

Present and Future

This year, a lot is new and there is plenty of activity around campus. For starters, the NanoEngineering department has moved into the new Structural and Materials Engineering building. If you are a student at UC San Diego and have not yet been in it, you are encouraged to. Also, the first class earning a Bachelors of Science in NanoEngineering will graduate this coming summer. On campus at UC San Diego, students have a wide range of options for experience outside the classroom, which NETS is exploring. Please stay tuned as we identify and create new opportunities relating to nanoengineering. To our new students, welcome to UC San Diego and the NanoEngineering community.

NETS is a relatively new organization and are just getting off the ground and we are not even a year old. Our mission for the year is to support NanoEngineering students and any others interested in this exciting field. Ultimately, we aim to create a larger community of students, faculty, and professionals and are working towards this.

Many of our members are wondering what exactly "nano" means and how will it impact our future. In a nutshell, this term refers to systems that are characterized on the scale of between 1 and 100 nanometers. Here, neither classical nor quantum mechanics clearly defines things. While discussion and speculation about how to engineer things on this scale is not new, we are just now finding out how to do this.

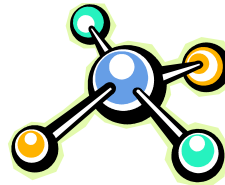
There is a small, but growing, nanotech specific industry around San Diego and in California. On a nationwide and global scale, investment and the number of new, commercial nanotech branches and projects in this field is continuing to increase.

As we further establish ourselves, more will come. This year, we have of potential for growth and development. Your feedback and active participation will determine the character and future of NETS as we move forward.

We cordially invite you to join with us.

Sincerely,

Duncan McClure,
NETS Board



Fall 2012, Issue 1

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Definitions of NanoEngineering

Nanotechnology is the ability to control and restructure the matter at the atomic and molecular levels in the range of approximately 1–100 nm, and exploiting the distinct properties and phenomena at that scale as compared to those associated with single atoms or molecules or bulk behavior. The aim is to create materials, devices, and systems with fundamentally new properties and functions by engineering their small structure. This is the ultimate frontier to economically change materials properties, and the most efficient length scale for manufacturing and molecular medicine. The same principles and tools are applicable to different areas of relevance and may help establish a unifying platform for science, engineering, and technology at the nanoscale. The transition from single atoms or molecules behavior to collective behavior of atomic and molecular assemblies is encountered in nature, and nanotechnology exploits this natural threshold.

- Definition set out in Nanotechnology Research Directions, 1999. Quoted from National science Foundation report *The long view of nanotechnology development: the National Nanotechnology Initiative at 10 years* by Mihail C. Roco, 2010, Published online: 12 February 2011

NanoEngineering At UCSD

Nanoengineering: The design, fabrication and characterization of nanoelements into nanostructures, devices, and systems and integration into larger scale structures. It will impact all aspects of our lives, from energy use, communication, medicine, to national defense.

- Dr. Shaochen Chen

Nanoengineering is the generation and exploitation of materials and phenomena that occur on the scale of 1 to 100 nanometers to improve human well-being. The most important area in which nanoengineering is making an impact is in information technology, where "microelectronics" has really been "nanoelectronics" for several years, although the most interesting effects of confining devices to small dimensions (tunneling, etc.) are treated as something to suppress, rather than something to exploit. In the next ten years, we will see nanoengineered systems contribute in significant ways to targeted treatment of diseases and to the energy challenge, particularly through advances in nanostructured solar cells and batteries.

- Dr. Darren Lipomi

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"materials and phenomena that occur on the scale of 1 to 100 nanometers to improve human well-being."

NETS GBM

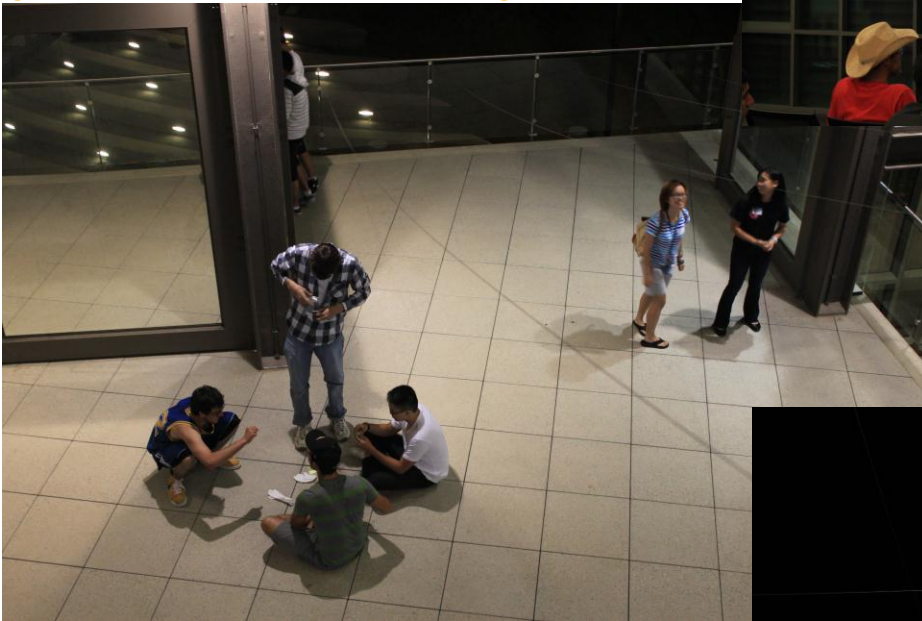
On Thursday, October 4th, NETS held its first General Body Meeting (GBM) of the 2012-1013 academic year. This event was kicked off with a brief presentation about nanotechnology, its prevalence, uses and potential.

The event culminated in a vehicle competition, in which teams built a small (but not nano) scale machine out of disposable, household materials and raced them down ziplines in the Structural and Materials Engineering building. The championship round saw Team Degaf, beat Team Ethanol, claiming the title

More photos are and coverage of the GBM will be posted on the NETS website.



Above: The moment before the opening presentation



Left: Vehicle competition, teams brainstorm their ideas.

Below: Congratulations to Team Degaf for taking first place in the vehicle competition



All photos courtesy of D. McClure Photography

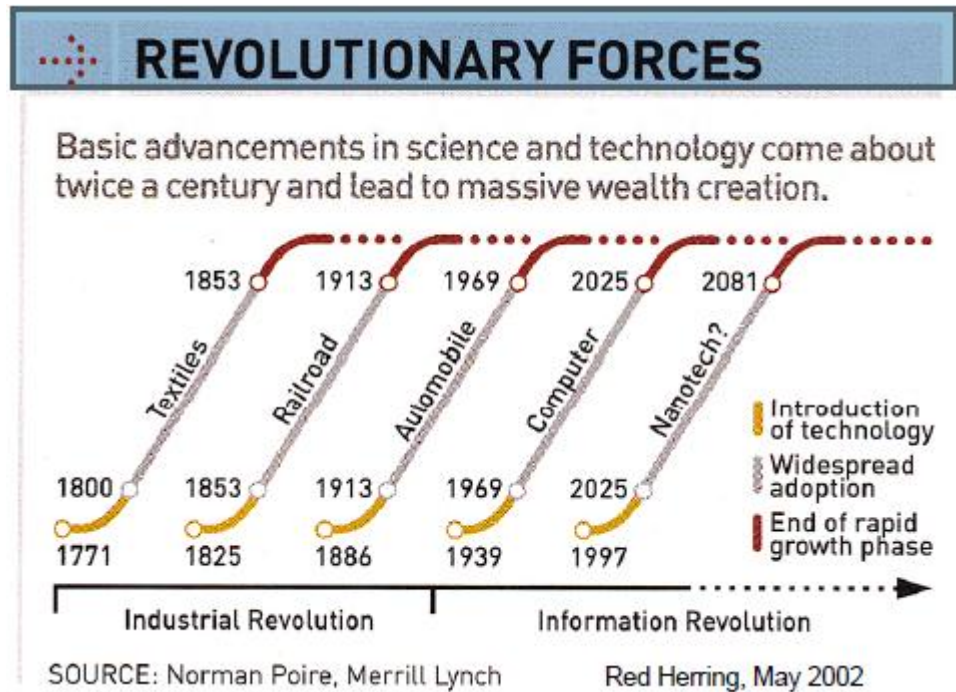


Upcoming Events

- Week 4: Seminar - Grad Student Ronnie Fang [Oct 22 at 6:30pm, Cymer Conference Center]
- Week 6: Faculty/Student Mixer [Nov 9th at 3pm, Cymer Conference Center]
- Week 9: Graduate Student Panel [Nov 29 at 5pm, Cymer Conference Center]
- Week 10: Study Area for Finals

Newsletter and GBM photos by Duncan McClure

Please send any questions, comments, or feedback to dmclure@ucsd.edu



Graphic of the Quarter – Revolutionary Forces

Nanotechnology is a field about to intensify, according to this figure published by Red Herring in 2002.

According to recent literature put out by the National Nanotechnology Initiative (NNI), we are transition from investment into developing nanotech products (Phase I) to putting them into practice (Phase II). In about 10 years, it is predicted that nanotech will take off and be widely adopted, driving demand for skilled professionals.

