NSF ExLENT Beginnings Track National Convening

Examples Systems Thinking Scalable Semiconductor Workforce

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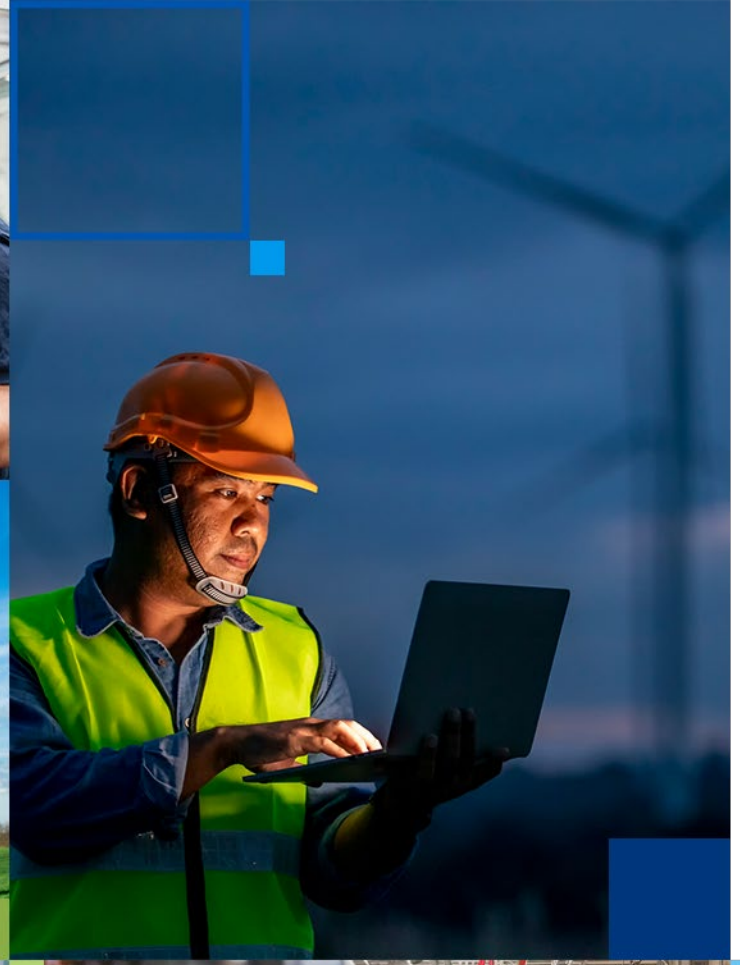
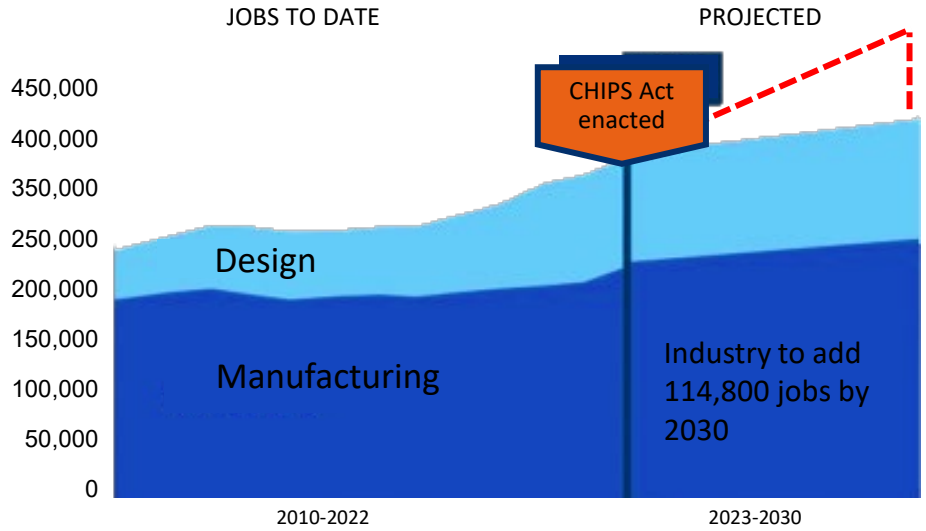
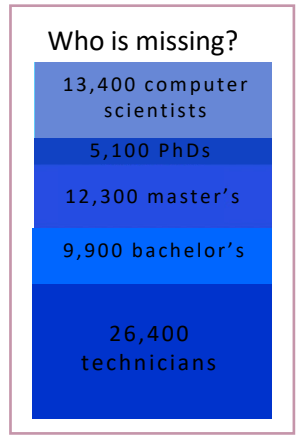


Context

LABOR GAP FACING THE U.S. SEMICONDUCTOR INDUSTRY



58% of new industry jobs at risk of going unfilled



Source : https://www.semiconductors.org/chipping-away-assessing-and-addressing-the-labor-market-gap-facing-the-u-s-semiconductor-industry/

- Workforce projected gaps continue
- U.S. New fab constructions: 140 projects across 30 states (Semiconductor Industry Association)

Ohio-Southwest Alliance on Semiconductors and Integrated Scalable Manufacturing (OASiS) Foundations Certificate

Led by University of Cincinnati-led | Intel Supported (2022–Present)

https://skillsofferings.uc.edu/public/category/courseCategoryCertificateProfile.do?method=load&certificateId=1328563

Opportunity and Goals

- Build a standardized semiconductor workforce curriculum that could be rapidly adopted across multiple institutions.
- Increase access to semiconductor education while maintaining consistent learning outcomes.
- Create a scalable model to meet growing national workforce demand.

Solution: 27.5-hour, self-paced online micro-credential:

Led by the University of Cincinnati in partnership with Intel and 15 higher education institutions.

- Created 5 classes: Semiconductor manufacturing fundamentals, Cleanroom and equipment safety, Professional workplace skills
- Plus 1 required experience: Hands-on cleanroom **in person, through virtual reality (VR)** or **Vacuum and Gas Handling course**

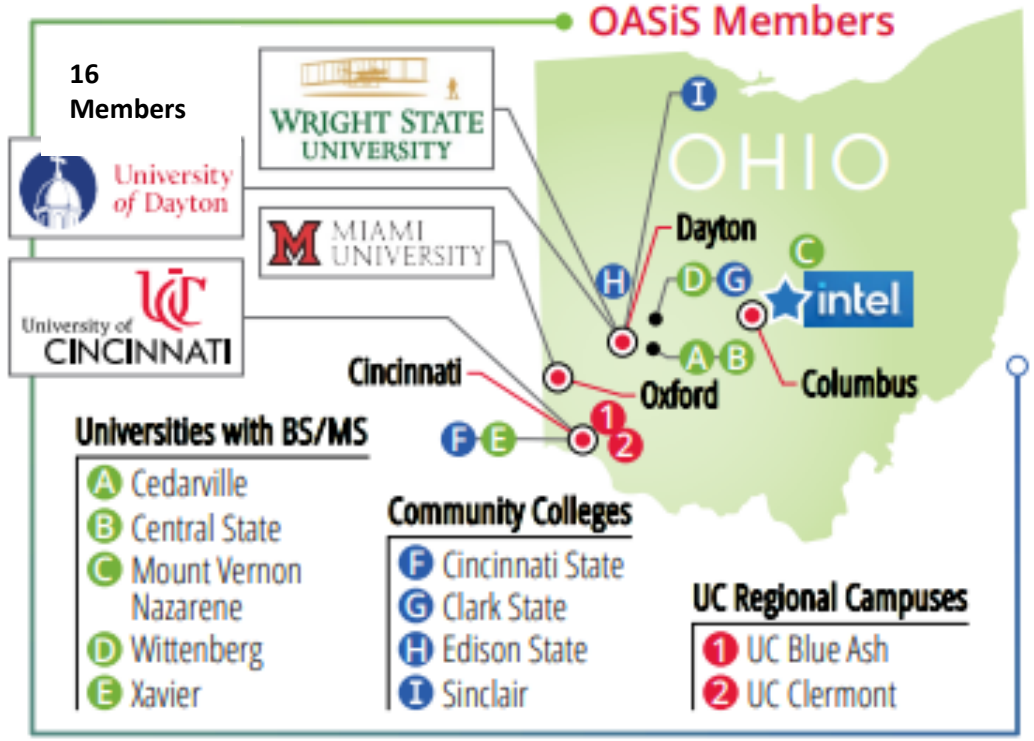
OASIS: Broadening Participation

Scaling for Impact

- **1,240+ learners** have completed the program across OASiS
- Standardized curriculum enables rapid adoption by new colleges and universities
- Expanding beyond Ohio:
  2025: University of Nevada, Las Vegas (40 completers)
  2026: University of Louisville and UC Irvine joined the consortium.
- Summer program expansion includes:
  Kent State University
  Central State University, (UG & HS students), creating an early talent pipeline into semiconductor careers.
- Modular course design supports the continual addition of new **stackable micro-credentials**, expanding technical content without redesigning the core program.

Sustainable & Transferable Model

- **Free, open-access course** lowers barriers for learners.
- Delivered online, enabling broad geographic reach and flexible implementation.
- VR-based cleanroom experience for institutions without fabrication facilities.
- Consortium model provides a repeatable framework for expanding to new institutions while maintaining curriculum consistency and industry alignment.



Potential Future Expansion:

- Gov. DeWine, Lt. Gov. Tressel, JobsOhio Announce $300M Experiential Learning Initiative to Address Talent Gaps and Bolster Career Awareness
- **National Network for Microelectronics Education** (NNME)

Summer Internship in Semiconductors & Electronics

Lead Institute: Central State University (OH)

***Developing the next generation of semiconductor* talent | Intel Supported (2022–Present)**

Program Foundation

- 8-week, stipend-supported academic internship led by **Central State University** in partnership with **Wright State University**
- Hands-on training in electronic hardware design, semiconductor fabrication, and hardware security
- Direct pathways to careers in the semiconductor industry

Leveraging Initial Investment

- Intel supported internship established a successful workforce development model.
- Program success attracted additional State investment and strategic partnerships.

Evidence of Scale

- Consistent year-over-year enrollment growth
- Hundreds of applicants annually, demonstrating strong student demand

Broadening Participation in summer internships

Sustaining and Scaling Impact

- **Expansion from one internship site to six partner institutions in 2026:**
  - Central State University (Lead), Wright State University
  - North Carolina A&T State University, SUNY Binghamton ,Clark Atlanta University, Fayetteville State University, University of Michigan, Prairie View A&M University
- **Expanding Capacity**
  - Central State University leads the NSF-funded **PARCS HBCU³** consortium, strengthening semiconductor research and workforce development across seven HBCUs.
  - CSU also participates in the NSF **ASEED⁴** initiative, broadening educational pathways and institutional collaboration.
- **Creating a Sustainable Ecosystem**
  - Shared curriculum and training resources
  - Increased internship opportunities for students
  - Diversified funding through industry and federal support
  - Growing pipeline of students' interest in the semiconductor ind.

Student Enrollment Growth

Year	Interns
2023	20
2024	39
2025	46
2026	50

AZ Quick Start – Maricopa Community Colleges

Intel Supported (2022–2023)

- 40-hr, 10 days, 4 hr/ day
- Mornings or Evenings
- $15 registration fee & tuition assistance upon successful completion
- 3 campus

Marketing- Semiconductor Technician Quick Start

- Hands-on learning from experienced instructors
- $306 tuition assistance upon successful completion
- Earn industry-recognized certification and college credits
- Students may have opportunity to interview for full-time jobs

Now Enrolling! Scan to learn more

https://rb.gy/n0ug1m

Institutes- Collaborative Partnerships and Resourcing

Grand Total: $26.5 Million

MCCCD Awarded $1.7 Million to Expand Semiconductor Technician Training

www.maricopa.edu/news/mcccd-awarded-17-million

SCAN TO LEARN MORE!

Grants

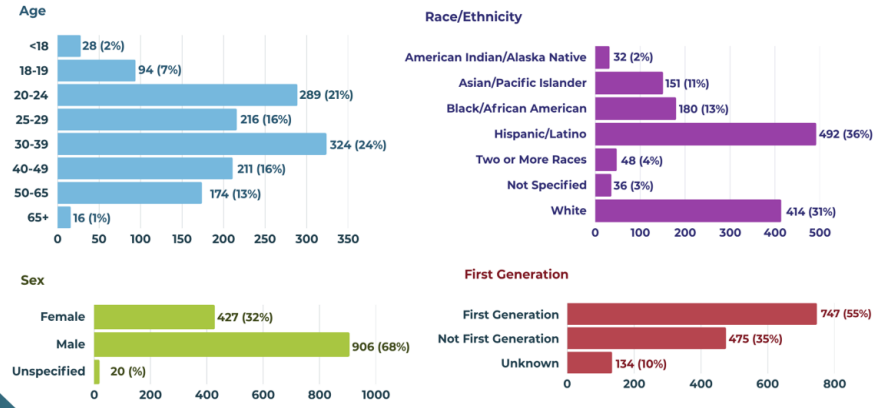
$15M - Arizona Commerce Authority (Semiconductor Accelerator)
$6.2M - Arizona Commerce Authority (Aerospace Accelerator)
$2.5M - Senator Kelly (CDS/DOE) (Semiconductor)
$1M - ARPA (Student Support)
$333K - Intel (Vacuum Equipment)
$196K - Intel (Engineering Pathways)
$163K - Intel (Semiconductor PPE & supplies)

Foundation

$100K - NXP Scholarship (Recruiting Technicians)
$20K - Intel Scholarship (Advancing Women in Manufacturing)
$25K - Intel (Semiconductor Engagement and Learning Grant)
$55K - Boeing Scholarship (Workforce, Aerospace)
$15K - Garcia Foundation Scholarship (Financial need-based)
$30K - TSMC (Semiconductor Pathways Scholarship)

Student Demographics Data- Semiconductor Technician AIT132 (Quick Start)

- **Number of Students:** 1,356
- **Certifications:** 1,319
- **Number of Classes:** 129



AzAMI Quickstart- Employment Report Insights

Student Quotes:

"Coming in with a little to no experience this course gave me such an amazing baseline that I was able to be hired at a level two position. I would strongly recommend it to anyone." MCC Student- Semiconductor Technician at Kelly Services

"A deep understanding of the model based problem solving (MBPS) in the program has helped a lot in acquiring this job position." - EMCC Student - Equipment Maintenance Technician (MET) II at Daicel

AIT 132 (Quick Start) Completer Survey

- Students reported interviewing with **51 companies**
- **Top 5 employers:** TSMC, Intel, Microchip, Sumco, NXP
- **40%** who were not previously employed gained employment in the field of semiconductors
- **47%** who were previously employed at the start of training either gained employment in the field of semiconductors or had a salary increase

Scale Deeper Educational Program

AZ Quick Start

From: a 10-day

To: 4 months class

- Stackable credits towards Associate degree

Maricopa Accelerated Semiconductor Training

MAST Description

- **Semiconductor industry** overview & career pathways
- **IC fabrication** fundamentals
- **Electrical & mechanical systems** training
- **Semiconductor manufacturing** process (lithography to packaging)
- **Cleanroom operations** & **safety practices**
  - Vacuum systems, chem handling, etc.
- Manufacturing **quality & process improvement**

Ultra High Purity Water (UHP) Certificate Program

Led by Clackamas Community College (OR)

Intel supported (2022) | Sustainable Workforce Training Model

Opportunity

- Build a scalable training solution aligned with manufacturing workforce needs.
- Expand access to specialized Ultra High Purity Water (UHP) education.
- Create flexible pathways for both prospective and current employees.

Course Topics Include:

- UHP systems overview
- General water chemistry
- Reverse osmosis
- Ion exchange
- Final knowledge assessment

Solution: 28-hour modular, asynchronous Ultra High Purity Water Certificate in partnership with Intel

- Updated and expanded Clackamas Community College's existing UHP certificate curriculum (KT1) to align with Intel's **talent pipeline needs**.

Scale & Sustainability

- **Pre-hire pathway:** The company can recommend prospective employees complete the course through **Clackamas Community College** before onboarding, helping them enter the workforce with foundational knowledge.
- **Employee development:** The course has been transferred into Intel's **Corporate Learning Management System (LMS)**, allowing employees across multiple sites to complete the training on demand.
- Learners who successfully complete the course earn at Intel earn **Clackamas Community College non-credit certificate**.
- Employees/Intel may choose to pay Clackamas Community College to convert the training into **college credit**, creating a stackable credential and an ongoing partnership between the college and industry.