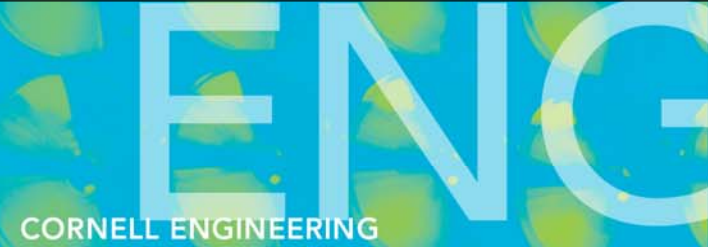




Materials Science + Engineering



Degree Programs and Research Areas

Materials scientists & engineers manipulate the mechanical, electrical, optical, magnetic, and chemical properties to create and improve the materials from which all engineered objects are made.

The department's four strategic research areas are:

- Energy & Environmental Technology
- Biotechnology & Life Sciences
- Nanotechnology
- Information & Telecommunications Technology



Degrees: B.S., M.Eng. and Ph.D. degrees

Trends

In the last decade, a revolutionary transformation has been taking place in MS&E.

- Traditional boundaries between the study of metals, ceramics, semiconductors, and polymers have begun to fade away.
- Advanced technologies require a more integrated approach.
- Molecular scale engineering.
- Expansion into the realm of biology.

Achievements

The MS&E department faculty has frequently been recognized for their contributions to the field:

- Prof. Emmanuel Giannelis is a founding Co-Director of the KAUST-CU Center for Energy and Sustainability.
- Assoc. Prof. George Malliaras was named Director of the Cornell NanoScale Science and Technology Facility and received the New York Academy of Sciences Blavatnik Award for Young Scientists.
- Assoc. Prof. Shefford Baker was elected Vice President/President Elect of the Materials Research Society (MRS).
- Asst. Prof. Chekesha Liddell (pictured below) received the Presidential Early Career Award for Scientists and Engineers (PECASE) from the National Science Foundation (NSF).
- Prof. Darrell Schlom has been selected to receive the 2008 MRS Medal.



Graduate students Ian Hosein and Stephanie Lee work with Asst. Prof. Chekesha Liddell (center).

Priority Goals

The primary goal of the department is to: **Strengthen our national rankings to consistently be a Top 5 program.**

To accomplish this, significant additional resources are needed. These include:

- Adding several new permanent faculty lines (currently 14).
- Raising endowed fellowships for graduate student support.
- Investing in undergraduate program recruitment and development.
- Significant investment in improving existing research space and equipment.



Amanda Kleiman '09 works on an experiment in the MS&E Undergraduate Laboratory.



PhD student Sara Barron (van Dover Group) using a vacuum deposition system in the lab

Challenges

- **Size and resource limitations** in MS&E are major impediments to achieving our goals and maintaining our national leadership position.
- Given **expected retirements** and key faculty taking on **significant administrative responsibilities**, adding new faculty is a top priority.
- We have historically performed at high levels without the benefit of **modern and ample space**. Our research groups will perform to their fullest potential only with adequate space.

Opportunities

- We have hired several **new faculty** in recent years, and they are demonstrating significant progress in all phases of their work.
- Exciting new **research developments**.
- **Highly visible initiatives** such as the KAUST-CU Center.
- Anticipated addition of **more faculty**.

Computer simulation shows how platinum nanoparticles will fuse into a structure with tiny pores after the polymers that guide them into position are removed. Image courtesy of Wiesner Group.

