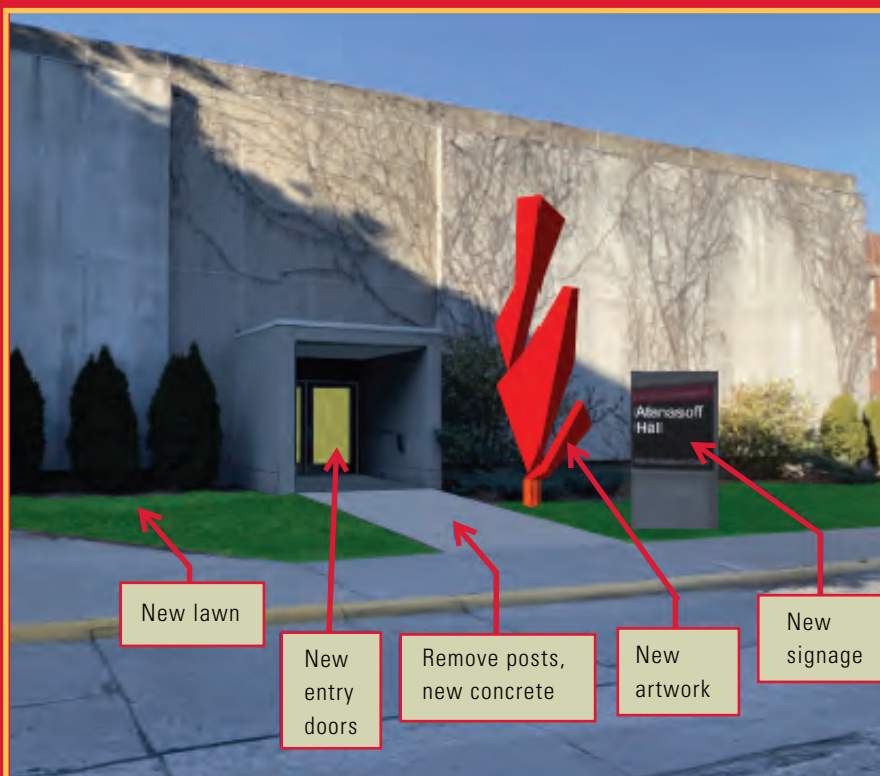
The building exterior (Image #3) would see improved landscaping, a sign on the east side where there currently is not one, artwork, and upgrades to the sidewalk and doors.

For the nearly 200 people who work out of Atanasoff Hall, these updates will be a welcomed





HALLWAYS



EXTERIOR

change. As the gathering place for Departmental meetings and events, the building updates will make Atanasoff Hall a more desirable place to work and meet.

The proposed updates will bring our building into the 21st century and be more reflective of the high-caliber work that comes out of Atanasoff Hall.

"At the heart of everything we do is our commitment to providing industry-leading educational resources to our students and these updates are an important step in that direction. By improving the resources available to our students, we are able to help ensure every student has a proper workspace in our program," Hridesh Rajan, Chair of the Department of Computer Science, said.

Whether someone is visiting Atanasoff Hall to participate in a lab, meet with a professor, or study with peers, these renovations are sure to make Atanasoff Hall a more welcoming, inspiring environment, conducive to collaboration.

**IF YOU ARE INTERESTED IN
HELPING US MAKE THESE
RENOVATIONS A REALITY, VISIT
[FOUNDATION.IASTATE.EDU/COMSCI](https://foundation.iastate.edu/comsci)**



INNOVATION AND ENTREPRENEURSHIP

COMPUTER SCIENCE STUDENTS GETTING INVOLVED ACROSS CAMPUS

The Department of Computer Science is home to some of the best and brightest students at Iowa State University. Our students are highly involved across campus in addition to being high academic achievers.

The College of Liberal Arts and Sciences (LAS), which hosts the Department of Computer Science, launched the Innovation and Entrepreneurship (I+E) Academy in the Spring of 2021. Computer science students have been involved in the program since its inception; merging their interests of computing and entrepreneurship.

The LAS I+E Academy offers LAS students the opportunity to engage in interactive activities to foster

their entrepreneurial drive. During the first year, they gain insight into what it means to be an entrepreneur through readings, reflections, case studies, and guest speakers. In the second year, the students match with university and local mentors who help guide them as they advance their projects forward.

The most recent cohort of participants included four computer science students; JJ ShraderBachar, Sundar Shivraj, Ranai Srivastav, and Yen Wang.

JJ ShraderBachar is a senior majoring in both computer science and Spanish. ShraderBachar joined the I+E Academy to help propel his media company, RWF Media. He specializes in making websites and



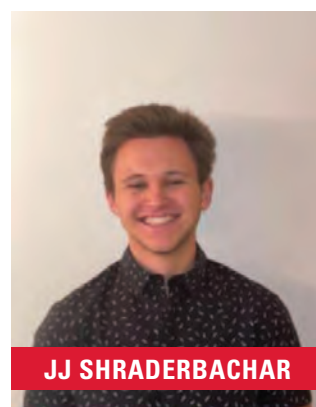
SUNDAR SHIVRAJ



YEN WANG



RANAI SRIVASTAV



JJ SHRADERBACHAR

managing social media accounts for small businesses.

ShraderBachar hopes to expand RWF Media to become a global company, something he hopes the academy will be a stepping stone towards.

"My educational background in computer science has helped me a lot with problem-solving," ShraderBachar said. "I've certainly encountered some problems in entrepreneurship and being able to problem solve effectively has helped a lot."

ShraderBachar has advice for other hopeful entrepreneurs: "You have to put in the work. It won't work unless you do."

Sundar Shivraj, a senior in computer science and data science, joined the academy because he saw this as a chance to take an idea he had always had and make it into reality, building from the ground up.

Shivraj is working on a collaborative project with other students involved in the academy that focuses on mental health, called, The Vibe.

"During our time at Iowa State, we have noticed that many students need help or support with their mental health, but often are unsure of where to go or do not have access to some of the options on and around campus," Shivraj said.

The first goal of their project is to create a welcoming space for students to visit when they need to spend

“

**YOU HAVE TO PUT IN THE WORK. IT WON'T
WORK UNLESS YOU DO.**

”

“

**I'VE LEARNED THINGS LIKE ORGANIZATION,
TIME MANAGEMENT, AND TEAMWORK
FROM MY COMPUTER SCIENCE CLASSES,
WHICH HAVE ALL IMPACTED MY TIME AT
IOWA STATE IN A POSITIVE WAY.**

”

time navigating their headspace and mental health needs. The second goal is to establish connections between students and other organizations on and around campus to make mental health resources more available and accessible to students.

Shivraj is also working on an individual project that is a multimedia platform/studio where people can share anonymous stories without fear of judgment.

The skills that Shivraj learned in the computer science classroom he feels have helped prepare him for other elements of being a student.

"I've learned things like organization, time management, and teamwork from my computer science classes which have all impacted my time at Iowa State in a positive way," Shivraj said.

Shivraj hopes future students are also compelled to join the I+E Academy.

"You are the one thing standing in between you and your idea," Shivraj said. "If you believe in your idea, you'll find a way to make it work."

An immediate goal for our department is to integrate an entrepreneurial mindset for all students, not just those in the entrepreneurial programs. If supporting young entrepreneurs is appealing to you, contact csdept@iastate.edu.



BACHELOR OF ARTS IN CS

Beginning in spring 2023, the Department of Computer Science at Iowa State University will offer a bachelor of arts degree in computer science. The degree program, which has received approval from the Iowa Board of Regents, is expected to lead to more diverse student enrollment.

The degree path aims to accommodate students who want to major in computer science but are interested in taking a wider variety of courses than the bachelor of science program allows. The bachelor of arts would require 32 computer science credits, compared to 50 for the bachelor of science. The curriculum ensures that the new degree path is as rigorous as the bachelor of science but gives flexibility to students.

The proposed program was spearheaded by Soma Chaudhuri, Professor and Associate Chair for Education, and Jack Lutz, Professor in the Department of Computer Science.

“Knowledge of computer science is becoming more and more important in the study of other disciplines,” said Chaudhuri. “With its fewer requirements, the B.A. in computer science allows students to double major in other areas of interest, leading to more career choices.”

Consultation with peer institutions indicated strong student demand for B.A. programs in computer science where they exist side-by-side with B.S. programs. The University of Iowa currently has 265 B.A. students in computer science and 205 B.S. students in computer science. The University of Colorado has 813 B.A. students in computer science and 921 B.S. students in computer science.

The B.A. program in computer science will have a close relationship with the existing B.S. program in computer science. The B.A. students will take their courses along with the B.S. students, not in separate sessions, and be subject to the same prerequisites and grade requirements.



There is an increasing demand for computing professionals in both the U.S. and internationally. The U.S. Bureau of Labor Statistics projects that the job outlook for software developers, quality assurance analysts, and testers will grow 22% from 2020 to 2030. In Iowa, the U.S. Bureau of Labor Statistics projects 5,652 jobs in computer occupations in 2030. Although U.S. universities graduate about 65,000 computer science students annually, there continues to be unmet demand. Iowa State University is well positioned to respond to this due to the strong demand for computer scientists and the growing commercial and academic demand for computer scientists who can work in interdisciplinary teams.

Iowa State University has a long history in computer science, dating back to Atanasoff's invention of the first electronic computer in 1939. The department's faculty collaborates with faculty in many other fields at Iowa State, both in research and in student supervision. B.A. students will thus be comfortable combining their computer science studies with a broader education.

“Enabling such broad-based education while preparing students for the 21st-century workforce is the core mission of LAS,” said Beate Schmittmann, Dean of the College of Liberal Arts and Sciences.



WOMEN IN COMPUTER SCIENCE



Hear why our current female students in computer science are getting involved across campus, why they've chosen computer science, and what they plan to do with their degree.

Hi, my name is **Kathryn Rohlfing** and I'm a senior in computer science with a Spanish minor from Dunlap, Illinois. Doing research and taking project-based courses have been my favorite things about studying computer science here, since I really like the hands-on opportunities. This past summer, I completed a virtual software engineering internship with Capital One, and will be working in their rotational program after graduation. It was a great experience working with other interns and full-time employees to learn about software development in a larger company, and I appreciated the chance to apply what I learned in classes into a real company project. I've loved my time studying computer science at Iowa State, and I hope you do too!



Hello, my name is **Sylvia Nguyen** and I am currently a junior from Des Moines, Iowa. I chose to study computer science because of the logic and problem-solving aspects of it and I have an interest in technology. My favorite things about computer science at ISU are the classes, the challenge the program brings and the amazing people in this field. My favorite club is digital women, which is a club that promotes and provides support with women in tech. My dream career is software engineer/data engineer. My advice for incoming freshmen is to embrace the change, to get out of your comfort zone, and to believe in yourself.



Hi, My name is **Megan Severson**, and I'm a junior in computer science from West Des Moines, Iowa. I chose to study computer science because I've always had a passion for technology, and I want to show people that this is a field that females can thrive in. In computer science at Iowa State, I've had the opportunity to be a teaching assistant, peer mentor, and participate in undergraduate research. Outside of the classroom, I'm a member of volleyball club, tennis club, and Kairos student ministry. My advice for incoming students is to get involved, whether it be activities related to your major or other hobbies you're interested in!



Hi, my name is **Neha Maddali**, and I'm a sophomore studying computer science. I'm from Carpentersville, IL and I chose computer science as it was something I was very involved in during high school. I enjoy the problem-solving aspect of the subject and ISU has helped me expand my interests in the field through the variety of courses they have to offer. Outside the classroom, I'm a Computer Science Peer Mentor, a member of the Computer Science Student Advisory Board, and work as a Residential Advisor in the dorms. I have an internship lined up with Service Management Group as a Data Engineer. My best advice: don't be afraid to try new things, and don't worry if you don't know what's going on in class. As long as you have an open mind to learn, you'll pull through!

One of the many ways our department invests in women in science is by sending them to the Grace Hopper Conference each year. The conference gives our students the chance to network with leading women in technology and see the potential their computer science degree can have. If you are interested in supporting this effort, contact csdept@iastate.edu.



NEW AUTONOMOUS SYSTEMS LABORATORY

On May 5th, the Department gathered to celebrate the opening of the new Autonomous Systems Laboratory. The new lab, housed in Communications 1110, is an important resource, equipped with hands-on learning opportunities, including a smart-city, a driving simulator, and a net for drone flying.

The lab was generously funded in part by LAS, serving as a physical reminder of the college's dedication to providing industry-leading educational resources to its students. LAS Dean Schmittmann and all who attended got to see lab demonstrations from the faculty and students using the lab.

Hridesh Rajan, Professor and Chair of the Department of Computer Science said of the lab, "This project is

an important step in furthering the Department's commitment to providing strong research programs needed to address the grand challenges of tomorrow. Autonomous Systems is a field with a bright future ahead, and this lab will facilitate research, educational and outreach projects to help meet the demands of the moment,"

Last fall, the Department launched the state's first Master's program in Artificial Intelligence, a program that will greatly benefit from this lab. The hands-on education will strengthen the rigorous coursework in AI, machine learning, robotics, and autonomous systems. In particular, the smart city will be utilized in COM S 476 (Motion Strategy Algorithms and Applications) to provide undergraduate students a hands-on experience in



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implementing algorithms taught in the course on a physical system, reinforce the core concepts, and demonstrate challenges related to the complex interaction between the computational, physical, and communication components in most robotics and autonomous systems.

On the research side, the lab provides the necessary platforms to study various aspects of autonomous and robotics systems. This will start at the component level (e.g., perception, localization, planning, and control) and continue to system-level design, development, and analysis of autonomous systems to interactions between multiple autonomous systems and between autonomous systems and humans. This new facility will allow the PIs in Computer Science to lead competitive proposals to the NSF Cyberphysical System program, NSF National Robotics Initiative, etc.

The smart city features a modular, inexpensive research platform for studying autonomy in complex systems. Classic control algorithms do not translate well between tasks since most of them have to be tuned to specific driving conditions such as lighting, road type, camera position, etc. To overcome this, the smart city offers a dataset compiled from different sources to offer more robustness to control models that can perform in diverse environments. The driving simulator provides a complimentary setup for studying the interactions between humans and autonomous systems. Its design features allow for the attachment of wheels, yokes, Joysticks, keyboards, mice, LCD screens, etc. Having a driving simulator will allow the student to become the “driver” of an autonomous racing simulator and learn expertise in robust perception, planning, and control at high speeds, overtaking algorithms, mapping, localization, head-to-head racing, and end-to-end autonomous driving.

“I recognize that none of this would be possible without the Principal Investigators of this project, Nok Wongpiromsarn and Ali Jannesari as well as the contributions from LAS. Their diligence and dedication are what made this idea a reality,” Rajan said.

FACULTY & STAFF AWARDS

PAVAN ADURI was selected to join the 2022-2023 cohort of Iowa State University's Emerging Leaders Academy. Pavan also received the 2022 ACM SIGMOD Research Highlight Award for his co-authored paper, "Model Counting meets F0 Estimation."

FORREST BAO was featured in a recent edition of an LAS publication for his work on developing AI technology to optimize solar installations.

MYRA COHEN gave the keynote address on "Software Testing and Repair of Organic Programs" at the 15th IEEE International Conference on software testing, verification, and validation. Cohen also gave the keynote at the 2022 ACM International Systems and Software Product Line Conference.

YAN-BIN JIA and his robotics laboratory received a generous donation of a robotic hand from Amazon's Robotics AI group. The hand is equipped with sensors in each fingertip, helping to further the capabilities of the department's robotics lab.

NICOLE LEWIS was awarded the LAS P&S Outstanding New Professional Award. The award recognizes Nicole for outstanding performance as the Graduate Program Administrator.

ROBYN LUTZ has been elevated as a Fellow of the Institute of Electrical and Electronics Engineers (IEEE) for contributions to software requirements for safety-critical systems.

SIMANTA MITRA was named the co-director for the North Central North American region of the International Collegiate Programming Contest. In his new role, he helps guide the direction of the ICPC.

HRIDESH RAJAN published a textbook that uses a hands-on approach to teach the principles of programming languages titled, "An Experiential Introduction to Principles of Programming Languages." Rajan also received the ISU Award for Early Achievement in Departmental Leadership.

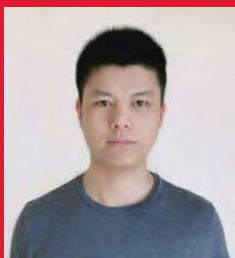
NOK WONGPIROMSARN received a National Science Foundation CAREER award, the highest honor awarded to junior faculty. Nok is the 9th member of the department's faculty to receive this high honor.



WELCOME NEW FACULTY



MENGDI HUAI, ASSISTANT PROFESSOR obtained her Ph.D. in Computer Science from the University of Virginia prior to coming to Iowa State. Her research interests are in the general areas of data mining and machine learning, with an emphasis on developing novel techniques to build trustworthy learning systems that are explainable, robust, private, and fair.



CHENGLIN MIAO, ASSISTANT PROFESSOR joins the department from his previous role as an assistant professor at the University of Georgia. He obtained his Ph.D. at the State University of New York at Buffalo. His research interests include security and privacy, Internet of Things (IoT), and machine learning with a focus in developing novel techniques for the security, privacy, and safety of emerging IoT systems and machine learning algorithms.



MEISAM MOHAMMADY, ASSISTANT PROFESSOR worked as a research scientist at Data 61 prior to joining the department. He obtained his Ph.D. from Concordia University. His research interests include differential privacy, federated learning, anonymity, computational learning theory, and secure multiparty computation.



ABRAHAM ALDACO, ASSISTANT TEACHING PROFESSOR joins the department from his previous role as a professor at Tecnológico de Monterrey. His research interests include data sciences, machine learning, applied statistics, applications of design of experiments, data analytics, simulation for modeling and optimization, cross-layer factor interactions, and computational security.



GEORGI BATINOV, ASSISTANT TEACHING PROFESSOR worked as a post-doctoral associate in the Department of Computer Science before being promoted to assistant teaching professor. His areas of expertise include user modeling and quantitative human-computer interaction.



MATTHEW HOLMAN, LECTURER joins the department after recently graduating from the University of Idaho with his master's degree in Computer Science after transitioning from a previous career in music. He specializes in using languages like Python, C, and C++ and looks forward to applying his previous experience in new, creative, and innovative ways.

CARL CHANG RETIREMENT



Carl Chang retired from the Department of Computer Science after a dedicated 20 years as a professor and former department chair. Chang served as department chair from 2003 to 2013, one of the longest appointments in that role in the history of the department.

Chang earned his Ph.D. from Northwestern University in 1982, following which he became an assistant professor at the University of Illinois at Chicago where he remained from 1984-2001.

He started as the department chair in the Department of Computer Science at Iowa State where he rejuvenized the department to expand the Ph.D. program from 30 to 100 Ph.D. students at its peak during his tenure as the chair. Over the span of his illustrious career, he authored or co-authored nearly 150 papers, delivered over 75 seminars and keynote

presentations, and taught over 100 courses.

During his terms as the chair, he promoted two full professors, twelve associate professors, four senior lecturers, and cultivated six NSF CAREER awardees. The department continued to grow in faculty size and strength and engaged heavily in interdisciplinary research. Today, computer science at Iowa State has visibly moved up in its national ranking and significantly improved its academic reputation with a globally recognized faculty which could not have been done without the continued support of Chang.

His research efforts span software architecture, requirements engineering, services computing and successful aging. He has published extensively in these areas in journals, refereed conferences, and various column articles and editor's messages. To date, 22 visiting scholars from foreign countries have been hosted for joint research in Chang's labs. Chang was a popular academic advisor with many students, having produced 38 Ph.D. dissertations, 31 M.S. theses, and more than 200 M.S. projects.

Chang has been an active volunteer leader in the IEEE Computer Society for almost three decades, even having served as president of the society in 2004. As an IEEE Fellow, he received the Computer Society's Outstanding Contribution Award, Meritorious Service Award, and the Golden Core Award, in addition to the IEEE Third Millennium Medal.

Not only is he an IEEE fellow, but he is also a Fellow of the American Associate for the Advancement of Science (AAAS), recipient of the prestigious Marin





Drivnov Medal from the Bulgarian Academy of Science, and recipient of IBM faculty awards in 2006, 2007, and in 2009, recipient of the 2012 IEEE Richard E. Merwin Medal, awarded the 2014 Distinguished Alumnus from his alma mater, National Central University in Taiwan, and the recipient of the 2014 Overseas Outstanding Contributions Award by the China Computer Federation (CCF), the largest professional association in China.

"I have never regretted having chosen a professor's life journey filled with excitement and gratefulness. Excitement which propelled me to conduct research which leads to a never-ending path into the unknown, and gratefulness which was derived from many days and hours spent with my students who I cherish very much," Chang said.

The Department of Computer Science at Iowa State

is forever changed because of the service and dedication of Chang. He leaves a lasting impact on our department and on the landscape of computer science.

We are very interested in cementing his legacy in our department, e.g. by establishing a scholarship or an endowed professorship. If you are interested in helping us do so, please contact csdept@iastate.edu.

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EXTERNAL ADVISORY COUNCIL NEW MEMBERS

THE EXTERNAL ADVISORY COUNCIL was formed in 2010 to assist the department in the following ways: gain insight and offer input into the mission, programs and activities of the department, facilitate the department in establishing mutually beneficial partnerships with individuals and corporations, actively participate in department fundraising efforts, assist in identifying and prioritizing resource needs of the department, participate in online discussions and attend annual on-campus meetings, represent the department to the ISU community at large as well as to external organizations.



MATT GOOD currently serves as the Chief Technology Evangelist for Kingland and is responsible for leading technology enablement and delivering confidence for Kingland's integral enterprise software clients. An Iowa State University graduate in both Computer Science and Music, Matt has gained a variety of enterprise software experiences at Kingland, IBM and SPSS. More recently, Matt's career has been directly focused on Kingland's clients, enabling them for enterprise software business value and successful outcomes throughout their partnership with Kingland – all accomplished through his involvement in product management, sales engineering, and client solution architecture.



MICHELLE MILLER is a passionate healthcare IT executive with over 24 years of experience innovating, leading, developing, designing, and executing on a vision to transform healthcare and enable interoperability. Currently, Michelle is the Senior Director of Clinical Data Enablement at Optum, which is part of the UnitedHealth Group family of businesses. She leads an elite team focused on clinical data interoperability necessary to get the right data to the right place at the right time with minimized costs in order to achieve better health outcomes. Michelle is a graduate of Iowa State University and has a Bachelor of Science in computer science. She has served a 5-year term on the ISU Alumni Association Board of Directors and was a member of the ISU Electrical and Computer Engineering (ECpE) external advisory board.



KEVIN SHEKLETON is a polyglot technologist, having worked in a wide variety of systems throughout his career. He is currently the Chief Architect and Distinguished Engineer at Cerner, a healthcare software IT company now part of Oracle. At Cerner, Kevin is responsible for Cerner's architecture and platforms. Kevin earned his B.S. in computer science from Iowa State University. He currently serves as a board member of Northland CAPS, a non-profit that helps connect high school students to industry professionals in order to provide a real-world learning experience. He is passionate about technology, security, and open source.





Wayne Ostendorf with John Atanasoff

REMEMBERING WAYNE OSTENDORF

On June 1, 2022, Wayne Oran Ostendorf passed peacefully at Mill Pond Community in Ankeny, Iowa. He lived 87 wonderful years celebrating faith, family, farming, fishing, fitness and friendships.

Wayne lived a lifelong journey with ISU as a professor, university administrator, leader, volunteer and loyal & true fan. As Director of the Administrative Data Processing (ADP) Center and as a Computer Science Department faculty member, Wayne provided a leadership role in the development of technology for student records, human resources, alumni, extension and financial systems for Iowa State.

Wayne became a member of the computer science faculty in 1967 as an assistant professor and taught a variety of computer science classes. He was promoted to associate professor in 1972 and served until 2000. In his role as professor he emphasized the use of academic models as they applied to actual business environments. He served on several departmental committees and was chair of the Computer Science Equipment

Committee from 1988 to 2000. He acted as an advisor for several non-thesis MS degree students as well as PhD degree program students from 1972 to 1982. He was elected to the Cardinal Key Honorary in 1976, received the Upsilon Pi Epsilon Membership in 1980, and the Outstanding University Academic Advisor Award in 1983.

Ostendorf was also active on many other university committees including, but not limited to, the Faculty Workload, Alumni Honors and Awards, University Extension Review, Total Quality Management Steering, and the Academic Affairs Computer Advisory Committees. He also served on several university-wide search committees.

Wayne passionately served in community organizations and often held leadership positions. He was particularly fond of Ames Town & Country Kiwanis and their work with Ames High School's Key Club as well as the Aktion Club.

Professionally, Wayne was a founding and active member of CUMREC

(College and University Machine Records Conference) from 1960 to 2000 and received the Frank Martin Service Award. He was a member and leader of CAUSE (College and University Systems Exchange) and the Central Iowa DPMA (Data Processing Management Association).

But he was perhaps most loved and known for creating a family atmosphere and positive team spirit with work. He worked hard and made work fun. He loved the people and energy of campus life, running or playing basketball every noon lunch break, the Carillon Bells and the aura of academia on a truly gorgeous campus.

If you are interested in helping us memorialize Wayne and his legacy in our department, please reach out to csdept@iastate.edu.

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Department of Computer Science

226 Atanasoff Hall
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