

ADVANCED ELECTRONICS R&D AND MANUFACTURING

IN NEW YORK'S CAPITAL REGION

(Updated: July 2021)



ASSETS

- ▶ Albany NanoTech Complex
 - **\$15B** in public and private investment
 - **1.65M sf** facility with **300** toolsets
 - **140,000 sf** of class 1 capable cleanrooms
 - 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:



GlobalFoundries:

- Fab 8 in Malta, near Saratoga Springs, is one of the nation's leading semiconductor manufacturing operations
- **\$15B, 2.9M sf** facility with **3,000+** workers
- **450,000 sf** of clean room and clean space
- Recently announced new Fab 8.2 will double output

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

Materials Engineering Technology Accelerator (META Center):

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

Wolfspeed & Danfoss Silicon Power:

- Wolfspeed is using SUNY Poly equipment at the Albany Nanoplex Complex to pioneer a process for producing devices on **200mm** silicon carbide wafers
- Danfoss uses silicon carbide chips made at the Albany Nanoplex Complex to manufacture power modules at Quad-C Iad in Utica
- This equipment will be transferred to the Marcy Nanocenter near Utica for a **\$1 billion 200mm** silicon carbide wafer fabrication facility
- **900** jobs at Marcy Nanocenter and Quad-C facility

Semiconductor Start-Ups:

FASTWATT

FastWatt

compact power conditioner using wide-band gap semiconductors



LUX Semiconductors

semiconductor recrystallization technology for flexible electronics

SelfArray

SelfArray

direct-view LED



Pallidus

produce silicon carbide crystals

thermaura

ThermAura

thermoelectrics



SMART Pad

wafer polishing pads with micro features



Menlo Microsystems

Electronic switches

NoMIS Power Group

silicon carbide semiconductor and module development

CAPITAL REGION INNOVATION PROWESS

- **1,404** semiconductor device patents awarded in U.S. listing at least one Capital Region inventor in 2019 – *more than any state except CA*
- **14th** most workers in the Scientific R&D Services jobs (8,214 in 2020*)
- **\$1.17B** in private business R&D spending in 2018*
- **\$1.46B** in Computer & Electronic Product exports in 2019* – *top 30 exporting metro*
- **\$3.3M** in NSF SBIR/STTR seed funding for semiconductor-related startups since 2015
- **\$343.4M** spent on engineering R&D by Capital Region colleges and universities in 2019

*Albany-Schenectady-Troy MSA



Albany NanoTech Complex



GlobalFoundries Fab8, Malta

Supply Chain: Advanced Materials & Chemicals

Pallidus
Momentive Performance Materials
PeroxyChem
Surpass Chemical

Construction

Beard Integrated Systems, Inc.
Total Facility Solutions Inc.

Engineering

Exyte
DPS
EYP

Equipment

Edwards Vacuum
Precision Valve and Automation
Banner Industries
Axcelis Technologies, Inc.
EBARA Technologies Inc.
Applied Materials
Tokyo Electron
ASML
LAM Research
General Control Systems

Gas

Noble Gas Solutions
Air Liquide

Fittings

Swagelok
Harrington Industrial Plastics

ADVANCED ELECTRONICS WORKFORCE (2020)

9,683 jobs, Including:

3,217 Semiconductor and Related Device Manufacturing

6,366 R&D in the Physical, Engineering, and Life Sciences

DEGREES AWARDED (2018-2019)

14,436 Total Degrees

3,565 STEM Degrees

1,333 Engineering & Engineering Technologies

Talent Pipeline



Technical Programs

- Training and Education Center for Semiconductor Manufacturing and Alternative and Renewable Technologies (TEC-SMART)/HVCC
- SEMI Industry Approved Apprenticeship Program/HVCC
- 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
- SUNY Polytechnic Institute Northeast Advanced Technology Education Center & Advanced Manufacturing Performance Center (Advanced Manufacturing Technician Program/Mechatronics)

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)