

CIS research brings new voice to people with communication limitations

by Jonny Hart

PHOTO: RYAN S. BRANDENBERG

Alternative and augmentative communication (AAC) technologies are an essential part of day-to-day life for people with conditions that limit communication, such as autism, cerebral palsy or aphasia, but the technology has struggled to keep up with the needs of its users.

"Existing AAC devices are really primitive," said Stephen MacNeil, assistant professor and director of the Human-Computer Interaction Lab. "You might have a device that looks like a keyboard where each key represents a word, and you press those words to communicate. But users have to sift through all of these words, and some of them are nested away in folders. It's just really inconvenient."

MacNeil is leading the technology and engineering development efforts for a new Rehabilitation Engineering Research Center (RERC), a multisite center based out of the University of Arkansas. RERC received $5 million from the National Institute on Disability, Independent Living and Rehabilitation Research to advance AAC technologies by making them more intuitive, personalized and accessible.

A portion of the funding—$1.5 million—will directly support the work of MacNeil and his co-primary investigators, Slobodan Vucetic, professor and director of Temple's Center for Hybrid Intelligence, and Eduard Dragut, professor.

AAC devices range from low-tech, such as picture boards, to high-tech, such as speech generating devices, or iPads and other devices that offer communication options that a user might need. The technology often has limitations, including that device capabilities don't evolve as a user grows and develops.

MacNeil and his team are working to make AAC devices more aware of a user's environment and use that context to provide relevant communication options, since a user may need different options when they're in the bathroom than they do in the kitchen, or when playing with a sibling, for example.

The researchers regularly consult with an advisory committee made up of people who use AAC devices, which helps the researchers better understand the challenges and potential use cases for the technology. "There needs to be more participation from people with disabilities in accessibility research, and right now that just doesn't happen enough," MacNeil said.

CIS LAUNCHES NEW UNDERGRADUATE AI MAJOR

The CIS Department has launched a new undergraduate major in artificial intelligence, preparing students to design, evaluate and deploy intelligent systems for a rapidly evolving range of industries.

Grounded in computer science, the new major combines specialized coursework in machine learning, cloud infrastructure, databases and human-AI interaction. "Students will also explore the ethical and practical considerations involved in developing intelligent systems that are interpretable, responsible and impactful," explained Yu Wang, professor and chair of the department.

Students will learn from computer and information science faculty with expertise in artificial intelligence and experience teaching AI-focused courses at Temple. Sample courses include Knowledge Discovery and Data Mining, Analysis and Modeling of Social and Information Networks and Development of Multitier Client/Server Systems.

The major also provides opportunities to engage in research through the department's Center for Hybrid Intelligence and Human-Computer Interaction Lab, as well as with other research centers across CST departments.

"Philadelphia and the Northeast corridor are a growing center of applied AI innovation," said Wang. "Working with our experienced faculty, graduates will be prepared to apply AI to challenges in healthcare, education, sustainability, finance and creative industries."

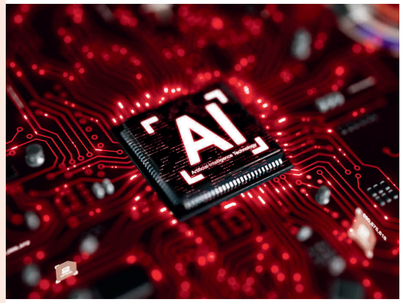




PHOTO: RYAN S. BRANDENBERG

CIS STUDENT EARNS PRESTIGIOUS GOLDWATER SCHOLARSHIP

by Khalil Bullock

For Kush Patel, a senior computer science major named a 2026-27 Goldwater Scholar, his path has been defined by curiosity and a passion for research.

Patel began exploring research early, joining the Human-Computer Interaction Lab the summer after his first year, where he worked under the guidance of Stephen MacNeil, director of the lab and an assistant professor. What started as an introduction to research quickly evolved into a focused interest in how students interact with emerging technologies, particularly artificial intelligence.

His Goldwater-recognized work examines how large language models—AI systems that can understand and generate human language—shape learning in computer science education, exploring how different types of AI-generated explanations impact student understanding. Patel's research tackles timely questions about AI's role in students' skill development and long-term learning.

"With so many students using AI tools now, I wanted to understand how they actually impact learning," Patel said. "It made me realize that this research matters now more than ever."

Patel serves as president of Temple's chapter of the Association for Computing Machinery and director of OwlHacks, while also mentoring students and working within the Honors Program.

TURNING INTERDISCIPLINARY COLLABORATION INTO A VISION FOR EDUCATION

by Khalil Bullock

A new interdisciplinary project led by faculty from CST and the College of Education and Human Development will bring together expertise in teacher education and AI to enhance how future educators are prepared for the classroom.

A $1.88 million grant from the U.S. Department of Education's Fund for the Improvement of Postsecondary Education Special Projects will support the work of several education faculty members in collaboration with CIS Professor Longin Jan Latecki.

At its core, the project is driven by a shared goal: expanding access to meaningful, high-quality instructional rehearsal opportunities for preservice teachers.

The team is exploring how emerging technologies can transform mathematics teacher preparation. Their project will develop an AI-driven virtual classroom system that uses "student agents" to recreate realistic instructional scenarios, allowing preservice elementary teachers to practice instructional strategies, classroom management and decision-making. By integrating educational theory with generative AI systems, the platform provides structured opportunities for preservice teachers to apply theory in realistic instructional settings and receive feedback.

The project draws on faculty expertise spanning education and computer science, creating an interdisciplinary team that mirrors the collaborative learning environments they hope to foster for future educators.



PHOTO: RYAN S. BRANDENBERG

NEXT-GEN COMPUTING POWERS DEMENTIA-FOCUSED AI RESEARCH

by Lina Duffy

Professor Mindy Shi is tackling one of healthcare's most difficult challenges: predicting and managing dementia progression over time.

While computing power has had a limiting effect on her research, that is shifting through Pennsylvania's new Keystone AI + Quantum Factory, which Temple helped launch. The consortium brings together universities, industry and public-sector leaders to expand access to advanced computing needed for research.

"This kind of computing infrastructure dramatically accelerates our research," explained Shi. "Some of the large-scale AI training and simulations that might previously have taken us weeks can now potentially be scaled down to a couple of days or even several hours."

The challenge in dementia and Alzheimer's care is that the disease develops gradually, producing changing signals that make it difficult to anticipate how a patient's condition may evolve. Her work aims to develop an agentic AI system capable of continuously modeling a patient's condition over time, accounting for uncertainty and guiding more personalized care decisions.

Shi's team is training AI models using large-scale simulations and augmented datasets to replicate how dementia progresses across different patient populations. Those efforts will allow her team to test interventions before they can be applied in clinical settings.