



Monthly Newsletter for January 2011

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R E S E A R C H I N I T I A T I V E

Dr. Jeffrey Welser, Director

## NRI Community News

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### [DARPA taps UCLA and Notre Dame for spintronic and nanomagnet research teams.](#)

The defense agency has doled out \$8.4 million for a four-year "spintronics" project led by the University of California, Los Angeles, and \$9.9 million for "nanomagnet" research led by the University of Notre Dame, both NRI funded universities. Both groups aim to build a basic magnetic logic circuit.

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### [SWAN professor helps develop first high-temp spin-field-effect transistor.](#)

An international team of researchers featuring Texas A&M University physicist Jairo Sinova has announced a breakthrough that gives a new spin to semiconductor nanoelectronics and the world of information technology.

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### [Kwok Ng and Jeff Welser are latest from SRC to be named IEEE Fellows.](#)

Welser, Director of the Nanoelectronics Research Initiative at SRC, will enter the IEEE Fellow class of 2011 on Jan. 1 for "leadership in emerging device technologies for computer applications."

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### [NRI highlighted in ElectroIQ article by TI Fellow and NRI Chair Robert Doering.](#)

The opportunities that nanotechnology presents to our industry are many, and a short article cannot come close to covering the breadth implied by this title! However, following a general introductory discussion, a few selected examples will help build an understanding of basic concepts behind some of the latest nanoelectronics research efforts. Most of the examples are taken from university research on potential "beyond-CMOS" device technologies funded by an industry-government partnership. References to more detailed publications on these projects are included to serve as a "pointer to the literature" on some of today's most significant nanodevice research.

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## NRI Community Announcements

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[2010 NRI-NIST Centers Year End \(December 2010\) Reports now available.](#)

**NIST**

**NSF-NRI Joint Activity:** The NSF and NRI plan to jointly support innovative research and education activities on the topic of *Nanoelectronics for 2020 and Beyond (NEB)*. These activities will be supported as interdisciplinary research team awards.

Submission Deadline: January 19, 2011.

To read more and download the RFP, please go to the [SRC Funding Opportunities](#) site.

## NRI Community Upcoming Events

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### 2011 International Conference on Frontiers of Characterization and Metrology for Nanoelectronics

May 23-27, 2011, the MINATEC Campus in Grenoble, France

Abstract submission closed December 20, 2010

Registration - The registration fee for the conference includes coffee breaks, lunches, a banquet, an extended abstract booklet, and a hardback book containing the workshop papers, along with a CD-ROM. The registration fee is 450 €. Students and post-docs may register for 300 €. [Online registration is now available!](#)

## NRI Calendar of Upcoming Events

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January 25: **e-Workshop** [“New Materials and Processes for Constructing Unconventional Hybrid Inorganic/Organic Electronic and Excitonic Circuitry”](#) presented by Prof. Tobin Marks from Northwestern University.

February 22: **e-Workshop** [“Topological Insulators and Nanoelectronic Device Applications”](#) presented by Prof. Yong Chen from Purdue University, part of the MIND Center.

## New Publications

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Don't forget to submit your new publications to NRI regularly – see the “University Requests” section below for more information. Following are all publications submitted since November 7, 2010. *Remember that anything marked as a Pre-Publication should NOT be shared outside of the NRI member community.*

*\*Pre-publication – do not distribute outside of NRI.*

### WIN CENTER – 3 publications, 1 pre-pub

[\\*Low Write-Energy Magnetic Tunnel Junctions for High-Speed Spin-Transfer-Torque MRAM](#)  
[Evolution of Spin-wave Modes in Magnetic Tunnel Junction Nanopillars](#)  
[Single-crystalline Ni\(2\)Ge/Ge/Ni\(2\)Ge Nanowire Heterostructure Transistors](#)

### INDEX CENTER – 6 publications, 2 pre-pubs

[\\*Interconnection Aspects of Spin Torque Devices: Delay, Energy-Per-Bit, and Circuit Size Modeling](#)

[\\*Grain Boundary Loops in Graphene](#)

[High Resolution Tunnelling Spectroscopy of a Graphene Quartet](#)

[Band Structure and Gaps of Triangular Graphene Superlattices](#)

[Gaps Tunable by Gates in Strained Graphene](#)

[Local Sublattice-Symmetry Breaking in Rotationally Faulted Multilayer Graphene](#)



## New Publications (cont'd)

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**SWAN CENTER – 1 publication, 0 pre-pubs**

[Graphene Films with Large Domain Size by a Two-Step Chemical Vapor Deposition Process](#)

**MIND CENTER – 12 publications, 6 pre-pubs**

[\\*Ultrafast Relaxation of Hot Optical Phonons in Monolayer and Multilayer Graphene on Different Substrates](#)

[\\*Non-Majority Magnetic Logic Gates: A Review of Experiments and Future Prospects for Shape-based" Logic"](#)

[\\*Fabrication and Characterization of Axially-doped Silicon Nanowire Tunnel FETs](#)

[\\*Self-aligned In\(0.53\)Ga\(0.47\)As /InP Vertical Tunnel FET](#)

[\\*Experimental Staggered Source and N+ Pocket \(d\)-Doped Channel III-V Tunnel FETs and Their Scalability](#)

[Full 3D Quantum Transport Simulation of Atomistic Interface Roughness in Silicon Nanowire FETs](#)

[Interface Trap Density Metrology of State-of-the-Art Undoped Si n-FinFETs](#)

[Atomic-Layer-Deposited High-k Dielectric Integration on Epitaxial Graphene](#)

[Empirical Study of Hall Bars on Few-Layer Graphene on C-Face 4H-SiC](#)

**PURDUE NCN CENTER – 1 publications**

[Switching Energy-delay of All Spin Logic Devices](#)

## University Requests

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**Pub Submission: it's your duty!** Please send them to [Allison](#) when you *first* send in your paper to the publication for review and she will do the rest! No usernames or passwords to remember, just attach the pub, hit "SEND" and you will be in compliance with your Center's contract. Of course, it's up to our university members to get those pubs into us so please send us your papers and presentations. We might even start a contest for most pubs!

**Guess what? NO MORE STUDENT FORMS!!!**

Any student or Postdoctoral Researcher participating in SRC research is required to register for an SRC web account, whether they are directly funded by the contract or leveraged from another source. That's right, if you are an NRI supported student all you have to do is follow these simple directions on the new SRC website:

**Students or Postdoctoral researchers new to SRC:**

- Go to the SRC website at <https://www.src.org/app/account/sign-in/> to register for a web account including completing the academic information portion of the form. We recommend that all students upload their resume. Our member companies have recruiters that look at this site first when they have positions to fill.

**Student or postdocs who have previously been on SRC research:**

- Update your graduation date, advisor, research task # and resume at <https://www.src.org/app/account/edit/education/>

**Please be sure *all* your NRI students and post-docs are registered on the website and that their information (particularly *graduation date*) is current.** For questions or help contact [leeann.clewell@src.org](mailto:leeann.clewell@src.org)

Should you have any questions, ideas, information to share, website issues or just want to talk about NRI, please call or email [Allison](#) at 919-941-9433, she will be happy to help!

*If you no longer are interested in receiving the NRI Newsletter, please reply to this email saying so and you will be removed from the list.*