



Green Mountain Section Technical Community Newsletter 2007

Welcome

2007 has been a remarkable year for the IEEE green mountain section. Members benefited from more variety in section activities and increased interactions with more institutions and professional groups.

Highlights

During the course of year, the IEEE Green Mountain section members have had the opportunity to participate and/or attend the following key events:

1. The launch of Alternative Energy Racing Organization, a student group of the University of Vermont IEEE chapter that works for the advocacy, research, and development of alternative-energy drive systems
2. 2007 Engineering Week full of activities promoting engineering careers.
3. 2007 ISSCC Review
4. 94th ANNUAL MEETING VERMONT SOCIETY OF ENGINEERS/APRIL MEETING OF THE VT SECTION OF ASCE
5. An evening with Vermont Lieutenant Governor Brian Dubie discussing the Green Valley Initiative economic development vision and the e-Vermont possibilities
6. IEEE Region 1 2007 Board of Governors Summer Meeting and Section Officers Leadership Workshop
7. 2007 Design TASC (Technology and Society Connection)
8. Annual dinner at the Inn at Essex, Vermont's Culinary Resort.

In December 11 of 2007, the Green Mountain IEEE section, jointly with the Computer Society chapter, the Solid-State chapter, and the student chapter co-sponsored a very successful technical seminar on Hybrid Technology for Automotive Applications presented by Paul Coleman from Toyota.

Upcoming Technical Vitality Seminars

Topic #1:

Record RF Performance of 45nm SOI CMOS Technology
by Sungjae Lee,

Location: IBM, Essex Junction, VT

Date: 01/18/08 at 3:00 PM

Abstract - We report record RF performance in 45-nm silicon-on-insulator (SOI) CMOS technology. RF performance scaling with channel length and layout optimization is demonstrated. Peak f_T 's of 485 GHz and 345 GHz are measured in floating-body NFET and PFET with nearby wiring parasitics (i.e., gate-to-contact capacitance) included after de-embedding, thus representing FET performance in a real design. The measured f_T 's are the highest ever reported in a CMOS technology. Body-contacted FETs are also analyzed that have layout optimized for high-frequency analog applications. Employing a notched body contact layout, we reduce parasitic capacitance and gate leakage current significantly, thus improving RF performance with low power. For longer than minimum channel length and a body-contacted NFET with notched layout, we measure a peak f_T of 245 GHz with no degradation in critical analog figures of merit, such as self-gain.

Topic #2:

High-Performance eDRAM Design
by Harold Pilo,

Location: IBM, Essex Junction, VT

Date: 01/25/08 at 3:00 PM

Abstract - Embedded memory plays a key role in achieving overall power and performance goal for VLSI systems. As technology scaling continues to drive higher level of integration in VLSI design for ever-increasing performance, embedded memory becomes even more critical in the era of nano-scale CMOS technology. In this Forum, high-performance eDRAM design is discussed. Key technical topics such as technology scaling, critical circuit design and power management are presented along with product requirements for different applications.

Topic #3:

A 450ps Access-Time SRAM Macro in 45nm SOI Featuring a Two-Stage Sensing-Scheme and Dynamic Power Management

by Vinod Ramadurai,

Location: IBM, Essex Junction, VT

Date: 01/25/08 at 3:45 PM

Abstract - A 450ps access-time 512Kb SRAM macro is fabricated in 45nm SOI. Power improvements are achieved with little effect on performance and area. A two-stage, body-contacted sensing scheme along with other techniques achieve a 58% improvement in power consumption compared to the previous-generation macro. A single-device dynamic leakage-suppression scheme reduces leakage power by 37% with 1.8% area overhead and no wake-up cycle requirements.

Topic #4:

Migration of Cell Broadband Engine™ from 65nm SOI to 45nm SOI

by Kevin McCullen,

Location: IBM, Essex Junction, VT

Date: 02/29/08 at 3:00 PM

Abstract - We describe the challenges of migrating the Cell Broadband Engine™ design from 65nm SOI to 45nm SOI using mostly an automated approach. The cycle-by-cycle machine behavior is preserved. The focus areas are migration effectiveness, power reduction, area reduction, and DFM improvements. The chip power consumption is reduced roughly by 40% and the chip area is reduced by 34%.

Membership Update

Are you interested in becoming an IEEE Member, Senior Member or Fellow? Contact **Vikram Iyengar**, Gold Chair/Membership Development, vikrami@us.ibm.com

Recognitions

Two new awards were instituted this year, the Green Mountain Innovation Award (GM-IA) and the Green Mountain Professional Award (GM-PA). Congratulations to the 2008 recipients:

1. Jeff Frolik was recognized "For Leadership and Innovation in Support of IEEE Student Activities."
2. Jim Monzel was recognized "For his Contributions in Support of the IEEE Mission."

2008 Elections

Elections for section officers are underway. Watch for additional communication on this topic.

Visit our website at:

<http://ewh.ieee.org/r1/vermont>

For general information please contact any of the Green Mountain Section 2007 officers at:

<http://www.ewh.ieee.org/r1/vermont/officers.html>

Member's Corner

Dear Hybrid Enthusiast,

As announced at the IEEE meeting on 12/11/07, a group of students at the University of Vermont are building a hybrid vehicle to compete in the International Formula Hybrid Competition next May. This event (co-sponsored by IEEE and SAE) has challenged the students to employ technologies and methodologies uncommonly seen at the undergraduate level. In short, this has been an incredible learning experience for them.

As you can imagine, the cost of such a project is not inconsequential and our students still need to raise about \$5k (of ~\$30k) to complete the project. If you know any parties/companies that might be interested in being a sponsor, please contact the students at the address below. Also, the group can certainly accept individual contributions (of any amount). They've set up a special gift account at UVM so your contributions will be tax deductible (you can send checks made to UVM AERO).

If you wish to learn more about what the project is all about please feel free to contact the students to arrange a visit to their shop (the fabrication starts January!). In the meantime, please visit their website: www.cems.uvm.edu/~aero

Thanks in advance for your interest and assistance.

- Jeff Frolik
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