I2S

Serving State, Local and National Workforces Through the Development of New Technologies and Leaders

IMPACT REPORT 2024-2025

KU INSTITUTE FOR INFORMATION SCIENCES
The University of Kansas

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TABLE OF CONTENTS

Letter from the Director
Introduction to I2S 4

Our Story 5

Our Mission 6

Our Work 6

Our Director 7

Our Centers

Radar Systems Lab (RSL)

Update from RSL Director Shannon Blunt 8

RSL In Focus 9

Center for Communications, Networking & Photonics (CCNP)

Update from CCNP Director Rongqing Hui 10

CCNP In Focus 11

High Assurance & Secure Systems Center (HASSC)

Update from HASSC Director Bo Luo 12

HASSC In Focus 13

Mathematical Methods & Interdisciplinary Computing Center (MMICC)

Update from MMICC Director Suzanne Shontz 14

MMICC In Focus 15

Center for Cyber-Social Dynamics (CCSD)

Update from CCSD Director John Symons 16

CCSD In Focus 17

Computer Systems Center (CSC)

Update from CSC Director Prasad Kulkarni 18

CSC In Focus 19

I2S Events 20

2024-2025 Awards and Projects 22

Nichols Hall on KU's West District Headquarters of I2S

LETTER FROM PERRY ALEXANDER DIRECTOR OF I2S

The last few years have been eventful at the Institute for Information Sciences (I2S), and 2025 is no exception. As I mentioned in last year's Impact Report, I2S transformed from the Information and Telecommunications Technology Center to I2S in 2022. This restructuring was not merely symbolic, but an important distinction that recognized the growth and inclusion of new and evolving technologies that touch all aspects of information-related research as well as their impacts on society.

I2S is organized as six research centers capturing core research focuses. Areas from our earliest days such as remote sensing research (now the Radar Systems Lab, directed by Professor Shannon Blunt) and telecommunications and networking (now the Center for Communications, Networking and Photonics, directed by Professor Ron Hui) continue at the heart of our activities. The High Assurance and Secure Systems Center, directed by Professor Bo Luo, and the Mathematical Methods and Interdisciplinary Computing Center, led by Professor Suzanne Shontz, and the Computer Systems Center, led by Professor Prasad Kulkarni, represent more recent areas of substantial growth. Our newest center, the Center for CyberSocial Dynamics, directed by Professor John Symons, brings together researchers exploring computing impacts on societal norms. Whether a particular research area is longstanding or emerging, all continue to be supported by I2S and grow collectively through extramural grants and support from KU's Office of Research (KUOR).

There is much news to share about our recent accomplishments across all of I2S. A few to note: Our Student Research Organization (ISO) became a formal KU Student Organization on campus beginning in 2025. In January, they hosted their first multi-day Research Symposium, a peer-to-peer conference where research students from KU and beyond shared their work through student-led presentations. In March, two undergraduate students from KU's Blockchain Institute (KUBI) earned standout recognition at the National Blockchain Conference in Denver (KUBI is a student-led technology initiative established under I2S). And in April, I2S was involved in the third annual KU & FBI Cybersecurity Conference.

Throughout these pages, I have invited all our Center Directors to share additional news and accomplishments pertaining to their areas of research. Furthermore, I invite you stay up-to-date by visiting i2s-research.ku.edu/news and to sign up for our newsletter.

While we continue to evolve with the rapid development of information technologies, a reminder that our core mission is and will always be to nurture our research community. Our primary goals remain supporting our PIs in groundbreaking research, positioning our students for success, and serving our state, region and nation. I2S demonstrates every day that research is education.

Perry

OUR STORY

The Institute for Information Sciences has a robust and remarkable history that spans six decades. In 1964, radar engineer and Professor Emeritus of Electrical Engineering and Computer Science Richard Moore launched the Remote Sensing Laboratory (RSL) at the University of Kansas. One of its early inventions was the radar radiometer and later the scatterometer. Such an instrument was eventually flown on the NASA's Skylab.

In 1983, Kumarasamy "Sam" Shanmugan established the Telecommunications and Information Sciences Laboratory (TISL). Through TISL, Shanmugan explored topics such as wireless communication systems and simulation of communication systems. His reseach interests included channeling modeling and wideband code division multiple access over satellite links.

Several years later, Shanmugan was instrumental in launching the Center for Excellence in Computer Aided Systems Engineering (CECASE), a separate research center supported by the Kansas Technology Enterprise Corporation and led by Dr. Julian Holtzman. CECASE applied the technical expertise of its staff and faculty in systems and software engineering to help Kansas companies solve problems in information and communication technology areas.

Meanwhile, in the early 1990s, TISL became a founding and contributing member of the multimedia Multidimensional Applications and Gigabit Internetwork Consortium, a pioneer in the World Wide Web. In 1996, TISL and CECASE were merged to form the Information and Telecommunications Technology Center (ITTC) under the leadership of Shanmugan.

As the next millennium approached, ITTC absorbed the RSL and launched the Ambient Computational Environments project, or smart rooms, which brought together computer vision, speech recognition, and sensors. Alongside these tremendous technological achievements, ITTC's Rapidly Deployable Radio Network project put KU on the map for mobile wireless networking.

Throughout the 2000s, several accomplishments were achieved by ITTC. We received our 10th U.S. patent. We launched our first company, Veatros, which developed technology designed to conduct real-time video processing. By 2002, ITTC's annual research expenditures exceeded $7 million, total ITTC royalty and licensing income to KU exceeded $1 million and the ITTC Graduate Fellowship was established.

By 2006, ITTC research achieved 30 technology licenses, totaled more than $55 million research expenditures, and attracted 87 company sponsors. All of that led to the completion and installation of a 384 CPU cluster with more than 30 TB of storage – a massive amount for the time.

In response to the evolution of technology since the formation of ITTC, we announced a change in our name to the Institute for Information Sciences (I2S). This restructuring was made possible through our Research Rising initiative, an interdisciplinary, multicenter organization focused on finding solutions to otherwise unsolved problems related to safe and secure physical, digital and social environments — ultimately creating more secure and resilient communities.

OUR MISSION

Our mission at I2S covers three distinct objectives:

- Basic and Applied Research:
  To create and disseminate fundamental knowledge and new technologies
- Advanced Workforce Development:
  To educate and train students for technology leadership
- Science and Technology Services:
  To provide state, national, and international leadership for next generation information infrastructure

OUR WORK

Today, our areas of research at I2S address a wide range of modern communications technologies and concerns. It's important to note that these technologies, and the risks that accompany them, continue to expand and evolve at a very rapid pace. Our faculty and graduate researchers continuously strive to improve technologies within their respective scopes of work.

RESEARCH AREAS

Blockchain • Computer Systems • Applied Mathematics • Ethics & Policy • Fiber Optics
Quantum Computing • Radar Systems • Computer Architecture • Embedded Systems
Cybersecurity & Privacy • Network Communications • Programming Languages
Signal Processing • RF Systems Engineering • Photonics & Optoelectronics
Computational Science & Engineering • Artificial Intelligence & Machine Learning

OUR DIRECTOR

Perry Alexander is the AT&T Foundation Distinguished Professor of Electrical and Computer Science and Director of the Institute for Information Sciences at the University of Kansas. His research and teaching interests include formal verification and synthesis, trusted systems, and programming language semantics.

After completing his doctoral degree from the University of Kansas in 1992, Alexander spent eight years with the Electrical and Computer Engineering Department at the University of Cincinnati. While there, he began to pursue interests in formal methods and automated software engineering, and founded and directed the Knowledge-Based Software Engineering Laboratory. Upon returning to KU in the early 2000s, he joined the Information and Telecommunications Technology Center (ITTC), as a principal investigator. Initially a lead Primary Investigator on the KU NSA Science of Security Lablet, Dr. Alexander continues developing verified trusted computing semantics and infrastructure.

As director, in 2022, he led the formal name change from ITTC to I2S to recognize the evolution of technology since the ITTC was formed in 1996. The name change ultimately represents an effort to “include all forms of information-related research in our work from sensing to human response.”

OUR CENTERS

Institute Centers organize faculty by research area and by project. Our six centers of focus exist indefinitely to provide community, share resources, and perform collaborative research. Award-Based Centers result from center-level grants to provide visibility and community. The Institute/Center model is adopted from the structure common to other KU research centers.

RADAR SYSTEMS LAB (RSL)

At the Radar Systems Laboratory (RSL), our research in 2024 and 2025 has been quite productive and has recently earned multiple international awards. We are working on a wide array of radar and related topics, including diverse radar waveform design, optimized and adaptive receive processing, radio frequency direction finding, and antenna calibration. Our primary focus is on connecting new theoretical advances with open-air experimental demonstrations, and subsequent transitions into operational radar systems.

We have numerous projects under current funding that run ongoing and in parallel with our comprehensive work, and we continue to make progress on multiple initiatives now and into the future at KU's Innovation Park and I2S headquarters at Nichols Hall.

It is worth noting that Innovation Park and KU RSL offer a tremendous and highly resourceful advantage to our studies as a state-of-the-art research facility.

The investments made through partnerships from both industry leaders and at the federal level continue to build the university into a leading hub for the highest level of defense technology developments. At the lab, this allows us to expand cutting-edge research that will lead to vast improvements in effective operations in spectrally congested and contested environments.

Our work is presented regularly at both the national and international levels through the Institute of Electrical and Electronics Engineers (IEEE) conferences. The IEEE is the world's largest technical professional organization dedicated to advancing technology for the benefit of humanity.

Shannon

KU's Innovation Park

RSL IN FOCUS

The Radar Systems and Remote Sensing Laboratory (RSL) conducts research in radar and other electromagnetic/acoustic sensing problems, including advanced system concepts, radar image formation, adaptive radar signal processing, multi-function systems, real-time/cognitive sensing, radar waveform diversity and design, and radar modelling and simulation.

DIRECTOR: SHANNON BLUNT

Shannon D. Blunt is the Roy A. Roberts Distinguished Professor of Electrical Engineering and Computer Science at the University of Kansas, Director of the KU Radar Systems Lab, and Director of the Kansas Applied Research Lab. He received a Ph.D. in electrical engineering from the University of Missouri in 2002, and from 2002 until he joined KU in 2005, he was with the Radar Division of the U.S. Naval Research Laboratory in Washington, D.C. His research interests are in sensor signal processing and system design with a particular emphasis on waveform diversity and spectrum sharing techniques, having made a variety of contributions that have been deployed in operational radar and sonar systems.

CENTER FOR COMMUNICATIONS, NETWORKING & PHOTONICS (CCNP)

At the Center for Communications, Networking, and Photonics (CCNP), we are a multi-disciplinary research center that conducts research on a wide range of topics, from wireline and wireless telecommunication systems and networks to electromagnetics and photonics.

In the 2024-2025 academic year, faculty Primary Investigators (PIs) in CCNP continued their success in research and have attracted research funding from both federal agencies and industry. Most notably young faculty members excelled in their respective research areas and were recognized by the community.

In collaboration with the University of Dayton, Patrick McCormick, as the PI, has received a $2.5M grant from the National Geospatial-Intelligence Agency for his proposal entitled “Midwest University Scholastic Initiative to eNGage Students in SAR (MUSINGSS)”. McCormick also received the 2025 Fred Nathanson Memorial Radar Award for outstanding contributions to the radar art. The award was established to recognize researchers under the age of 40.

Shima Fardad received a competitive grant of $500,000 from the National Science Foundation (NSF) on “Transient Photonics in Optically Actuated Soft-Matter”, which will empower her research in emerging areas of optics and nano-phonics. As an editor of the journal “Nature: Scientific Reports”, Fardad received the 2025 Springer Nature Editor of Distinction Award to honor her distinguished service.

Erik Perrins, department chair of electrical engineering and computer science, was awarded designation of University Distinguished Professor.

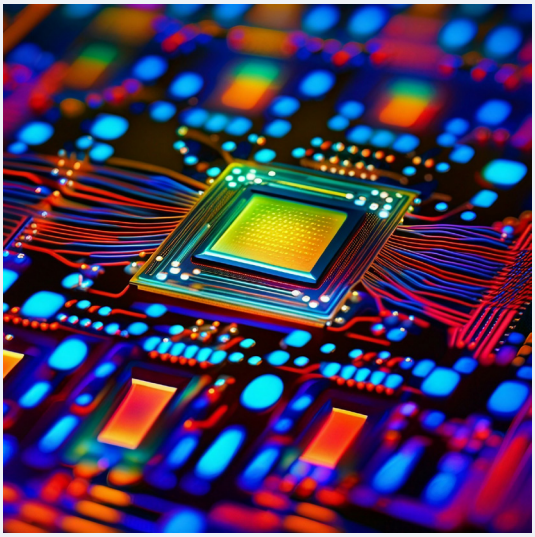
Our research efforts have resulted in a large number of impactful publications in leading academic and engineering journals as well as presentations at prestigious international conferences. Faculty and graduate students were also nominated with top honors for their research papers.

Building upon our prior success, we will continue to make progress in the coming years. In particular, we will promote collaborations among research groups within CCNP, as well as collaborations with external groups, to broaden our scope of research and pursue new opportunities.

Ron

DIRECTOR: RONGQING HUI

From 1982 to 1985, Rongqing Hui taught at the Physics Department of Anhui University, Hefei, China, where he also conducted research into optical fibers and sensors. From 1985 to 1989, he was with the Optical Communications Laboratory of Beijing University of Posts and Telecommunications, where he worked in the field of coherent optical fiber communication systems and components. From 1989 to 1990, he held a Research Fellowship from Foundazione Ugo Bordoni, Rome, Italy, where he worked on nonlinear effects and optical injection locking of semiconductor laser devices. From 1990 to 1993, he was with the Department of Electronics, Politechnico Di Torino, where he worked on optical communications and single frequency semiconductor laser devices. He is currently a Professor in the Department of Electrical Engineering and Computer Science at the University of Kansas and the Director of the Center for Communications, Networking and Photonics at I2S.



CCNP IN FOCUS

The Center for Communication, Networking, and Photonics (CCNP) conducts research in telecommunication systems, subsystems and networks to photonic materials, devices, and the understanding of their fundamental physics and engineering design rules.

HIGH ASSURANCE & SECURITY SYSTEMS CENTER (HASSC)

The High Assurance and Secure Systems Center (HASSC) has and continues to play an important role as a disciplined research hub focused on the evolution and improvement of cybersecurity technologies at I2S. Our PIs cover work on a wide range of security and privacy research.

Recent awards for projects include more than $500,000 from the National Science Foundation (NSF) for CAREER: SATC: on Bridging the Gap Between Research and Practice: Automation and Metrics in Security Operation Centers, led by associate professor Alex Bardas; a $1.8 million NSF award for Collaborative Research: Frameworks: Automated Quality Assurance and Quality Control for the StraboSpot Geologic Information System and Observational Data, led by associate professor Drew Davidson; and a $100,000 NSF award for Planning: DCL-EPSCOR: SaTC Frontier: Exploring the Synergy Between Generative AI and Cybersecurity led by professor Bo Luo.

Notably, in 2023, the Department of Defense awarded a two-year grant valued at $1.5 million to the center and I2S to participate in the Virtual Institute for Cyber and Electromagnetic Spectrum Research and Employ (VICEROY). The VICEROY program at KU is referred to as the Midwest VICEROY Institute, or MVI, and is led by professor Fengjun Li. MVI is one of three virtual institutes in the country. The complexity and diversity of modern digital communications systems, such as 5G and 6G networks, as well as AI and electronic warfare systems, present significant challenges to protect networks from cyberattacks. According to Li, the MVI program seeks to address the national cybersecurity workforce shortage and aims to train future leaders in cybersecurity and cyber operations.

IEEE S&P, ACM CCS, USENIX Security, and NDSS are considered the most prestigious and competitive publication venues for security and privacy research, a.k.a., the “Big Four”. Since 2020, HASSC researchers have published 19 papers in the big four conferences, including 2 papers in IEEE S&P, 7 papers in USENIX Security, 7 papers in ACM CCS, and 3 papers in NDSS. In addition, HASSC researchers have published 4 papers at the 40th Annual Computer Security Applications Conference (ACSAC), which is the second oldest cybersecurity research conference second only to IEEE S&P. Only Virginia Tech had more papers (5) than KU.

Bo

HASSC IN FOCUS

The High Assurance and Secure Systems Center (HASSC) provides a university-wide focal point for those involved in cybersecurity research, development, and education. HASSC researchers cover a wide spectrum of security and privacy research, including system security, network security, data/information security, hardware security, and privacy. Expertise includes theoretical modeling, synthesis and verification, threat modeling and analysis, applied cryptography and blockchain, and secure system design. Expanding leading-edge cybersecurity and defense mechanisms earned KU federal National Center of Academic Excellence in Cyber Defense Education (CAE-CD) and Research (ACE-R) dual designations.

DIRECTOR: BO LUO

Bo Luo is a professor in the Department of Electrical Engineering and Computer Science at the University of Kansas and the Director of the High Assurance and Secure Systems Center at I2S. After earning B.E. and M.Phil. degrees in Electrical and Information Engineering, Luo received his Ph.D. from the University of Pennsylvania in Information Sciences and Technology in 2008. His current research interests lie at the intersection of security and privacy and data science. In particular, he is interested in adversarial machine learning, information and security systems, IoT/CPS and hardware-enabled security, and privacy of online social networks.

MATHEMATICAL METHODS & INTERDISCIPLINARY COMPUTING CENTER (MMICC)

Researchers in the Mathematical Methods and Interdisciplinary Computing Center (MMICC) are focused on research and innovation through myriad projects that span a variety of fields, including biology, medicine, radar, and autonomous vehicles, that aim to deliver solutions to real-world applications. Recent accomplishments at MMICC include:

- Jeni Lohoefener participated in the development of a successful NSF Secure and Trustworthy Cyberspace (SATC) Frontiers planning proposal focused on the intersection of cybersecurity and generative AI.
- Bozenna Pasik-Duncan and Tyrone Duncan collaborated on control and prediction for non-Gaussian Rosenblatt processes.
- Zijun Yao secured a $70,000 seed grant as part of a multi-institutional project led by the University of Wyoming, contributing to the development of a multi-agent AI system designed to enhance AI-human collaboration in creating Individualized Education Programs (IEPs) for students with disabilities.
- Jamie Walters delivered an invited talk at the American Society of Naturalists annual conference in Asilomar, California, on his lab's investigation into the genetics of sex-differences among moths and butterflies.
- Morteza Hashemi published three IEEE Transactions papers applying multi-agent reinforcement learning to address key challenges in wireless spectrum optimization, AR/VR system performance, and distributed control of electric vehicle charging systems.
- Michael Branicky was elected a Fellow of the American Association for the Advancement of Science (AAAS), for distinguished contributions to modeling, analysis and control of cyber-physical systems, and for applications to networked control systems and robotics.
- Cuncong Zhong collaborated with KUMC faculty on elucidating how the human gut microbiome modulates immunotherapy in lung cancer; the results have been published in the journal Nature Communications.
- Patrick McCormick received the 2025 Fred Nathanson Memorial Radar Award for outstanding contributions to the radar art by a researcher under the age of 40.
- Hongyang Sun received an NSF CAREER Award for his project entitled "CAREER: Embracing Uncertainty in High-Performance Computing Resource Scheduling: An Integrated Algorithmic and Machine Learning-based Approach".
- Esam El-Araby's group received a Best Research Poster Award Top-5 Finalist at the International Conference for High Performance Computing, Networking, Storage, and Analysis (SC24) for their work entitled "An Accurate and Scalable Multidimensional Quantum Solver for Partial Differential Equations".
- Huazhen Fang and his Ph.D. students published a paper in the IEEE Transactions on Robotics entitled "Model Predictive Inferential Control of Neural-State Space Models for Autonomous Vehicle Motion Planning". This work addresses an important challenge: optimal control of complex systems modeled using neural networks.
- Shannon Blunt received the IEEE/AESS 2025 Warren D. White Award for fundamental and practical contributions to radar waveform design for advanced radar systems.
- Hossein Saiedian continues his research in software engineering, information security, and computing education.
- Dongjie Wang delivered an invited keynote at the ARRML'25 Workshop on Adaptive, Robust, and Responsible Machine Learning, co-located with SDM 2025.

- Yunwen Wang is involved in an ongoing research collaboration about embodied conversational agents for health support with several researchers at the University of Southern California.
- Arvin Agah, Dongjie Wang, and Zijun Yao are forming a new collaboration to investigate potential applications of artificial intelligence for early detection of Alzheimer's disease.
- Rachel Jarvis served as session chair for the Emerging RF Technologies at the 2025 IEEE Wireless and Microwave Technology Conference.
- Suzanne Shontz received the 2024 James Corones Award for Leadership, Community Building and Communication from the Krell Institute.

Suzanne

MMICC IN FOCUS

The Mathematical Methods and Interdisciplinary Computing Center (MMICC) MMICC's mission is to advance the application of mathematical methods and computational techniques across various domains of science, engineering, and beyond. MMICC is dedicated to promoting interdisciplinary research, facilitating educational opportunities, and fostering a collaborative environment that empowers individuals and teams to solve complex problems through mathematical insights and computational expertise.

DIRECTOR: SUZANNE SHONTZ

Suzanne Shontz is a professor and associate dean of graduate and online education at the University of Kansas School of Engineering and the Director of the Mathematical Methods & Interdisciplinary Computing Center at I2S. After completing her undergraduate education at the University of Northern Iowa, Shontz earned an M.S. in Applied Mathematics and Computer Science followed by a Ph.D. in Applied Mathematics from Cornell University. Her primary research interests are computational- and data-enabled science and engineering, more specifically, parallel scientific computing with a focus on unstructured mesh, numerical optimization, model order reduction, and numerical linear algebra methods and their applications to computational medicine, materials, electronic circuits, and radar.

CENTER FOR CYBER-SOCIAL DYNAMICS (CCSD)

Our center leadership is happy to share the accomplishments of the Center for Cyber-Social Dynamics (CCSD) over the past year. Our faculty, researchers, and students have demonstrated both innovation and impact across diverse areas of scholarship, public engagement, and institutional leadership. The 2024–2025 academic year has underscored our role as a hub for advancing research at the intersection of technology, society, and human flourishing.

In September 2024, CCSD launched the Navigating Our Worlds virtual series in partnership with KU's The Commons. This interdisciplinary program brought together scholars and the public to examine the ethical and social implications of emerging technologies, strengthening KU's leadership in conversations about the digital age. That same month, postdoctoral researcher Rebecca Johnston, affiliated with CCSD and the Center for Russian, East European & Eurasian Studies, published their work on how the Russian state deploys culture to bolster its domestic and foreign policy aims, including the war in Ukraine. Her contributions exemplify the global scope and significance of research nurtured within our community.

Our momentum accelerated in February 2025, when CCSD earned two noteworthy research seed grants from the Computational Cybersecurity in Compromised Environments (C3E) Challenge Problems initiative for projects examining human–AI interaction and vulnerabilities in large language models. These recognitions reflect the center's leading role in shaping the next generation of secure and equitable AI systems.

The spring semester continued with notable outreach and collaboration. In March, CCSD convened a workshop on Advancing Fairness in Machine Learning, creating a forum for KU scholars and external partners to develop shared frameworks for addressing concerning inconsistencies in AI. At the same time, we announced our 2025 conference Civility in Politics, co-sponsored with the KU Philosophy Department. This conference gathered national and international experts to examine civility as both a civic virtue and a pressing democratic challenge.

April 2025 brought national visibility as both the I2S and CCSD directors, Dr. Perry Alexander and John Symons respectively, were featured on a leading cybersecurity podcast, recorded live at the FBI and KU's third annual Cybersecurity Conference. This platform showcased KU's research leadership to broader audiences in academia, government, and industry.

In May, CCSD appointed its inaugural AI Governance Fellow, Professor Najarian Peters, whose work on AI governance has contributed significantly to research and policy discussions. That same month, CCSD expanded its community engagement by leading an educational initiative at a local retirement community, focusing on online safety and AI awareness. These efforts illustrate how our research mission is inseparable from our commitment to public good.

Beyond these milestones, our faculty and students continue to bring KU scholarship to the world stage. Two doctoral students, Oluwaseun Sanwoolu and Oluwakorede Ajibona organized an international workshop in Nigeria, Africa on philosophy, technology, and society in Africa,

while a KU philosophy study on AI and morality, ran by Sanwoolu, received attention around campus with its critical insight: AI can imitate moral reasoning without truly possessing it.

Looking ahead, we remain dedicated to expanding the reach of I2S research, supporting interdisciplinary collaboration, and ensuring that technological innovation serves democratic values and human dignity.

I extend my deepest gratitude to our faculty, students, staff, and partners for their extraordinary contributions. Together, we are shaping not only the future of research but also the future of society.

John

CCSD IN FOCUS

The Center for Cyber-Social Dynamics is focused on the interaction between internet technologies and society. Research initiatives focus on understanding the psychological, social, cultural, and political effects of technology. We bring expertise from the humanities and social sciences into collaborative research with engineering and design.

DIRECTOR: JOHN SYMONS

John Symons is a professor in the Department of Philosophy at the University of Kansas and director of the Center for Cyber-Social Dynamics (CCSD) at I2S. His area of research interest is centered in philosophy of technology with ties to formal epistemology, philosophy of psychology, and metaphysics of emergence. As director of CCSD, Symons engages in the interdisciplinary and cross-cultural study of the relationship between Internet and data-driven technologies and society, politics, and culture in order to help our communities to mindfully and ethically shape technologies to promote human flourishing. In addition to his teaching and research work, Symons is also the host of The Cyber-Social Dynamics Podcast.

COMPUTER SYSTEMS CENTER (CSC)

At the Computer Systems Center (CSC), we are working on a broad range of systems topics, including static and run-time systems tools to improve the performance and security of software, predictable real-time software/ hardware systems, embedded machine learning, computer architecture, quantum computing systems, development and optimization of quantum algorithms and applications, hardware security, trust assurance and verification of hardware, and computing education.

Fellow researchers within CSC are working on multiple collaborations applied to a wide range of contexts. Center researchers are working on multiple projects sponsored by the National Science Foundation (NSF). Electrical Engineering and Computer Science assistant professor Tamzidul Hoque is collaborating with researchers at the University of Florida and University of North Texas to build new educational modules focused on edge AI, which will enable students to create and run AI code on low-power TinyML devices, and build interest in technology as a career path for high school students. He is also working on projects to tackle hardware security in the semiconductor industry and combat threats like reverse engineering and IP theft.

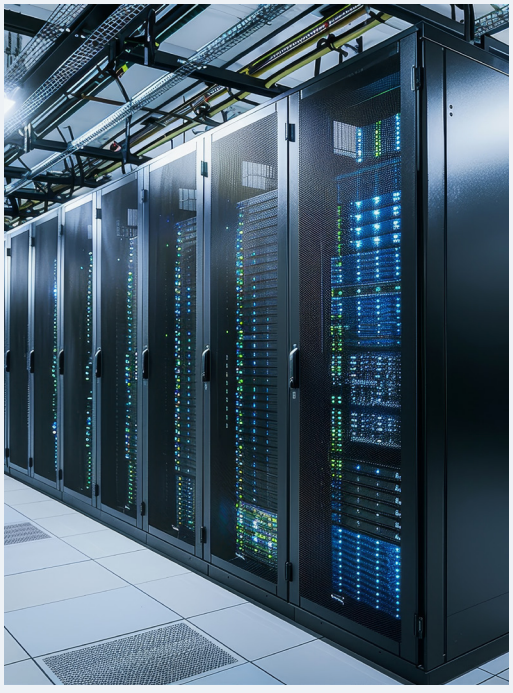
Professor Heechul Yun was awarded a new grant to explore the theory and practice concerning the formulation, design, and implementation of architectural on-the-fly Data Transformation Units (DTUs) to improve performance of complex applications by bridging the widening gap between memory technology and processors. CSC researchers also continue to conduct high-profile research for existing projects in quantum computing and software systems. Along with students they continue to publish in top-tier computer science conferences and journals. Additionally, they continue to serve the wider systems community by actively leading and participating at conferences and journal review panels.

Faculty researchers at CSC advise many MS and PhD student candidates and conduct research on a wide range of technology advancements within computer systems. Supporting our graduate student initiatives has and will continue to have an important role in CSC's development and growth.

Prasad

DIRECTOR: PRASAD KULKARNI

Prasad Kulkarni is a professor and associate chair for graduate studies in the Department of Electrical Engineering and Computer Science at the University of Kansas and the director of the Computer Systems Center at I2S. After completing his undergraduate education in computer engineering at Poona University in India, Kulkarni earned his masters and doctoral degrees in Computer Science at Florida State University. His research areas of interest include static and dynamic/adaptive compilers, computer architecture, and embedded systems. Kulkarni was an IBM Ph.D. Fellow in 2006 and 2007 and was the recipient of the Faculty Early Career Development Award from the National Science Foundation in 2010.



CSC IN FOCUS

The Computer Systems Center is an initiative aimed at exploring, enhancing, and innovating various facets of computer systems. This dedicated research center serves as a hub for interdisciplinary collaboration, fostering the development of cutting-edge technologies, and addressing pressing challenges in the field of computer systems.

I2S Events

I2S hosts a variety of student- and faculty-led events throughout the year, including the annual I2S Student Research Symposium (ISRS), the GenCyber Summer Camp for K-12 teachers, and the Civility and Politiics in a Changing World hosted by CCSD and KU's Department of Philosophy. ISRS, which is led by the I2S Student Organization, is an opportunity for graduate students to share their research and ideas with other graduate students and faculty members. In 2025, this event was expanded to include students from regional colleges and universities outside of KU.

The annual GenCyber Camp for Teachers, which is supported by the National Security Agency (NSA) and the National Science Foundation (NSF), offers K-12 teachers a series of lectures, labs, discussions, and other programs geared toward cybersecurity education.

The 2025 Civility and Politics Conference is an international event hosted jointly by Monash University via the Research Talent Accerator Fellowship program. The conference provides a forum for interdisciplinary debate and, in the long term, to establish an international network of scholars working in this field.

On April 3-4, 2025, I2S faculty joined representatives from academia and the cybersecurity industry to host the third annual FBI & KU Cybersecurity Conference. The conference brought together experts in the field from around the country and highlighted the most up-to-date practices, research, and information in cybersecurity. Speakers that headlined the conference included Niantic Vice President Brian McClendon, KU Chancellor Douglas A. Girod, and I2S Director Perry Alexander.

Brian McClendon, Senior Vice President of Engineering at Niantic, speaks at the 2025 FBI & KU Cybersecurity Conference on April 3, 2025

Ahmet Soyyigit receives first place for his oral presentation at the 2025 I2S ISO Research Symposium

GenCyber Summer Camp 2024

Awards & Funded Projects Snapshot

I2S faculty and graduate researchers are routinely the recipients of funding awards and recognition. Following are active and new awards the center has received in 2024 and 2025. For the latest on the institute's awards, visit our website at **i2s-research.ku.edu**.

2024

Towards Building a Research Program Focused on Tracking and Surveillance of Hardware and Human
Sponsor: New Faculty Research Development Award
Recipient: Sumaiya Shomaji
Funding: $20,000

Collaborative REU Site: TRUST: Training Research for Undergraduates in Secure and Trusted Systems
Sponsor: National Science Foundation
Recipient: Tamzidul Hoque
Funding: $30,000

DMR:TMRP: Transient Photonics in Optically Actuated Soft-Matter
Sponsor: National Science Foundation
Recipient: Shima Fardad
Funding: $492,489

Collaborative Research: SaTC: CORE: Medium: KIPPER: Learning-Guided Hardware IP Protection
Sponsor: National Science Foundation
Recipient: Tamzidul Hoque
Funding: $400,000

Role of Gut-Immune Interactions in Aging-Associated Bladder Cancer
Sponsor: University of Kansas Medical Center Research Institute
Recipient: Cuncong Zhong
Funding: $2,500

Collaborative Research: SHF: Medium: Effortless Data Locality Through Near-memory On-the fly Data Transformation
Sponsor: National Science Foundation
Recipient: Heechul Yun
Funding: $396,000

Mutal Coupling Wideband Array Calibration
Sponsor: Lockheed Martin
Recipient: Patrick McCormick
Funding: $99,999

Collaborative Research: AHA! AI Hardware Adventures for High Schoolers
Sponsor: National Science Foundation
Recipient: Tamzidul Hoque
Funding: $354,936

Industrial Scale Proof Engineering for Critical Trustworthy Applications (INSPECTA)
Sponsor: Collins Aerospace
Recipient: Alexander Warren
Funding: $97,500

Planning: DCL-EPSCOR: SaTC Frontier: Exploring the Synergy Between Generative AI and Cybersecurity
Sponsor: National Science Foundation
Recipient: Bo Luo
Funding: $100,000

Deep AI Encoded ECGs for Cardiovascular Health Prediction and Explainability
Sponsor: University of Kansas Medical Center Research Institute
Recipient: Sumaiya Shomaji
Funding: $57,723

NSF Student Travel Grant for 2024 Women in Hardware and Systems Security (WISE) Workshop
Sponsor: National Science Foundation
Recipient: Tamzidul Hoque
Funding: $10,000

Automatic Program Synthesis with Correctness Guarantees
Sponsor: New Faculty Research Development Award
Recipient: Sankha Guria
Funding: $9,562

NFRD: Building Interdisciplinary Collaborations for Privacy-Preserving Smart Communities
Sponsor: New Faculty Research Development Award
Recipient: Han Wang
Funding: $8,214

2025

Spectrum Management in Congested and Contested Electromagnetic Environments
Sponsor: Huntington Ingalls Industries, Inc.
Recipient: Shannon Blunt
Funding: $3,856,752

CAREER: Embracing Uncertainty in HPC Resource Scheduling: An Integrated Algorithmic and ML-Based Approach
Sponsor: National Science Foundation
Recipient: Hongyang Sun
Funding: $558,208

Midwest University Scholastic Initiative to eNGage Students in SAR (MUSINGSS)
Sponsor: National Geospatial Intelligence Agency
Recipient: Patrick McCormick
Funding: $500,000

Gaining Radar Advances with Spatio-temporally-variant waveform Predictive planning (GRASP)
Sponsor: University of Missouri, Kansas City
Recipient: Matthew Heintzelman
Funding: $301,720

Collaborative Research in Digital Coherent Optical Systems and Sensors
Sponsor: Ciena Corporation
Recipient: Rongqing, Hui
Funding: $225,000

GOALI: CNS: Medium: Communication-Computation Co-Design for Rural Connectivity and Intelligence under Nonuniformity: Modeling, Analysis, and Implementation
Sponsor: Arizona State University
Recipient: Morteza Hashemi
Funding: $168,548

Shield IRAD - StoWGe Enhancements
Sponsor: Lockheed Martin
Recipient: Patrick McCormick
Funding: $150,000

Advanced Waveform Investigation
Sponsor: Defense Engineering Corporation
Recipient: Charles Mohr
Funding: $95,000

Research and Development of Advanced Radar LPI-Optimized waVEforms (RADAR LOVE)
Sponsor: KBR Wyle Services LLC
Recipient: Charles Mohr
Funding: $70,000

Developing A Multi-Agent System to Enhance AI-Human Collaboration in IEP Development for Students with Disabilities
Sponsor: University of Wyoming
Recipient: Zijun Yao
Funding: $70,000

HF Radar Analysis
Sponsor: Systems Technology Research (STR)
Recipient: Charles Mohr
Funding: $25,000

Enhancing Digital Learning Outcomes through Personalized Content Recommendation
Sponsor: University of Wyoming
Recipient: Zijun Yao
Funding: $25,000

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