

Volume 1, Issue 1

SCALE

Scalable Asymmetric Lifecycle Engagement

Developing the U.S. Defense Microelectronics Workforce

In this edition:

SCALE PI Symposium- pg. 1

SCALE Student Spotlight- pg. 1

MEST & nanoHUB Collaboration- pg. 2

SCALE Social Media Campaign pg. 2

Event Calendar- pg. 2



OUSD WFD Leadership



Kara Perry, PhD.

SCALE Program Manager
Kara.L.perry6.civ@us.navy.mil

Taylor Hubbard, Capt. USAF

MEST Program Manager
Taylor.hubbard.1@us.af.mil



Purdue SCALE Leadership

Peter Bermel, PhD.

Director
pbermel@purdue.edu

Kerrie Douglas, PhD.

Associate Director
douglask@purdue.edu

Tom McKinley, PhD.

Managing Director
mckinltl@purdue.edu

Eric Holloway, PhD.

Internship Coordinator
eahollow@purdue.edu

Tamara Moore, PhD.

K-12 Director
tamara@purdue.edu

Jason Morphew, PhD.

Director of Undergraduate Curriculum
jmorphew@purdue.edu

Alejandro Strachan, PhD.

Online Resource Director
strachan@purdue.edu

Jennifer Linvill, PhD.

Workforce Needs Director
jlinvill@purdue.edu

SCALE QUARTERLY

Funded by the Office of the Under Secretary of Defense for Research and Engineering (OUSD R&E)
Trusted & Assured Microelectronics Program

SCALE provides academic opportunities for working in defense microelectronics for learners at all stages of one's education and career through:

- K-12 curriculum and hands-on learning experiences;
- undergraduate and graduate curriculum;
- research, internships, and career opportunities in preferred technical areas of strong national need, and
- technical content accessibility through nanoHUB



Dr. Perry at the PI Symposium

SCALE PI Symposium- Purdue University

The 2nd Annual Scale PI Symposium was held at Purdue from May 22-24, 2023, with nearly 50 attendees representing the Department of Defense (DoD), Defense Industrial Base (DIB), and SCALE consortium academic partners.

On Day 1, SCALE leadership presented updates on the consortium, including funding, the workforce development model, metrics, student career pathways and placement, workforce needs assessment, and classroom assessment.

On day 2, the DoD and DIB attendees broke out for a caucus with the external evaluators, provided feedback and recommendations, and discussed

partnering strategies and outcomes with SCALE Director, Dr. Peter Bermel. At the same time, the academic partners held a working session focused on planning for the next year, including brainstorming within the technical verticals on recruitment and retention, incorporating SCALE into the classroom, research, mentoring, professional development practices, and collaboration across the verticals and academic partners.

Drs. Tom McKinley and Kerrie Douglas led the working session with SCALE faculty to create quad charts for each major aspect of the SCALE model to: identify current work being done within each technical ver-

tical, measures of success, and new opportunities and barriers. Results from this session are currently being used to help identify ways to strengthen the consortium.

Concurrent to the Symposium, Dr. Jason Morphew facilitated a workshop on Integrating Microelectronics into Introductory Engineering led by multiple Purdue faculty and graduate students, as well as training on culturally-relevant pedagogy, led by Dr. Kelly Cross, Georgia Tech.

On Day 3, groups came together to share the exciting outcomes from the workshop and several attendees submitted content to the SCALE group on nanoHUB. The three-day Symposium wrapped up with remarks from SCALE's Program Manager, Dr. Kara Perry, NSWC Crane. Participants found the event informative and productive. —written by Lynn Zentner, PhD.

Student Spotlight- Hannah Pike

Hannah Pike joined the SCALE program as a Purdue University undergraduate via the SCALE first-time researcher (FTR) program. When asked about her interest in entering SCALE FTR, Hannah said, "I applied for the program in the area of radiation-hardened technologies as a way of combining my major in Aeronautical and Astronautical Engineering with my minor in Nuclear Engineering. I wanted an experience beyond the classroom that would be an introduction to research."

That opportunity shaped Hannah's career plans. Through her SCALE FTR research project, Hannah recognized the importance of Radiation-Hardening and Space Environments research. She enjoyed her experience with mentor Charles Grey

and Professor Peter Bermel so much that she chose to continue their working relationship this fall as she starts her master's work. Her research is related to the radiation detection work she began under the SCALE FTR program.

"SCALE prepared me with technical knowledge in radiation detection and hardening and an awareness of their importance. In addition, SCALE provided me great experiences in scientific writing, professional presentations, public speaking, and working with data which will help in my graduate

program. Dr. Bermel also aided me with my resume, recommendations, and essays for grad school applications," said Hannah.

After graduate school, Hannah aspires to work in the Department of Defense, the US Military, or a nuclear national laboratory. She is also considering doctoral studies in nuclear engineering. —written by Mignon Evans, Lead Administrative Assistant



Hannah Pike & Dr. Peter Bermel

SCALE Partners

University Partners

Air Force Institute of Technology
 Arizona State University
 Brigham Young University
 Georgia Institute of Technology
 Indiana University
 New Mexico State University
 Morgan State University
 Notre Dame University
 Ohio State University
 Purdue University (Lead)
 Saint Louis University
 SUNY-Binghamton
 Texas A&M University
 University of California-Berkeley
 University of Colorado-Boulder
 University of Florida
 University of Maryland
 University of Tennessee-Chattanooga
 Vanderbilt University

Government Partners

Air Force Life Cycle Management Center (AFLCMC)
 Air Force Nuclear Weapons Command (AFNWC)
 Air Force Research Lab-Space Vehicles Directorate (AFRL/RV)
 Department of Energy National Nuclear Security Administration (DOE/NNSA)
 Missile Defense Agency (MDA)
 Naval Research Laboratories (NRL)
 NSWC-Crane
 National Aeronautics and Space Administration (NASA)
 Sandia National Laboratory
 Space Systems Command (SSC)
 U.S. Navy Strategic Systems Program (SSP)
 U.S. Air Force
 U.S. Air Force Materiel Command (AFMC)
 U.S. Army Combat Capabilities Development Command
 White Sands Missile Range (SVAD)

Industry Partners

Aerospace Corporation
 Amentum
 Analog Devices
 Applied Materials
 BAE Systems
 Blue Origin
 Boeing Corporation
 Calumet Electronics
 Cobham Advanced Electronic Solutions (CAES)
 Draper Labs
 General Dynamics
 GlobalFoundries
 IBM
 Innovative Scientific Solutions Inc. (ISSI)
 Integra Technologies
 Intel
 In-Q-Tel
 Johns Hopkins Applied Physics Laboratory
 KBR
 Keysight
 L3 Harris
 Mercury Systems
 Milanowski & Assoc.
 MIT Lincoln Labs
 Northrop Grumman
 Reliable Microsystems
 Renesas Electronics
 Science Systems and Applications Incorporated (SSA)
 Silicon Technologies
 SkyWater
 Taiwan Semiconductor Manufacturing Company (TSMC)
 Trusted Semiconductor Solutions
 Western Digital

MEST and nanoHUB Collaboration

The MEST Center and nanoHUB are partnering to bring microelectronics design and security training to the nanoHUB platform.

“MEST provides innovative and customized training content to professionals in the area of microelectronics design and assurance. The partnership with nanoHUB provides a unique opportunity to take advantage of a very well-developed platform for course offering. This partnership will enable content sharing among instructors and audiences from various groups - including nanoHUB, SCALE and MEST - providing far more reach than each team could have accomplished individually,” said Dr. Mark Tehranipoor, U of Florida.

As part of the new collaboration, nanoHUB leadership, including

Dr. Alejandro Strachan, and MEST co-directors, Drs. Tehranipoor and Waleed Khalil, OSU, are working to migrate MEST’s existing resources, including webinars, trainings, and courses to nanoHUB in the coming months.

MEST’s new microelectronics security training materials offered by leading experts will continue to be developed and published in nanoHUB regularly to serve working professionals from government agencies, national labs, defense industry, and academia.

Restricted MEST resources will remain secure and private in nanoHUB and will only be accessible to MEST participants.

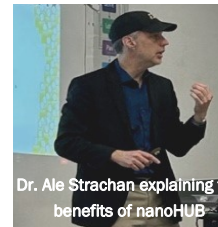
To access the training re-

sources online, participants will simply create a free nanoHUB account and be added to the nanoHUB MEST community. The set-up will be very similar to the SCALE community pages in nanoHUB.

More information will be available in the near future.

Sign up for [nanoHUB](https://nanohub.org) today to access these resources or email contact@nanohub.org.

—written by Amy Joo, Marketing and Community Engagement Specialist



Dr. Ale Strachan explaining benefits of nanoHUB

MEST Training Center- <https://mestcenter.org>

SCALE Social Media Campaign

Keeping SCALE stakeholders connected and up to date is critical to fostering and maintaining the partnerships that are key to developing the U.S. microelectronics engineering workforce. This summer, [SCALE](https://scale.org) is launching a social media campaign that will inform a wide audience about SCALE successes and opportunities. Content will be strategically created and curated for consumption by academia, governmental agencies, and defense industrial- base partners, as well as engineering students and potential employers. A variety of social media will be utilized to feature SCALE initiatives, working groups, and other relevant microelectronics engineering

news. Information will highlight SCALE’s [technical areas](#), (radiation-hardening; system-on-chip; heterogeneous integration/advanced packaging; embedded systems/AI, and supply chain awareness). Prominently featured will be: programmatic activities; K-12 initiatives; the nanoHUB and MEST collaboration; workforce needs assessments; [current and prospective students](#), career pathways; internships; research; [partnerships](#), and other microelectronics engineering workforce development efforts.

—written by Jenn Linvill, PhD.



STAY CONNECTED to SCALE on [LinkedIn](#)



Scan for more information about SCALE Academic, Government & Industry Partners

2023 Event Calendar



Last Weds. Monthly	SCALE Assessment Working Group Meeting
Bi-weekly until 14 Aug.	SCALE Summer 2023 Weekly Research Working Group Meeting
25– 27 Sept	CSME annual review

Have a question or an article topic suggestion?
 Email us at SCALE-WFD@us.navy.mil or SCALE@purdue.edu