Microelectronics Workforce Development

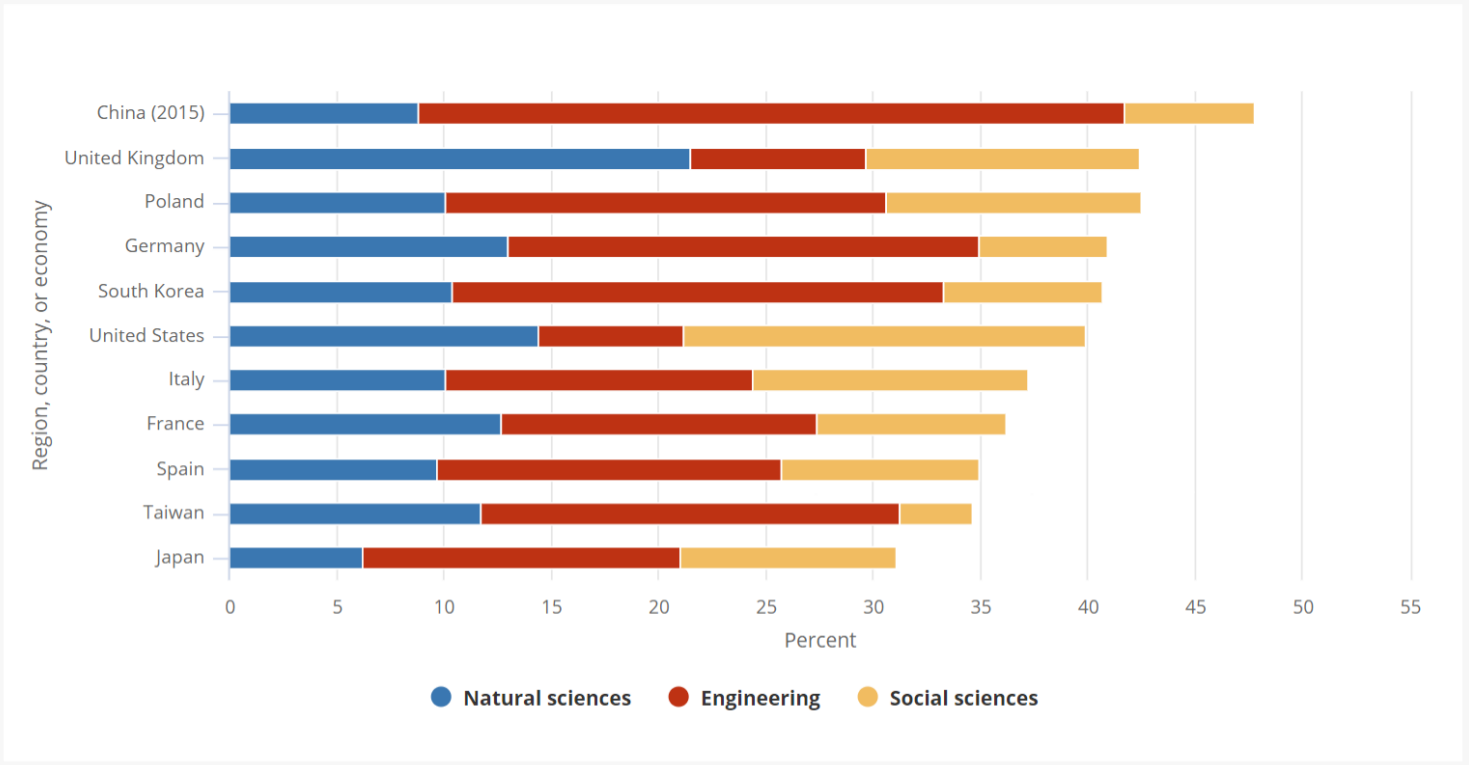
SCALE
Scalable Asymmetric Lifecycle Engagement

Alison Smith, Ph.D.
Education & Workforce Development Co-Lead, Trusted & Assured Microelectronics Program/OUSD(R&E)
Chief Engineer, Materials Analysis, Naval Surface Warfare Center, Crane Division (NSWC Crane)

*Presentation material courtesy of the SCALE consortium manager, Purdue University

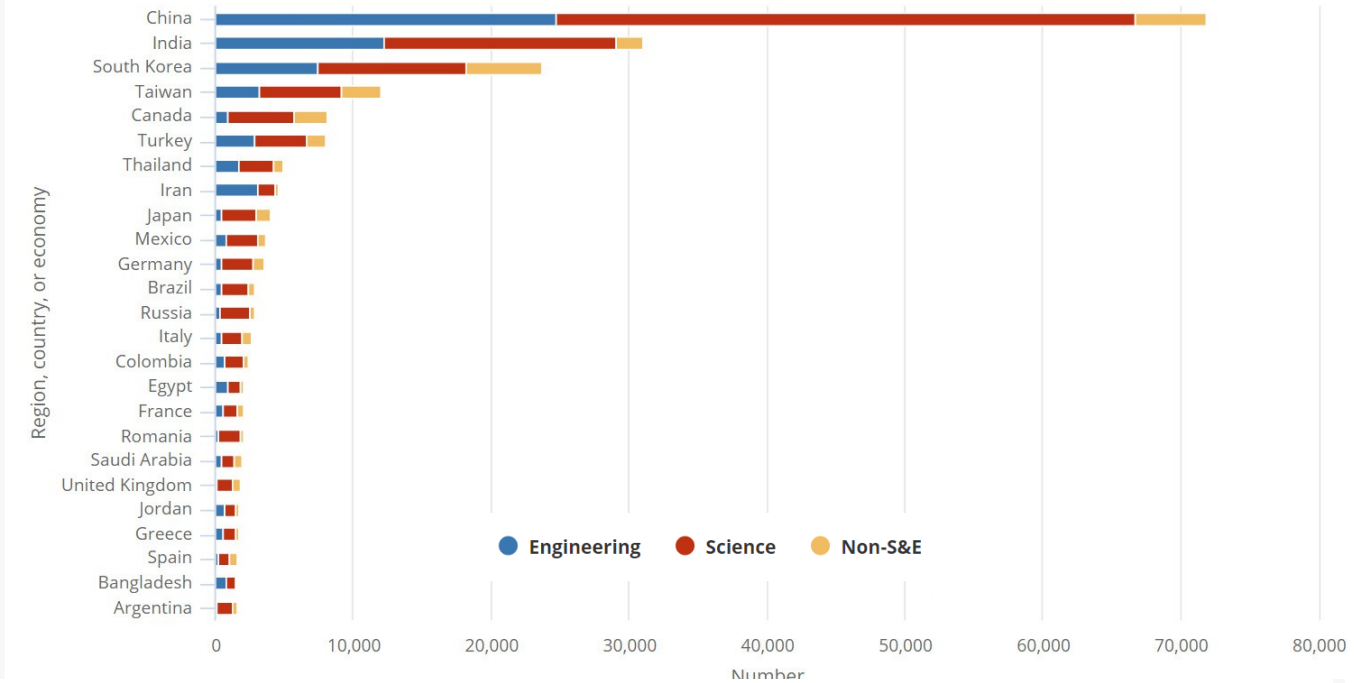
PURDUE UNIVERSITY

Total first university degrees by S&E field, by selected region, country, or economy: 2016 or most recent year



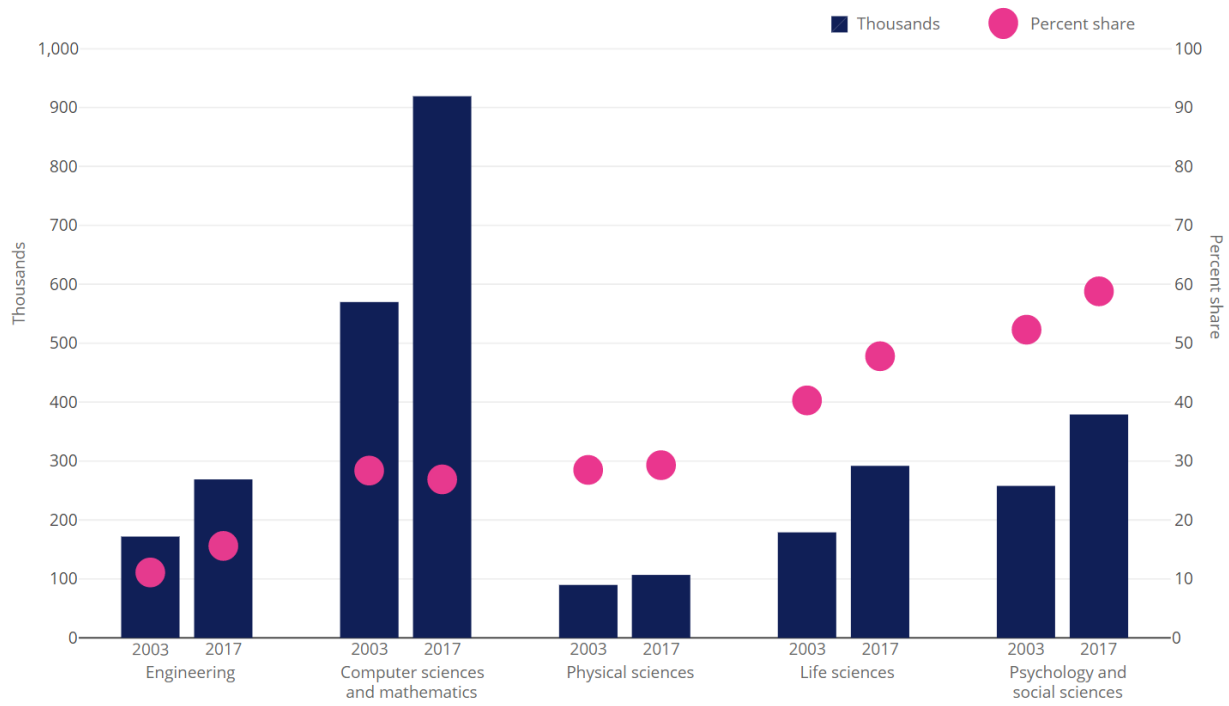
In US, disciplines needed to support microelectronics have the greatest shortage.

Top 25 regions, countries, or economies of origin of U.S. doctorate recipients on temporary visas, by broad field: 2000–17



In US, temporary visa holders account for 34% of total S&E and 50% in engineering, math, CS, and economics.

Women in S&E occupations, by broad occupational category: 2003 and 2017



In US, the percentage of women in Engineering, Computer Sciences, Mathematics, and Physical Sciences has remained stagnant since 2003.

Recruiting, Preparing and Retaining the Future Microelectronics Workforce

- STEM Demand vs Capacity: Demand up and Enrollment down
  - Growth in AI, Commercial Space, 5G…….
- Talent Acquisition Competition; Appeal and Compensation
- Need a “ready workforce” for next generation technologies
- US now faces a severe shortage of sufficiently trained personnel, particularly in microelectronics

Gartner Survey 2019 – talent shortages top risk factor for organizations

SCALE

Scalable Asymmetric Lifecycle Engagement

A Public-Private-Academic Partnership

Innovative Model Development to Increase the Talent Pipeline

This opportunity is open to industry partners
First intern cohort starts Summer 2021

The Goal

Develop meaningful program for US citizen students to establish relationships with potential employers, which lead to employment after graduation

Public-Private-Academic Partnership

A Ready Workforce

SCALE
Scalable Asymmetric Lifecycle Engagement

Nationally Coordinated
Regionally Executed

Scalable: Extend the program across multiple universities.
Replicable: Extend the program across other technology areas.

Workforce Objectives

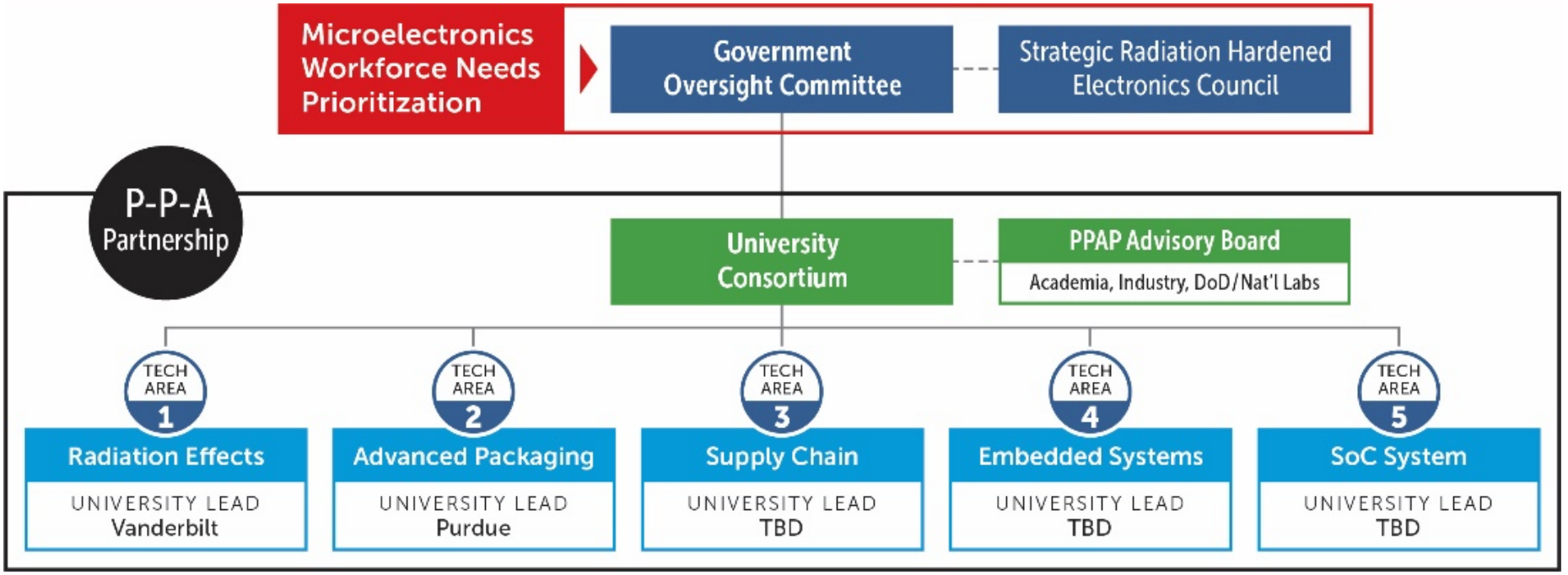
- Priority 1: ***Intellectual Property Generation: A viable, cost-effective approach to workforce development at scale***
- Priority 2: ***Placement of personnel at stakeholder agencies***
- Priority 3: ***Customized curriculum, training, and certifications***

Key Attributes of the Model

- Scalable to other universities; increase student participants & address regional needs
- Replicable to address any specialized technology area need
- Early recruitment and exposure to microelectronics career pathways; increase domestic students into the microelectronics pipeline
- Leverages existing R&D investments
- Nationally coordinated and regionally executed; network of stakeholders and universities

Model Overview

Public-Private-Academic Partnership (PPAP) Model

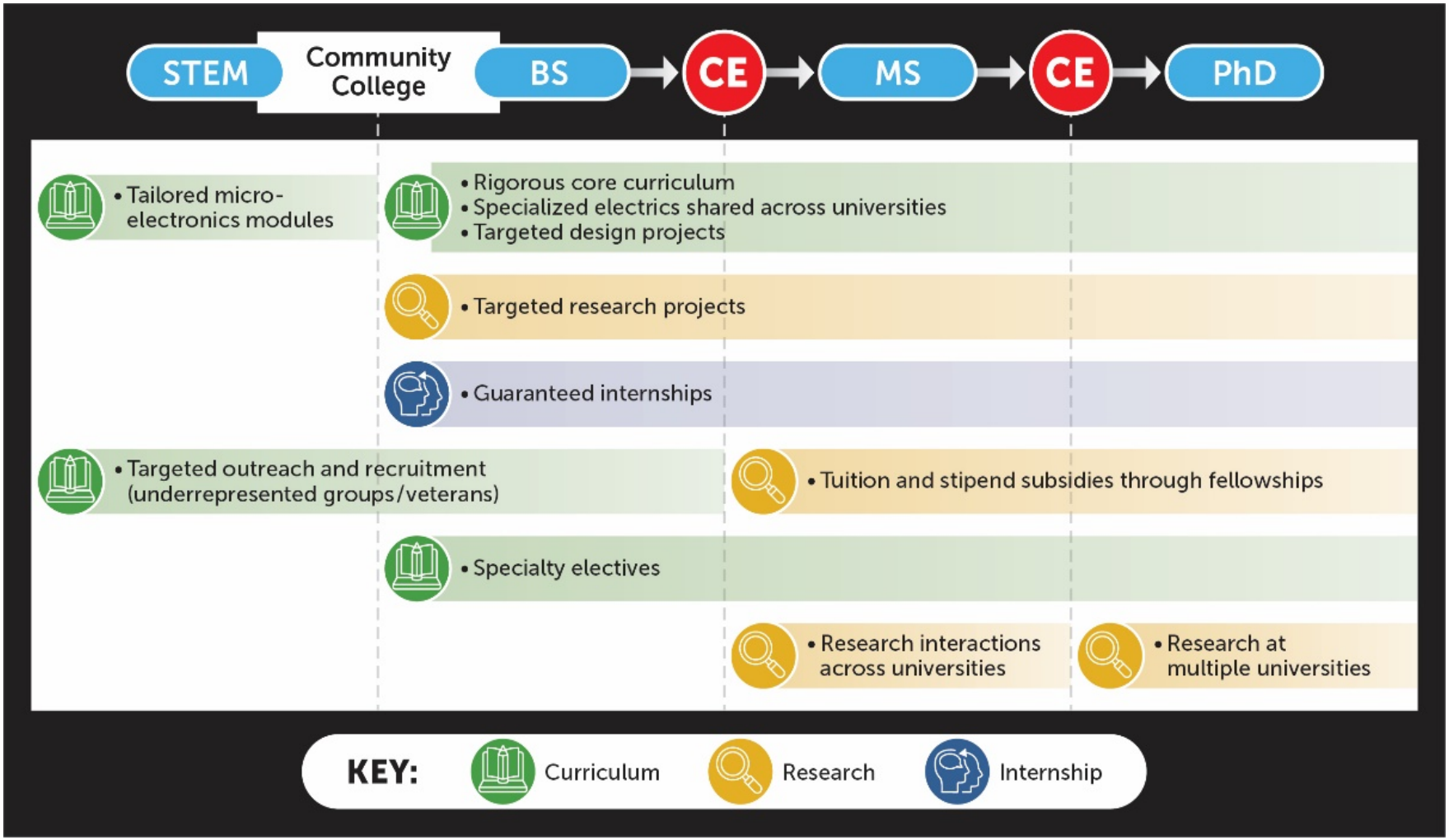


Government Oversight Committee (GOC): Provides education & workforce development priorities & objectives, technical direction, partnering requirements, programmatic oversight, and funding. GOC consists of service and government representatives.

University Consortium Lead: Ensures GOC objectives are met, funding dispersal, and programmatic execution in each technology area.

Technology Area Leads: Coordinate efforts in their technology area across consortium, including standardized curricula, continuous learning, certifications, immersive training, internships, and placement.

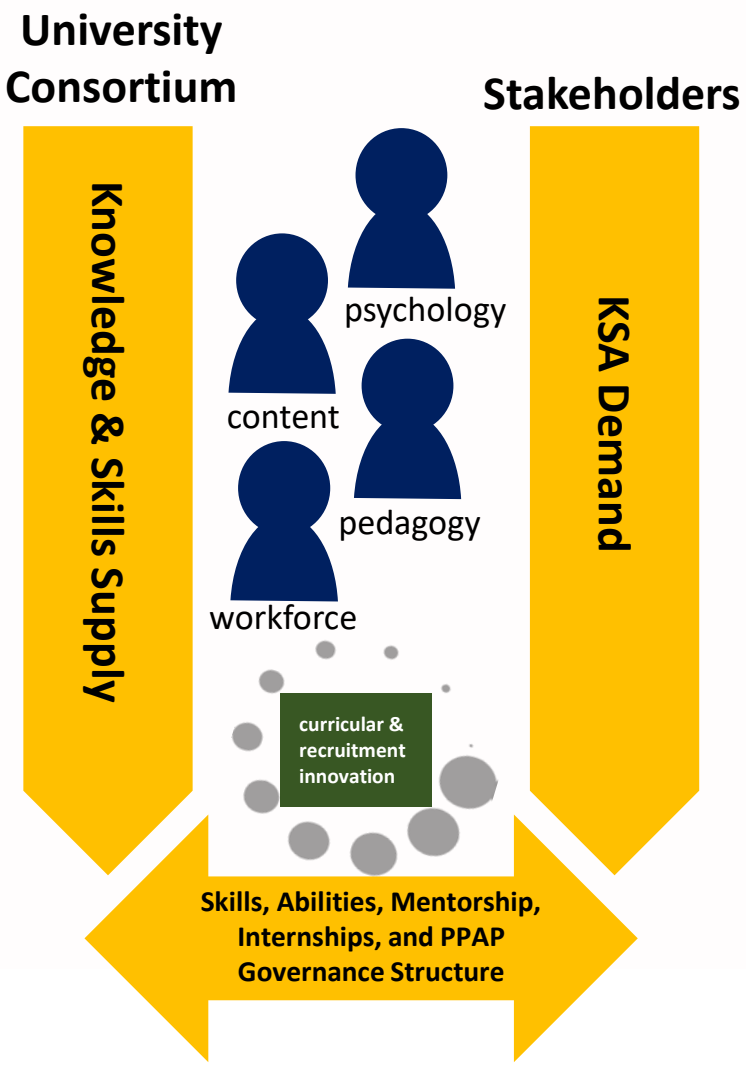
Produce a Readier Workforce



Includes Early Recruitment & Continuing Education

With Seed Funding, Focus Is On Customized Curriculum & Targeting BS Students

Recruit First



- Comprehensive approach:
  - organizational & educational psychology
  - pedagogy
  - community of practitioners
  - technical faculty
- Recruitment & retention focus
- K-12, undergraduate, and graduate students
- Continuing education / Continuous upskilling
- Diversity and inclusion are woven into the fabric of SCALE
- Students will be trained in state of the art tools and processes

What are we doing now…

- **Prof. Mike Alles, Lead PI**
- **Remote Internships**
  - **Summer 2020**
  - **Early exposure**
  - **Expand the number of students**

Topics include

- Investigation of a Radiation Test simulator (counterpart to a flight simulator)
- Development of documentation and tutorials for use of Model Based Systems Engineering software: SEAM
- RHBD circuit design
- Radiation characterization of advanced (7nm and 5nm) CMOS FinFET technologies
- Model development for the radiation response of Power MOSFETs
- Exercise of environment simulation codes to support comparison of different models and code versions

Questions?

POCs:
Dr. Alison Smith
alison.smith@navy.mil

Prof. Peter Bermel, Project PI
pbermel@purdue.edu