



Issue 68

Stay informed about what's happening in the nanoHUB community by exploring upcoming events, new resources, and community news.

## Upcoming events

### Recitation Series: nanoHUB Tools for Semiconductor Education

The Chips and Science Act and recent economic needs have re-kindled national and global interest in semiconductor devices and created an urgent need for more semiconductor device engineers and architects. Students need to be trained in the fundamentals of semiconductor devices to meet this growing demand. nanoHUB director, Dr. Gerhard Klimeck, will introduce the tools found in the [ABACUS Tool Suite](#) in nanoHUB, which have been used by over 19,500 users and in over 350 classes globally. He developed these tools to teach his standard semiconductor device class at Purdue University.

The objective of the recitation series is to enable faculty to enhance existing or new semiconductor classes with interactive simulations. Simulations and animations can immerse students into “what if?” scenarios and engage them in more active forms of learning through homework assignments and design projects assignments.

#### Next Session

Thursday, August 31, 2023 from 11:00 AM to 11:45 AM EDT

[Register here](#)

### An Introduction to Finite Element Analysis of Material Microstructure Properties in nanoHUB

In this webinar Yang Dan, of the University of Illinois at Urbana-Champaign (UIUC), will give a brief introduction to the fundamentals of FEA and [OOF2](#) (Object-Oriented Finite Element) and demonstrate OOF2 simulations of stress distribution in example materials, with and without temperature effect. The Department of Materials Science and Engineering at UIUC has incorporated several computational modules into undergraduate courses that uses FEA to explore mechanical properties of materials, with the help of the OOF2 software in nanoHUB. Yang will also share his experience as an instructor in these courses on how OOF2 and nanoHUB facilitate teaching and learning at UIUC.

#### Date and Time

Friday, September 15, 2023 from 11:00 AM to 12:00 PM EDT

[Register here](#)

## New on nanoHUB

### ABACUS Overview and Crystal Structures (Fall 2023)

In the [first recitation session](#) on nanoHUB Tools for Semiconductor Education, Dr. Klimeck briefly discusses a new initiative, [Chipshub.org](#), then moves into an overview of [ABACUS](#) and demonstrates the Crystal Viewer Tool. This tool allows students to start with the visualization of a standard silicon text book unit cell, then expand the view to a larger crystal and immerse themselves into the various directional symmetries with activities such as viewing Miller planes and counting the number of bonds on such surfaces.

### ABACUS Bandstructure and Band Models (Fall 2023)

In the [second recitation session](#), Dr. Klimeck gives a brief overview of ABACUS and demonstrate several bandstructure tools. With these, students can explore the Standard Periodic Potential aka Kronig-Penney model as well as bandstructure formation by transmission through finite barriers. Students can change barrier heights or shapes and gain a “feeling” for the resulting shapes and effective masses of the bands. The more sophisticated bandstructure lab enables students to model standard bulk materials such as Si or GaAs in a

sophisticated Tight Binding model used in NEMO5. Effects of various strain configurations can be modeled and visualized. The tool can also model the bandstructure of modern nanowires. Some of these tools are powered by NEMO5 which is now being used to design nanometer scaled transistors in industry.

## nanoHUB Community News

### Science Gateways 2023 Conference

#### Rising Star Award

The [SGX3 Rising Star of the Year award](#) acknowledges Rising Stars for notable achievement in the advancement of science gateways. Rising Star of the Year applicants (or those being nominated for Rising Star of the Year) must be either an enrolled student or a professional. Individuals from all disciplinary areas are welcome to apply.

Selected Rising Star of the Year individuals will receive an honorarium of \$500 and a certificate. Rising Star of the Year recipients will be announced at the annual Gateways conference, and applicants are encouraged to attend. You will be asked to submit a travel support request form at a later date.

Nominate a student or professional through the [Rising Star of the Year application](#) before **September 1, 2023**.

#### Registration & Travel Support

Discounted early-bird registration (\$450) for the [Science Gateways 2023 Conference](#) will be available until **Friday, September 15, 2023**.

There is also a limited amount of travel support. Please [fill out the form](#) if you would like to be considered to receive travel support for Gateways 2023. Travel support includes flight, hotel and conference registration (up to a maximum of \$2000).

#### Faculty Hackathon

There is still time to apply to the [FacultyHack@Gateway2023!](#) The hackathon will involve five teams of two Computer Science faculty or one Computer Science and one related discipline area faculty.

Faculty teams will adapt High-Performance Computing (HPC) tools for use in their courses. They will leave with "ready-to-go" course outlines, supporting data, and identified resources. Each team will be assigned a technical mentor to help with this process. Teams completing all four challenges receive a \$1000 honorarium.

The deadline to apply is **September 15, 2023**.

**Do you have a suggestion or nanoHUB success story you'd like to share?**  
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