



Information Technology

Impact Report FY2025

Purdue Information Technology

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From the CIO

Looking back, FY25 saw several large-scale projects come to fruition at Purdue. Many of these would not have been possible without countless hours and effort by Purdue IT employees. From the launch of Purdue's first urban location in Indianapolis to the opening of one of the largest gaming lounges in the country, the Alienware Purdue Gaming Lounge, members of the Purdue IT team were hard at work behind the scenes building infrastructure, equipping labs and providing hands-on technical support for students, faculty and staff.

While these are examples of the more visible results of our effort, the truth is that Purdue IT is always working diligently behind the scenes to keep the university running and to empower giant leaps across the Purdue University system. Our team serves students, faculty and staff at Purdue's locations in West Lafayette, Indianapolis, Purdue Fort Wayne, Purdue Northwest and Purdue Global.

At a glance, Purdue IT:

- maintains one of the world's largest wireless networks
- support tens of thousands of desktop computers in classrooms, labs and offices
- supports an advanced research cyberinfrastructure that includes multiple Top 500-class supercomputing clusters
- supports major academic systems such as the Brightspace course management system
- implements and develops innovative learning and classroom technologies
- protects the security of data that crosses the networks and promotes the personal security and privacy for all people at Purdue
- engages with the Purdue community to ensure timely, high-quality service when technical issues arise

So, as you read through the highlights of what Purdue IT has accomplished in FY25, do so knowing that it barely scratches the surface of what our dedicated staff do day in and day out to power the university.

Boiler up!

Christian Theumer
CIO & Vice President of Information Technology

Mission & Vision

Mission

Purdue IT provides the technology infrastructure, services, solutions, and information security that support teaching and learning, enhance research, and enable faculty and staff to achieve their objectives while providing a positive student experience.

Vision

To empower giant leaps across Purdue by providing safe, efficient and reliable services in our pursuit to become the benchmark for IT in higher education.

Professional Development

ITIL® Training



Purdue IT continued to use the Axelos IT service management framework ITIL (IT Infrastructure Library) to create an agile, flexible organization that focuses on creating value for customers. ITIL gives all Purdue IT employees a common language and framework for delivering IT as a service, regardless of an individual’s role or area of expertise.



What’s New

Purdue, Dell Technologies launch the Alienware Purdue Gaming Lounge

High-tech venue elevates Esports experience for gamers and innovators

On Thursday, Aug.15, 2024, Purdue University officially opened its new esports facility, the Alienware Purdue Gaming Lounge. Housed within the France A. Córdoba Recreational Sports Center, the 2,000-square-foot esports space is outfitted with Alienware, Dell Technologies’ iconic gaming brand. The lounge serves as one of the largest dedicated collegiate gaming facilities in the country.

In addition to casual gaming use, the lounge will provide an elite gaming space for students to train and compete in esports. There are several esports and gaming organizations at Purdue. This offering also serves as a unique attraction for prospective incoming students.

“The esports ecosystem at Purdue is thriving, with thousands of students actively participating,” said Mike Warren, senior director of Recreation & Wellness at Purdue. “Whether students are looking to get casually involved or compete at higher levels, we are excited to support gaming here at Purdue RecWell, showcasing the latest technology.”

The APGL offers Purdue staff, faculty, students, esports clubs and visitors a unique gaming experience. Gamers who visit the venue will be able to enjoy some of the current and most popular titles, including Counter-Strike, League of Legends, Rocket League and Valorant.

The gaming lounge is equipped with 22 gaming desktops and three gaming laptops, as well as a Nintendo Switch and a PlayStation 5.

The Alienware-powered system, in the varsity and training rooms, includes:

- **Processor:** Intel® Core™i9 14900F (24-Core, 68MB Total Cache, 2.0GHz to 5.8GHz w/Turbo Boost Max 3.0)
- **GPU:** NVIDIA(R) GeForce RTX™ 4080 SUPER 16GB GDDR6X
- **RAM:** 64GB, 2x32GB, DDR5, 5200MHz
- **Storage:** 1TB NVMe M.2 PCIe SSD



“Watching the students walk into this beautiful facility and hearing their enthusiastic feedback over the Alienware technology has been rewarding to witness,” said Beth McCuskey, Purdue University’s vice provost for student life. “It validates Purdue’s investment in the space and our strategic partnership with Dell Technologies to embolden Boilermaker gamers — from novices to varsity-level players — to engage at the highest levels of esports competition.”

Matt McGowan, general manager of Alienware, highlighted Dell’s significant commitment to esports and explained how its technology fosters the educational community among students and universities.

“Esports gaming technology is not just about bolstering the next generation of gamers competing to their best abilities; it’s about inspiring the future of discovery,” McGowan said. “This partnership between Alienware and Purdue will empower players and support those gamers in becoming the next generation of innovators, engineers and researchers that Purdue has built its academic reputation on.”

The France A. Córdoba Recreational Sports Center (Co-Rec) is a multifaceted fitness and wellness facility that offers a wide range of recreational activities aimed at promoting the holistic well-being of students, faculty and staff. It includes sports courts, swimming pools, fitness classes and exercise equipment. Now, thanks to the APGL, well-being evolves to cognitive skills.

“These students are learning in environments that you wouldn’t find in any other type of setting like this,” McCuskey said. “They’re gaming together. They’re strategizing. They’re communicating. They’re problem-solving. And they’re learning soft skills that will help them stand out in the job market.”

The venue includes a broadcast studio that will allow students to produce video content and stream matches to general audiences. It also includes training and review space for the high-level teams to review their performance and improve.

“This space is about more than gaming; it’s about developing social connections, finding a community and creating a sense of belonging,” Warren added.

As part of the agreement, Dell/Alienware will provide annual scholarship funding during the term of the collaboration, reflecting Dell’s commitment to leveraging the positive impacts of esports to bolster education.

Wish fulfillment

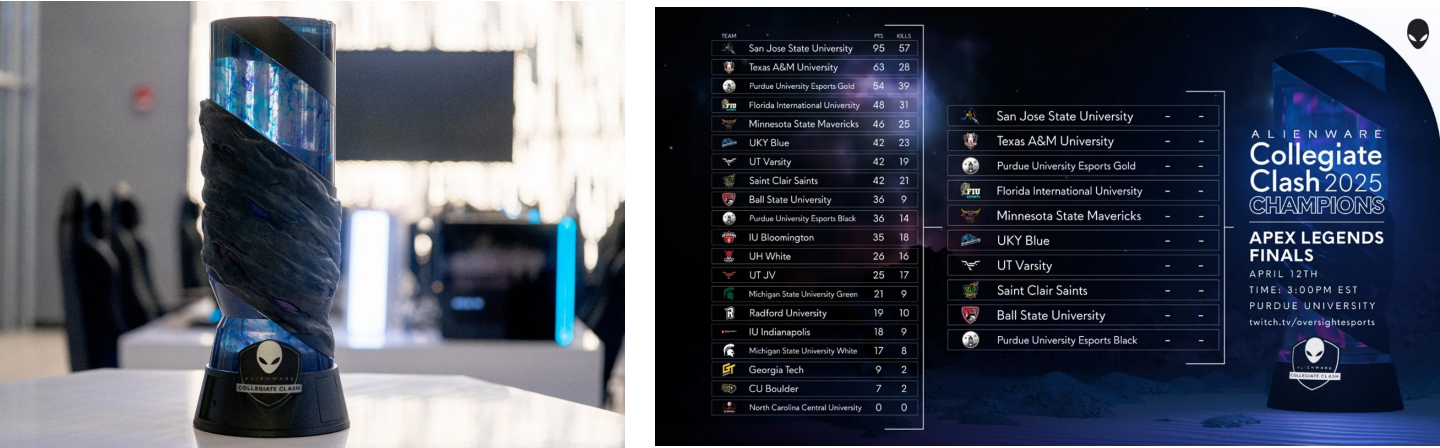
In November 2024, Kids Wish Network, in partnership with Purdue and Alienware, fulfilled a special wish for a 13-year-old gamer who has been battling Focal Segmental Glomerulosclerosis (FSGS), a progressive kidney disease. Hunter Breitenstein and his family flew from Leesburg, Florida, so Hunter could join Purdue’s varsity Rocket League Team for a scrimmage.

Upon their arrival to campus, Hunter and his family received VIP treatment, cheering on Purdue Football from a VIP suite and taking a private tour of campus. Then it was off to the Purdue Gaming Lounge where Hunter received his official varsity game jersey customized with his gaming handle before joining his teammates for the 3-on-3 scrimmage. Hunter also received a high-end Alienware gaming laptop, which he uses to continue multiplayer gaming with his Purdue Rocket League teammates back home.



Alienware Collegiate Clash Esports Tournament

On April 12, 2025, Purdue hosted the final round of the Alienware Collegiate Clash 2025. Competitors will battle in a winner takes all competition, through six intense Apex Legends matches, all vying for a custom-designed trophy and medals by Volpin Props and an Alienware gaming kit—ensuring the winners dominate their campus scene. This championship event featured the top 10 teams from a 30-team qualifying round. Purdue was the only school to have two teams qualify for the ACC Finals. Ultimately, the team from Texas A&M University took home the championship prize.



About the Purdue Gaming Lounge

Purdue’s gaming lounge has become the inspiration for other lounges across the country. Representatives from Cincinnati Children’s Hospital were recently on-site as they consider installing a similar space for their patients.

“In addition to being one of the largest collegiate esports lounges, the Purdue Gaming Lounge is unique due to its location at the Co-Rec rather than within the student union,” said Deanna Shafer-Rater, Director of Endpoint Management Services at Purdue. “Our gaming lounge is located within the heart of the residential area of campus, which makes it more convenient for students to access on evenings and weekends.”



Purdue IT opens headquarters at Convergence Center for Innovation and Collaboration



On Tuesday, Oct. 8, 2024, Purdue IT held a ribbon-cutting ceremony to celebrate the opening of its newest offices in the Convergence Center for Innovation and Collaboration (CONV). Located in the heart of the district at the western edge of Purdue University, CONV is where private industry collaborates with Purdue faculty, students and one another.

The space serves as a vital operations center with state-of-the-art technology powered by Cisco. The suite features office and hoteling space for Purdue IT employees, equipped with Webex Desk minis, Webex Desk Pros, Webex Board Pros and Webex Roomkit presentation equipment, as well as Meraki cameras and sensors.

Purdue University partners from Cisco and Presidio were on-site for the event along with University Chief of Staff Ian Hyatt and several Purdue IT staff. After the ceremony, guests enjoyed refreshments and a tour of the space to learn more about the equipment and operations at CONV.



Purdue launches Women in Technology chapter

In November 2024, Purdue IT announce the creation of the Purdue Women in Technology (WIT) peer group. Purdue has been a longstanding member of the Big Ten Academic Alliance Women+ in Technology peer group. Purdue WIT serves to attract, develop, retain and advance women in information technology roles across the Purdue community. The group is open to all interested Purdue University faculty and staff in a technology affiliated role at any campus.

Cybersecurity

Purdue Partners with Rapid7 for Vulnerability Management

Purdue has partnered with Rapid7 to help identify, prioritize and remediate security vulnerabilities quickly and effectively. A quick response is essential to minimizing impact of incidents. This partnership has resulted in the ability to shut down threats and threat actors before they can gain a foothold within Purdue systems. Now, investigation for critical and high alerts can begin within minutes, rather than days or weeks.

Other highlights include:

- Purdue's cyber insurance annual premium has decreased by approximately 13 percent following the partnership with Rapid7 because of enhanced vulnerability scan coverage, continuous security operations center (SOC) monitoring and increased visibility provided by the Rapid7 agent.
- Purdue shifted from monthly to six-hour vulnerability scans on over half the university's assets using Rapid7, greatly improving remediation testing for administrators.
- With managed vulnerability management (MVM), Purdue launched projects to address backlogged vulnerabilities, enabling teams to resolve more than 60 percent of them.
- Administrators and leaders now use dashboards and reports for clear vulnerability data and actionable insights.
- Automation is expediting remediation and allowing Purdue IT's SOC team to respond quickly to compromised accounts and systems.

Purdue Adopts Zero Trust Architecture

Purdue IT adopted the Zero Trust Architecture, a framework that enhances security by requiring continuous verification of every access request, both inside and outside the network. By adopting a “never trust, always verify” mindset, ZTA aims to minimize the risk of data breaches and unauthorized access.

Highlights of Purdue’s ZTA program in FY25 include five key areas:

Security Platform Optimization

- Consolidated multiple enterprise security platforms, including data loss prevention, endpoint detection and response, and network log analysis

Identity Protection

- Enabled MFA validation with numeric code
- Enforced strict time and location based-access for privileged users
- Automated reset of compromised accounts

Data Protection

- Applied active-mode data loss prevention to block misuse of PCI
- Published end-user support material for approved storage locations
- Enforced encryption + whitelist access for confidential data repositories

Device Protection

- Established audit visibility for all connected devices
- Enforced device posture assessment for privileged access

Network Protection

- Eliminated 1,000+ high-risk physical access points
- Reduced public network attack surface by 5,000+ systems

AI and Automation

AI Community of Practice Teams Channel promotes collaboration and exploration across Purdue system

“Too often, these technologies feel distant or overwhelming, but they don’t have to be.”

Purdue’s AI Community of Practice (CoP) brings together professionals exploring and implementing AI technologies like generative AI, large language models, image generation and predictive systems across Purdue, regardless of department or role.

Purdue Director of AI and Automation, Kenny Wilson, created the community out of the belief that the future of work and the ability to serve others depends on the understanding and responsible application of artificial intelligence.

“Too often, these technologies feel distant or overwhelming, but they don’t have to be,” Wilson said. “I want to build a space where people from across disciplines can come together to ask questions, share ideas, explore possibilities and learn from one another.”

Members collaborate to share practical applications, discuss ethical considerations and stay current with rapidly evolving AI capabilities while fostering responsible innovation. The CoP is organized into sub-

channels with such themes as wins and recognition, general discussion, events, AI strategy and more.

“This community is about more than tools. It’s about building confidence, sparking curiosity, and creating real value in our day-to-day work,” Wilson explained. “I hope members gain practical insights they can use right away, a broader awareness of what’s possible and the encouragement to lead AI conversations in their own areas.”

RPA Center automation streamlined Administrative Operations process

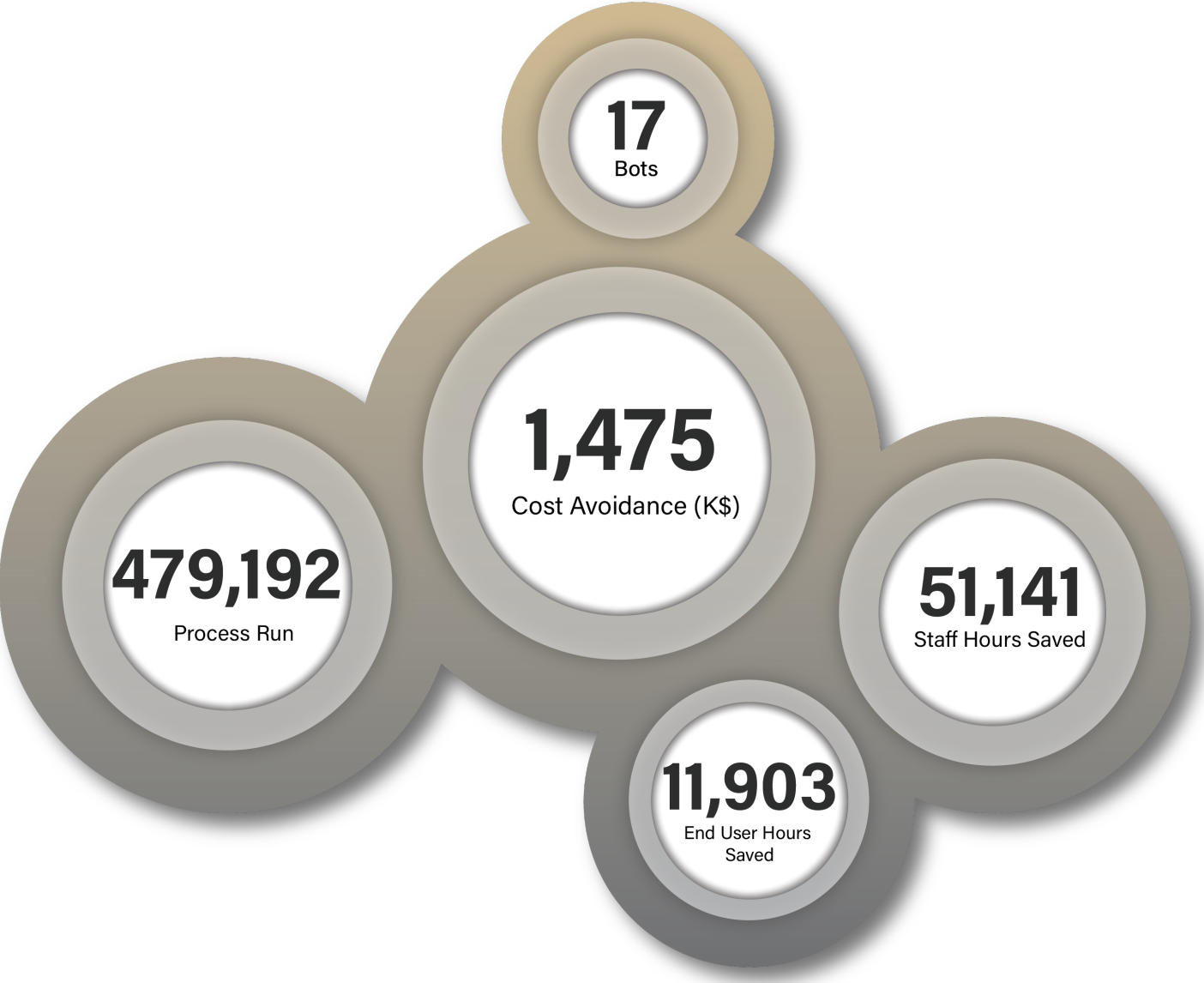
When a construction project is completed at Purdue University, project documents are archived into OpenText Document Management system (eDocs) to retain official records for the University. Over the last few years, the pandemic and relocation resulted in an estimated multi-year backlog for Administrative Operations. Adding and processing construction-based documentation was a manual and time-consuming process that encompassed the bulk of staff time. Implementation of the RPA automation helped to clear the backlog, offer greater keyword search capabilities and allow staff to keep up with incoming closed construction projects. Not only does this mitigate the need to hire additional staff, saving time and costs, it offers greater growth and development for Archives staff by aiding in the building of additional eDocs libraries across Administration Operations, enhancing cybersecurity, business operations, and records management.

Collaborations generate wins in ongoing cost-avoidance efforts

The procurement and finance teams recently worked with the Robotic Process Automation (RPA) group to develop an automation on what would have been a very manual and time-consuming process to gather this data. The solution, an Ariba Attachment Audit Automation (bot), was used to review approximately 240,000 records across three fiscal years to address audit points including ensuring business areas are meeting compliance requirements.

“This automation was able to get us the information we need to analyze the auditing process and make decisions on how much risk the University will assume. The data gathered by the automation was also used to make recommendations on potential process improvements,” said Whitney Beutel, Director of Business Operations and Administration. “Our automations (bots) continue to provide cost avoidance wins as well as reduce risk from minor errors. These automations continue to protect the Purdue Brand reputation.”

Robotic Process Automation



End User Experience

Supporting users at Purdue in Indianapolis

While countless hours of work went into setting up Purdue’s first urban location in Indianapolis before its July 1, 2024, launch, the IT support didn’t end there. Purdue IT maintains a presence in Indianapolis providing end-user and system support.

Ongoing efforts include:

- Migration of lab systems, faculty and staff system and computers to BoilerAD
- Transfer of data from Indiana University (IU) to Purdue
- Migration of OneDrive from IU to Purdue for all faculty and staff
- Installation of new computers
- Assist with the installation of Purdue servers in the datacenter
- Printer migration to the Purdue domain

When classes began at Purdue in Indianapolis, IT team members staffed a help desk in the Engineering/Technology building to support students, faculty and staff with IT issues including printing, wireless connectivity and other resources. In addition, IT staff are on hand to address issues in-person as needed.

Plans are currently underway to open an IT Service Desk in the Indianapolis Student Center in FY26.

Genesys contact center

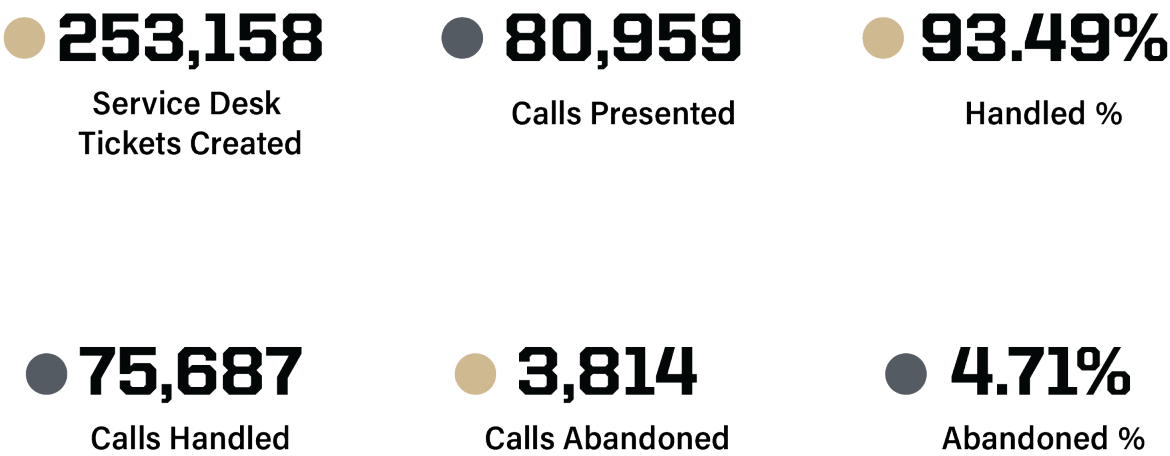
The Purdue IT Service Desk & IT Service Management teams implemented the Genesys contact center software solution. Genesys Cloud replaces Cisco UCCX as the tool used for customers to reach our service desk technicians via phone. This tool provides many benefits to our customers, agents, and leaders – including access to live reporting, integrations with TDX (for automatic ticket creation) and Ivy (for live agent chat), and the ability to better plan for staffing through the Workforce Management component. Future additions may include AI features such as live Agent Assist (AI-generated links and scripts determined by the caller’s questions) and Voicebots (automated assistance to callers when agents aren’t available or necessary) – all to help streamline and improve the customer experience.



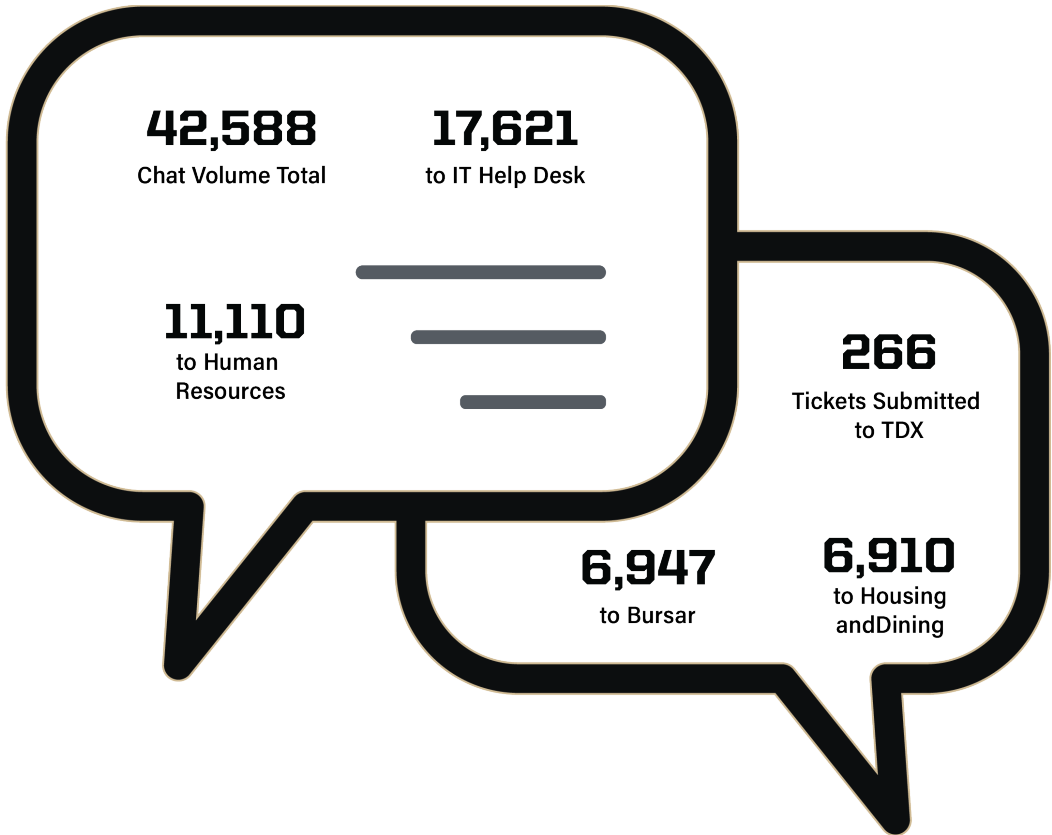
New IT Service Desk location opened on West Lafayette campus

In fall 2024, Purdue IT added a walk-up IT Service Desk location in the Humanities, Social Sciences and education (HSSE) Library. The HSSE Service Desk provides on-site support related to Wi-Fi set up, account issues, multi-factor authentication, Duo physical tokens, printing questions, and other services.

IT Service Desk Support



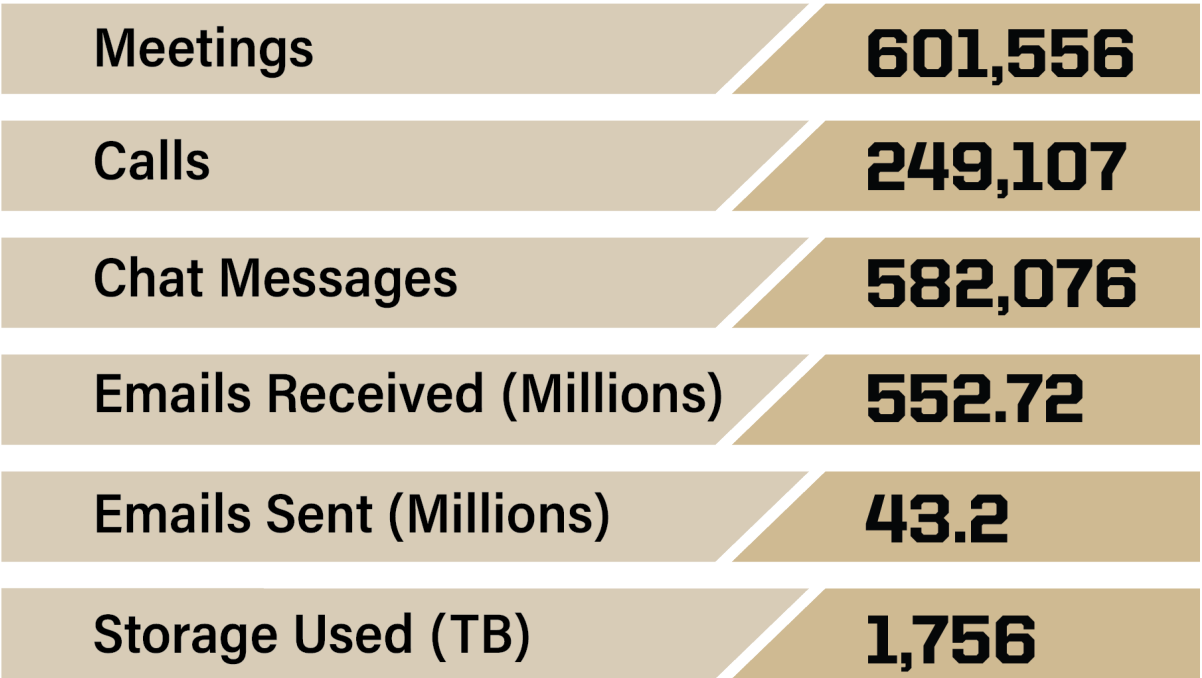
Ivy.AI Chats



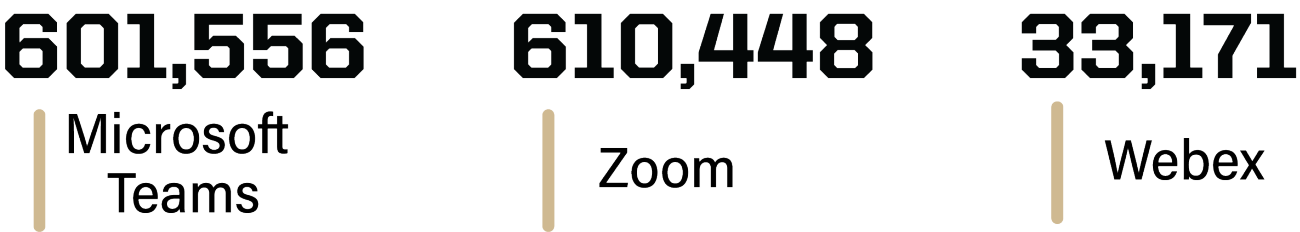
Network and Infrastructure

BY THE NUMBERS

Microsoft



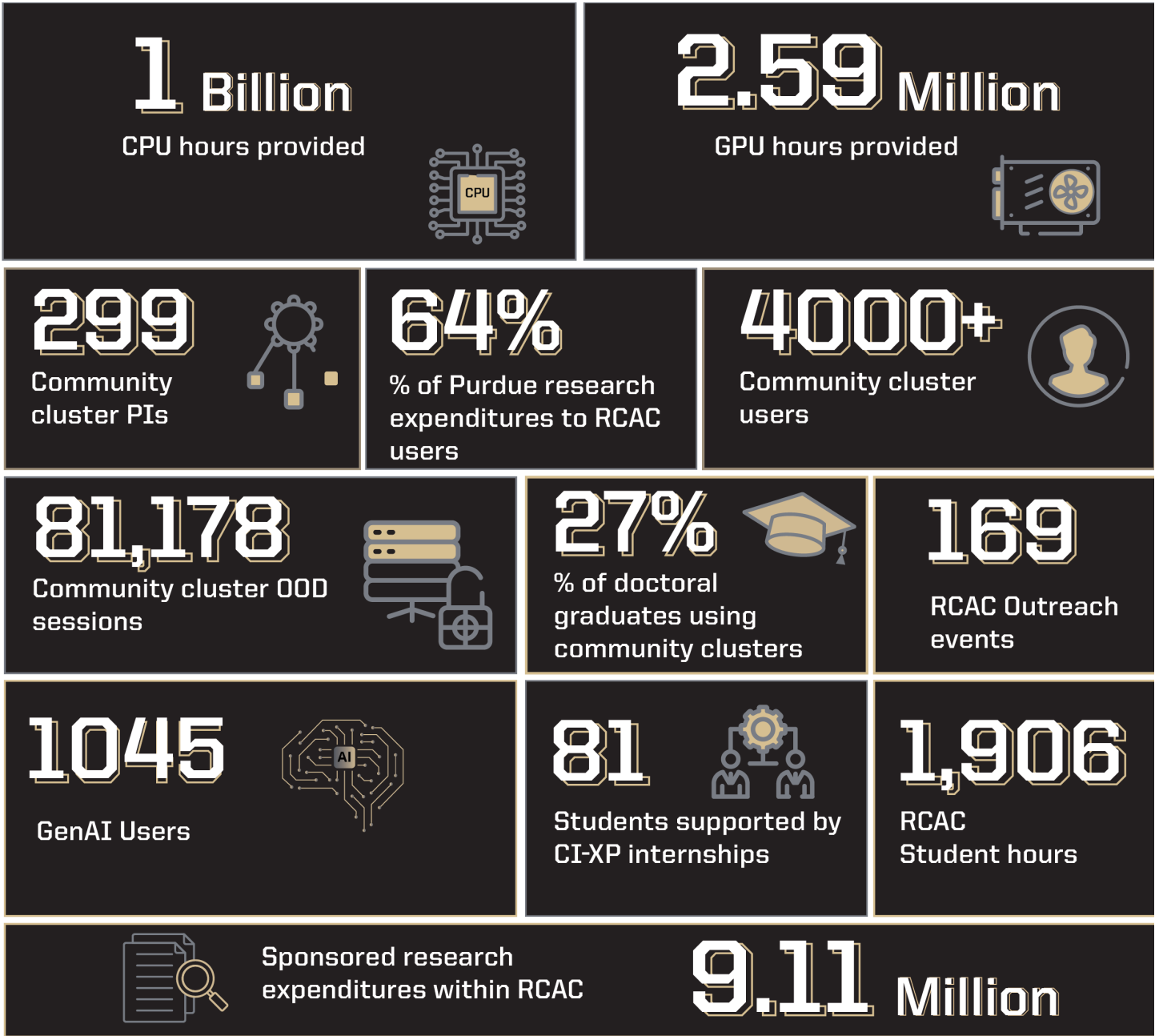
Virtual Meetings



Research Computing

Purdue's Rosen Center for Advanced Computing (RCAC) provides advanced computational resources and services to support Purdue faculty and staff researchers. The center also conducts its own research and development to enhance the capabilities of these resources.

RCAC PIs are leaders on several large research awards supporting CI professionals, AI, campus networking enhancements, and Stream CI a data streaming platform.



ANVIL



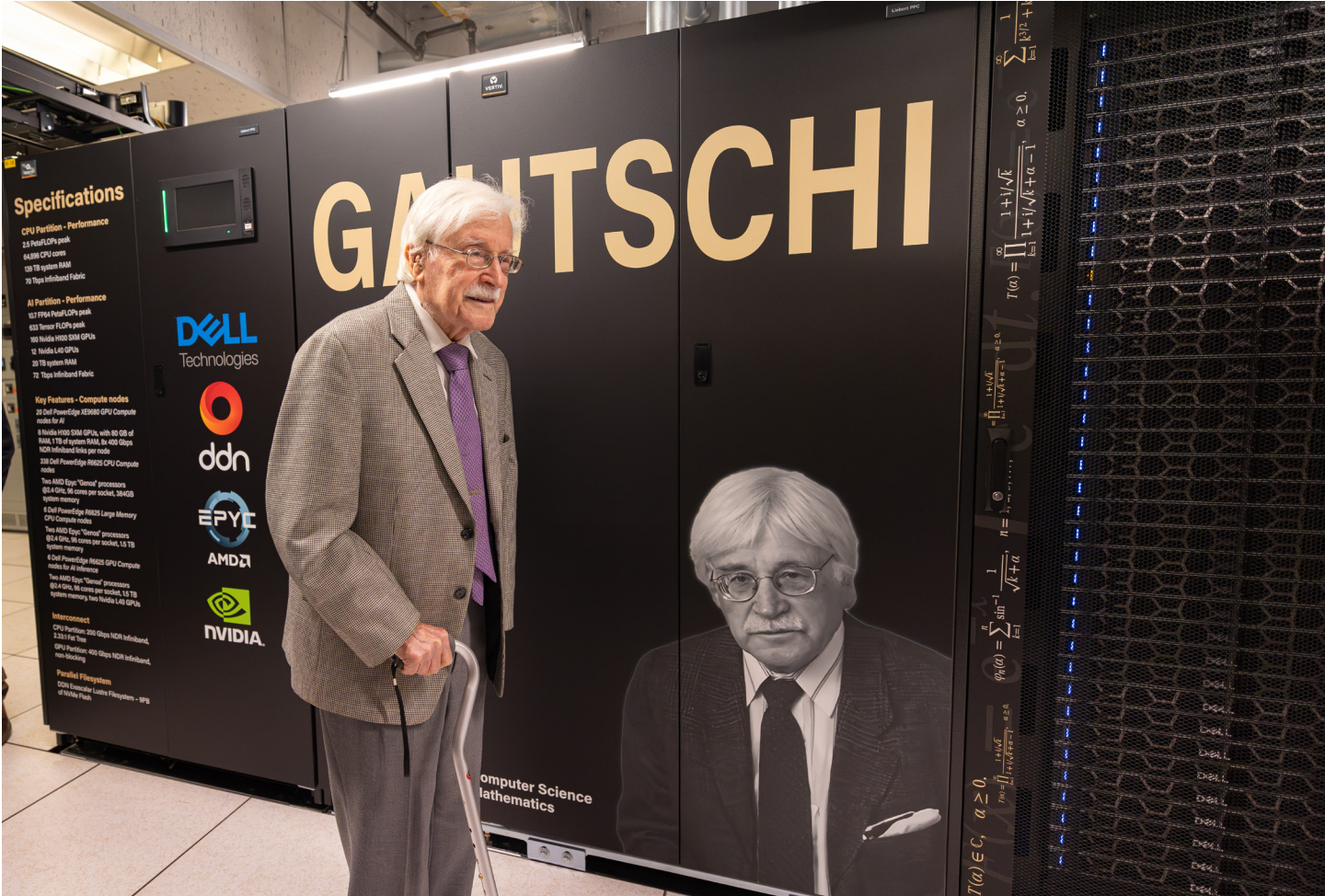
Anvil received AI hardware upgrade

Purdue University's powerful supercomputer, Anvil, received a major upgrade, thanks to funding provided by the National Science Foundation's (NSF) NAIRR Pilot Program. The NSF launched the National Artificial Intelligence Research Resource (NAIRR) Pilot to demonstrate the NAIRR concept and advance its primary goals of spurring innovation, increasing diversity of talent, improving capacity, and advancing safe, secure, and trustworthy AI in research and society. The new expansion has been installed and is now ready for use. With this Anvil upgrade, Purdue now offers a national supercomputing resource designed to enhance artificial intelligence (AI) workflows and help the U.S. lead the charge in AI research.

As an official resource provider for the NAIRR Pilot, Anvil received funding to pursue these goals, namely by improving Anvil's capacity to enable AI research. A total of 84 Nvidia H100 SXM GPUs were procured and added to the system. With this upgrade, Anvil is now poised to deliver a world-class AI supercomputing resource to researchers nationwide.

Before the expansion, Anvil's system consisted of 1,000 Dell compute nodes, each with two 64-core third-generation AMD EPYC processors, 32 large memory nodes with 1 TB of RAM per node, and 16 GPU nodes, each with four NVIDIA A100 Tensor Core GPUs, all of which are interconnected with 100 Gbps Nvidia Quantum HDR Infiniband. The new NSF funding has added 21 Dell PowerEdge XE9640 compute nodes, each with 4 Nvidia 80GB H100 SXM GPUs, as well as an additional 1 PB of flash-based object storage integrated into Anvil's composable subsystem. The new GPU nodes also feature an additional NDR Infiniband fabric to support larger AI workloads.

Gautschi ranked 157 on list of world’s most powerful supercomputers



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Purdue launched powerful LLM service, GenAI Studio

In collaboration with the Institute for Physical AI (IPAI), Purdue University’s Rosen Center for Advanced Computing (RCAC) now offers a powerful new feature in its artificial intelligence software services—Purdue GenAI Studio. Purdue GenAI Studio is a large language model (LLM) service that makes open-source LLM models like LLaMA accessible to anyone at Purdue. Unlike other LLM services, Purdue GenAI Studio is hosted entirely on-premises using resources within Purdue’s community cluster supercomputers. This means researchers have more democratized access to LLMs, as well as more control.

Purdue GenAI Studio uses existing investments in compute resources already made at Purdue by leveraging the Anvil supercomputing system. The service provides tools, documentation, and expertise that allow faculty to build and apply LLMs to research and teaching. Purdue GenAI Studio’s user interface (UI) is intuitive and easy to use. There are two modalities for interacting with Purdue GenAI Studio—both the UI and API,—and additional functionality for both is under active development. The chat interface allows researchers to select from a list of open-source models, including base models (LLAMA, Mistral, Phi, etc.) as well as any custom models the individual researcher may have created. Users may also select multiple models to compare the output for any prompt. Additional open-sourced models that are not already listed can be added to Purdue GenAI Studio upon request.

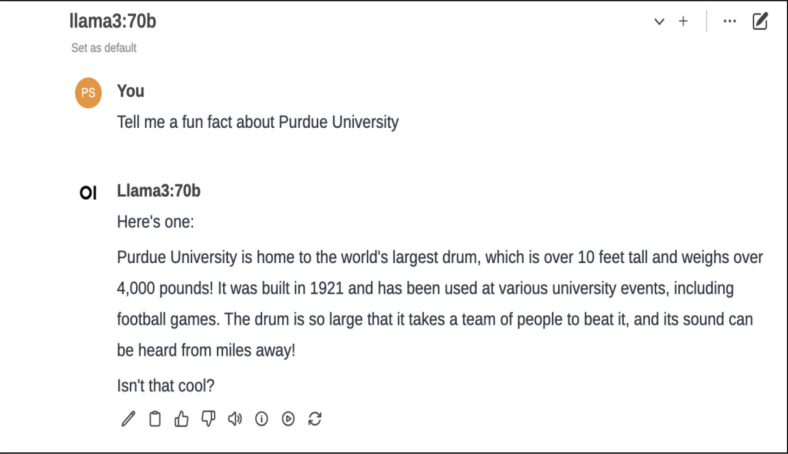
Purdue GenAI Studio also offers Retrieval-Augmented Generation (RAG) functionality. RAG functionality allows researchers to upload their own data into the model, providing it with more context. This adds to the model’s base knowledge, which helps it to provide more accurate responses in particular domains. However, GenAI Studio should not be used with University data classified as sensitive or restricted.

Purdue GenAI Studio

On-Demand Model Hosting, Access, and Training

Leveraged from Anvil

- Using existing investments in compute resources already made at Purdue
- Provide tools, documentation, and expertise to allow faculty to build and apply LLMs to research and teaching
 - Open source models like LLAMA, Mistral, Phi, etc.
- Expose access to model instances via APIs, chat interfaces



Served nearly 1M chat messages last month!

CollabXR advances education through successful pilot program

Purdue University’s Envision Center (EC) is ushering in the next generation of teaching and learning by leveraging their cutting-edge virtual reality platform, CollabXR. CollabXR is a shared learning platform that puts advanced visualizations at the fingertips of professors and students, immersing them in a learning environment like never before. Throughout the Spring 2025 semester, six different university instructors took advantage of an Innovation Hub-supported pilot program to utilize CollabXR and deliver world-class educational experiences to students.

The CollabXR (XR=extended reality) platform is a shared environment that allows anyone in a headset to view and interact with the same virtual content pieces together, viewed in fully virtual (the entire field of vision is virtual, obscuring all of the real environment, and other participants appear as virtual avatars) or passthrough augmented reality (cameras feed the real room and people to the headset view, overlaying virtual content to appear to exist in the same space). Developed in conjunction with Professor Danny Milisavljevic,

the CollabXR platform is the first of its kind, merging virtual reality (VR), augmented reality (AR), and mixed reality (MR) capabilities with training, research, and education.

Thanks to support from Purdue University’s Innovation Hub, the EC was able to run a semester-long pilot program to test and explore CollabXR in real-world learning environments. The pilot program initially received 13 project proposals from instructors who wished to use CollabXR in their classrooms. Of these, the EC accepted six project proposals for the Spring 2025 semester. These six projects marked the first large-scale implementation of CollabXR in the classroom.

“Utilizing CollabXR in these different classroom settings was an amazing opportunity for us,” says George Takahashi, Principal Visualization Scientist at the Envision Center. “Not only was the platform a huge success, enabling the professors to relay complex information in a very fun and impactful manner, but we took away lessons that will allow us to improve functionality for future courses.”



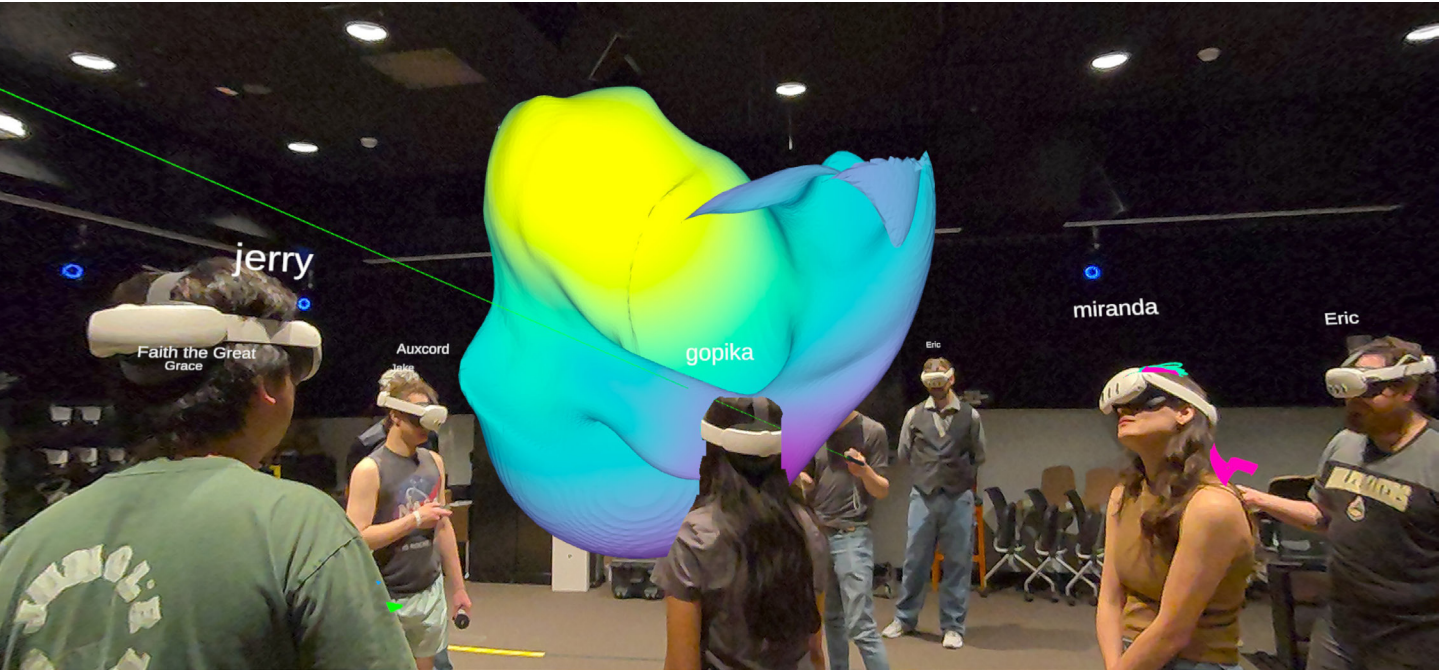
The six projects covered a wide range of domains, from Aeronautics to Nursing to Liberal Arts, and delivered educational experiences to both graduate and undergraduate students. Once the pilot program was completed, over 50 students were directly impacted through the use of CollabXR. Feedback provided by the users (instructors and students alike) after the semester showed that CollabXR was an overwhelming success. The six course instructors who took advantage of CollabXR in their lessons were as follows:

Maxim Lyutikov – Professor, Department of Physics and Astronomy

Lyutikov took advantage of CollabXR to teach an advanced physics research course, PHYS 590. The group already utilizes high-performance computing resources at RCAC to simulate plasma bubbles in 3-dimensions (3D). Before importing their data into the CollabXR platform, visualizing these 3D simulations was difficult, therefore making thorough data comprehension unfeasible. Lyutikov believed that CollabXR would enable him and his students to utilize their data to the fullest to understand interesting and relevant physical phenomena. The group used CollabXR specifically to observe floating plasma bubbles in galaxy clusters, the shapes of the

bubbles as they rise, and their trajectory through space.

“There is a clear science value,” says Lyutikov. “Two times I was [immersed in CollabXR], I saw 3D details that were very convincing theory-wise. Any 2D cut would have missed that.” Lyutikov went on to note that CollabXR could also be tremendously useful for showcasing research at conferences or other public presentations, as well as for enhancing journal publications.



Kenshiro Oguri- Assistant Professor, School of Aeronautics and Astronautics

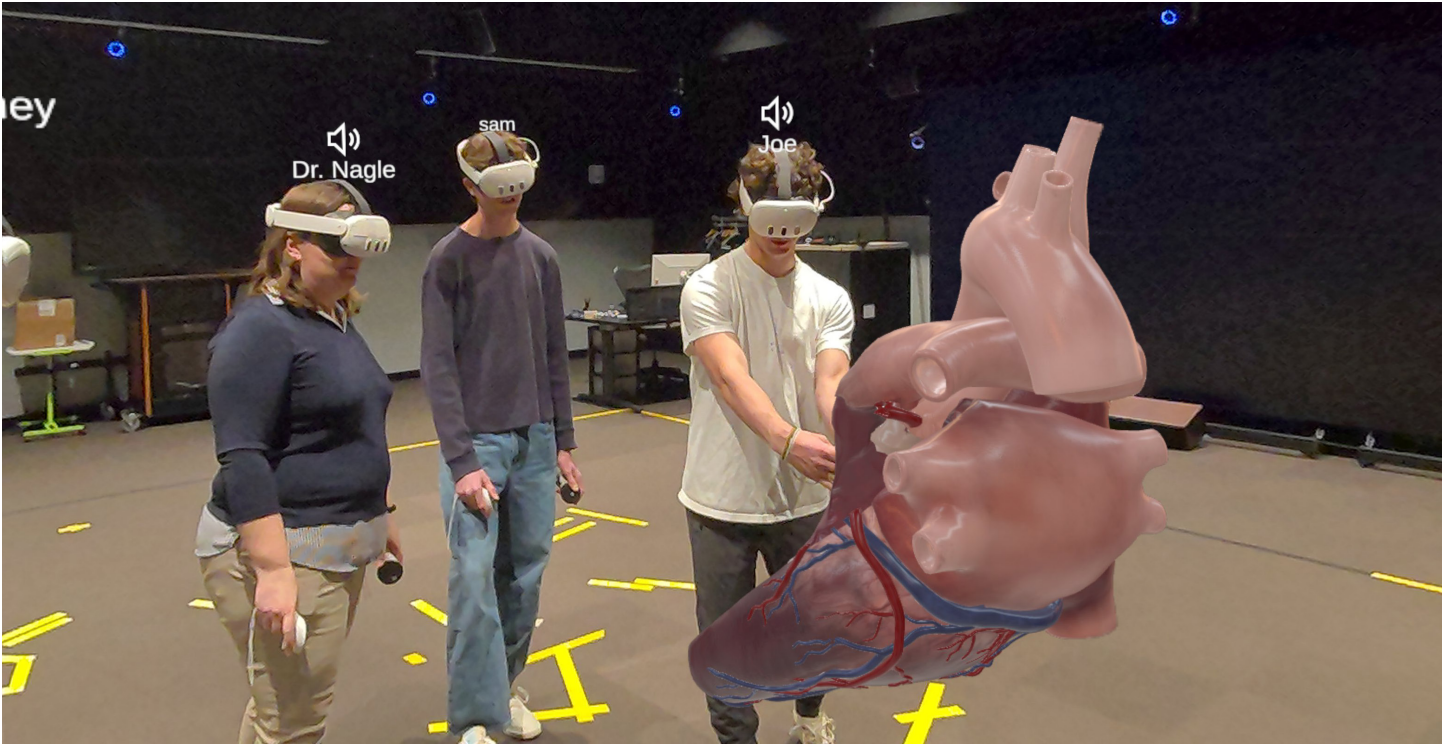
Oguri utilized the CollabXR platform for his course titled Applied Control in Astronautics (AAE590), which introduces students to the theoretical and practical foundations of control techniques with an emphasis on its application to dynamical systems in astronautics. The primary benefit Oguri was hoping the students would obtain with CollabXR was an improved physical intuition of simulation results. He also believed that CollabXR would enable group discussions where everyone was on the same page, facilitating efficient brainstorming of research ideas. The research data the group examined with CollabXR included spacecraft trajectory displaying orbits, maneuvering thrust, and uncertainty quantification of the spacecraft position as it travels.

“Using the CollabXR platform greatly helps us to gain intuition about three-dimensional orbits, trajectories, and objects (spacecraft, planets, asteroids, etc) in space as well as investigate their details interactively, which is typically very hard to do on papers or computer screens,” says Oguri. “Access and future development with the CollabXR platform would help my students gain intuition about orbital mechanics, space navigation, and mission design much more quickly, which might largely reduce the time for them to acquire necessary understanding to begin their research, and hence greater research accomplishments for the same amount of time spent. It will also make it easier for me to collaborate with other researchers in different fields, which might greatly broaden the scope of collaboration and types of researchers.”

Amy Nagle – Clinical Associate Professor, School of Nursing

Nagle applied to use CollabXR in teaching multiple nursing courses, including NUR 317, NUR 314, and NUR 420. Her intent was to have the Envision Center develop an interactive heart where students could observe blood flow through the vessels, chambers, and valves of the heart, while also listening to the different heart sounds to help them understand what they are hearing. By teaching within the CollabXR platform, Nagle could provide the students with a much more in-depth, hands-on learning experience without the need for cadavers.

“It was great to be able to show students how the heart functioned with a realistic model that I could move around and manipulate,” says Nagle. “I loved being able to draw on the heart, look at different views, and easily toggle between those views. I also liked that the students could interact with it, point at different parts, and ask questions while pointing to what they were talking about. It really brings the anatomy alive and allows those hands-on learners to optimize their learning.”



Jun Chen – Professor, School of Mechanical Engineering

Chen teaches Fluid Mechanics (ME308) to undergraduates in the Mechanical Engineering program at Purdue. Chen wished to incorporate CollabXR into his classroom to showcase flow fields around various objects. For this semester specifically, Chen used CollabXR to provide his students with the opportunity to directly observe a flow field demonstrating the movement and pressure of air around an airfoil in a 3D setting.

“The CollabXR experience [...] demonstrates the great potential of applying advanced technology for teaching and learning,” says Chen. “To the best of my knowledge, this is the first time to show the complicated 3D flow structure—which is very tricky to explain to students in standard lectures—vividly in the eyes of students. The students are amazed to see what they observe and develop an increased interest in learning more about the subject. I am looking forward to working with [the Envision Center] to further develop this capacity to be adopted into our curriculum.”



Frederick Dunn – Lecturer, College of Liberal Arts

Dunn teaches a course titled Academic and Professional Communication for International Teaching Assistants (SCLA 620). The course is part of Purdue’s Oral English Efficiency Program and is designed to enhance the language, communication, and presentation skills of graduate students whose first language is not English, helping them feel more confident in their roles as teaching assistants. Dunn wanted to incorporate CollabXR into his classroom for a ‘Show and Tell’ event designed to enhance English language skills through interactive VR. Specifically, CollabXR would enable the students to engage with virtual objects related to their fields of study, allowing them to practice teaching and presenting in English in a low-stakes environment.

“As a language instructor,” says Dunn, “CollabXR enabled me to provide my students with a heightened level of authenticity in their communication practice. For example, one of my

students, who presented on tar spot (a corn disease), was able to confidently demonstrate his knowledge without needing to physically walk through a cornfield to point out varying degrees of infection. Instead, he used the virtual environment to illustrate key details, practicing both subject-specific explanations and English communication with a clear, genuine purpose.”

Dunn continues, “As my students come from a wide range of fields, such as agriculture, electrical and computer engineering, aerospace, and veterinary sciences, it’s often impractical or even impossible to bring discipline-specific items into a traditional classroom. By integrating CollabXR, students practiced their language skills in scenarios that felt purposeful and domain-specific, fostering deeper engagement and motivation.”

Kathleen Howell – Hsu Lo Distinguished Professor, School of Aeronautics and Astronautics

Howell wished to incorporate CollabXR into a number of her graduate-level Aeronautics and Astronautics courses, including AAE 532, AAE 632, and AAE 690. According to Howell, processing and designing spacecraft pathways requires geometrical understanding of complex trajectories, and being able to visualize this helps students tremendously with comprehension. Howell used CollabXR in her lessons specifically to show her students visualizations of complex trajectories and orbital dynamics to convey concepts in spacecraft mission planning and analysis.

“It was easy to see how I could create new class demonstrations and interactive lessons for students,” remarked Howell after her first time using the new CollabXR platform. “I think the experience could serve the topic very well, but especially during an interactive lesson that was specifically designed for this environment.” Howell also noted that these types of visualizations and teaching methods may eventually become a requirement as sustainable operations in space become more routine.



Purdue awarded two NSF grants to enhance networking for research

The National Science Foundation’s (NSF) Office of Advanced Cyberinfrastructure awarded Purdue University two new Campus Cyberinfrastructure (CC*) grants. The two awards, totaling nearly \$1.5 million, will directly address and enhance the cyberinfrastructure at Purdue University.



Chipshub and Anvil union is a proven success for semiconductor workforce development



Chipshub, the online platform for everything semiconductors, arrived in September 2024. After a massive development effort from the nanoHUB team, and with help from RCAC staff, the online platform delivered advanced simulation software to the Purdue Summer Training, Awareness, and Readiness for Semiconductors (STARS) program, a huge step forward for semiconductor workforce development in the United States.

Over the next five years, Chipshub is expected to impact more than 200,000 U.S. engineering students and about 50,000 designers. Now that it has been

successfully used with the STARS program, the next steps involve expanding Chipshub access beyond Purdue and making the platform available throughout the country. This would be a boon for the nation, allowing other institutions to utilize these state-of-the-art tools without having to reinvest in the development time and resources already taken on by the Chipshub team.

Award-winning HyperShell software developed by RCAC helps simplify “many task” computing



RCAC staff members have developed a piece of software, known as HyperShell, that helps divide and conquer large volumes of discrete tasks to assist with scheduling and managing what’s known as “many task computing.” HyperShell has been dubbed “the ultimate workflow automation tool.”

In traditional high-performance computing, there’s just one big job for the supercomputer to tackle. But more often these days, researchers are doing what’s known as “high-throughput computing” or “many-task computing” where the supercomputer is performing a very large number of small, independent tasks, such as analyzing tens of thousands of pieces of data in a dataset.

Traditional HPC job schedulers like Slurm are not well-suited to managing this kind of computing, so RCAC lead research data scientist Geoffrey Lentner saw the need for a piece of software to help facilitate this kind of workflow, and HyperShell was born.

HyperShell, which is written in Python, is useful for researchers doing large volumes of data analysis and processing, such as in fields like bioinformatics, climate modeling, math and statistics optimization and agriculture.

Purdue awarded Western Digital storage to enable big data health research

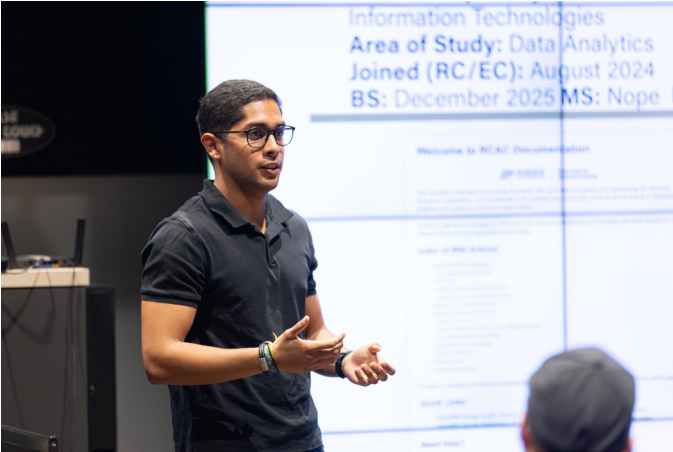
In June 2025, Purdue University was awarded 1.2 Petabytes of hard disk drive (HDD) storage from Western Digital to further enable research that relies on quick access to big data repositories. This award, granted through Western Digital’s Petabyte Innovation Quest (PIQ “PEAK” Award), helps bolster Purdue’s robust ecosystem of data services and data-driven models by creating the Purdue One Health Data Engine (POHDE)—a storage facility aimed at facilitating research spanning disciplines from weather and climate, to ecosystem health, to environmental toxicology, to plant and animal health, to personalized human health.

CI-XP students showcased projects

In May 2025, RCAC hosted the annual CI-XP Student Program Lightning Talks, giving RCAC students a chance to showcase their projects and accomplishments to peers and staff within the organization.

The CI-XP (Cyber Infrastructure-eXPerience) Student Program provides work opportunities and an authentic workplace experience for students with the goal of enhancing education through the development of professional skills, responsibilities, habits, attitudes, self-confidence, and self-development. The program comprises graduate and undergraduate student workers in RCAC, the Envision Center, the Scientific Solutions Group, and the Anvil REU programs. RCAC staff serve as mentors to the students.

During the 2025 CI-XP Lightning Talks event, 36 students gave two- to four-minute presentations highlighting their projects and what they’ve learned throughout the school year. Each student gave a brief overview of themselves: their background, course of study, likes and dislikes, and plans after graduation. They then moved on to their accomplishments and takeaways from working at RCAC.



Purdue receives \$4 million NSF grant for StreamCI data streaming platform



RCAC is leading a major National Science Foundation (NSF) grant awarded to create an artificial intelligence (AI)-ready streaming data platform for researchers across domains. This new platform, known as StreamCI, will significantly lower technical barriers associated with harnessing massive data streams, empowering experts from a wide range of scientific fields to build intelligent and responsive applications that will be more efficient and effective than ever before.

In June 2025, the NSF awarded Purdue researchers \$4 million over five years to develop and refine StreamCI. Carol Song, the Chief Scientist of RCAC, is the Principal Investigator (PI) on the project. She and the Research Software Engineering (RSE) team at RCAC will work alongside co-PIs Ananth Grama, Jian Jin, Michael Heinz, and Ming Qu, and senior personnel Martin Jun, Mohammad Jahanshahi, Kristen Bellisario, Jacob Hosen (all professors at Purdue) to bring StreamCI to life. The soul of the project lies in making continuous data streams (e.g. real-time sensor data) more manageable and AI-ready for scientists who may not be cyberinfrastructure experts, something the group felt was critically needed in the research community.

HPC Impact on Courses

125

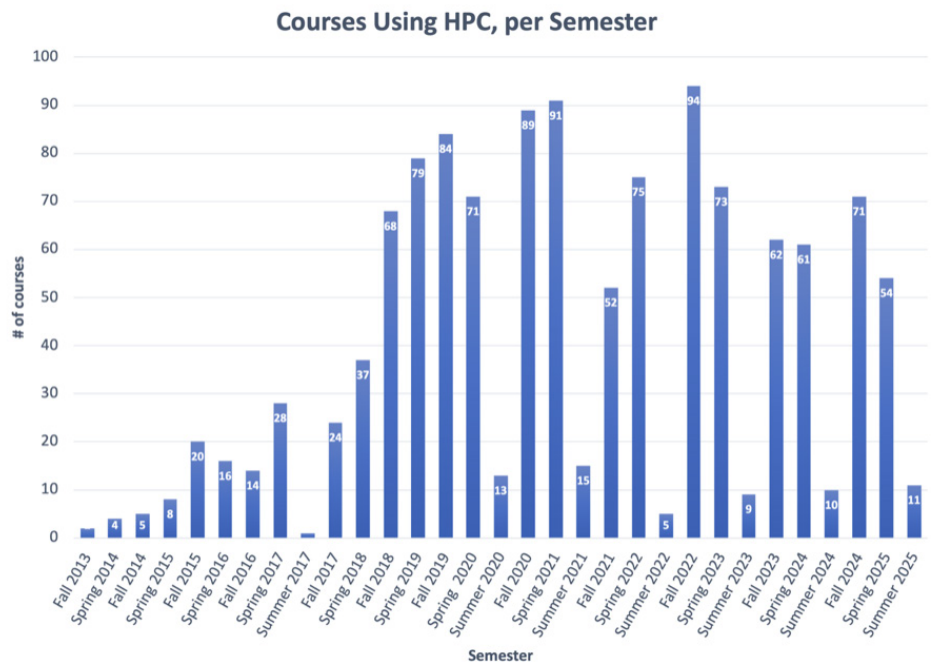
Courses

During the 24-25 Academic Year
(Fall 2024 - Summer 2025 semesters) 125
courses used HPC for instruction purposes.

4716

Students

Impacting a total of over 4500 students
during the 24-25 Academic Year





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