## Open to external corporate, government, and university affiliates

The Claire and John Bertucci Nanotechnology Laboratory is open to external users from corporate, governments, and university affiliates. Approximately 200 individual researchers take advantage of the facility each year.


Contracts are available for partners interested in using our lab directly as well as those who seek fee-for-service work. Included with the contract, researchers are provided:

- ☑ 24/7 access to equipment and facilities
- ☑ Staff support and training
- ☑ Access to process knowledge and recipes
- ☑ Networking opportunities with students, postdocs, faculty, and staff

If you are interested in joining The Claire and John Bertucci Nanotechnology Laboratory, please contact Matthew Moneck by phone at 412-268-5430 or by email at mmoneck@andrew.cmu.edu.

**Prof. Gianluca Piazza, Faculty Director**

"The new Claire and John Bertucci Nanotechnology Laboratory is catalyzing activities around nanomanufacturing at CMU and helping in generating an ecosystem that engages researchers, students, and industry in unique ways. The new Eden Hall Foundation Cleanroom will have a long-lasting transformative impact on the College of Engineering and the broader CMU community. The Nanofab will ensure that CMU maintains a position of leadership in driving discovery and innovation in nanoscale engineering."

**Dr. Matthew T. Moneck, Executive Manager**

"The Claire and John Bertucci Nanotechnology Laboratory is truly a game-changing space. We already see the active impact the Eden Hall Foundation Cleanroom has made on our campus and its community. As we look ahead, we are excited about the new collaborations this facility may bring and the prospect of those collaborations to generate advancements in science and engineering through new equipment, resources, and funding that allow our researchers to produce the next generation technologies which help shape our world."

Carnegie Mellon University

## Contact us

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# Claire and John Bertucci Nanotechnology Laboratory

A premier nanomaker hub
nanofab.ece.cmu.edu

# Nanofab quick facts

The Claire and John Bertucci Nanotechnology Laboratory is a premier research facility in Western Pennsylvania and the “Tech-Belt” (PA-OH-WV) region. Located in Carnegie Mellon University’s Sherman and Joyce Bowie Scott Hall, the "Nanofab" houses more than 100 processing tools maintained by highly qualified technical staff members, and is responsible for more than $10M/year in cutting-edge research.


### Eden Hall Foundation Cleanroom

The 14,000 sqft. Claire and John Bertucci Nanotechnology Laboratory houses the brand new 8.500 sqft. Class 10/100 Eden Hall Foundation Cleanroom. Characterized as one of the most energy efficient cleanrooms in the United States, the nanotechnology lab as a whole has helped the Sherman and Joyce Bowie Scott Hall building earn the distinction of being certified LEED Gold. Furthermore, the lab features state-of-the-art controls, 19 brand new wet chemistry decks, 3 EMI-shielded rooms, and many other advancements designed to support a continuously growing and diversified set of users.

# Nanofab capabilities

### Etching

Suite of 6 Cl-based and F-based ICP and RIE tools, 3 ion beam etch tools (one with SIMS endpoint), $XeF_2$, vapor HF, wet etch, critical point dryer, O2 plasma ash, UV ozone.

### Lithography

3 e-beam systems, i-line stepper, suite of mask aligners, direct write laser system and photomask generator.


**Key tools**
Elionix ELS-G100 E-beam System, ASML 5500/80 i-line Stepper, Plasma Therm Versaline Cl-based ICP RIE, STS Multiplex Bosch Etcher, STS Aspect AOE and ICP RIE, GVD Corp. iLab and oLab CVDs, Tegal AMS AlN Sputtering, Cambridge Fiji ALD with Plasma, Kurt Lesker 8-source PVD75 Evaporator

### Deposition

Suite of 15 PVD systems, ALD, PECVD, CVD, parylene, electroplating.

### Post-Processing, inspection, and metrology

CMP, stress measurement, reflectometry, SEMs, profilers, probe stations, microscopes, RTA, annealing, wafer dicing.

### Material capabilities (>100 available)

Variety of metals, oxides, nitrides and semiconductors, as well as polymers, parylene, PDMS, SU8. Specialties include: AlN, magnetic materials, functional oxides.

# Core research areas

With up to 50 faculty using the nanotechnology laboratory, Carnegie Mellon University is a world leader in:

- Magnetics and Spintronics
- MEMS and NEMS
- Functional Oxides and Resistive RAM
- Photonics and Plasmonics
- Biointerfaces and Bioelectronics
- 2D Materials (Graphene, BN, etc.)
- Organic and Inorganic Interfaces

The multidisciplinary and collaborative nature of the faculty of Carnegie Mellon University has given way to several major research thrusts centered around nanoscale manufacturing:

- **Emerging Computing Technologies** (non-volatile memory, magnetic logic, neuromorphic, and low-energy computing)
- **Internet of Things** (integrated sensors, actuators, resonators, modulators, switches)
- **Energy** (solar and thermal adsorbers, materials for energy conversion, light harvesting materials, and thermal management)
- **Life Sciences** (neural probes, bio-sensors, hydro-gel electronics, and protein scaffolds)