NANOSCALE EDUCATION, SCIENCE, AND TECHNOLOGY CENTER (NEST)

Ben Hawkins
Associate Director, Cal Poly Microfabrication Lab
Associate Professor, Biomedical Engineering

Hans Mayer
Director, Cal Poly Microfabrication Lab
Associate Professor, Mechanical Engineering

“FABRICATING A NANOSCALE FUTURE”

The CP NEST Center will be the primary provider of workforce training, education, and research in nanoscale systems for the CSU and the Central Coast

A HUB FOR NANOSCALE ENDEAVORS

Supporting students, faculty, and community

The CP NEST Center can provide centralized support for

- Student education for careers in nanoscale and semiconductor manufacturing
- Worker certification, training, and re-/up-skilling
- Industry partner outreach and development
- Developing, supporting, and maintaining highly specialized equipment
- Conducting and sharing research activity
- Supporting funding requests/grants

BUILDING A WORKFORCE

Multidisciplinary Research and Training

By 2030, the US will need **150,000 new workers** in microelectronics fabrication. Skilled labor (AS/CC), operators and managers (BS/MS), and technical leaders (MS+) in nanoscale and semiconductor manufacturing are all expanding

Faculty need facilities access for research and innovation

Interested Cal poly students from Electrical, Computer, Mechanical, Biomedical, and Materials Engineering as well as Physics, Chemistry, and Manufacturing are all seeking relevant learning opportunities

Community college and industry partners also seek this expertise

THE NEST CENTER

An Organizing Entity

Establishing a clearly identifiable unit – The Nanoscale Education Science and Training Center – addresses the needs of all stakeholders

- Cal Poly students can find resources (Microsystems Technology ”club”) and classes (Multidisciplinary Microsystems Minor)
- Cal Poly faculty can find and support facilities
- Community members can find training opportunities (SEMI-accredited certificate)
- External partners can connect to skilled researchers and advanced equipment

ENVIRONMENTAL ANALYSIS

Semiconductor Manufacturing is Growing

The 2022 CHIPS and Science Act providing significant funding to develop domestic semiconductor manufacturing.

Investment continues, with global companies (TSMC, Micron Semi, Intel, Qualcomm) establishing new domestic facilities.

Rapid developments in quantum computing and AI-specific chip manufacturing continue to drive demand

Education and workforce development efforts are needed **now** to meet increasing demand by 2030

- Engineer demand is forecasted to grow from 9,000 to 17,000 annually starting in 2025.
- Technician demand is expected to double from 7,000 to 14,000 annually

ROADMAP

1. Convene an advisory board with internal and external stakeholders, including key industry partners
2. Establish the Nanotechnology Education Science and Technology Center at Cal Poly to act as a coordinating hub
3. Develop a standards-based certificate program for internal and external stakeholders, and establish a Multidisciplinary Microsystems Minor for Cal Poly students
4. Leverage expanded industry and government partnerships to enhance facilities and capabilities

RESOURCES

Have

- Existing lecture and laboratory coursework
- Faculty engaged in managing and developing facilities and coursework
- Growing student interest and a network of alumni supporters

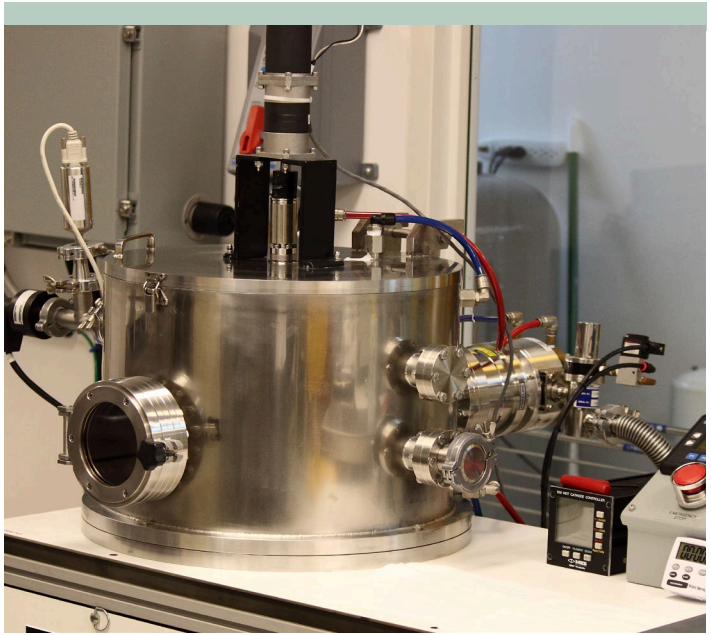
Need

- Development support for industrial relations and partnerships
- Financial support for facilities operation, maintenance, and modernization
- Dedicated full- or part-time technical staff
- Expanded networking resources

BUDGET AND FUNDING

One-time and continued support for cleanroom facility

Item	Cost
Supplies/operating costs	~$25k/year (ongoing)
Equipment maintenance/replacement	$25k
Upgrades	$3M +
Courses	5-9 WTU/term
Certificate Program (Open University, self support)	(under development)



THE ASK

COLLEGE OF ENGINEERING AND CAL POLY

SUPPORT/BUY-IN

Endorsement of the proposal to establish the CP NEST Center as a College of Engineering resource, as well as support for curricular proposals and administrative needs

ADVANCEMENT

The financial development of the CP NEST Center will depend on increasing engagement from industry, academic, and government partners

FINANCIAL COMMITMENT

Continued financial support for facility, as well as associated coursework, in partnership with internal and external stakeholders

THANK YOU

"The impossible often has a kind of integrity which the merely improbable lacks."

Douglas Adams