

ADVANCED ELECTRONICS R&D AND MANUFACTURING IN NEW YORK'S CAPITAL REGION

ASSETS

SUNY Polytechnic Institute:

- ▶ Albany NanoTech Complex
 - **\$15B** in public and private investment
 - 1.65 million sf facility with 300 toolsets
 - **140,000 sf** of class 10K and better cleanroom
 - Wet labs, metrology labs and 3D packaging
- ▶ R&D capabilities include:
 - Power Electronics/Mixed Signals
 - Wafer Processing & Manufacturing
 - Lithography Tooling
 - Materials Research
 - Compound Semiconductor Research & Applications
 - Data Analytics
 - Potential for Commercial Wafer Production
 - Artificial Intelligence
 - Nanomedicine

Center for Semiconductor Research:

- **\$500M** partnership with leading semiconductor companies, including:



Supply Chain:



GLOBALFOUNDRIES:

- Fab 8 in Malta, near Saratoga Springs, is the nation's most advanced semiconductor factory
- **\$15B, 2.9M sf** facility with **3,000+** workers
- **450,000 sf** of clean room and clean space

IBM Research AI Hardware Center:

- **\$300M** center for R&D, emulation, prototyping, testing and simulation activities for the new AI cores, with specialization in wafer processing
- **326** jobs at Albany NanoTech

Materials Engineering Technology Accelerator (META Center):

- Applied Materials' R&D hub for prototyping of new materials, process technologies and devices
- **\$880M** public-private investment
- **400** jobs at Albany NanoTech

CREE:

- Cree is using SUNY Poly equipment to pioneer a process for producing devices on **200mm** silicon carbide wafers
- SUNY Poly equipment will be transferred to the Marcy Nanocenter near Utica for a **\$1 billion** **200mm** silicon carbide wafer fabrication facility
- **600** jobs at Marcy Nanocenter

CAPITAL REGION INNOVATION PROWESS

- **1 in 5** semiconductor device patents awarded in U.S. listed at least one Capital Region inventor (1,302 in 2018)
- **10th** most workers in the R&D in Physical, Engineering, and Life Sciences industry (6,467 in 2018*)
- Named by Brookings the **3rd** Leading Potential Innovation Growth Center in U.S.*
- **1 of less than 50** metro areas where private businesses spend more than \$1B on R&D (\$1.256B in 2015*)
- **\$374.1M** spent on engineering R&D by Capital Region colleges and universities in 2018

*Albany-Schenectady-Troy MSA



Albany Nanoplex Campus



GLOBALFOUNDRIES Fab8

NANOTECHNOLOGY WORKFORCE

Jobs by Industry

9,975 Advanced Electronics Cluster jobs

Including:

3,635 Semiconductor Device Manufacturing

5,675 R&D in the Physical, Engineering, and Life Sciences

Jobs by Occupation

Engineers

Chemical: 236
 Electrical: 1,209
 Industrial: 1,679
 Materials: 187
 Mechanical: 1,390

Technicians

Chemical: 386
 Electrical and Electronics
 Engineering: 529
 Industrial Engineering: 660
 Mechanical Engineering: 109

Degrees Awarded (2018)

3,824 STEM

1,450 Engineering & Engineering Technologies



Talent Pipeline

Technical Programs

- Capital Region BOCES: Engineering Technician Program/Mechatronics
- Fulton-Montgomery Community College: Electrical Engineering Technology
- Hudson Valley Community College: Advanced Manufacturing (w/Capital Region BOCES)
- SUNY Adirondack: Advanced Manufacturing and Mechatronics (w/WSWHE BOCES)
- SUNY Schenectady: Nanoscale Materials Technology

Engineering Degree Programs

- SUNY Polytechnic Institute: Nanoscale Engineering, Nanoscale Science, Advanced Technology
- Rensselaer Polytechnic Institute: Materials Engineering, Mechanical Engineering, Industrial Engineering, Electrical Engineering, Chemical Engineering
- Union College: Electrical Engineering, Mechanical Engineering, Nanotechnology (minor)
- University at Albany: Electrical and Computer Engineering
- Excelsior College: BS Electrical Engineering Technology (BSEET)