

Materials Science + Engineering

CORNELL ENGINEERING

Degree Programs and Research Areas

Materials scientists and engineers manipulate the mechanical, electrical, optical, magnetic, and chemical properties to create and improve the materials from which all engineered objects are made. We offer BS, MEng and PhD degrees.

Primary Areas of Research

The department's four strategic research areas are Energy and Environmental Technology, Biotechnology and Life Sciences, Nanotechnology, and Information and Telecommunications Technology.

Trends

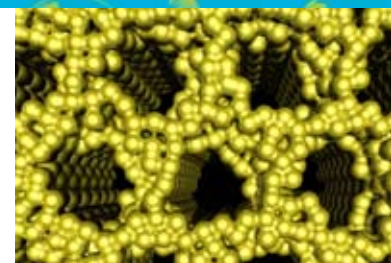
In the last decade, a revolutionary transformation has been taking place in MSE. The traditional boundaries between the study of metals, ceramics, semiconductors, and polymers have begun to fade away, largely because advanced technologies require a more integrated approach. Molecular scale engineering, coupled with its expansion into the realm of biology, is dramatically changing the landscape. Cornell MSE has embraced these changes and focused our research activities around the four strategic areas identified above.

Achievements

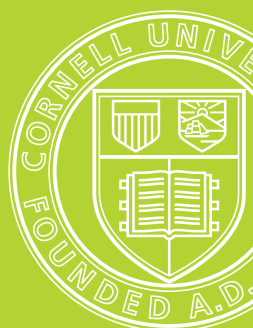
MSE department faculty has frequently been recognized for their contributions to the field. For example, Prof. Emmanuel Giannelis is a founding Co-Director of the KAUST-CU Center for Energy and Sustainability; Assoc. Prof. George Malliaras was named Director of the Cornell NanoScale Science and Technology 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); and Asst. Prof. Chekeshia Liddell received the Presidential Early Career Award for Scientists and Engineers (PECASE) from the National Science Foundation (NSF). Finally, new faculty member Prof. Darrell Schlom has been selected to receive the 2008 MRS Medal.

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, and significant investment in improving existing research space and equipment.



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.



Challenges

Size and resource limitations in MSE are major impediments to achieving our goals and maintaining our national leadership position. Combined with 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. Combined with exciting new research developments, highly visible initiatives such as the KAUST-CU Center, and the anticipated addition of more faculty, the Department is very well positioned for the next five years.



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



Amanda Kleiman '09 works on an experiment in the MSE Undergraduate Laboratory.