

Rosen Center for Advanced Computing

Cyberinfrastructure Outreach, Workforce & Industry Engagement Initiative



Rosen Center for
Advanced Computing

Welcome Letter

Suzanna Gardner,
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I came to this work by an unlikely path. After competing internationally in athletics, I built a career that took me across borders before bringing me here. That same mindset, discipline, persistence, and a willingness to compete where no one expects you to is what I bring to my work every day. Every step taught me the same lesson: talent is everywhere, but access is not. The people who go on to change a field are rarely the ones who started with the most resources; they’re the ones someone took a chance on.

That belief is the heart of everything we do here. At RCAC, advanced computing isn’t reserved for those who already know they belong in it. Through the Cyberinfrastructure Outreach, Workforce & Industry Engagement Initiative, we meet learners wherever they are: a high schooler writing their first line of Python at one of our summer camps, an educator bringing HPC into a classroom for the first time, or a student at a smaller institution discovering they can run real research on a national supercomputer. We don’t just open the door; we walk people through it.

What makes this model work is that none of these efforts stands alone. Outreach, education, experiential learning, and workforce readiness are connected stages of a single pathway designed to turn early curiosity into lasting careers in AI, high-performance computing, and data-driven science. We do this work inside the same environments professionals use every day, because the best preparation for the future is building it in now.

I’ve seen what happens when someone is given the access and the encouragement to try: it changes the trajectory of a life. That’s the opportunity in front of all of us, and it’s exactly why I’d love to hear from you. Whether you’re a student, an educator, a researcher, a partner organization, or an industry, there’s a place for you in this work. Reach out, let’s talk about where your journey could go.

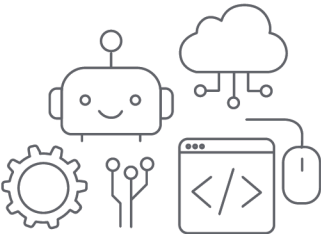
Impact at Scale

K - 12 STUDENTS IMPACTED

291

K - 12 CAMPS

10



TRAVEL
SCHOLARSHIPS
AWARDED

29



CI-XP
INTERNSHIPS

Undergraduate &
Graduate students

200+

10

HACK-A-THONS
SUPPORTED

20

PARTNERSHIPS &
COLLABORATIONS

SINCE 2023

Outreach & Workforce Initiatives

Modern research, innovation, and economic competitiveness are increasingly driven by artificial intelligence, high-performance computing (HPC), and data-intensive science. Yet access to these technologies—and the pathways to effectively use them - remains uneven across educational institutions, communities, and disciplines.

The Rosen Center for Advanced Computing (RCAC) is uniquely positioned to address this challenge.

Through the Cyberinfrastructure Outreach & Workforce Initiative, RCAC is building a cohesive, vertically integrated talent development ecosystem that connects early exposure, academic learning, experiential engagement, and workforce readiness. This initiative brings together a broad portfolio of outreach programs, student experiences, and training opportunities under a unified strategy designed to expand access to advanced computing and prepare the next generation of Cyberinfrastructure researchers and professionals.

Rather than treating outreach, education, and workforce development as separate efforts, RCAC aligns them into a single, scalable pipeline model—one that transforms initial curiosity into sustained engagement, and ultimately, into career readiness.

By aligning education, experiential learning, and cyberinfrastructure access, RCAC:

- Expands participation in advanced computing
- Strengthens NSF's broader impacts
- Drives workforce development at scale
- Positions RCAC as a national leader in computational talent development



Cyberinfrastructure Talent Pipeline

At the core of this initiative is a five-stage pathway that supports learners from their first exposure to computing through their transition into the workforce.

RCAC delivers a 5-stage integrated pathway:

Exposure

In Stage 1, RCAC introduces K-12 students, educators, and communities to computational thinking through immersive, hands-on experiences. These include STEM camps, cybersecurity and AI programs, educator workshops, and partnerships with organizations such as museums and community groups.

Early Academic Engagement

As students enter higher education, RCAC supports the integration of computational tools into coursework and learning environments. Through course modules, immersive visualization environments, and introductory exposure to systems like Anvil, students begin to understand how computing supports research across disciplines.

Applied Skill Development

In Stage 3, RCAC provides structured training programs that equip students with practical, workforce-relevant skills. These include onboarding to HPC systems, training in Linux environments, job schedulers, data management practices, and reproducible research workflows.

Experiential Learning

In this stage, students apply their skills in real-world contexts. Programs such as CI-XP, the Anvil REU, internships, and hackathons provide opportunities for participants to work on collaborative, project-based challenges.

Workforce & National Engagement

The final stage connects participants to the broader national ecosystem. Through conference participation, collaborations with industry and national labs, and continued research engagement, students transition into careers or advanced study.

STAGE 1

STAGE 2

STAGE 3

STAGE 4

STAGE 5

What We Deliver

An Integrated Model for Outreach, Engagement, and Workforce Development

RCAC's strength lies in its ability to integrate diverse programs into a unified strategy. Rather than operating in isolation, outreach, student engagement, and workforce development function as interconnected components of a larger system.

Outreach & Access

RCAC expands participation in computing by engaging with K-12 students, educators, and under-served communities. Through camps, workshops, and partnerships, the initiative builds early pathways into STEM while promoting inclusivity and broadening participation. Programs include our AI and cybersecurity camps, Code Explorers camp, and educator workshops.

Student & Experiential Programs

Students engage directly with advanced computing through structured programs that combine learning with application. Whether through internships, research experiences, or hackathons, participants gain exposure to real-world computational challenges. These programs emphasize learning by doing, ensuring that students develop both technical skills and confidence. These internships and experiential programs have students working directly with HPC systems at RCAC

Workforce Development

RCAC aligns training and experiential opportunities with workforce needs. By focusing on skills such as data analysis, HPC workflows, AI applications, and collaborative problem solving, the initiative prepares participants for careers in research, industry, and government.

Importantly, this preparation occurs within the same environments used by professionals, bridging the gap between education and employment.

Why This Model Works

This integrated approach is effective because it is:

- **Scalable**, supporting growth across institutions and communities
- **Experiential**, emphasizing hands-on learning
- **Strategic**, aligned with national priorities in workforce development
- **Sustainable**, building long-term capacity rather than one-time engagement



"So in two years, I am really indebted to everything RCAC has done for me. Working there was a really great experience. And really big thanks to my mentors, who provided me with these opportunities and guided me on my journey. Because of the experience and the work I was able to accomplish, I ended up with a full-time software engineering job at Red Hat, right out of college."



Vivek Ragavan

Software Engineer, Red Hat

"My time at RCAC gave me mentors who believed in me, sometimes more than I believed in myself. They trusted me with impactful work—outreach that reached hundreds of K-12 students and presenting at conferences—and stayed in my corner if I got things wrong. A WHPC scholarship enabled me to attend the SOUPS conference, deepening the security research I was pursuing and connecting me with the wider usable security community. I've grown here more than I ever expected to, and I'm leaving as a better version of myself."



Madiha Fathima

Research Support Dev - Student Service

Supporting Student Experience

In conjunction with Purdue's Women in High-Performance Computing (WHPC) chapter, RCAC offers scholarships that provide travel assistance to undergraduate and graduate students who wish to attend major computing conferences. Through these scholarship opportunities, RCAC and Purdue WHPC have enabled student participation in a variety of national and international conferences, including Supercomputing (SC), the Grace Hopper Celebration (GHC), the ACM Special Interest Group on Computer Science Education (SIGCSE) conference, the Society of Women Engineers (SWE) conference, Game Developers Conference (GDC) Festival of Gaming, the IEEE International Symposium on Mixed and Augmented Reality (ISMAR) conference, and more!



Why Women in HPC at Purdue Matters

Women in HPC (WHPC) at Purdue exists to promote and advance the representation of women in high-performance computing and technology, a field where they remain significantly underrepresented. Led by the Rosen Center for Advanced Computing, the chapter brings together undergraduate and graduate students, faculty, and staff, and its mission goes beyond a statement of values: it turns into scholarships, mentorship, events, and a community that measurably changes the trajectory of the students it reaches.

This opportunity opens doors to networks and cutting-edge research that most students would never access on their own. Its mentorship program pairs faculty and staff with students over a structured six-month cycle of two to three hours a month, building the kind of sustained relationships that keep women in the field rather than letting them quietly leave it.

An Invitation to Industry: Help Us Close the Talent Gap

Every sector, pharmaceuticals, energy, defense, finance, manufacturing, and AI, is racing to hire people who can work fluently in high-performance computing, AI, and data-driven science. That talent doesn't exist in the numbers the economy needs, and the gap is widening. Companies are competing for the same small pool, while the work waiting to be done only grows.

At the Rosen Center for Advanced Computing, we've spent years turning curiosity into capability, introducing K-12 students to computational thinking and giving undergraduates hands-on experience on Purdue's supercomputers. By treating this infrastructure as a platform for experiential learning, we're training the future computing workforce on the same national-scale resources professionals rely on. What we've created is more than a set of programs; it's a vertically integrated talent pipeline that carries learners from first exposure to workforce-ready professionals.

When you partner with us, you don't just support that pipeline. You plug directly into it:

- Sponsor a student project team that spends a semester working on your real data and real challenges, hosted on a supercomputer with our staff alongside them, delivering proof-of-concept work and a recruiting funnel in one.
- Gain priority access to national-scale HPC and AI infrastructure, plus staff consultation and training built for your team.
- Gain early access to students you've already seen in action—talent you helped shape and are ready to hire.
- Join a community of partners, researchers, and students at our annual industry convening.

This is how the gap closes: not by waiting for graduates to arrive job-ready on their own, but by building that readiness together, inside the environments your teams already use.



Building the Future Workforce Through RCAC

The demand for cyberinfrastructure talent continues to grow across every sector of society. Meeting this demand requires more than access to technology—it requires intentional, structured pathways that prepare individuals to use it effectively.

RCAC is meeting this challenge by building a model that is:

- Integrated across education and research
- Grounded in real-world experience
- Scalable across institutions and communities

This initiative represents a shift from isolated programs to a cohesive workforce development strategy, positioning RCAC as a national leader in preparing the next generation of cyberinfrastructure scientists and professionals.

RCAC is not waiting to solve the cyberinfrastructure talent gap. We are actively building a scalable, experiential workforce pipeline that prepares students to lead in high-impact fields, such as artificial intelligence, high-performance computing, and data-driven science. By working with us, you are working towards the development of tomorrow's leaders in computing.

We're now assembling our founding group of industry partners. If your company depends on computational talent and, increasingly, every company does, there's a place for you here. RCAC offers opportunities to connect, collaborate, and grow to anyone interested in computing. Whether you are a student, educator, researcher, industry, or partner organization, we would love to discuss how we can help you on your journey.

Partner with us. Train with us. Build with us.

Let's talk about what your team needs and how we can close this gap together.

Suzanna Gardner - *Outreach, Engagement & Workforce Development - Rosen Center for Advanced Computing, Purdue University*



Contact us

We want to hear from you! Whether you're a student, an educator, a researcher, a partner organization, or an industry, there's a place for you in this work. Reach out, let's talk about where your journey could go.

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