Semiconductors@Purdue



FALL 2026

PURDUE UNIVERSITY



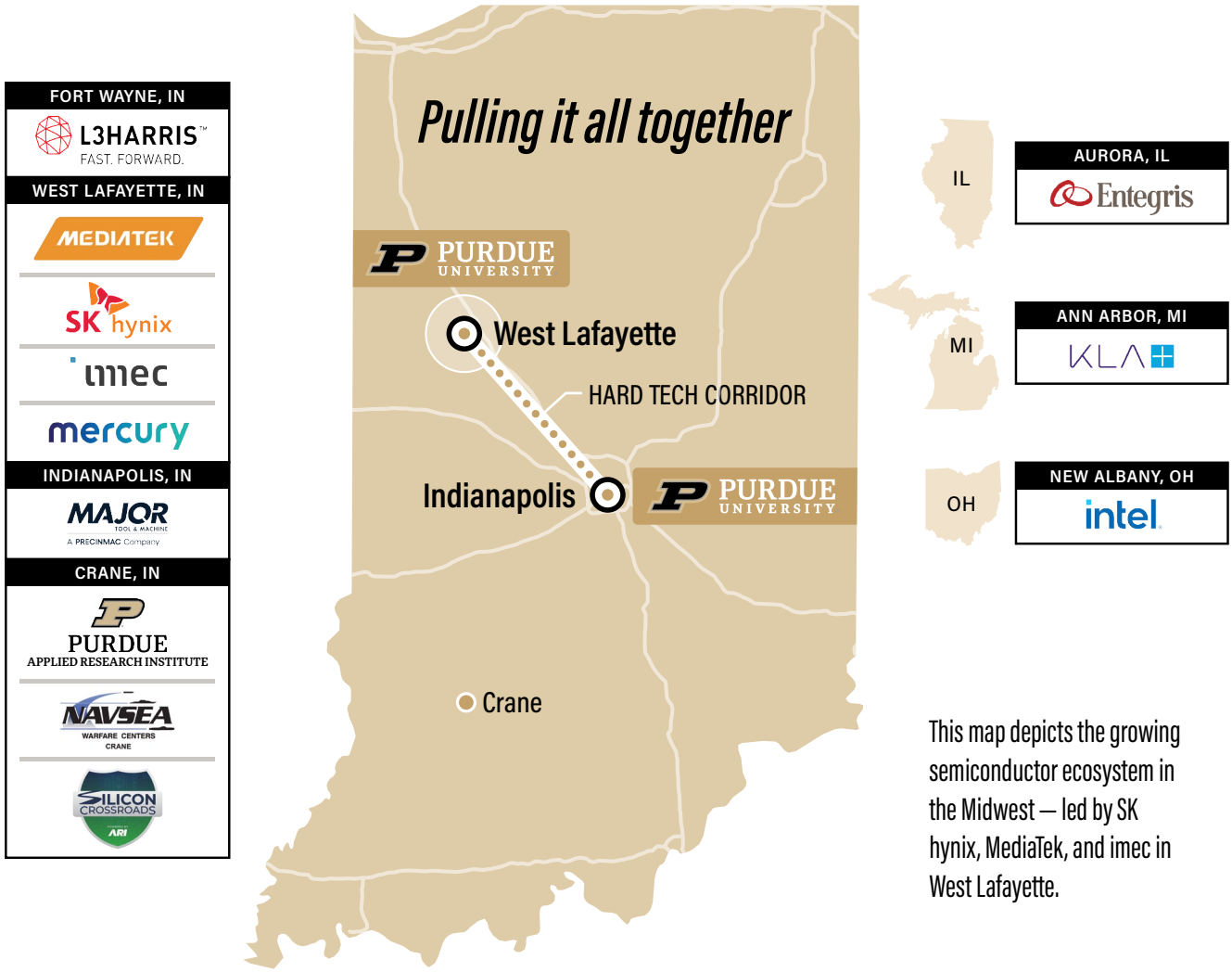
"West Lafayette, Indiana, home of Purdue University, welcomes SK hynix, MediaTek, and imec to our community. We're delighted that these three global leaders have selected West Lafayette as their newest sites. West Lafayette is a rapidly growing community with a business-friendly environment built on our partnership with Purdue, a skilled, highly educated workforce, exceptional schools, and a high quality of life that helps attract and retain employees. We look forward to working with our partners to grow Indiana's semiconductor ecosystem."

Erin Easter | Mayor, West Lafayette, Indiana



"Greater Lafayette is proud to be the place where the next chapter of the global semiconductor story is being written. Anchored by Purdue University and Ivy Tech, and strengthened by a community known for collaboration, affordability, and quality of life, we offer more than talent — we offer staying power. The arrival of SK hynix, MediaTek, and imec signals not only today's opportunities but also a future where students, businesses, and residents alike thrive in a resilient, globally connected economy."

Mike Berger | President and CEO, Greater Lafayette Commerce



This map depicts the growing semiconductor ecosystem in the Midwest — led by SK hynix, MediaTek, and imec in West Lafayette.

Cover image: Researchers in the Scifres Nanofabrication Laboratory at the Birck Nanotechnology Center.

Table of Contents

Semiconductors@Purdue: From Small Steps to Giant Leaps 4

Purdue Semiconductor Leadership Council 5

What Purdue Offers 6

Purdue University: The Heart of the Silicon Heartland 7

Semiconductors@Purdue 8-9

Semiconductors@Purdue: Next Steps 10

Semiconductors for Indiana: Next Steps 11

SK hynix West Lafayette 12-13

MediaTek Purdue 14-15

imec USA — West Lafayette, Indiana R&D Center 16-17

Purdue International Semiconductor Partnerships 18-19

Workforce Development at Purdue 20-22

SCALE (SCalable Asymmetric Lifecycle Engagement) 23

Research and Innovation at Purdue 24-25

The Atalla Institute for Advanced System Integration and Packaging (ASIP) 26

Birck Nanotechnology Center and Scifres Nanofabrication Laboratory 27

Silicon Crossroads: Innovation, Infrastructure, and Workforce Development 28

Purdue Applied Research Institute: Defense-Aligned Microelectronics Innovation 29

Global Semiconductor Partnership: Purdue's Worldwide Impact 30

Purdue Computes 31

Intelligent Codesign Cloud Lab for Non-Equilibrium and Low-Dimensional Materials (ICoN-PCL) 31

Semiconductors@Purdue in the News 32-33

Endorsements 34

Purdue Faculty Serving in National Semiconductor Leadership Roles 35

For more information on Semiconductors@Purdue, please visit our website at:
https://engineering.purdue.edu/semiconductors

or email us at:
semiconductors@purdue.edu

Semiconductors@Purdue: From Small Steps to Giant Leaps

Every breakthrough that will define the next century – artificial intelligence, advanced medicine, clean energy, national security, autonomous systems, space exploration – depends on one foundational technology – semiconductor technology. At Purdue University, semiconductor excellence runs deep within our DNA — from the 1940s when Karl Lark-Horovitz, head of physics, first developed techniques to grow and dope high-quality semiconductor crystals, to Mohamed (John) Atalla, a Purdue alumnus who co-invented the silicon MOSFET in 1959, to Fred Terman, who hailed from Indiana and went on to become the father of Silicon Valley — Hoosiers have been defining and refining semiconductor technology. Now, inspired by Purdue alumnus Neil Armstrong, we look forward to a giant leap that will create a new cluster of semiconductor design, manufacturing, research, and talent development in the U.S. heartland.

It starts with people. As a public land-grant institution with the largest STEM enrollment among America's top 50 universities, talent development is central to our mission. Our Semiconductor Degrees Program (SDP) introduces students to the wide range of career opportunities in the semiconductor industry through classes, certificates, internships, degrees, and hands-on learning opportunities. The Purdue-led Scalable Asymmetric Lifecycle Engagement (SCALE) program, sponsored by the U.S. Department of War, addresses the defense sector through a consortium of more than 36 universities. Together, SDP and SCALE make Purdue a major supplier of talent to semiconductor companies across the U.S. and to companies in the growing Midwest semiconductor ecosystem.

Exceptional facilities and centers support trailblazing research. The Birck Nanotechnology Center's Scifres Nanofabrication Laboratory is in the process of becoming the nation's first AI/digital twin-enabled semiconductor R&D lab. Purdue research centers address advanced packaging, AI chip design, secure semiconductor ecosystems, and environmentally sound semiconductor manufacturing. Purdue's Chipshub provides fingertip access to industry standard CAD tools to academic users across the U.S., and Purdue has a major role in SPARC (Semiconductor and Packaging Advanced Research Consortium), an SRC operated, industry-funded program supporting collaborative academic research.

At Purdue, we take great pride in affordable, excellence at scale in everything we choose to do, in particular, in the co-generation of workforce, innovation, and jobs. MediaTek, a global leader in chip design, opened its first Midwest office on Purdue's West Lafayette campus in 2022. Imec, the world's largest independent semiconductor R&D center, launched a research partnership at Purdue in 2023. In 2024, SK hynix, the global leader in memory chips for AI, announced its plans for an advanced packaging facility and R&D lab near the Purdue campus. Strong partnerships with semiconductor companies across the U.S. and with India, Taiwan, Japan, Korea, and other countries cement Indiana's place on the global semiconductor map.

This edition of Semiconductors@Purdue summarizes our accomplishments to date and our plans for the future.

Join us now as we build a thriving and vibrant new semiconductor ecosystem in the Heart of the Silicon Heartland.



Mitchell E. Daniels, Jr.

Interim President

Purdue University



Mark Lundstrom

John A. Edwardson Dean of the College of Engineering

Chief Semiconductor Officer

Don and Carol Scifres Distinguished Professor of Electrical and Computer Engineering

Purdue University

Purdue Semiconductor Leadership Council



Zhihong Chen | Reilly Professor of Electrical and Computer Engineering, Mary Jo and Robert L. Kirk Director of Birck Nanotechnology Center



Mark Lundstrom | John A. Edwardson Dean of the College of Engineering, Chief Semiconductor Officer, Don and Carol Scifres Distinguished Professor of Electrical and Computer Engineering



Chad Pittman | President and CEO, Purdue Research Foundation



David Janes | Professor of Electrical and Computer Engineering, Director of Semiconductor Degrees Program, Dean's Faculty Fellow for Semiconductors@Purdue, Director of ECE Project Track MS Program



Peter Bermel | Elmore Professor of Electrical and Computer Engineering, Co-Director, Scalable Asymmetric Lifecycle Engagement (SCALE)



Dimitrios Peroulis | Senior Vice President for Partnerships and Online, Reilly Professor of Electrical and Computer Engineering



Tanya Finkbiner | Vice President of Development, College of Engineering



Brooke Beier | Senior Vice President, Purdue Innovates



Darren Crum | Director, Microelectronic Laboratory (PML), Purdue Applied Research Institute (PARI)



Vijay Raghunathan | Vice President and University Ambassador to India, Professor of Electrical and Computer Engineering



Ganesh Subbarayan | James G. Dwyer Professor of Mechanical Engineering, Director, Atalla Institute for Advanced System Integration and Packaging (ASIP)



Dan DeLaurentis | Executive Vice President for Research, Bruce Reese Professor of Aeronautics and Astronautics



Nikhilesh Chawla | Associate Dean for Research and Innovation, Ransburg Professor in Materials Engineering



Amy Marconnet | Professor of Mechanical Engineering, Associate Director of Semiconductor Degrees Program



Kerrie Douglas | Professor of Engineering Education, Co-Director of SCALE



Joe Krok | Executive Director for Corporate Relations, College of Engineering



Dana Weinstein | Professor of Electrical and Computer Engineering



Chris Brinton | Faculty Director, Hub for Innovation, Ventures, and Entrepreneurship (HIVE), Elmore Associate Professor of Electrical and Computer Engineering



Richard Sikora | Executive Advisor for Innovation and Entrepreneurship, Office of Research

What Purdue Offers

- Committed to excellence at scale in research and education with impact on the commercial sector, the nation's defense and security, and affordability
- 14 straight years of frozen tuition
- 57,000 students at the West Lafayette location, 70% STEM
- More than 19,000 engineering students, more than 100,000 engineering alumni
- First-of-kind School of Sustainability Engineering and Environmental Engineering — with a focus on semiconductor manufacturing
- Exceptional research facilities, with more than 400 research labs in West Lafayette
- Birck Nanotechnology Center and Scifres Nanofabrication Laboratory — the nation's finest academic semiconductor research facility
- Extraordinary and innovative Engineering faculty, including 27 National Academy of Engineering members, 19 National Academy of Inventors fellows
- No. 1 online MS programs in all 5 ranked engineering specialties: civil engineering, electrical engineering, industrial engineering, mechanical engineering, and engineering management.
- Semiconductor research across the stack — materials and devices, circuits and novel architectures, reliability and security, sustainable manufacturing, thermal management, advanced packaging and heterogeneous integration, Microelectromechanical Systems (MEMS), photonics, and quantum technologies
- The nation's most ambitious semiconductor talent development programs — the Semiconductor Degrees Program for the commercial sector and the Department of War (DOW)-funded, Naval Surface Warfare Center-managed SCALE for the defense sector
- Home of nanoHUB, the world's preeminent science gateway for nanotechnology and Chipshub, supporting integrated circuit design in academia across the U.S.
- A business-minded university backed by Purdue Research Foundation's track record of meeting industry partners' needs with space, logistics, and community connections

PURDUE UNIVERSITY

#1 Producer of **ENGINEERING DEGREES** in the U.S.

#1 and **IN MARKET DEMAND** in the U.S.

LARGEST
TOP 10
UNDERGRADUATE ENGINEERING PROGRAM

#4
GRADUATE ENGINEERING
in the U.S.

#7
IN THE U.S.
FOR PATENTS

Purdue University: The Heart of the Silicon Heartland

The Midwest is an exceptional source of talent, research, and research facilities — ready and able to address the nation's semiconductor challenge.

The Top 10 Universities in these Midwest States:

- Graduate more BS and PhD engineers than the top 10 universities in each of the semiconductor clusters in Oregon, California, Arizona, Texas or New York
- Include four of the nation's top 20 engineering programs
- Conduct over $1 billion of engineering research — more than the top 10 universities in Oregon, California, Arizona, Texas or New York

The Midwest is also Home to:

- Two national laboratories (Argonne National Laboratory and Fermilab)
- Air Force Research Laboratory and Naval Surface Warfare Center Crane
- DOW Silicon Crossroads Microelectronics Commons HUB
- Two imec U.S. sites (Purdue and Michigan)
- R1 network of five university semiconductor labs operating as one — Illinois, Michigan, Minnesota, Notre Dame, and Purdue



Semiconductors@Purdue

Semiconductors@Purdue is an integrated ecosystem built on a foundation of research and innovation, talent development, and partnerships. We partner with companies in all segments of the semiconductor industry, including leading-edge companies establishing facilities in the region.



Research and Innovation

Purdue's research and innovation programs partner with industry to address manufacturing, advanced packaging, chip design, and secure electronics.

Purdue Centers and Institutes:

- $70M-plus upgrade to Birck Nanotechnology Center (200mm tools, digital twins)
- Atalla Institute for Advanced System Integration and Packaging (ASIP)
- Center for Secure Microelectronics Ecosystem (CSME)
- Institute of Chips and AI (IChAI)



Birck Nanotechnology Center cleanroom

Funded Centers and Programs:

- Lilly Endowment Inc. award of $50M for Purdue Computes with $25M for semiconductors
- nanoHUB creates Chipshub with National Science Foundation (NSF) support, providing commercial Electronic Design Automation (EDA) tools for U.S. academic institutions
- $19M award from NSF for nanoHUB, Birck Nanotechnology Center, and MMRL to develop a programmable cloud laboratory that enables remote, AI-driven autonomous experimentation in semiconductor fabrication, expanding access to Birck's advanced cleanroom capabilities, called ICoN-PCL.



Launch of the Institute of Chips and AI

Talent Development



Interns from Purdue STARS and Purdue-Ivy Tech Chips programs

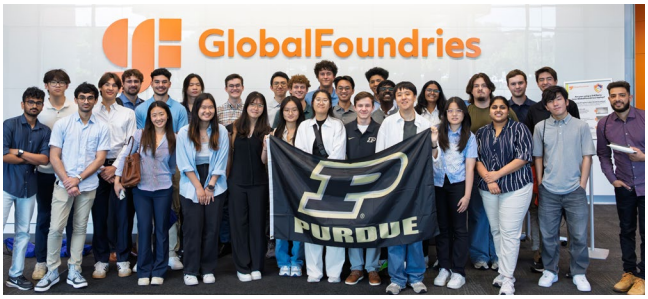
Purdue's workforce programs are guided and supported by industry to address all segments of the semiconductor ecosystem to meet the talent needs of local, regional, and national industry.

- First large-scale Semiconductor Degrees Program
- Guided by Semiconductor Degrees Leadership Board (40 leading companies)
- Programs to attract students into semiconductors (Changing the World with Chips, STARS)
- Experiential learning programs, including System-on-Chip Extension Technologies (SoCET), Semiconductors@Birck, Summer Undergratuate Research Fellowships (SURF), First-Time Researcher
- SCALE's 36-university national network with tech verticals relevant for defense and commercial leap-ahead technologies
- nanoHUB and Chipshub have served over 230,000 unique simulation users where over 93,000 were in formal classroom settings In the U.S. nanoHUB has server over 890 educational institutions

Partnerships with Leading Companies

Purdue has formed strategic partnerships with leading companies, such as GlobalFoundries, TSMC, ASML, Dassault Systémes, and others on research and workforce development.

- Joint/sponsored research projects
- Company-sponsored workforce programs
- Industry personnel engaged in programs



STARS interns at Purdue@GlobalFoundries Day

Developing Local Ecosystem

Purdue is leveraging our research, innovation, and talent development expertise to attract companies to the region and support their needs.

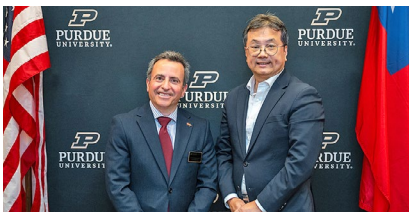
- MediaTek Semiconductor Design Center at Purdue
- Imec Innovation Hub at Purdue
- SK hynix advanced packaging manufacturing facility and R&D center, including supplier network



SK hynix announcement of advanced packaging facility in West Lafayette

Partnerships and Leadership

Purdue is developing strategic partnerships with countries, companies, and institutions to support a robust global supply chain.



Purdue and GCCS leaders sign semiconductor research and workforce development agreement

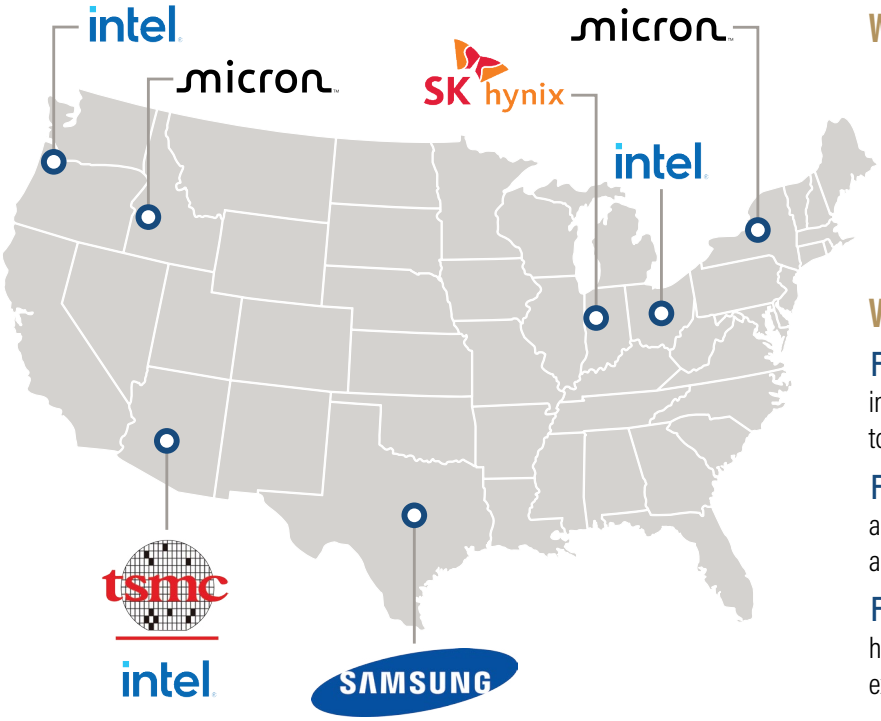
Major International Partnerships:

- UPWARDS U.S.–Japan partnership for workforce development
- MOU with Dominican Republic to bolster semiconductor industry and support near-shoring
- India-Purdue semiconductor alliance and Center for Education and Engagement
- MOU with National Yang Ming Chiao Tung University (NYCU) to co-develop online semiconductor curriculum
- MOU with GeChi Compound Semiconductor Co. (GCCS) to commercialize silicon carbide and strengthen semiconductor research and workforce development

Semiconductors@Purdue: Next Steps

Much has been accomplished since May 2022, when Purdue University announced its commitment to helping the nation address its semiconductor challenge. The stage is now set for even bigger opportunities.

The U.S. is now investing leading-edge manufacturing in only a few regions of the country. With the SK hynix advanced packaging and manufacturing and R&D facility, West Lafayette is the newest and is well positioned to tap the resources of the Midwest to succeed and grow.



What is a Semiconductor Cluster?

- Manufacturing
- Supply chain partners
- Design
- Research and innovation
- Startup ecosystem
- Talent development

Value Proposition:

For Indiana: High-value, high-paying jobs in a growing industry — from "brain drain" to "brain gain."

For Purdue: Opportunities for students and faculty to be part of a thriving, vibrant, and growing creative environment.

For the U.S.: An opportunity to tap the human talent, facilities, and manufacturing expertise of Indiana's Hard Tech Corridor.

SK hynix

MEDIATEK

imec

PURDUE UNIVERSITY

With SK hynix, the leader in memory for AI; MediaTek, a global leader in chip design; imec, the leading independent semiconductor R&D center; plus the assets of Purdue University, the nation's largest STEM university, the stage is set.

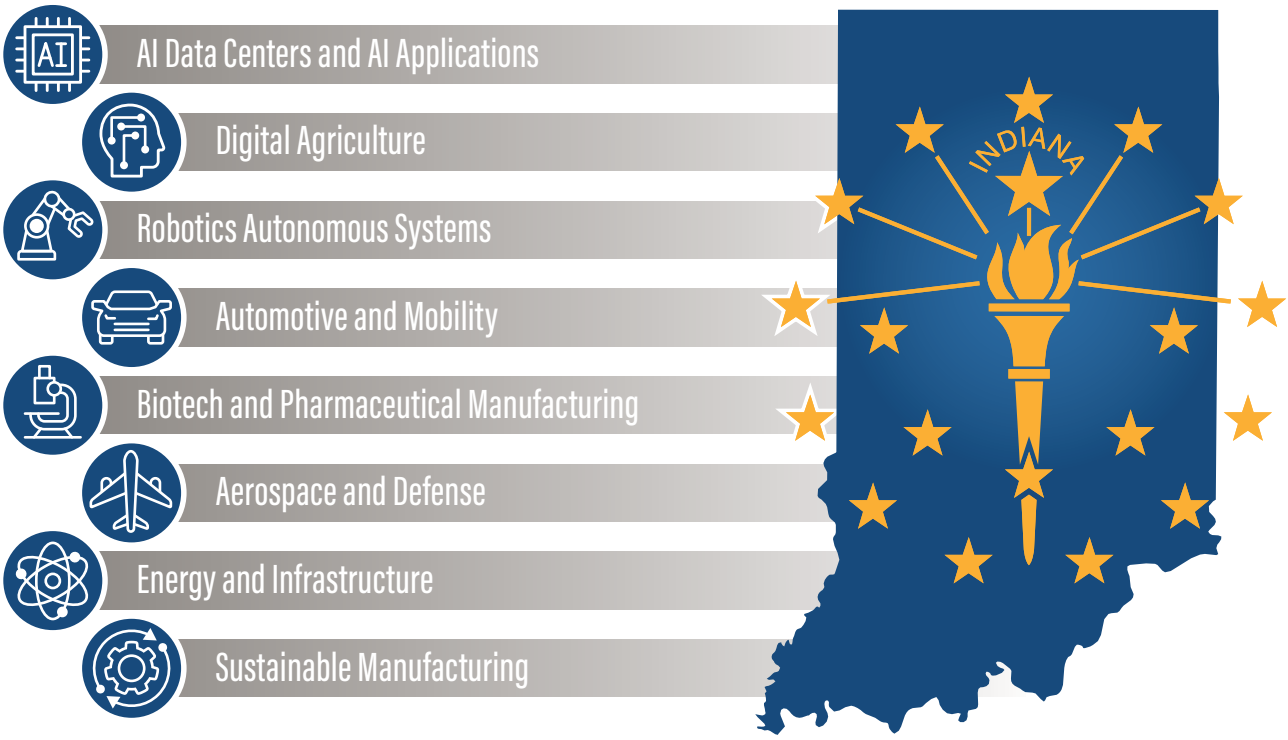
Anchored by Purdue University's West Lafayette location to the north and 16 Tech and Purdue in Indianapolis to the south, the Hard Tech Corridor begins and ends with world-class innovation.

Indiana's defense-aligned semiconductor ecosystem is centered around the Naval Surface Warfare Center Crane.



Semiconductors for Indiana: Next Steps

Semiconductors — the 21st century's new "oil" — is foundational to our nation's economic and national security. As a manufacturing powerhouse with the nation's most intensive manufacturing economy, semiconductor technology is especially critical to Indiana's future in AI-driven manufacturing.



Indiana is the nation's most manufacturing-intensive state. Over the next decade, artificial intelligence (AI), enabled by semiconductor technology, will reshape manufacturing.

With industry leaders in semiconductor design, manufacturing, and research for AI, Indiana is positioned to lead the nation in the AI-driven transformation to Industry 4.0.

SK hynix	Driving the future of AI as the global leader in high-bandwidth memory for AI
MEDIATEK	Enabling pervasive AI with chip hardware for AI "at the edge" — in homes, cars, on the person, and in the factory
imec	Helping corporate users of AI to harness the power of leading-edge semiconductor technologies for business-critical systems

An AI First Mover Leading the Global AI Memory Era

Founded in 1983, SK hynix is a South Korean company that manufactures and sells semiconductor memory chips. A part of SK Group, a multinational South Korean conglomerate, SK hynix is known for its technological advancements in memory solutions, particularly in AI and data center applications. As a leader in the global memory chip market, it specializes in Dynamic Random Access Memory (DRAM) and Not AND (NAND) flash memory and is also the leading producer of High Bandwidth Memory (HBM) for AI. Garner forecasts the global memory chip market revenue to grow from approximately $216 billion in 2025 to $633 billion in 2026 and $748 billion by 2027. The market for HBM — where SK hynix has a leading position with a 56.4% share — is also projected to grow from approximately $33 billion in 2025 to $86 billion in 2027.

Headquartered in Icheon, South Korea, and with more than 46,000 employees, the company also has facilities and offices across the globe. In the U.S., SK hynix has offices in Bellevue, Washington; Houston and Austin, Texas; and San Jose, California. Its facility in West Lafayette, Indiana, will be the newest and the first HBM advanced packaging fab in the U.S.



SK hynix manufactures DRAM, NAND flash memory, and enterprise solid-state drives, but the company is best known as a pioneer in the global AI memory industry, boasting strong leadership in HBM. Leveraging its technological edge, the company drives innovation across the AI memory landscape, playing a pivotal role in the broader AI ecosystem. SK hynix recently shipped samples of 12-high HBM4E featuring a maximum data processing speed of 16 Gbps per pin to major customers. With an annual revenue of $72 billion and a market cap of $1.54 trillion, SK hynix is the third largest semiconductor company globally and is on a strong growth trajectory driven by the exploding demand for AI memory, where it holds the No. 1 market share.

SK hynix recognizes social responsibility as an integral part of its operations. Its DBL (Double Bottom Line) management system pursues both economic and social value creation and balances these two values while gaining competitive advantages. Key aspects of social value for SK hynix include stakeholders' happiness, environmental responsibility, and social contribution activities.

With an annual revenue of $72 billion and a market cap of $1.54 trillion, SK hynix is the third largest semiconductor company globally and is on a strong growth trajectory driven by the exploding demand for AI memory, where it holds the No. 1 market share. Being located near Purdue, a major research university and leader in intellectual property generation, was a significant factor in selecting West Lafayette for the first SK hynix manufacturing facility and R&D lab in the U.S.



SK hynix Indiana will drive the AI memory landscape with advanced packaging manufacturing and R&D



In April 2024, SK hynix announced its plan to build an advanced packaging, fabrication, and R&D facility in the U.S. SK hynix's choice of West Lafayette as the construction site is not only due to its superior location but also its rich scientific research talent and resources. SK hynix is closely cooperating with top research institutions, such as Purdue, to jointly promote the R&D of AI memory technology. The company plans to rely on the new facility to mass-produce the next generation of HBM products, further consolidating its leading position in the global HBM market.

SK hynix's new facility will not only drive the innovation of the semiconductor industry but also create significant job opportunities locally. Approximately 1,000 jobs in production, management, and R&D will be created directly and many thousands more in the supporting supply chain, driving the development of related industrial chains and promoting regional economic prosperity.

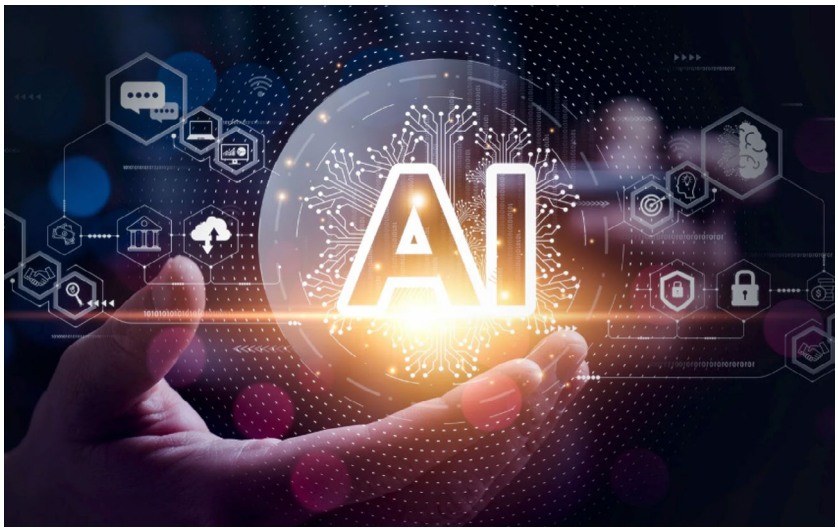
The location of the new facility adjacent to Purdue, the nation's largest STEM university, and close to Ivy Tech Community College, will provide a steady supply of talent as SK hynix operations grow. Research partnerships will leverage Purdue's Atalla Institute for Advanced System Integration and Packaging (ASIP), a 35-faculty institute for advanced packaging and heterogeneous integration, as well as Purdue's expertise in chip design for AI and the capabilities of the Birck Nanotechnology Center, with advanced packaging capabilities that are being upgraded with guidance from SK hynix.

"Our location here in the talent-rich heart of America's heartland will provide SK hynix with the people and research expertise to drive the development of AI and contribute to the prosperity and security of the U.S.," said Woong-Sun (William) Lee, senior vice president of SK hynix.

The construction of SK hynix's facility in Indiana is not only an important step in the company's own development strategy but also an important signal in the global semiconductor industry. As the project progresses, SK hynix is expected to achieve more breakthroughs in the field of AI memory and provide more advanced and efficient semiconductor products for global customers. The project will also inject new vitality into West Lafayette and the entire U.S. semiconductor industry, promoting the economic development and security of the U.S.

Leading the Generative AI Revolution

Founded in 1997, MediaTek is the world's fifth-largest chip design company and the only non-American company among the top 10 chip designers in the global semiconductor industry. As a public company headquartered in Hsinchu, Taiwan, with more than 20,000 employees and significant operations in more than 50 countries, MediaTek also plays an important role in supporting connectivity, compute platform, datacenter solutions, power management and the innovation ecosystem in the U.S.



MediaTek's dedication to innovation has positioned it as a driving market force in key technology areas, including mobile technologies, AI and high-performance computing, datacenter electronics, smart home, automotive solutions, and a broad range of advanced multimedia products such as smartphones, tablets, smart televisions, routers, and voice assistant devices. MediaTek is the leading supplier of chips for smartphones and has recently announced transformative technologies for intelligent cockpits to bring generative and agentic (i.e., autonomous) AI to the driving experience. MediaTek empowers and inspires people to expand their horizons and achieve their goals more easily and efficiently than ever before through smart technology. This is especially relevant to Indiana industries, such as pharmaceuticals, medical devices, automotive, agribusiness, space, defense, and more.

Now the second-largest publicly traded company in Taiwan behind TSMC, MediaTek is a critical player in the global 5G market and the mobile sector generally. With 2025 revenue of more than $19 billion, up from $11 billion in 2020, and more than 2 billion devices sold in the last year, MediaTek is on a strong growth trajectory driven by strides in innovation fueled by its commitment to R&D. The proximity to Purdue, a major research university and leader in IP generation, was a major factor in selecting West Lafayette.

Having operated in the U.S. for more than 20 years, MediaTek plays an important role in the U.S. semiconductor ecosystem, promoting secure and trusted technologies. Through this partnership, MediaTek is working closely with local universities like Purdue to foster education as well as growth in the R&D of critical new technologies that will be utilized in local design and manufacturing facilities. MediaTek is also honored to be the technology provider of choice to the most important American consumer device companies and to partner with these companies to create new devices that help Americans stay connected, healthy, and productive at work and play.

Global semiconductor design firm MediaTek moves operations to Indiana



Taiwanese semiconductor giant MediaTek announced in late June 2022 that it would partner with Purdue to create a new semiconductor design center within Discovery Park District at Purdue. The MediaTek-Purdue partnership, the company's first with a U.S. university, represents a new growth model for MediaTek USA at a time when most chip design operations are clustered on the East and West coasts. As companies continue to move operations inland, they're taking notice of what the Midwest, and particularly Indiana, has to offer. MediaTek is working with Purdue on a chip design focused on engineering education. It will also conduct joint research with Purdue in next-generation computing and communications chip design.

> *"Here in Indiana, we have access to some of the best engineering talent in the world. In addition to Purdue, West Lafayette is close to nearly a dozen of the top engineering schools in the country. Through this partnership, we see opportunities to apply our expertise in AI technologies to address the needs of local manufacturers."*



Kou-Hung Lawrence Loh
Corporate Senior Vice President of MediaTek
and President of MediaTek USA

> *"Attracting a world-class chip design firm to Indiana has been a longtime goal for our team. I applaud the Indiana Economic Development Corporation and, of course, the whole team here at Purdue for doing the hard work necessary to get a global company to take a look at Indiana and all we have to offer. The MediaTek investment confirms Indiana's emergence as a center of semiconductor technology and Purdue's Discovery Park District as the state's premier new economic engine."*
> (Quote is from 2022)



Mitch Daniels
Purdue University President (2013-22)
Purdue University Interim President (2026)

Imec is the world's leading independent research and innovation center in nanoelectronics and digital technologies. With a track record of 40 years in driving the semiconductor roadmap, imec has remained at the forefront of advancing chips to be smaller, faster, more affordable, and more sustainable. Every smartphone includes microchip technology invented by imec.

Imec research facilities in Leuven, Belgium



Imec was established with seed funding from the government of Flanders, the Dutch-speaking part of Belgium, with a population almost identical to Indiana's. It began with about 70 people led by Professor Roger Van Overstraeten of KU Leuven, and since that time, imec's facilities, programs, and research staff have become an essential component of the global semiconductor innovation ecosystem. Imec is a neutral ground where competitors collaborate in imec's state-of-the-art cleanrooms, which represent a $4 billion investment and house the world's most advanced collection of microchip processing equipment. In addition, the NanoIC pilot line, deployed under the European Chips Act, represents a €2.5 billion total investment to accelerate beyond-2nm semiconductor innovation, with support from the EU, the Government of Flanders, and industry partners.

The foundation of imec's strategy and success is reflected in its collaborative ecosystem of global industry partners, startups, universities, and research institutions. Imec's global team of more than 6,500 scientists, engineers, and innovators works with this ecosystem to bridge the gap between academia and industry, facilitating the rapid transfer of knowledge and technology from the research lab to the market. This means companies can develop disruptive industry-relevant solutions faster than ever before.

What sets imec apart is the combination of expertise in advanced semiconductor technology with in-depth data and AI knowledge. While microchip technology is at the core of what imec does, its impact extends significantly across key application domains. The research center plays a vital role in advancing innovation in computing, health, automotive, industry, consumer electronics, aerospace, security, energy, and agrifood.

Imec is all about tangible impact. Alongside R&D collaborations, imec offers easy access to chip development, prototyping, and production services. We're committed to stimulating entrepreneurship and kick-starting remarkable technology startups.

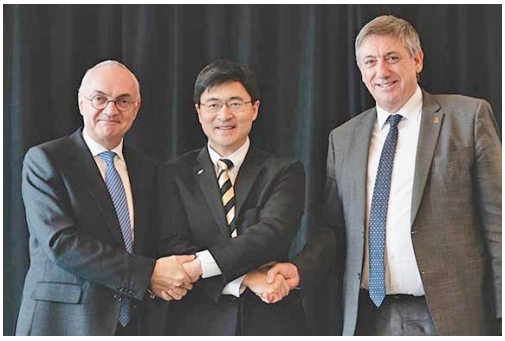
With headquarters in Leuven, Belgium, imec has research sites across Europe, the United States, and a growing presence around the world. One of its newest U.S. research sites is at Purdue's West Lafayette location.

Imec's Indiana R&D Center, located at Purdue, is a key component in the core research of the world's premier independent semiconductor R&D organization and brings high-paying, high-value jobs to Indiana while supporting Indiana's critical industries — from large to small.

Global leader in semiconductor research and innovation, imec opens R&D center in Indiana



Imec plays a crucial role in the industry's success by fostering collaboration across the ecosystem. Through deep and locally integrated partnerships, imec aims to ensure that tomorrow's technology meets society's needs. Imec's collaboration with Purdue, a powerhouse of semiconductor research for almost a century, aligns perfectly with this approach.



In May 2023, the state of Indiana and imec announced a partnership that laid the foundation for a groundbreaking transatlantic collaboration in semiconductor research and development, accelerating innovation across Indiana's key industries. The partnership brings together world-class expertise and state-of-the-art technology with the exchange of students, faculty, and professionals between Indiana and Belgium to foster collaborative research and innovation. In December 2023, imec President and CEO Luc Van den hove, Purdue President Mung Chiang, and Flemish Deputy Prime Minister Jan Jambon formally launched an ambitious research program that began with four programs targeting advanced semiconductor development.

The imec-Purdue partnership:

Four programs setting the stage for semiconductor development in Indiana:

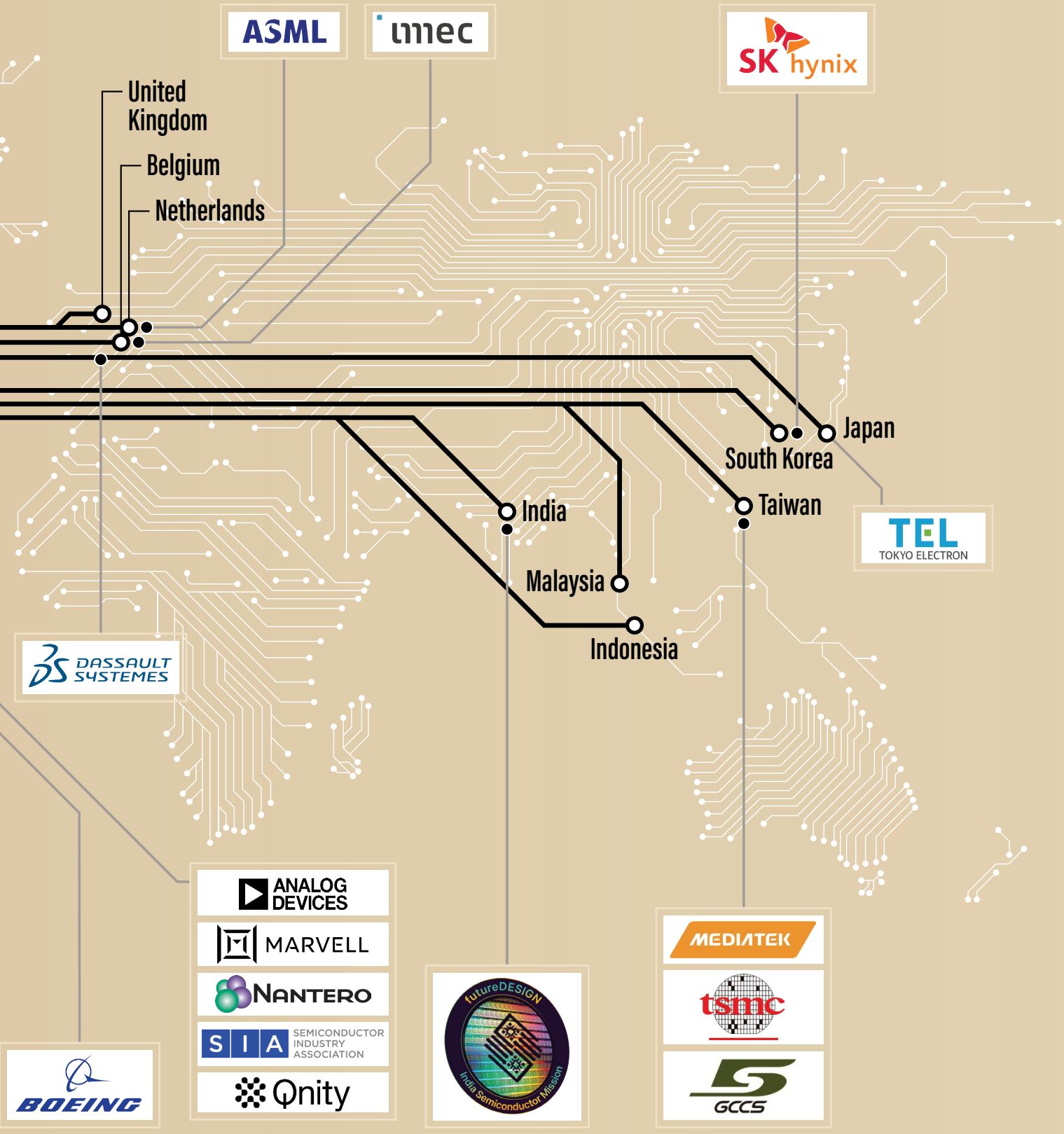
1. 2D Materials for exploratory advanced logic
2. Advanced packaging
3. Advanced memory architectures for compute
4. Sustainable semiconductor manufacturing

> *"What makes this partnership so powerful is the opportunity to connect research, talent, and industry in ways that create lasting impact. Together, imec and Purdue are advancing semiconductor innovation while helping develop the next generation of engineers, researchers, and technology leaders who will shape the future of this industry."*

Jim Foresi
Director of imec's West Lafayette, IN and Ann Arbor, MI R&D Centers




skywater
Entegris
TERADYNE
Microsoft
Micron
GlobalFoundries
IBM
AMD
APPLIED MATERIALS
cadence
chipfoundry
CISCO
intel
Lam RESEARCH
NVIDIA
SANDISK
semi
SYNOPSYS
United States
Mexico
Dominican Republic
Costa Rica
Panama
Qualcomm
onsemi
Amkor Technology
MICROCHIP
RTX
tsmc
L3HARRIS
Air Liquide
Texas Instruments
mySilicon Compass

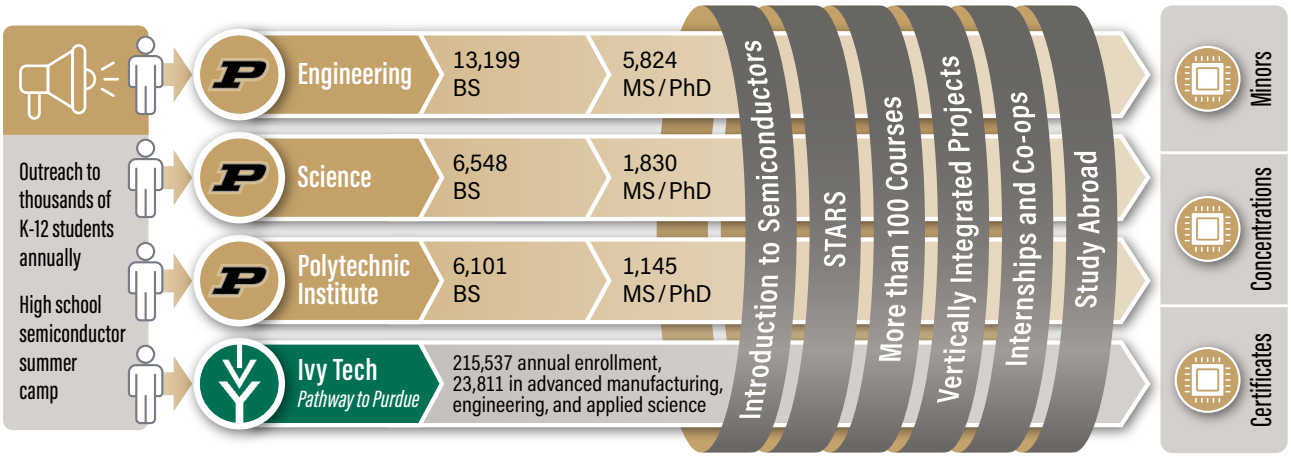


Purdue International Semiconductor Partnerships

Workforce Development at Purdue

Semiconductor Degrees Program (SDP)

Industry-Focused, Industry-Guided, Industry-Engaged



- Purdue figures include Purdue West Lafayette and Purdue Indianapolis.
- Purdue conferred **9,565** degrees to engineering, science, and Polytechnic Institute students in academic year 2025-26.

Purdue's SDP, founded in 2022, is the first large-scale semiconductor degrees program in the U.S. To establish and guide the program, we engaged technical leaders from 40 top companies on our Semiconductor Degrees Leadership Board. To address the key question of "can we attract large student interest?," we created the Changing the World with Chips course and Student Training on Awareness and Readiness for Semiconductors (STARS) program. We created multisemester team project courses, leveraging our Vertically Integrated Projects (VIP) framework, with focuses in chip design (System-on-Chip Extension Technology) and manufacturing/advanced packaging (Semiconductors@Birck). Internships, co-ops, and study abroad programs, along with the project courses, engage students with industry-relevant topics. Our online MS/certificate programs serve working professionals to help them develop skills for advancement and career mobility. Partnerships with the Ivy Tech Community College network provide stackable certificates and pathways to BS programs.

The answer to the question of "can we attract interest?" has been a resounding "yes," with over 350 students per year participating in an experiential learning program and over 500 students pursuing or having completed a campuswide semiconductor certificate, a department-specific concentration or SCALE programs. Purdue's SDP is leading the way in developing talent for the semiconductor industry.



The 2025 Semiconductor Career Fair attracted 21 top companies and 800 students

Changing the World with Chips

In 2023, Purdue's Office of Professional Practice created ENGR 10301 (Changing the World with Chips) course, which serves first-year students. Each semester, the course brings high-level experts to present overviews of the industry and highlight career pathways. Over 900 students have taken the course to date.

Team Project Courses/Programs in Chip Design and Manufacturing

Team-based experiential learning programs allow students to build industry-relevant technical and professional skills. Company partners enable hands-on programs through financial sponsorship and participation in project definition and team mentoring.



Students receiving training on a deposition tool inside the Scrifes Cleanroom

The Summer Training and Readiness in Semiconductors (STARS) program has been transformed from a summer internship into "Intro" courses to increase capacity (200+ students/year) and prepare students for multi-semester team projects and internships. Intro courses on chip design/tape-out and manufacturing/ advanced packaging include hands-on modules.

Semiconductor-focused teams in Purdue's VIP courses allow students to earn academic credit while engaging in multsemester research and design projects. The VIP team structure provides leadership and project management experience, as returning students mentor and guide new members.

The Semiconductors@Birck VIP course involves projects in semiconductor manufacturing and advanced packaging, including fabrication in the Birck Nanotechnology Center cleanroom, characterization, and statistical process control. A new Virtual Twins@Birck course is preparing students to develop and apply digital twins, which can accelerate process development and enable training at a larger scale than possible using physical laboratories.

The Purdue System-on-Chip Extension Technologies (SoCET) VIP course gives students hands-on experience with a fully developed, industry-quality, system-on-a-chip design flow. SoCET was founded in 2012 by Matthew Swabey, assistant professor of engineering practice, and Mark Johnson, senior lecturer, with 15 students. Currently 240 students strong, members of the group engage with commercial design tools to design processor chips that are prepared and fabricated at foundries. Numerous SoCET alumni can be found at many of the biggest names in chip design and fabrication including AMD, Apple, Intel, Meta, Nvidia, Texas Instruments, and Qualcomm as well as variety of defense contractors, national labs, and Department of War (DOW) engineering facilities.

Semiconductor Student Alliance

Purdue students established the first chapter of the Semiconductor Student Alliance (SSA) and are helping to establish chapters at other institutions. SSA facilitates student involvement in semiconductor-related programs, including educational modules, mini-conferences and leadership opportunities.

Semiconductor Ambassadors

In partnership with SSA, Semiconductors@Purdue has established a student ambassadors program. The ambassadors will represent our programs at events involving companies, student organizations and public outreach.

Workforce Development at Purdue *(Cont'd)*



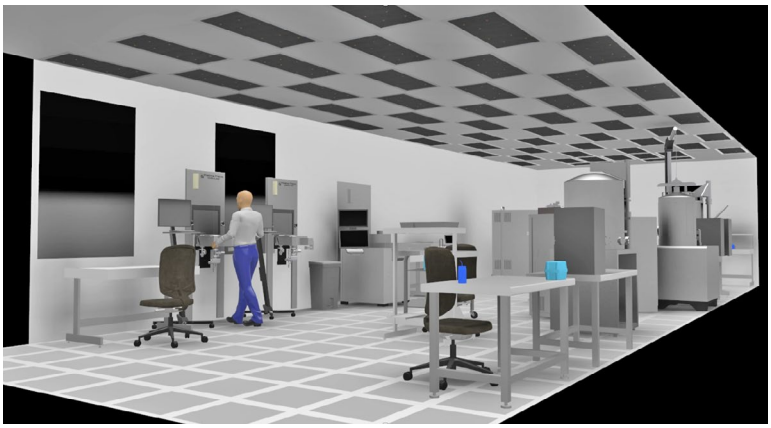
"We're seeing a robust ecosystem develop on campus, with students becoming engaged as freshmen, participation in focused courses and extended projects, integrating insights and skills from internships, and graduating ready to contribute to the innovation-driven industry. Companies are guiding and engaging in our efforts to develop strong programs and to leverage our programs into regional and national leadership in semiconductor talent development. It's an exciting time to be at Purdue."

David Janes, Professor of Electrical and Computer Engineering, Director of the Semiconductor Degrees Program (SDP), and Dean's Faculty Fellow for Semiconductors@Purdue

2025-30 Talent Development Strategy/Goals

Excellence at Scale in Workforce Development for Local, Regional, and National Needs

- Serve as a major talent provider and trainer for companies across the country
- Involvement of companies in guiding, supporting, and developing programs
- Partnerships with universities, community college networks, and industry associations, which leverage our programs, curricula, facilities, and expertise
- Semiconductor-specific courses/ experiential learning to enhance fundamental curricula across industry-relevant disciplines



Creating digital twins for Scifres cleanroom operation and processing equipment

- Large-scale dissemination of course modules and virtual versions of hands-on experiential learning, utilizing digital twins of industry-relevant process tools and commercial design tools/curricula on nanoHUB/Chipshub



"In three years, Purdue's SDP has, besides knowledge transfer, galvanized a new generation of talent to be passionate about semiconductors. And this is exactly what our nation needs. Let's continue to work together to take the SDP to new heights."

Anthony Yen, Co-Chair of Purdue's Semiconductor Degrees Leadership Board, Head of Technology Development Center at ASML, and Distinguished Adjunct Professor at Purdue



"Skilled talent is foundational to the future of technology. Purdue's SDP proves that when education and industry unite, it is a multiplier to inspire and attract the next generation of semiconductor leaders. Thank you for the excellent progress, and lots more opportunities ahead."

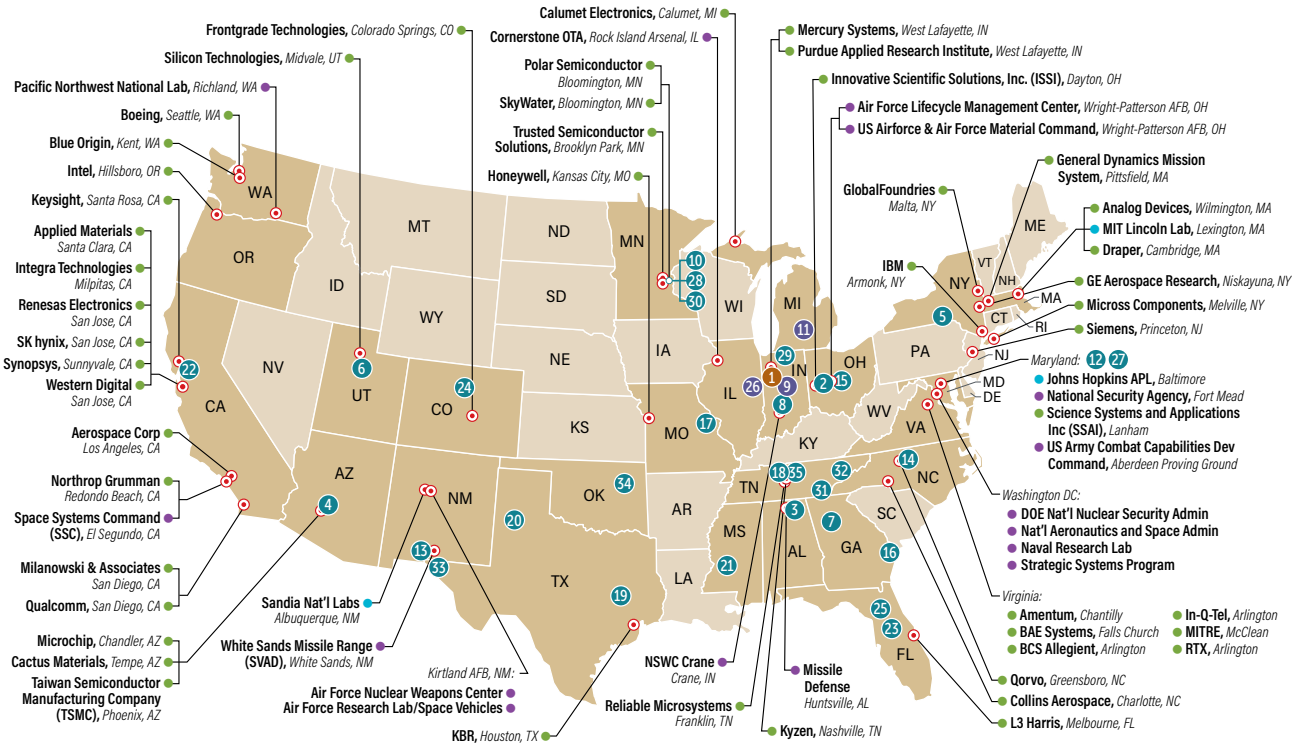
Keyvan Esfarjani, Co-Chair of Purdue's Semiconductor Degrees Leadership Board and Former Intel EVP/Chief Global Operations Officer

SCALE
SCalable Asymmetric Lifecycle Engagement

A National Consortium to Develop a Highly Trained U.S. Workforce for Microelectronics Careers

As the demand for a highly skilled semiconductor workforce continues to grow, Purdue University is leading a national effort to prepare the next generation of talent through SCALE (SCalable Asymmetric Lifecycle Engagement). The consortium brings together 36 colleges and universities with nearly 80 industry and government partners to provide students with hands-on learning, research experiences and direct pathways into careers supporting the nation's microelectronics ecosystem. Since its launch, SCALE has trained nearly 1,800 U.S. citizen students and expanded its reach through employer-informed coursework that has engaged more than 15,000 students nationwide. The program also has developed more than 450 educational resources available through nanoHUB, helping broaden access to semiconductor education across the country. Today, about 80% of SCALE participants enter the semiconductor workforce or continue to graduate school, underscoring the program's impact on strengthening America's microelectronics talent.

SCALE Partner Network



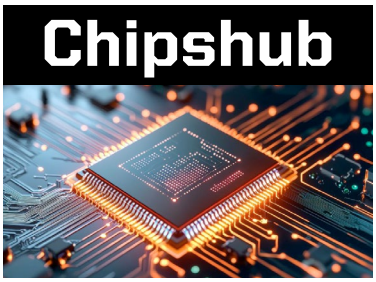
Partners →

1. **Purdue University,** *West Lafayette, IN* (HI/AP, RH, SoC, CSME)
2. **Air Force Institute of Technology,** *Wright-Patterson AFB, OH* (RH)
3. **Alabama A&M University,** *Huntsville, AL* (RH)
4. **Arizona State University,** *Tempe, AZ* (HI/AP, RH, CSME)
5. **Binghamton University,** *Binghamton, NY* (HI/AP)
6. **Brigham Young University,** *Provo, UT* (RH)
7. **Georgia Institute of Technology,** *Atlanta, GA* (HI/AP, RH, SoC, CSME)
8. **Indiana University,** *Bloomington, IN* (ESS/TAI, SoC)
9. **Ivy Tech Community College,** *West Lafayette, IN* (SoC)
10. **Metropolitan State University,** *St. Paul, MN* (RH)
11. **Michigan State University,** *East Lansing, MI*
12. **Morgan State University,** *Baltimore, MD* (SoC)
13. **New Mexico State University,** *Las Cruces, NM* (RH)
14. **North Carolina A&T State University,** *Greensboro, NC* (RH)
15. **Ohio State University,** *Columbus, OH* (SoC)
16. **Savannah State University,** *Savannah, GA* (RH)
17. **St. Louis University,** *St. Louis, MO* (RH)
18. **Tennessee State University,** *Nashville, TN* (RH)
19. **Texas A&M University,** *Commerce, TX* (CSME)
20. **Texas Tech University,** *Lubbock, TX* (CS)
21. **Tougaloo College,** *Tougaloo, MS* (RH)
22. **University of California,** *Berkeley, CA* (SoC)
23. **University of Central Florida,** *Orlando, FL* (HI/AP, CSME)
24. **University of Colorado Boulder,** *Boulder, CO* (CS)
25. **University of Florida,** *Gainesville, FL* (HI/AP, CSME)
26. **University of Illinois Urbana-Champaign,** *Champaign, IL*
27. **University of Maryland,** *College Park, MD* (RH)
28. **University of Minnesota,** *Minneapolis, MN* (RH)
29. **University of Notre Dame,** *South Bend, IN* (ESS/TAI)
30. **University of St. Thomas,** *Minneapolis, MN* (RH)
31. **University of Tennessee,** *Chattanooga, TN* (RH)
32. **University of Tennessee,** *Knoxville, TN*
33. **University of Texas at El Paso,** *El Paso, TX* (HI/AP)
34. **University of Tulsa,** *Tulsa, OK* (ESS/TAI)
35. **Vanderbilt University,** *Nashville, TN* (RH)

Institution Topic Areas →
(ESS/TAI) = Embedded Systems Security/Trusted AI
(HI/AP) = Heterogeneous Integration/Advanced Packaging
(RH) = Radiation Hardened
(CS) = Compound Semi
(SoC) = System on Chip
(CSME) = Center for Secure Microelectronics Ecosystem

Partner Type →
SCALE and ME Commmons Partner Universities
SCALE Partner Universities
ME Commons Partner Universities

Research and Innovation at Purdue



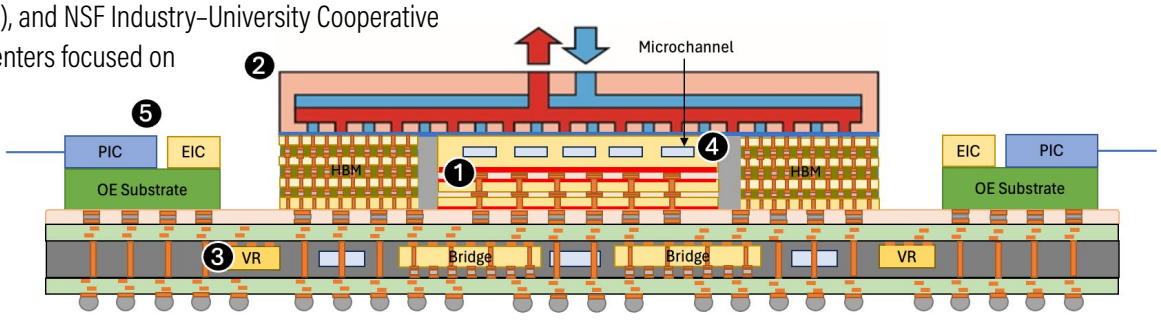
Chipshub Purdue

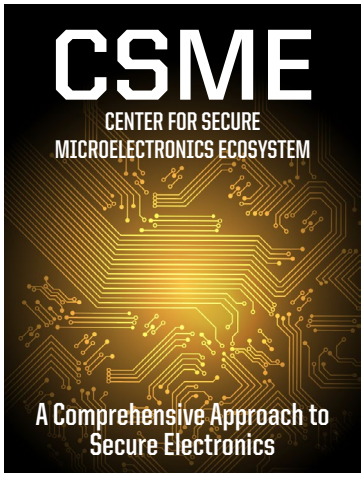
In a significant step forward for Semiconductors@Purdue, the U.S. National Science Foundation (NSF) selected the Purdue-led Chipshub, powered by Purdue's groundbreaking nanoHUB, to support chip design teaching and research for all educational institutions across the U.S. Chipshub's vision is "Chipdesign for every student everywhere". This newly designated NSF Chip Design Hub will install, deploy for access, and support Electronic Design Automation (EDA) tools for the educational semiconductor community and reduce barriers for entry. The hub's academic team will also develop curricula for students at a variety of different kinds of universities and colleges. Prominent EDA vendors, such as Cadence, Synopsys, Siemens, Keysight, Ansys, and Luceda, will supply free licenses to enable any U.S. higher education institution to perform chip design on Chipshub. A large set of Synopsys, Cadence, and Silvaco tools are already installed on Chipshub and have served over 1,590 users in the U.S. in the academic year 25/26. 715 users were in formal classes while the majority of users were engaged in open self-study efforts. Fifteen Institutions used Chipshub in formal classes using TCAD and EDA tools. The five-year goal is to expand academic classroom use to 100 universities, with the NSF Chip Design Hub open to all U.S. institutions of higher learning. For more information, contact Professor Gerhard Klimeck, Elmore Professor of Electrical and Computer Engineering (gekco@purdue.edu).

SPARC-INSPIRE

Purdue University led a group of five universities that received a three-year $4 million award for advanced packaging research under the newly created Semiconductors and Advanced Packaging Research Consortium (SPARC) by the Semiconductors Research Corporation (SRC). The industrial sponsors of SPARC include IBM, Intel, MediaTek, Micron, SK hynix, Samsung, and Tokyo Electron. The Purdue-led proposal, one of three selected in the inaugural round of SPARC, is titled INSPIRE: INnovation in System Packaging and Integration REsearch. The objective of INSPIRE is to provide innovative research solutions in advanced packaging for system level integration through five technical priority projects that reflect system integration challenges identified across the semiconductor industry: hybrid bonding for 3D integration, system design space exploration, power conversion and delivery, thermal solutions, and photonics integration. The five priority areas of INSPIRE are interlinked and progress system-level industry targets through a scalable reference architecture.

INSPIRE is executed by a highly accomplished, multidisciplinary team. Ganesh Subbarayan (Purdue) leads the team with co-investigators: Dan Jiao, Nikhilesh Chawla, and Justin Weibel (Purdue); Madhavan Swaminathan (Penn State); Kanad Ghose and Bahgat Sammakia (SUNY-Binghamton); Subramanian Iyer (UCLA); and Sachin Sapatnekar (U. Minnesota). The investigators collectively bring leadership experience directing major national programs and industry engaged research centers, such as the U.S. CHIPS R&D National Advanced Packaging Manufacturing Program, SRC funded centers (CHIRP and CHIMES), and NSF Industry–University Cooperative Research Centers focused on electronics cooling and energy efficiency (CTRC and ES2).





SCALE
SCalable Asymmetric Lifecycle Engagement
Developing the U.S. Defense Microelectronics Workforce

MEDIATEK

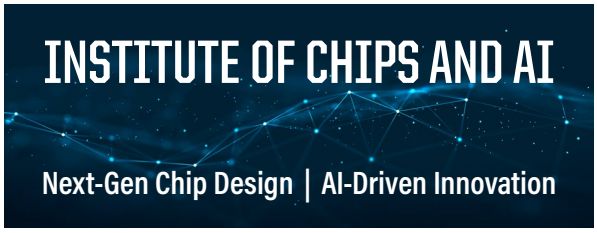
SYNOPSYS®

tsmc

CSME

The Center for Secure Microelectronics Ecosystem (CSME) is a first-of-its-kind global partnership between industry, academia, and the U.S. government to advance the field of secure microelectronics. CSME's mission is to help ensure a secure supply of semiconductor chips and related products and tools, from the foundry to the packaged system. CSME research addresses security concerns across the entire semiconductor lifecycle from design to fabrication, assembly, distribution, and end-of-life. CSME is also training a new generation of workforce that is equipped to address the challenges of secure microelectronics. To ensure that the center leverages leading academic talent to achieve impact, CSME brings together seven academic institutions across the U.S. to collaboratively pursue common research goals and deliver solutions to complex problems that go beyond the typical research efforts in a university.

CSME was launched with anchor industry partner, TSMC, and the DOW-supported Scalable Asymmetric Lifecycle Engagement (SCALE) microelectronics workforce development program. Synopsys, a U.S.-based global leader in EDA and semiconductor intellectual property, is the consortium's founding EDA member. MediaTek, a global leader in chip design, is the first fabless design company to join CSME. For more information, contact CSME co-directors Anand Raghunathan, the Silicon Valley Professor of Electrical and Computer Engineering (raghunathan@purdue.edu), and Joerg Appenzeller, the Barry M. and Patricia L. Epstein Professor of Electrical and Computer Engineering (appenzeller@purdue.edu).



IChAI

Purdue's Institute of CHIPS and AI (IChAI) is at the forefront of a transformative era where chip design and artificial intelligence converge. IChAI's mission is to harness innovative chip technology to power the future of AI while leveraging AI itself to streamline and enhance chip design processes. This virtuous cycle drives cutting-edge advancements while also addressing the growing complexities and costs associated with developing state-of-the-art semiconductors. IChAI brings together experts from machine learning, computational neuroscience, theoretical computer science, integrated circuits and systems, distributed computing, robotics, and autonomous systems to pursue improvements in cognitive systems that are difficult for these communities to achieve independently.

Backed by a rich history of excellence in both AI and chip research with over 50 PhD graduates making significant contributions in academia and industry, IChAI builds on a legacy of groundbreaking projects such as the Semiconductor Research Corporation (SRC)/Defense Advanced Research Projects Agency (DARPA) Center for Brain-Inspired Computing. Closely connected with its research agenda is an innovative educational program at the intersection of AI algorithms and hardware that addresses students in academia and industry, is guided by a top-tier alumni advisory board, and is delivered by some of the world's top experts. For more information, contact Kaushik Roy, IChAI director and the Edward G. Tiedemann, Jr. Distinguished Professor of Electrical and Computer Engineering (kaushik@purdue.edu), and Anand Raghunathan, IChAI co-director and the Silicon Valley Professor of Electrical and Computer Engineering (raghunathan@purdue.edu).

Website: CHIPSandAI.org

The Atalla Institute for Advanced System Integration and Packaging (ASIP)



Ganesh Subbarayan
Director, ASIP

The Atalla Institute for Advanced System Integration and Packaging will be fundamental to cost and power efficient implementations of next-generation Artificial Intelligence (AI), High Performance Computing (HPC) and communication systems. Three bottlenecks currently limit integrating chips into systems: increasing cost of manufacturing with advancing fabrication technology nodes for chips of the same size; the technological limits on speed of communication between processors and memory; and the throttling of processor performance due to the inability to adequately cool the chips. Advanced packaging in general provides cost-effective solutions to the above challenges. A new challenge in the emerging AI era is the exponential increase in energy consumption for machine learning workloads as AI model sizes exceed tens of trillions of parameters. This in turn has necessitated seemingly insatiable demands for large data communication between the processor and memory. Nascent chip stacking technologies that shorten wire lengths between processors and memory through three-dimensional integration are expected to be key to achieving energy efficiency in AI modules.

ASIP is building a new consortium that is bringing together globally pre-eminent memory and processor design and fabrication companies, fabless system integrators, equipment vendors, inspection tool developers, materials suppliers, electronic design automation (EDA) tool companies, Outsourced Semiconductor Assembly and Test (OSAT) providers, and university researchers to develop advanced system integration and packaging solutions for future computing and communication systems. In addition to the industry members, other strategic partners of ASIP include international leaders such as imec and Global Electronic Association. ASIP researchers address design and fabrication challenges including optimal chip placement for performance and power delivery, assuring signal and power integrity, choice of interconnect materials and processes, best thermal solutions, and assessments of reliability, sustainability, testability, and security. More than 35 faculty researchers address the advanced packaging challenges at ASIP — the largest such grouping in a U.S. university! For more information, contact Ganesh Subbarayan, the James G. Dwyer Professor of Mechanical Engineering and Director of ASIP (ganeshs@purdue.edu).

PURDUE UNIVERSITY ASIP
Atalla Institute for Advanced System Integration and Packaging

> *"Purdue University is home to one of the nation's largest and most diverse groups of faculty researchers in advanced packaging, backed by more than three decades of sustained excellence in the field. This depth of expertise uniquely positions Purdue to address both the research challenges and workforce needs of the AI era."*
>
> **Dr. Ravi Mahajan,** Member NAE, Intel Fellow, Assembly and Test Technology Pathfinding, Intel Corporation

> *"We greatly value R&D engagement with Purdue in advanced packaging — it is critical to our mission in West Lafayette."*
>
> **Dr. Jaesik Lee,** VP Package Engineering, SK hynix

The Birck Nanotechnology Center and Scifres Nanofabrication Laboratory



Zhihong Chen
Director,
Birck Nanotechnology Center

An Academic Research Facility Built to Partner with Industry

For two decades, Birck has provided an extraordinary environment where partnerships flourish, innovation thrives, and the engineers and researchers of the future are trained.

Birck's 25,000-square-foot Scifres cleanroom is complemented by 33,000 square feet of specialized characterization laboratories. Hundreds of researchers from across the university and beyond make use of Birck. With recent support from Purdue, Lilly Endowment Inc., and the Silicon Crossroads Microelectronics Commons Hub, more than $70 million is being invested in facility upgrades and new processing and metrology tools to better support the nation's critical need to address the lab-to-fab challenge and accelerate the pace of innovation.

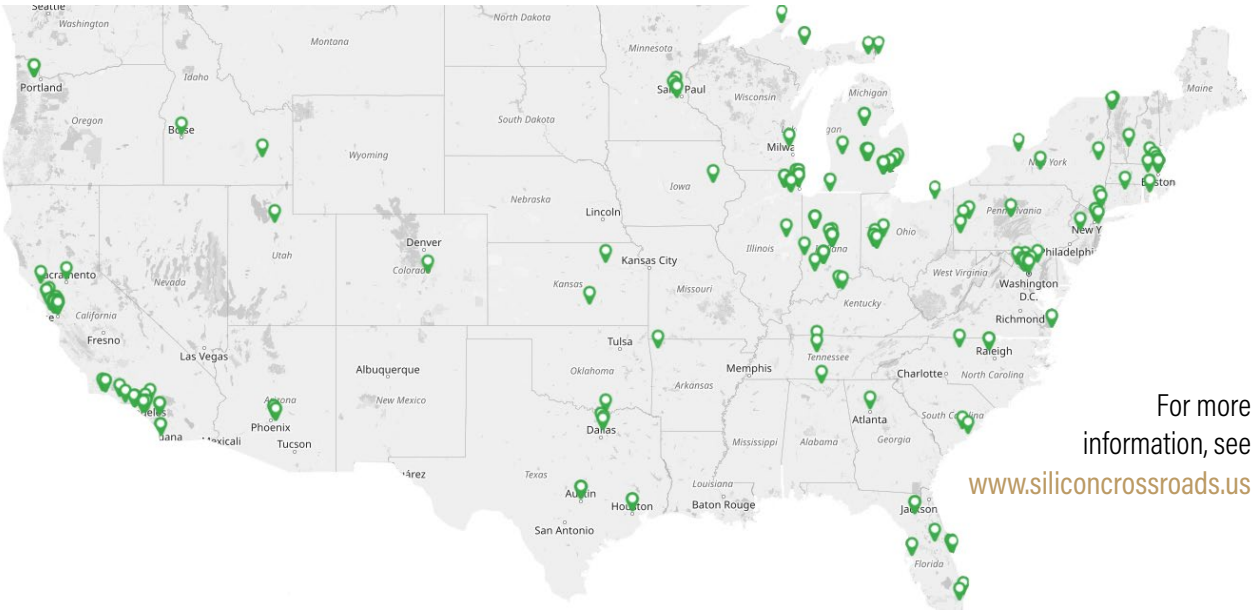
As we look to the next 20 years, we see the Birck Center and Scifres Lab playing an important role in the nation's research infrastructure by supporting fundamental and translational research that engages industry and academic partners. Our vision for this first-of-its-kind AI- and digital twin-enabled facility is summarized below. It includes a physical side to transition advances from 200mm tools in Birck to 300mm capabilities for manufacturing. The physical side is supported with an AI/digital twin capability to accelerate the pace of research and to support workforce development.



Innovation, Infrastructure, and Workforce Development

The Silicon Crossroads Microelectronics Commons Hub, led by the Applied Research Institute, was awarded in September 2023, through the Departrment of War (DOW), as one of the eight Microelectronics Commons Hubs awarded through the CHIPS and Science Act of 2022.

Building off its core foundation of Indiana, Illinois, and Michigan, Silicon Crossroads now boasts a nationwide membership of 282 innovators, transition owners, academic leaders, Defense Industrial Base (DIB) partners, government program managers, and prototyping/manufacturing facilities that are accelerating microelectronics development. Silicon Crossroads is a microelectronics asset; its headquarters in America's heartland is a testament of the region's commitment to accelerating microelectronics to strengthen the nation's mission.



For more information, see www.siliconcrossroads.us

The DOW invested $2 billion in the Microelectronics Commons initiative through the CHIPS and Science Act. This initiative, designed to strengthen the United States' national capabilities by onshoring the infrastructure (physical, digital, and human) required for microelectronics prototyping across six DOW-critical technology areas. Microelectronics Commons is focused on creating a national network for onshoring microelectronics, hardware prototyping, lab-to-fab transition of semiconductor technologies, and semiconductor workforce training.

The Silicon Crossroads Hub is supported through its members. Purdue continues to be a strategic partner for the hub as it completes its first years of execution. The university leads a technical project funded through the hub and has fabrication assets located at the Birck Nanotechnology Center, a state-of-the-art cleanroom that supports advanced research and prototyping in microelectronics, nanotechnology, and semiconductor device fabrication. This facility is accessible to the membership through the R1 network.

PURDUE
APPLIED RESEARCH INSTITUTE

Defense-Aligned Microelectronics Innovation



WestGate Academy, located in Odon, Indiana

Purdue supports Indiana's rapidly growing microelectronics ecosystem by advancing research, workforce, and industry engagement in support of U.S. national security. Through Purdue's management of WestGate Academy and the expanding ecosystem at WestGate@Crane Technology Park, the university is helping establish Indiana as a national leader in defense-aligned microelectronics innovation.

The PARI Microelectronics Lab (PML) bridges university research with real-world defense applications. PML leverages faculty, students, and dedicated research staff to accelerate the path from discovery to impact. Core focus areas include microelectronics for extreme environments (radiation-hardened, cryogenic, and high temperature), advanced packaging, modeling and simulation, integrated photonics, compound semiconductors, and device test and characterization. Working closely with Naval Surface Warfare Center (NSWC) Crane and the Defense Industrial Base, PML provides technology identification, maturation, and advisory functions, while facilitating access to state-of-the-art test facilities and creating hands-on opportunities for graduate engagement.

Complementing PML, WestGate Academy serves as the gateway to the defense by acting as a concierge to NSWC Crane industry partners; Purdue Research Foundation and Purdue University engage through the academy to build collaboration and growth opportunities. The academy also houses the Silicon Crossroads Microelectronics Commons Hub, fostering high-tech solutions for the warfighter and supporting partnerships with CACI, Amentum, Kratos Defense, and NHanced Semiconductor — whose new semiconductor packaging facility represents a major milestone for the region. Additionally, the academy provides an unprecedented off-site hub for NSWC Crane's workforce development team and supports pipeline initiatives such as the SCALE, K-12 semiconductor programs, and the Summer Intern Programming Series.

WestGate@Crane Technology Park is a national model for defense-aligned innovation. With NSWC Crane serving as contract lead for the $2 billion Microelectronics Commons program, WestGate@Crane connects defense, academia, and industry in powerful new ways. The park is home to more than 60 organizations and 1,000 employees, ranging from startups to Fortune 500 firms, and it continues to attract strategic investment. In 2025, new construction and major renovations have expanded capacity for the microelectronics sector, building on earlier growth by NHanced Semiconductors, Reliable Microsystems, Draper, and Trusted Semiconductor Solutions.

Together, Purdue, PARI Microelectronics Lab, Purdue Research Foundation, and the WestGate@Crane Technology Park drive forward a comprehensive microelectronics ecosystem that strengthens U.S. innovation, workforce, and defense readiness.

For more information, contact the director of PML, Darren Crum (djcrum@purdue.edu).

Global Semiconductor Partnerships:
Purdue's Worldwide Impact

As America's semiconductor university, Purdue is making giant leaps for global impact in semiconductors.

By forging high-impact partnerships with governments, universities, and industry leaders across Asia, Europe, and Latin America, Purdue is driving innovation, powering research breakthroughs, building talent pipelines, and strengthening the global semiconductor ecosystem.

India and Asia | India is vital to Purdue's semiconductor strategy. From a landmark alliance with the government of India to joint R&D programs and dual-degree offerings with leading academic partners, Purdue is helping shape the future of India's chip economy.

Anchoring this momentum is the new U.S.-India Center of Excellence in Semiconductors (CES), centerpiece of the INDUS-CHIPS alliance. The announcement, with U.S. Sen. Todd Young and U.S. ambassador to India Eric Garcetti in attendance, marked a major step in bilateral collaboration. CES will unite academia, industry, and government to accelerate advances from chip design to advanced packaging — serving as a model for partnership. Purdue is also investing in talent pipelines: Multiple cohorts of Indian students have completed hands-on research at the Birck Nanotechnology Center, with more expected.

Across Asia, Purdue is broadening its reach. A new summer bootcamp program will welcome South Korean students for intensive training in advanced chip design. The Center for a Secure Microelectronics Ecosystem (CSME) has also welcomed MediaTek as a member alongside TSMC and Synopsys to tackle design and supply chain security challenges.

UPWARDS Network | Purdue is a founding member of the U.S.-Japan University Partnership for Workforce Advancement and Research & Development in Semiconductors (UPWARDS), launched in 2023 by Micron, Tokyo Electron, and NSF. Partnering with 10 universities in the U.S. and Japan, Purdue helps build industry-aligned curricula, expand opportunities for women, foster exchanges, and advance memory-centric research. With over $60 million in joint investment, UPWARDS aims to strengthen fabrication, design, packaging, and process technologies while preparing a diverse, skilled microelectronics workforce.



The 5th UPWARDS U.S.-Japan Meeting on November 13 and 14, 2025 held in Tokyo, Japan, welcoming over 70 guests from 11 Japanese and U.S. universities as well as the two industry leaders that started UPWARDS: Micron and Tokyo Electron (TEL)

Europe/U.K. | In Europe, Purdue partners with imec, which established a research hub on Purdue's campus, and with ASML, the world leader in photolithography, to advance next-generation manufacturing and workforce training. In the U.K., Purdue's partnership with King's College London is accelerating innovation at the intersection of semiconductors and AI.

Latin America | In 2025, Purdue signed MOUs with Costa Rica's Ministry of Foreign Trade and Instituto Tecnológico de Costa Rica, with a major delegation visit planned this year. In the Dominican Republic, a 2024 MOU led to new partnerships and the 2025 visit of President Luis Abinader to Purdue. In Panama, a 2024 agreement quickly brought the first Universidad de Panamá students to Purdue in 2025 for internships.

From West Lafayette to the World

Purdue is uniting academia, industry, and government into a global semiconductor network. By leading with vision and speed, Purdue is fueling innovation, shaping tomorrow's workforce, and strengthening global competitiveness. *In doing so, Purdue is blazing new trails in setting a global benchmark for recognition and leadership in semiconductors.*

Purdue Computes



Purdue Computes Four Key Pillars:

1. Computing
2. Physical AI
3. Semiconductors
4. Quantum Science and Engineering

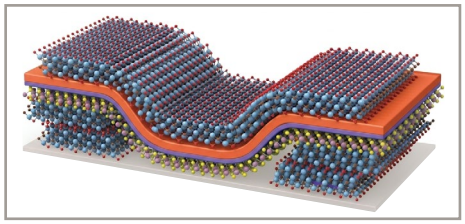
Catalyzed by a $50M Lilly Endowment Inc. grant, Purdue Computes is a universitywide strategic initiative that positions the university at the forefront of computing, physical AI, semiconductors, and quantum science and engineering — the foundation of the AI tech stack and future innovation. Powered by Purdue's commitment to talent, research, and strong industry partnerships, Purdue Computes is driving an innovation-based economy and building America's future. Collectively, these strengths will create a hard-tech center of gravity in Indiana to advance the state's economy by creating high-value, high-paying jobs for Hoosiers; providing in-state career opportunities for graduates of Indiana's universities; and by drawing talent from across the nation to Indiana.



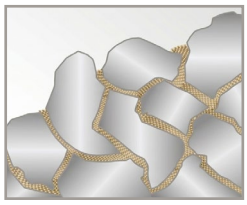
Alejandro Strachan
Director, ICoN-PCL

NSF Awards Purdue $19 Million for AI-Driven Semiconductor Research Labs

The Intelligent Codesign Cloud Lab for Non-Equilibrium and Low-Dimensional Materials (ICoN-PCL) will provide a national user community with remote access to powerful physical and digital tools that accelerate the discovery and integration of new materials into next-generation aerospace, energy, and electronics technologies. By integrating autonomous labs with standardized data capture and unleashing the power of AI with the largest collection of nanotechnology and materials manufacturing tools in academia, ICoN-PCL will transform isolated instruments into coordinated discovery engines, fundamentally redefining how research facilities operate and serve their communities. Bringing together resources from nanoHUB, the Birck Nanotechnology Center, and the Manufacturing and Materials Research Lab, ICoN-PCL will reduce duplicative resourcing, maximize equipment utilization, build modular training pathways, and grow the national pool of talent capable of discovering and generating trustworthy results, accelerating prototyping, and co-optimizing material, device, fabrication, and manufacturing. Such innovations will have a strong impact on U.S. competitiveness as processes that today take months to years will be reduced to days or hours, and industry partners will gain results ready to scale and benefit society. For more information, contact Alejandro Strachan, Reilly Professor of Materials Engineering and Director of ICoN-PCL (strachan@purdue.edu).



Co-design material and device for advanced electronics. 2D materials are central for future logic devices ICoN-PCL focus on interfaces and defects that currently limit performance.



Co-design material and fabrication for advanced alloys for extreme conditions (space, nuclear, and energy). ICoN-PCL focus: 2D materials dispersions for strengthening.

PURDUE UNIVERSITY

Semiconductors@Purdue in the News

PURDUE NEWS

June 28, 2022

Purdue University Partners with Leading Global Chipmaker MediaTek on Semiconductor Design Center

"Attracting a world-class chip design firm to Indiana has been a longtime goal for our team," Purdue President Emeritus Mitch Daniels said. "The MediaTek investment confirms Indiana's emergence as a center of semiconductor technology and Purdue's Discovery Park District as the state's premier new economic engine."

PURDUE NEWS

April 24, 2023

Purdue Invests $49M in Semiconductor Research and Learning Facilities

"Birck Nanotechnology Center has for decades been a critical home for discovery and technology development, both for Purdue researchers and those from industry and other universities who use our facilities," says Zhihong Chen, the Mary Jo and Robert L. Kirk Director of the Birck Nanotechnology Center. "This investment will ensure that we maintain our state-of-the-art facilities, reclaim more space, and establish new capabilities for semiconductor R&D."

PURDUE NEWS

December 11, 2023

European Technology Leader imec Opens Innovation Hub at Purdue

"The collaboration aims to capitalize on imec's extensive global expertise and Purdue's academic prowess to further propel Indiana into a prominent position within the semiconductor innovation ecosystem," said Mark Lundstrom, Purdue's chief semiconductor officer and senior advisor to the president.

PURDUE NEWS

January 10, 2024

Purdue University Receives $100 Million Commitment from Lilly Endowment

"These new initiatives hold great promise to strategically build connections between business education and the powerful technologies in computing, semiconductors, and physical AI and thereby prepare Purdue students for effective leadership in business and other pursuits in a future of rapid technological change," said N. Clay Robbins, chairman and CEO of Lilly Endowment.

PURDUE NEWS

April 3, 2024

SK hynix Announces Semiconductor Advanced Packaging Investment in Purdue Research Park

"We believe this project will lay the foundation for a new Silicon Heartland, a semiconductor ecosystem centered in the Midwest Triangle. This facility will create local, high-paying jobs and produce AI memory chips with unmatched capabilities, so that America can onshore more of its critical chip supply chain," said SK hynix CEO Kwak Noh-Jung.

INSIDE INDIANA BUSINESS

December 5, 2024

Purdue Launches AI Chip Technology Institute

"The Institute of Chips and AI joins a host of other Purdue institutes and centers focused on building world-leading programs in physical AI and semiconductor development that reflect Purdue's role as America's semiconductor university," College of Engineering Dean Arvind Raman said in the release. "These programs are inspiring Purdue's efforts to make Indiana the Silicon Heartland."

INSIDE INDIANA BUSINESS

August 26, 2025

Purdue Receives $7M to Expand Chipshub Initiative

"This award is momentous for Purdue and our nation," said Gerhard Klimeck, a professor of electrical and computer engineering who also serves as director of the university's Center for Predictive Devices and Materials and its Network for Computational Nanotechnology.

PURDUE NEWS

May 28, 2026

Purdue, GeChi Compound Semiconductor Co. (GCCS) Partner to Scale the Future of Silicon Carbide

"With this agreement, Purdue and GCCS are leveraging research strengths at the academic and industry levels," Dan DeLaurentis, executive vice president for research, said. "It continues Purdue's position as a leader in the latest semiconductor research."

PURDUE NEWS

August 5, 2026

Purdue Secures $19M from NSF to Develop AI-Driven Programmable Labs for Semiconductors, Advanced Materials

"For decades, materials discovery, manufacturing and device fabrication have operated in silos, slowing the path from breakthrough to real-world impact," Alejandro Strachan, Reilly Professor of Materials Engineering said. "ICoN-PCL is about bringing these pieces together by using AI and data to enable true codesign, where materials and processes are developed simultaneously to accelerate innovation in ways we simply couldn't accomplish before."

Endorsements



"In partnership with the semiconductor industry, our nation's universities play a critical role in strengthening U.S. leadership in chip technology. SIA applauds Purdue's exciting and innovative work to advance this effort and looks forward to continuing to work together to promote semiconductor design, manufacturing, research, and talent development in the Midwest and across our country."

John Neuffer | President and CEO, Semiconductor Industry Association



"Differentiated technologies to drive AI performance and address a growing diversity of AI applications will characterize the next wave of electronics. There is an absolutely critical need for creative engineers with a broad understanding of microelectronics from materials and processes, to devices and circuits, advanced packaging and heterogeneous integration, system in package design, test, and qualification. SEMI has been delighted to partner with Purdue for nearly four years now to help define and launch the kind of comprehensive and innovative talent development program that the semiconductor industry critically needs."

Ajit Manocha | President and CEO, SEMI



"The TSMC-Purdue partnership began in 2021 when TSMC became the founding industry partner in CSME — a multiuniversity Center for Secure Microelectronics Ecosystem that addresses security from the foundry to packaged systems. As our U.S. manufacturing operations grew so did our engagement in Purdue's talent development programs, especially the experiential programs, STARS and VIP. Purdue is now a major supplier of talent to TSMC Arizona, and we expect our talent development partnership to grow in support of our growing manufacturing presence in the U.S."

Rose Castanares | CEO, TSMC Arizona



"Developing the next generation of semiconductor talent is a national imperative — one that demands deep collaboration between industry and academia. At GlobalFoundries, we're proud to partner with leading institutions like Purdue to meet this challenge head-on. Together, we've built a strong foundation for workforce development, and now we're expanding into joint research that will drive the next wave of innovation. Semiconductors power our daily lives, and as the industry continues to grow exponentially, this new generation of engineers will be key to ushering in the innovations of tomorrow."

Thomas Caulfield | Executive Chairman, GlobalFoundries



"MediaTek opened its first design office in the U.S. Midwest in 2022, and our partnerships with Purdue on research and talent development are important as this new operation grows. As the first leading-edge design company in Indiana, we look forward to working with Purdue University to develop a growing semiconductor ecosystem in the U.S. heartland."

Joe Chen | President, MediaTek



"In 2023, imec USA selected Purdue University as one of its few sites for U.S. operations, and we have been truly delighted with how quickly and strongly our partnership has developed. The collaboration between our teams has not only met but often exceeded our expectations, delivering impressive results. We look forward to an even deeper relationship and an expanding presence in West Lafayette to support the growing semiconductor ecosystem in Indiana and across the U.S."

Luc Van den hove | Chairman of the Board of Directors, imec



"We are excited to build a state-of-the-art advanced packaging facility in Indiana. We believe this project will lay the foundation for a new Silicon Heartland semiconductor ecosystem. This facility will create local, high-paying jobs and produce AI memory chips with unmatched capabilities, so that America can onshore more of its critical chip supply chain. We are grateful for the support of the state of Indiana, Purdue University and the broader community involved. We look forward to expanding our partnership in the long run."

Kwak Noh-jung | CEO, SK hynix

Purdue Faculty Serving in National Semiconductor Leadership Roles



Carol Handwerker

Reinhardt Schuhmann, Jr. Distinguished Professor in the School of Materials Engineering and Professor of Environmental and Ecological Engineering, Purdue University | Head of Technology Strategy, CHIPS Program

Handwerker currently serves as the Reinhardt Schuhmann, Jr. Distinguished Professor in the School of Materials Engineering and a Professor of Environmental and Ecological Engineering at Purdue. She formerly worked at the National Institute of Standards and Technology (NIST), where she became chief of the Metallurgy Division. She is well known for her research on determining the best options for solder that connect electronic components to circuit boards in advanced packaging, focusing on almost any physical condition that a solder joint could encounter. Her current research is part of the U.S. Partnership for Assured Electronics and is backed by a $20 million DOW contract. Since July 2023, she has been serving as Head of Technology Strategy in the CHIPS Program Office, providing guidance in the implementation of the 2022 CHIPS and Science Act, which has appropriated $39 billion for onshoring semiconductor and advanced packaging manufacturing in the U.S. and strengthening their domestic supply chains.



The Honorable Joseph S. Jewell

John Bogdanoff Professor of Aeronautics and Astronautics | Assistant Secretary of War for Science and Technology, U.S. Department of War

In December of 2025, Purdue Engineering's Joseph S. Jewell was confirmed by the Senate as assistant secretary of war for science and technology, where he advises the Under Secretary of War for Research and Engineering and leads the Department of War's science and technology enterprise. Jewell is the John Bogdanoff Professor of Aeronautics and Astronautics at Purdue and a leading researcher in hypersonics and aerothermodynamics. Since joining Purdue in 2019, Jewell has helped establish Purdue as a national leader in hypersonics, serving as director of two uniquely capable hypersonic wind tunnels in the College of Engineering and Purdue Applied Research Institute (PARI). His research has included leading hypersonic test programs for the Army, Navy and Air Force. Previously, Jewell spent more than five years as a research scientist at the U.S. Air Force Research Laboratory. He has authored more than 150 journal articles and conference papers and holds a U.S. patent in hypersonic inlet design.



Arvind Raman

Robert V. Adams Professor in Mechanical Engineering, Purdue University | Undersecretary of Commerce for Standards and Technology and Director of the National Institute of Standards and Technology

On June 1, 2026, former Purdue Engineering Dean Arvind Raman was confirmed by the Senate as undersecretary of commerce for standards and technology and the 18th director of the National Institute of Standards and Technology (NIST). A Purdue faculty member since 2000, Raman is an internationally recognized researcher, educator, and leader who served as the John A. Edwardson Dean of the College of Engineering beginning in 2023. During his tenure as dean, Purdue Engineering reached record levels of research funding and philanthropy, rose to No. 4 nationally in graduate engineering research rankings, and became the nation's largest producer of engineering graduates while reducing the average time to earn a bachelor's degree in engineering to under four years. His appointment reflects Purdue's growing influence in advancing innovation, manufacturing and America's technology leadership.



The Semiconductors@Purdue ecosystem brings together Purdue's Birck Nanotechnology Center and global industry leaders SK hynix, imec, and MediaTek across AI memory, semiconductor research and innovation, and edge AI. Together, these anchor partnerships position Purdue as a bridge between academic research, workforce development and the semiconductor design and manufacturing industries.

Follow Purdue Engineering on Social Media:

@PurdueEngineering

@PurdueEngineers

semiconductors@purdue

#PurdueEngineering

Purdue Engineering