Electronics from the Bottom Up: Summer School 2012

Date and Location

July 16-20, 2012
Burton Morgan Building, Room 121
Purdue University, West Lafayette, IN, USA
Co-sponsored by the Network for Computational Nanotechnology and by the Intel Foundation

Registration/coffee: 7:30 am Lectures will be conducted in room 121 of the Burton Morgan Building

Summer School Details

NCN's Electronics from the Bottom Up (EBU) is an innovative educational initiative cosponsored by Intel, NCN, and Purdue University – to introduce students to new ways of thinking about electronic devices. New concepts and approaches, emerging from current research on nanoscience, are applied to non-equilibrium problems like nanoscale transistors, energy conversion devices, and bio-sensors. Lectures are designed to be broadly accessible to students with a BS in engineering, physics, and chemistry. The goal is to provide students with a deeper understanding of how structures at the atomistic and nanoscale affect performance at the micro and macroscopic scales. EBU shows students how a broad understanding of fundamental concepts helps them understand cutting edge research in nanoscience and technology.

This program is suitable for graduate students, faculty, and industry professionals working on electronic materials and devices. The Summer School will be an intensive and collaborative experience. Attendance is limited to fifty participants.

The 2012 Summer School will feature lectures by Dr. Michael McLennan on "Rapid Application Deployment" and Professors Mark Lundstrom, Supriyo Datta and Gerhard Klimeck on the topic of "Semiconductor Physics". Drs. Fonseca, Kubis, Povolotskyi, and Sellier will present a lecture and several tutorials on "Device Modeling with NEMO5."

The format will consist of:
See full [Summer School Schedule]

- Four lectures: Rapid Application Deployment, by Michael McLennan
- Nine lectures: Semiconductor Physics, by Supriyo Datta, Gerhard Klimeck and Mark Lundstrom
- One lecture and six tutorials: Device Modeling with NEMO5 by the NEMO5 Team (Michael Povolotskyi, Jim Fonseca, Tillmann Kubis, and Jean-Michel Sellier)

Participants who complete the series of lectures and exercises will be awarded a certificate of completion.

Instructors

Supriyo Datta is the Thomas Duncan Distinguished Professor of Electrical and Computer Engineering at Purdue University and has received IEEE Technical Field Awards for both research and graduate teaching. His unique approach to the problem of quan- tum transport combining the non-equlibrium Green function (NEGF) formalism of many-body physics with the Landauer formalism from mesoscopic physics has been widely adopted in the field of nanoelectronics.

Mark Lundstrom is the Don and Carol Scifres Distinguished Professor of Electrical and Computer Engineering at Purdue University. His research uses theory, modeling, and computer simulation to explore the physics and ultimate limits of electronic devices. Lundstrom is known for his pioneering studies of carrier transport in nanoscale transistors.

Gerhard Klimeck is the Director of the Network for Computational Nanotechnology at Purdue University and a Professor of Electrical and Computer Engineering. He guides the technical developments and strategies of nanoHUB.org that served over 167,000 users worldwide with on-line simulation, tutorials, and seminars in the year 2010. Previously he was a member of technical staff at the Central Research Lab of Texas Instruments where he served as manager and principal architect of the Nanoelectronic Modeling (NEMO 1-D) program. Prof. Klimeck's research interest is in the modeling of nanoelectronic devices, parallel cluster computing, and genetic algorithms.

Michael McLennan received a PhD in 1990 from Purdue University for his dissertation on dissipative quantum mechanical electron transport in semiconductor heterostructure devices. He went on to work at Bell Labs and Cadence Design Systems, where he developed many CAD tools for semiconductor device and process simulation. He joined the nanoHUB.org team in 2004 and is now the director of the HUBzero Project at Purdue.

Tillmann Kubis was born in Ingolstadt, Germany. He received the Diploma degree (2004) and PhD degree (2009) in physics from the Technical University of Munich, Garching, Germany. His research interests are the modeling of realistic charge, spin and heat transport in semiconductor nanodevices and optoelectronics using numerical implementations of the nonequilibrium Green's function formalism. He is currently a Research Assistant Professor at the Network for Computational Nanotechnology, Birck Nanotechnology Center, School of Electrical and Computer Engineering, Purdue University, West Lafayette IN, USA.

Jean Michel Sellier is Research Assistant Professor at the Network for Computational Nanotechnology, Purdue, in the group of Prof. Klimeck. He is one of the core developers of NEMO5, a NanoElectronic MOdeling simulator. His research focuses on the simulation of Schroedinger-Poisson systems in both stationary and transient phases.

Michael Povolotskyi received the M.Sc. degree in applied mathematics and physics from Moscow Institute of Physics and Technology, Moscow, Russia, in 2000, and the Ph.D. degree in electric engineering from the University of Rome "Tor Vergata," Rome, Italy, in 2004. He continued his professional development as a Postdoctoral Researcher in "Tor Vergata" and in

the Georgia Institute of Technology, Savannah. Since 2009, he has been with Purdue University, West Lafayette, IN, as a Research Assistant Professor in the School of Electrical and Computer Engineering. His research interests include the modeling of semiconductor nanostructures, devices, and high-power computing. He is a coauthor of electronic modeling software nextnano3, TiberCAD, and NEMO5.

Jim Fonseca is a Postdoctoral Research Associate and a core developer of NEMO5. He received a B.S. in Computer Engineering from Virginia Tech (2001) and a Master's and Ph.D. (2008) from Ohio University. He developed software to study ionic selectivity in ion protein channels using Monte Carlo simulations during a postdoc at Rush University before joining the Klimeck group. He is interested in developing software for scientists.

Links

[Travel Information]

[Electronics from the Bottom Up]

Brochure (feel free to post or distribute): efbu2012_final.pdf (139 KB, uploaded by Vicki Johnson 6 years 6 months ago)

"Electronics from the Bottom Up" is an educational initiative designed to bring a new perspective to the field of nano device engineering. It is co-sponsored by the Intel Foundation and the Network for Computational Nanotechnology.]