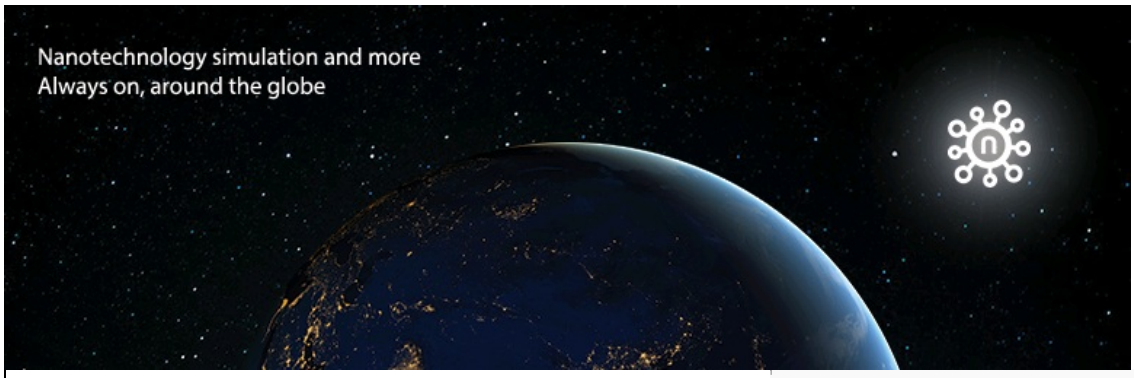
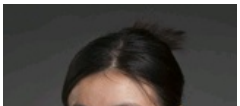


Issue 34

Chinese Engineering Freshmen Learn Materials Science Concepts With nanoHUB

Last summer, Lan Li traveled nearly 7000 miles to introduce college freshmen in the south of China to computational simulation with nanoHUB tools.



Upcoming Events

Nano Curriculum Materials I Workshop

When: Four Friday sessions, 11 a.m. - 4 p.m. EDT, March 22, 29, April 5, 12, 2019

Where: Online workshop

This series of two workshops, the Nano Curriculum Materials Workshops were created to provide faculty with resources (labs, presentations, and more) and guidance to effectively teach undergraduate nanotechnology courses. Application deadline: Friday, March 8, 2019.

Website: Nano Curriculum Materials I Registration

7th European Nanotechnology Congress

When: May 17-18, 2019

Where: Brussels, Belgium

The 7th European Nanotechnology Congress gathers renowned scientists, physicians, surgeons, young researchers, industrial delegates and talented student communities in the field of nanotechnology under a single roof where networking and global partnering happens for the acceleration of future research.

Website:
https://www.meetingsint.com/conferences/euronanotechnology

Explore Events

New Resources

CELL-MET Technology Foundations

The NSF Engineering Research Center in Cellular Metamaterials (CELL-MET) plans to accomplish four goals with the cellular metamaterials it intends to build: fabricate responsive heart tissue containing muscle cells and blood vessels; understand and control the tissue using optical technologies; scale the process up to easily create multiple copies of the tissue; and personalize the product, so it can be tailored to individual patients.

These 'Technology Foundation' videos provide insight on the current progress of each Thrust Area (Nanomanufacturing, Nanomechanics, Imaging, and Cellular Engineering) as presented by graduate students representing Boston University, the University of Michigan, and Florida International University.

PhysiCell: Invader-Scout-Attacker System

This model was created to show the potential for chemical communication to drive complex dynamics in multicellular systems. It is part of a course on computational multicellular systems biology created and taught by Dr. Paul Macklin in the Department of Indiana University. It is also part of the education and outreach for the IU Engineered nanoBIO Node.

NCN Undergraduate Research Experience 2018 - 3 Minute Research Talks

As part of their undergraduate research experience, each student gave a 3-minute presentation describing their research work. This series contains each recorded presentation.

Water From Urine

The average person on Earth uses about 80 gallons of water per day, however, in space astronauts only use about 3 gallons of water per day. Because water is a limited resource in space, NEWT (Nano-Enabled Water Treatment) scientists

are working on a solution to recycle water from urine using nanotechnology. In this video, students will learn about the process required to extract water from urine.

Nanoparticle Assembly Lab

and Engineering at Boise State University, was invited by faculty at the Harbin Institute of Technology to offer “Summer Course in Special Topic”, a one-credit class lasting three weeks between the end of the spring semester and the beginning of summer vacation.

The Harbin Institute of Technology Shenzhen (HITSZ) is located in Shenzhen (near Hong Kong), Guangdong Province, China.

The course was organized by the Department of Materials Science and Engineering at HITSZ but offered to all interested freshman engineering students. 55 undergraduates in Materials Science and Engineering, Computer Science, Environmental Engineering, Civil Engineering, and other related disciplines attended.

“Students could take my course to meet an elective requirement,” says Dr. Li. “They could also use it as an English language credit, as the course was taught in English.”

Faculty hosts at the university thought it might be difficult to run tools installed locally on Linux or Unix machines, so Dr. Li suggested nanoHUB as an option. Others were concerned that nanoHUB might not be accessible in China due to the strict national firewall, but experiments proved otherwise.

60% of course time was devoted to covering basic materials science concepts such as atoms, molecules, and crystal structures, with the rest dedicated to computational simulation. Dr. Li demonstrated the SIESTA tool from the MIT Atomic-Scale Modeling Toolkit module to perform thermodynamic and kinetic calculations, electronic structure calculations, and mechanical property prediction.

As an introductory-level course, the majority of the students had no computational science, modeling, or materials simulation background.

“It was a very good experience. For students, it was the first time for them to learn what ‘material’ really means. They were so surprised to find that you can find the most stable structure of a material computationally without doing experiments,” Dr. Li says.

According to Dr. Li, the freshman students found it easy to keep up with the materials being taught. They were also interested to learn that the tools on nanoHUB were free to access. Dr. Li hopes that students may be inspired to take materials science courses in their junior year, with her course providing an introduction.

At the end of the three-week period, she asked students to write a course summary. Many students expressed interest in using nanoHUB in the future, especially those students studying materials science.

Dr. Li will likely teach the course again this summer. She also plans to continue the discussion with faculty in China regarding the use of nanoHUB in their own courses and for research.

Help Your Research Stand Out

If you are writing a journal article or other scholarly publication that references nanoHUB or a nanoHUB resource, i.e. a simulation tool, teaching resource, presentation, or compact model, your paper can benefit from increased exposure provided by inclusion in the nanoHUB citation database.

Make sure that your paper mentions “nanoHUB” by name. Our automated system for tracking online citations will capture, categorize, and archive a link to your research paper on our “Citations” page. If you include a **link to the published resource** that you are citing, we can also make sure that your paper is listed as a citation directly on that resource’s home page. This

This app simulates the self-assembly of charged nanoparticles (NPs) into aggregates mediated by smaller, oppositely-charged linkers under different ionic physiological conditions. Users can input control parameters such as NP charge, linker concentration, and ionic strength to predict formation of NP aggregates. This information may be useful in designing NP features to produce desired effects when NPs interface with biological entities.

Machine Learning for Materials Science: Part 1

Data science and machine learning are playing increasingly important roles in science and engineering and materials science, and engineering is not an exception. This online tool provides examples of the use of these tools in the field of materials science using Jupyter notebooks. The notebooks contain step by step explanations of the activities and live code, that can be modified by the users for hands-on learning. The initial set of tutorials focuses on: i) data query, organization, and visualization, ii) developing a simple model using linear regression to explore correlations between materials properties, and iii) neural network models trained to predict materials properties from basic element properties.

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