Semiconductor Manufacturing Program
At UCF
October 22nd, 2022

College of Engineering
and Computer Science

UNIVERSITY OF CENTRAL FLORIDA
Current Semiconductor-Related Activities at UCF

• Spread over three colleges of CECS, COP, COS
  • More than 20 research-active faculty members
  • Close to $20M research funding during the past 4 years
  • Spanning a range of expertise including Silicon Photonics, MEMS, Material Processing, Solar Cells, Interconnects, etc..

• Facilities
  • Central cleanroom operation managed by the office of research (OR)
  • Central characterization facility managed by OE

• Education
  • More than 40 courses (UG and GR) are offered over several discipline
  • Consistent hands-on fabrication training at graduate level
Current Training Activities

• Mostly focused on graduate students
• Consistently produced high-quality graduates that are hired by major players: Intel, TI, Micron, Renesas, etc...
• Recently extended to undergraduate in limited capacity
New Investments

$3.1M in recurring and $10.8M in nonrecurring Funds

Academic Excellence Program

• Cleanroom Equipment Budget ($1,785,000 nonrecurring):
  • Advanced Electron-Beam Lithography System ($1.5M)
  • E-Beam Evaporator System for Metal Deposition ($280,000 with $260,000 from UCF)
  • Plasma-Enhanced Chemical Vapor Deposition (PECVD) Chamber ($255,000 with $30,000 from UCF)
• 6 Faculty Lines ($1.15M recurring and $3.8M startup fund)
• Two Cleanroom Technical Staff Positions ($250K recurring salaries):
  • Manager of UCF’s Nanofabrication Cleanroom Facilities
  • Equipment Maintenance Engineer

Jump Start Program

• Equipment Acquisition: A direct-write (maskless) photolithography tool ($534,000)

Operational Excellence Funds

• 13 faculty lines ($1,950,000 recurring salaries and $5,200,000 startup funds)
Major Equipment Acquired

• Two major equipment are ordered
• Installation planning is ongoing

Raith EBPG5150 Plus - Ultra High-Performance e-Beam Writer

DWL 66+ maskless photolithography system from Heidelberg, Inc.
Latest Announcement

- New Undergraduate Degree in Semiconductor Manufacturing is being planned at UCF
- A three-year budget of $250K/year is allocated by the provost
- A task-force is formed to fast-track the program development
- A certificate in semiconductor science and engineering will be announced in spring 2023
- A degree program announcement in Semiconductor Manufacturing is expected in 3 years
The Potential

• More than 100 graduates per year is envisioned in 5 years
• Variety of skill set:
  • Semiconductor materials
  • Semiconductor processing
  • Process Integration
  • Yield management
  • Equipment operation and maintenance
• Job-ready graduates through:
  • Targeted skill-development curriculum
  • Summer internships to better prepare the students
  • Year-around on-campus cleanroom co-op positions to enhance the learning experience
The Industry Engagement

- Efforts have stated to recruit industrial partners
- An industrial advisory board will be formed to guide the program and shape it around the industry needs
- The industrial partners are expected to:
  - Review curriculum and offer feedback
  - Help in teaching the course through expert advice
  - Offer guaranteed internship lines to the students
  - Help fund the on-campus co-op positions
  - Help with acquiring training equipment and software
  - Provide major funding for renovation of the labs and building new space.
THANK YOU