

62nd



**DEVICE
RESEARCH
CONFERENCE**

University of Notre Dame
Notre Dame, Indiana

June 21–23, 2004

TMS



IEEE

ADVANCE PROGRAM

including

Housing and Registration Forms

www.tms.org/DRC.html

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DRC Registration and Campus Housing forms are included in the center of this brochure.

INTENDED AUDIENCE

The Device Research Conference (DRC) is sponsored by the IEEE Electron Devices Society. DRC brings together scientists, engineers, and students to present breakthroughs and advances in device research. Individuals actively engaged or interested in electronic devices and materials research and development are encouraged to attend this meeting.

DATE AND LOCATION

The 62nd Annual DRC will be held at the University of Notre Dame, Indiana, June 21-23, 2004. This conference is being coordinated with the Electronic Materials Conference of TMS, which will take place the same week, June 23-25, 2004, at the same location. The coordinated efforts are made in recognition of the strong interaction between device and electronic materials research and provides for an exchange of information between attendees of both conferences.

ABOUT THE UNIVERSITY OF NOTRE DAME

A leading Catholic research university, Notre Dame stands among the nation's top 20 universities in terms of both academics and endowment. The university is organized into four undergraduate colleges—arts and letters, science, engineering, and business—the Graduate School, the Law School, and the School of Architecture. The combination of groundbreaking research and a long tradition of excellence in undergraduate and graduate education has attracted world-class teachers and scholars to the university's 729-member teaching-and-research faculty. The total student population of about 10,700 men and women is drawn from all 50 states and some 88 foreign countries and includes 1,500 graduate students and 1,150 professional students. Substantial new investments in a wide range of academic programs, institutes, centers, and major facilities have marked the past several years at Notre Dame. Founded in 1842 by a priest of the Congregation of Holy Cross, Notre Dame is located north of the city of South Bend, Indiana, and about 90 miles southeast of Chicago. Its 1250-acre-campus contains two lakes and 104 buildings. The university's Main Building with its famed Golden Dome is among the most widely known university landmarks in the world.

For more information on the University of Notre Dame, visit the university website at Notre Dame's Center for Nano Science and Technology (nano.nd.edu) and Department of Electrical Engineering (www.ee.nd.edu). Both sites have active research groups in electronic devices, circuits, and systems. An on-line campus map is available at www.nd.edu/map/.

REGISTRATION INFORMATION

Early Housing and Registration are Advised.

CONFERENCE REGISTRATION

All attendees are encouraged to register in advance to avoid delays in registering at the Conference. Both Device Research Conference (DRC) and Electronic Materials Conference (EMC) badges will be accepted by both conferences on Wednesday, June 23. DRC advance registration fees are as follows:

IEEE and TMS members	\$ 350
Non members of IEEE and TMS.....	\$ 400
Students	\$ 125

DRC Registration fee includes Sunday welcoming reception, Monday poster session reception, Tuesday conference banquet, Tuesday rump session, coffee breaks, attendance to all technical sessions, and TMS Exhibit on Wednesday.

Register in advance via the TMS OnLine form at www.tms.org/DRC.html or complete the registration form provided in the center of this mailer. **Advance registrations will be accepted until June 2, 2004.** For questions concerning registration, please contact TMS Meeting Services by telephone: (724) 776-9000 ext. 243; fax: (724) 776-3770; or e-mail: mtgserv@tms.org.

You may register at the conference. Please note: On-site registration fees will be higher. On-site registration will be located in McKenna Hall beginning on Sunday afternoon continuing through Wednesday morning during the following hours:

Sunday, June 20	4:00 pm–9:00 pm
Monday, June 21.....	7:30 am–5:00 pm
Tuesday, June 22	7:30 am–5:00 pm
Wednesday, June 23.....	7:30 am–3:00 pm

REFUND POLICY

A written request must be sent to TMS Headquarters, 184 Thorn Hill Road, Warrendale, PA 15086, USA, postmarked no later than June 2, 2004. A \$50 processing fee will be charged on all cancellations. NO refunds will be issued after the deadline date.

SESSIONS

The Device Research technical program will commence at 8:30 am on Monday, June 21. All sessions will be held on grounds at the University of Notre Dame in DeBartolo Hall.

Building on the success of poster sessions in previous years, an expanded poster session will be part of DRC 2004. In the DRC tradition, rump sessions will continue to provide a forum for frank discussion of contentious topics in device research and applications.

For technical program information regarding the 62nd IEEE Device Research Conference, please contact:

GENERAL PROGRAM CHAIR

Pallab Bhattacharya
University of Michigan
Department of Electrical Engineering and Computer Science
1301 Beal Avenue
Ann Arbor, MI 48109-2122
Tel: (734) 763-6678
Fax: (734) 763-9324
Email: pkb@eecs.umich.edu

Or

TECHNICAL PROGRAM CHAIR

Alan Seabaugh
University of Notre Dame
266 Fitzpatrick Hall
Notre Dame, IN 46556
Tel: (574) 631-4473
Fax: (574) 631-4393
Email: seabaugh.1@nd.edu

PROGRAM

A conference digest with session titles and abstracts of papers to be presented at the meeting will be made available for all registrants at the registration desk when picking up your registration packet.

COMPUTER/NETWORK FACILITIES

Registrants will have access to Notre Dame's information technology infrastructure, which includes more than 500 workstations in 12 computer clusters, and the *ResNet* Ethernet network providing internet access to all campus dorm rooms and several public areas. A temporary username and password will be provided to registrants upon check-in. Each technical session room has a video projector, a VGA connection for a laptop, and a Windows workstation equipped with CD and floppy disk drives, Microsoft PowerPoint and Adobe Acrobat software.



REGISTRATION INFORMATION

MESSAGES

Telephones and a message board will be located near the Registration Desk in McKenna Hall. Messages will be posted in this area throughout the conference. Messages may be left for attendees by calling (574) 631-6691.

RECREATION

Notre Dame's recreational facilities are available to conference guests. Conference nametags must be worn at all times and room keys must be presented in order to use the recreational facilities. Golf, swimming, racquetball, basketball, squash, weight lifting and tennis facilities are available. Current schedules and reservation information will be available in your conference packet. Walking and jogging route maps with distances are also available at the Information Desk in the Center for Continuing Education, McKenna Hall. For further facility information see <http://www.nd.edu/~recsport>.

DRESS

The Device Research Conference encourages an informal and comfortable atmosphere. A sweater or light jacket is occasionally needed for the evenings. The University of Notre Dame is a pedestrian campus, so be sure to wear comfortable walking shoes.

CAMPUS SMOKING POLICY

The University of Notre Dame prohibits smoking in its buildings, including residence halls. Smoking is allowed only in designated areas outside buildings.

BEST STUDENT PAPER AWARD

Papers and posters presented by students, based on their own work, are eligible for this annual award. Information on student travel assistance may be obtained by writing to the DRC General Program Chair, Pallab Bhattacharya.

AMERICANS WITH DISABILITIES ACT



TMS supports the federal Americans with Disabilities Act (ADA) which prohibits discrimination against, and promotes public accessibility for those with disabilities. In support of and compliance with this Act, we ask that those attendees of DRC requiring specific equipment or services indicate their needs on the enclosed housing form or by contacting the TMS Meeting Services Department.

POLICY ON AUDIO AND VISUAL RECORDING OF TECHNICAL PAPER PRESENTATIONS/SESSIONS

Recording of sessions (audio, video, still photography, etc.) is not permitted at DRC.

FOR MORE INFORMATION

Regarding conference logistics, please contact:

Michael Packard, CMP
Manager, Meeting Services
TMS
184 Thorn Hill Road
Warrendale, PA 1508
Tel: (724) 776-9000 ext. 225
Fax: (724) 776-3770
E-mail: packard@tms.org

Regarding meeting registration and pricing, please contact:

TMS Meeting Services
184 Thorn Hill Rd
Warrendale, PA 15086
Tel: (724) 776-9000 ext. 243
Fax: (724) 776-3770
E-mail: mtgserv@tms.org

Pertaining to the Electronic Materials Conference, please contact:

April S. Brown, EMC General Chair
Duke University
130 Hudson Hall
Durham, NC 27708
Tel: (919) 660-5442
Fax: (919) 660 5293
E-mail: abrown@ee.duke.edu

Or

Edward Yu, EMC Program Chair
University of California, San Diego
ECE Dept MC 0407
9500 Gilman Dr
La Jolla, CA 92093
Tel: (858) 534-6619
Fax: (858) 822-3425
E-mail: ety@ece.ucsd.edu



TECHNICAL EXHIBIT

On Wednesday, June 23, from 9:20 am until 4:00 pm, DRC attendees are invited to attend the EMC Exhibition of electronic materials technology and related services. The exhibition is an opportunity for DRC attendees to learn more about products and services in electronic materials. You are encouraged to visit the exhibits and interact with the participating vendors.

Exhibition Location: DeBartolo Hall, Rotunda Area

Exhibit Dates and Times:

Wednesday, June 23..... 9:20 am–4:00 pm
and 6:00 pm–8:00 pm
Thursday, June 24 10:00 am–4:00 pm

NOTE: Companies interested in participating in this exhibit should contact TMS for more details and exhibitor information at the following:

Cindy A. Wilson, Exhibits Coordinator
TMS/EMC Technological Exhibit
184 Thorn Hill Road
Warrendale, PA 15086
Tel: (724) 776-9000 ext. 231
Fax: (724) 776-3770
E-mail: wilson@tms.org

HOUSING & ACCOMMODATIONS

ON-CAMPUS HOUSING ACCOMMODATIONS

We are pleased to invite DRC attendees to reside on the campus of the University of Notre Dame. On-campus air conditioned, dormitory housing will be available on a first request basis in an air-conditioned residence hall within an easy walk from the technical session area. Accommodations are single occupancy dormitory rooms each with its own sink. Common shower and restroom facilities are designated for men and women on each floor. Guests may wish to bring a robe and shower thongs. Linen service for towels and bed sheets will be provided, however washcloths are not. Calling card accessible phones are available within the residence hall lobbies. Conference attendees bringing personal computers with Ethernet connectivity can enjoy free internet access through *ResNet*, Notre Dame's high-speed network wiring in every dorm room and several public areas on campus (cable with RI-45 connector required). Telephones are not provided in residence hall rooms. Wake-up service is not available, so you may wish to bring an alarm clock.

Hotels are also available; these are listed in the Off-Campus Housing section of this brochure.

The University of Notre Dame offers the following package plans to provide planning flexibility and the option to attend both DRC and EMC. Residence hall package plans A, B, and C include full meal service. Residence hall room packages without meals are not available. No adjustments from the chosen package for lodging or meals will be made for late arrival or early departure.

Please indicate your plan preference on the enclosed reservation form and return it with your payment to:

DRC/EMC
Center for Continuing Education
115 McKenna Hall
Notre Dame, IN 46556
Tel: (574) 631-6691
Fax: (574) 631-8083
E-mail: cce@nd.edu

Reservations should be received at the University by May 19, 2004. Prepayment is required.

Method of Payment

Payment in U.S. dollars may be made by:

Check or Money Order. Checks must be drawn on a U.S. Bank and made payable to "The University of Notre Dame, CCE"

Credit Card: Visa, MasterCard, American Express, Discover



HOUSING & ACCOMMODATIONS

ON-CAMPUS HOUSING & ACCOMMODATIONS

PLAN A: Includes lodging Monday and Tuesday nights and the following 6 meals:

- Monday.....lunch and dinner
- Tuesday*breakfast and lunch
- Wednesday.....breakfast and lunch
- Per person \$145.00

PLAN B: Includes lodging Sunday through Tuesday nights and the following 7 meals:

- Monday.....breakfast, lunch and dinner
- Tuesday*breakfast and lunch
- Wednesday.....breakfast and lunch
- Per person \$190.00

PLAN C: (for those planning to attend DRC and EMC) Includes lodging Sunday through Thursday night and the following 13 meals:

- Sunday dinner
- Monday..... breakfast, lunch, and dinner
- Tuesday*breakfast and lunch
- Wednesday.....breakfast, lunch and dinner
- Thursdaybreakfast and lunch
(no dining commons meal offered
Thursday night due to the
EMC Banquet)
- Friday breakfast and lunch
- Per person \$330.00

NOTE: This package includes dinner on your arrival day.

* The DRC conference banquet is Tuesday evening.

EARLY ARRIVAL

Saturday Night (June 19) Room Rate.

NOTE: No meals are included with prices. Cash will be accepted in the dining hall.

-- \$38.00

LATE DEPARTURE

Friday Night (June 25) Room Rate.

NOTE: Friday night and Saturday morning meals are not included with prices. Cash will be accepted in the dining hall.

Checkout on Saturday is 10:00 am

-- \$38.00

COMMUTER LUNCH PACKAGE

Attendees that plan to make off-campus housing arrangements directly with the hotel/motel and wish to purchase a commuter-lunch package for on-campus meals, the following packages are available through the University of Notre Dame.

NOTE: It is important to apply early.

Three (3) lunches \$35.00

Five (5) lunches..... \$55.00

ON-CAMPUS DINING HOURS

Meals will be served in the South Dining Hall, conveniently located near the residence halls, during the following hours:

Breakfast..... 7:00 am–8:00 am

Lunch 11:45 am–1:15 pm

Dinner 5:30 pm–7:00 pm

NOTE: Food facilities on campus close at 7:00 pm.

NO REFUNDS WILL BE MADE FOR LATE ARRIVALS, EARLY DEPARTURES, OR MISSED MEALS.



HOUSING & ACCOMMODATIONS

OFF-CAMPUS HOUSING & ACCOMMODATIONS

Blocks of rooms have been reserved at special conference rates for the hotels listed below. Rooms will be released as early as May 31. Thereafter, reservations can be obtained only on a space available request. Please make your reservations directly with the hotel via mail, telephone, or fax as soon as possible. Rooms are available for DRC and EMC, Sunday through Thursday nights. You must identify yourself as either a DRC or EMC attendee. Friday or Saturday night are available, if requested at the time your reservation is made. However, the special rates below DO NOT apply to weekend rates. Friday and Saturday rates will be higher. Please note that the following rates DO NOT include tax.

The Morris Inn

Notre Dame Ave
Notre Dame, IN 46556
Located on the Notre Dame Campus,
directly across from the conference center.
www.themorrisinn.com
Tel: (574) 631-2000
Fax: (574) 631-2340

\$102.00-\$120.00 per night plus 12% tax (Rate includes a full, hot breakfast of your choice in Sorin's Dining Room.)

The Inn at Saint Mary's

53993 US933
South Bend, IN 46637
Located on the campus of Saint Mary's College,
adjacent to the University of Notre Dame.
www.innatsaintmarys.com
Tel: (574) 232-4000
Fax: (574) 289-0986

\$99.00 per night plus tax (Rate includes complimentary full hot breakfast.)

Holiday Inn – University Area

515 Dixieway N.
South Bend, IN 46637
Located 1 mile from the University
of Notre Dame campus.
Tel: (574) 272-6600
Ask for Michelle Brown when
making your reservations.
Fax: (574) 272-5553

\$69.95 per night plus tax

Best Inns of America

425 Dixieway N.
South Bend, IN 46637
Located 1/2 mile from the University of
Notre Dame campus.
www.bestinn.com/
Tel: (219) 277-7700
Fax: (219) 277-2490

\$49.00 per night plus tax (Rate includes complimentary continental breakfast.)

Jamison Inn.

1404 North Ivy Road
South Bend, IN 46637
Located adjacent to Notre Dame campus
Tel: (574) 277-6500
Fax: (574) 271-0586

*\$70.00 per night plus tax
(Rate includes full breakfast buffet.)*

SOCIAL EVENTS

SUNDAY, JUNE 20

Welcoming Reception: All attendees are invited to attend a hosted Welcoming Reception, 6:00 PM–8:00 PM, located in the McKenna Hall Atrium.

MONDAY, JUNE 21

Poster Session: The poster session will be held Monday evening in McKenna Hall. Presenters will be on hand to discuss individual posters. A Buffet Reception will be held concurrently from 5:30 PM to 8:30 PM.

TUESDAY, JUNE 22

Conference Banquet: Conference attendees and their guests will have the opportunity to enjoy a catered cookout in the Irish Courtyard on the University of Notre Dame campus. The dinner will begin at 6:00 pm and continue till 8:00 pm. The cost of this event is included in the full conference and the student registration fees.

The cost for guests is \$40 for adults and \$15 for children 12 and under. You may order tickets for this event on the registration form. You are encouraged to purchase your tickets in advance. Tickets will be available at the registration desk at the conference. Deadline for ticket sales will be 5:00 pm on Monday, June 21, 2004.

Tuesday Rump Session: After the banquet, attendees are invited to attend the Rump Session on Tuesday evening from 8:00 pm till 10:30 pm. The reception will be located in McKenna Hall.

INFORMAL COFFEE BREAKS

During the intermission of morning and afternoon sessions (at approximately 10:00-10:40 am and 3:00-3:40 pm) coffee, tea, and sodas will be served in DeBartolo Hall.

TRANSPORTATION

BY AIR

Notre Dame is about 15 minutes from South Bend Regional Airport (Ask your travel agent to book you to South Bend, Indiana). From the airport take "Lincolnway West" East (Left out of the airport) to downtown South Bend. Turn Left on Indiana 933 (Michigan St.). Stay on Indiana 933 to Angela Boulevard which is the second stop light north of the St. Joseph River. Turn right onto Angela Boulevard then left at the first stop light onto Notre Dame Avenue. Visitor Parking is located on the right side of Notre Dame Ave about 200 yards from Angela.

You can also fly to Chicago and drive or take a limousine. The university is about 2 hours (by car) from O'Hare airport, less to Midway. From O'Hare Airport: Take Route 190 east out of O'Hare to Route 90 east (Kennedy Expressway) toward downtown Chicago where it merges with Route 94 south (Dan Ryan Expressway). Take the Skyway exit off the Dan Ryan and remain on Route 90 to the Indiana Toll Road which eventually merges with Route 80. Get off at Exit 77 (South Bend/Notre Dame).

BY CAR

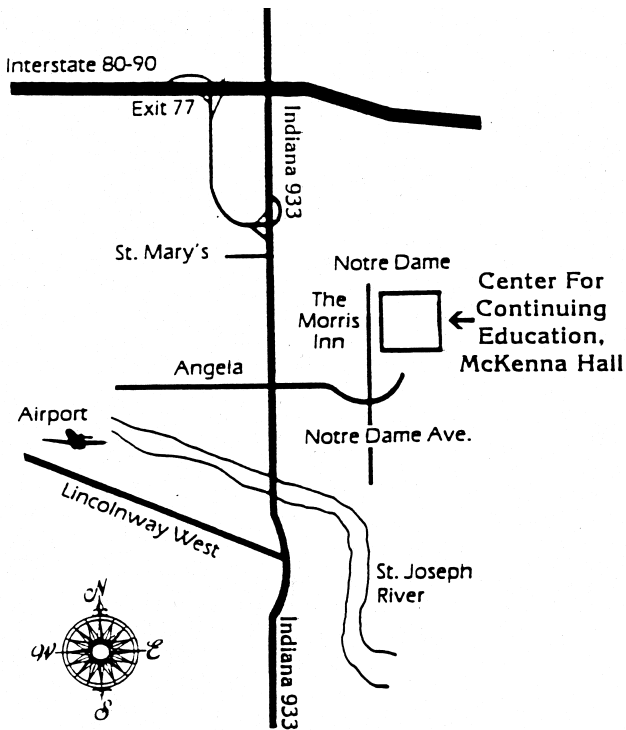
From the north: The University is located just south of the Indiana Toll road (Interstate 80/90). Exit Interstate 80/90 at exit 77 and turn right onto Michigan (Indiana 933). Make a left at the 4th stop light (Angela Boulevard). Make a left at the first stop light (Notre Dame Avenue). Visitor Parking is located on the right side of Notre Dame Ave about 200 yards from Angela.

From the south: Take US 31 north which becomes Indiana 933 just south of South Bend. Stay on Indiana 933 to Angela Boulevard which is the second stop light north of the St. Joseph River. Turn right onto Angela Boulevard then left at the first stop light onto Notre Dame Avenue. Visitor Parking is located on the right side of Notre Dame Ave about 200 yards from Angela.

BY TRAIN

The South Shore Line trains run directly from the Chicago Loop (corner of Michigan and Randolph) to South Bend Regional Airport in South Bend. From the airport, the Notre Dame campus is approximately a 15 minute ride. Various transportation methods are available (ie. taxi, rental car, limo). For detailed driving directions see the "By Air" section above.

NOTRE DAME

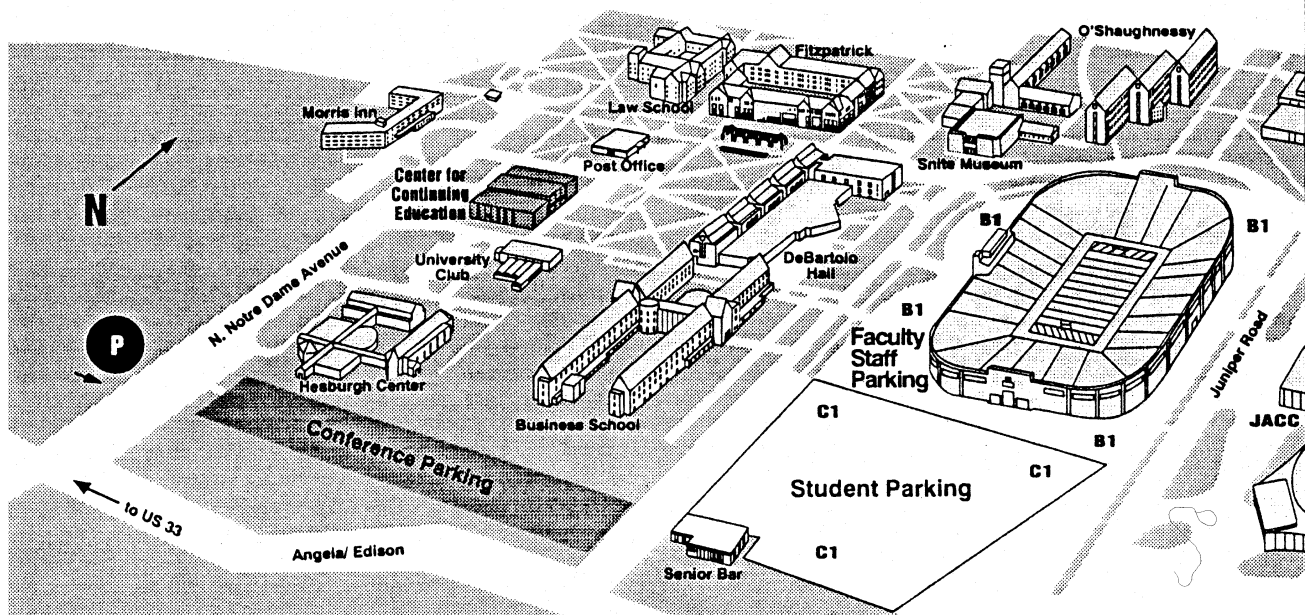


PARKING

Guests staying in a Notre Dame Residence Hall will be directed to appropriate parking after unloading at the assigned Residence Hall. The parking lot of the Morris Inn is restricted to overnight and dining guests of the Inn.

Visitor parking is permitted in the parking lot south of the Hesburgh Center, off Notre Dame Avenue. Coupons to exit the lot (\$1.00 each) are available at the Information Desk of the Center for Continuing Education (CCE) in McKenna Hall. The parking fee is not included in the cost of housing. Cars parked illegally are subject to ticketing and towing. Parking for handicapped guests with appropriate license designations is located in the drive, north of the CCE.

UNIVERSITY CAMPUS



CAR RENTAL SPECIAL

HERTZ Rent-a-Car System



has been selected as the Official Car Rental Company for the 62nd Annual DRC in Notre Dame, Indiana.

Meeting rates listed below, with free unlimited mileage, are guaranteed one week before through one week after the actual meeting dates and are subject to car availability. Rates are available from all Indiana locations.

Advance reservations may be made by booking online at www.hertz.com or calling the Hertz reservations line at 1-800-654-2240 in the US; 1-800-263-0600 in Canada; International - contact your nearest Hertz reservation center or call +1-405-749-4434. You must give the reservations agent the Hertz CV# to receive the special rates. Advance reservations are recommended.

Identify yourself as an attendee of DRC and reference the following CV number: CV#02QJ0009.

Car Class	DAILY Per Day	WEEKEND Per Day	WEEKLY 5-7 Days
A Economy	\$46.99	\$22.99	\$189.99
B Compact 4DR.....	\$51.99	\$25.99	\$204.99
C Midsize.....	\$55.99	\$27.99	\$219.99
D Special Sporty.....	\$57.99	\$32.99	\$234.99
F Full-size 4DR.....	\$60.99	\$34.99	\$249.99
G Premium	\$65.99	\$39.99	\$259.99
I Towncar	\$79.99	\$63.99	\$346.99
L 4WD/AWD SUV	\$79.99	\$63.99	\$346.99
R Minivan 2WD.....	\$82.99	\$65.99	\$354.99
U Convertible.....	\$79.99	\$63.99	\$346.99

TERMS AND CONDITIONS

- UNLIMITED MILEAGE ALLOWANCE ON ABOVE RATES.
- One-way service fee will apply when cars are not returned to renting location.
- Additional daily charges for optional coverage (Loss Damage Waiver, Personal Accident Insurance, Personal Effect Protection, refueling and state tax) are not included in the above rates.
- Drivers must meet standard Hertz age, driver, and credit requirements.
- Hertz is a frequent flyer partner with US Airways, Delta, Northwest, United, and American Airlines. Frequent flyer information may be requested at time of car booking.
- Weekly rentals are from five to seven days. Weekend rentals are available for pick-up between noon Thursday and noon Sunday and must be returned no later than Monday at 11:59 pm. Thursday pick-up requires a minimum three-day keep, Friday pick-up requires a minimum two-day keep, and Saturday/Sunday pick-ups require a minimum one-day keep.

SPECIAL AIRFARE

Official Carrier of
the 62nd Annual DRC



U.S AIRWAYS

US Airways agrees to offer an exclusive low rate for attendees traveling to the 2004 Device Research Conference in Notre Dame, Indiana. Offer applies to flights on US Airways via Chicago, Illinois and South Bend, Indiana.

This special fare will offer a 7% discount off First or Envoy Class and any published US Airways promotional round trip fare via Chicago. A 12% discount on unrestricted coach fares will apply with seven-day advance reservations and ticketing required via Chicago. US Airways will offer a 5% discount off First or Envoy Class and any published US Airways promotional round trip fare and a 10% discount on unrestricted coach fares with seven-day advance reservations and ticketing via South Bend. Plan ahead and receive an additional discount by ticketing 60 days or more prior to departure. These discounts are valid provided all rules and restrictions are met and are applicable for travel from all points on US Airways' route system. The above discounts are not combinable with other discounts or promotions, and are valid three days before and after the meeting dates. Additional restrictions may apply on international travel.

US Airways will also offer exclusive negotiated rates for attendees who are unable to meet the restrictions of the promotional round trip fares. Certain restrictions, including advance purchase requirements, may apply.

To obtain these discounts, you or your professional travel consultant must call US Airways' Meeting and Convention Reservation Office toll free at (877) 874-7687; 8:00 am- 9:30 pm, Eastern Time.

REFER TO GOLD FILE NO. 78672843

Once your reservations are confirmed, US Airways will mail the tickets to you or suggest several other convenient methods of purchase.

If you normally use the services of a travel agent or corporate travel department, please have them place the call so that they may obtain the same advantages for you. The special meeting fare is only available through the US Airways Group and Meeting Reservation Office.

US Airways group and meeting customers may take advantage of special negotiated rates with Avis Rent-A-Car. Please call Avis, toll free at (866) 629-6995 and Reference AWD K609400 for additional information.

ORGANIZING COMMITTEE

GENERAL PROGRAM CHAIR

Pallab Bhattacharya
University of Michigan
Dept of Electrical Engineering & Computer Science
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Ann Arbor, MI 48109
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TECHNICAL PROGRAM CHAIR

Alan Seabaugh
University of Notre Dame
266 Fitzpatrick Hall
Notre Dame, IN 46556
Tel: (574) 631-4473
Fax: (574) 631-4393
E-mail: seabaugh.1@nd.edu

TECHNICAL PROGRAM VICE CHAIR

Theresa Mayer
Penn State University
230 Electrical Engineering West
University Park, PA 16802
Tel: (814) 863-8458
Fax: (814) 865-7065
E-mail: tsm2@psu.edu

TREASURER

Tom Jackson
Penn State University

PAST CHAIR

Jeff Welser
IBM

LOCAL ARRANGEMENTS CHAIR

Patrick Fay
261 Fitzpatrick Hall
Department of Electrical Engineering
University of Notre Dame
Notre Dame, IN 46556-5637
Tel: (574) 631-5693
Fax: (574) 631-4393
E-mail: pfay@nd.edu

TECHNICAL PROGRAM COMMITTEE

Joerg Appenzeller, IBM, T.J. Watson Research Center
Bobby Brar, Rockwell Scientific Company
Andy Bryant, IBM
Augusto Gutierrez-Aitken, Northrop Grumman
Space Technology
Pranav Kalavade, Intel
Fumio Koyama, Tokyo Institute of Technology
Roger Lake, University of California
Lynn Loo, University of Texas
John O'Brien, University of Southern California
Alberto Salleo, Palo Alto Research Center
Nitin Samarth, Penn State University
Tetsuya Suemitsu, NTT Photonics Laboratories
Joerg Schulze, University of the German
Federal Armed Forces
Lars Erik Wernersson, University of Lund
Yifeng Wu, CREE Santa Barbara Technology Center
John Zolper, DARPA/MTO

INVITED SPEAKERS

Yuji Ando (R&D Assoc. FED)
Yasuhiko Arakawa (University of Tokyo)
Sanjay Banerjee (University of Texas, Austin)
Paul Baude (3M)
David Emerson (CREE, Inc.)
Stephen Empedocles (Nanosys, Inc.)
Mark Hersam (Northwestern University)
Thomas Jackson (Penn State University)
Craig Lent (University of Notre Dame)
Mark Lundstrom (Purdue University)
Richard Martel (University of Montreal)
Umesh Mishra (University of California, Santa Barbara)
Hiroo Munekata (Tokyo Institute of Technology)
Henning Sirringhaus (Plastic Logic)
Nongjian Tao (Arizona State University)
Lukas Worschech (University of Wurzburg)

TMS NON-MEMBER ATTENDEES

MEMBERSHIP OFFER FOR NEW MEMBERS!

Become a TMS Member today and pay only \$54 for the remainder of 2004 and discover a wealth of information on electronic materials and resultant devices.

Plus, enjoy all of the benefits that TMS Membership has to offer, including:

- A print and electronic subscription to *JOM*, the magazine that explores the traditional, innovative, and revolutionary issues in the minerals, metals, and materials fields.
- An optional subscription to the *Journal of Electronic Materials*, a joint TMS and IEEE publication.
- Free electronic subscription to *TMS Letters*, a peer-reviewed journal containing two-page technical updates of research presented at TMS meetings that is not published elsewhere.
- Networking opportunities with a prestigious membership through international conferences.
- Discounts on TMS publications and conference fees.
- Access to the TMS organizational network through the searchable OnLine Membership Directory.
- Plus an array of other membership benefits and services.

Once you have been a part of all that TMS has to offer, you'll want to continue your membership long into the future.

To become a member of TMS, complete an application and return it to the TMS Registration Desk during the conference, along with your \$54 membership fee. Or, you may opt to mail your application and payment to TMS Headquarters, 184 Thorn Hill Road, Warrendale, PA 15086, USA.

You may also join via the TMS website at www.tms.org/Society/membership.html. For more information, you can visit the website or contact the TMS Membership Department at membership@tms.org or (724) 776-9000 ext. 241.

Students living in North America can apply for a Joint ASM/TMS Joint Student Membership for \$25. Students living outside North America may apply for TMS Student Membership for \$15.

TMS

JOURNAL OF ELECTRONIC MATERIALS

The *Journal of Electronic Materials*, a monthly archival publication of TMS and the Institute of Electrical and Electronics Engineers (IEEE), was created to serve as the publication of the Electronic Materials Conference. Throughout the year, *JEM* publishes selected papers presented at this conference and others in the electronic materials field and welcomes the submission of articles related to electronic materials issues.

The journal contains technical papers detailing critical new developments in the electronics field, as well as invited and contributed review papers on topics of current interest, designed to enable those in the field of electronics to keep abreast of activities in areas vital to their own technical interests.

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62nd DEVICE RESEARCH
CONFERENCE
PRELIMINARY
ADVANCE PROGRAM

Monday AM, June 21, 2004
RM 101 DeBartolo

Plenary Session

Session Organizer:
Pallab Bhattacharya,
University of Michigan

Session Chair:
Alan Seabaugh,
University of Notre Dame

8:30 AM Welcoming Remarks

**Presentations: IEEE Fellows and Best Student
Paper Awards**

9:00 AM I.-1 Plenary

Gallium Nitride Electronics: Watt is the limit?

U. K. Mishra, ECE Dept., University of California
at Santa Barbara, California, USA

9:50 AM Break

10:15 AM I.-2 Plenary

**The Transistor: From Lillienfield to Landauer,
to ...?**

M. Lundstrom, Purdue University, West Lafayette,
Indiana, USA

11:05 AM I.-3 Plenary

Electronics Anywhere

T. Jackson, Pennsylvania State University, Univer-
sity Park, Pennsylvania, USA

Monday PM, June 21, 2004
RM. 102 DeBartolo

Session II.A. Scaling Silicon

Session Organizer: **Andy Bryant, IBM**

1:20 PM II.A-1 *Invited*

Nanoparticle Floating Gate Flash Memories

S. Banerjee, D. Kim, T. Kim, L. Weltzer, Y. Liu, S. Tang, and M. Palard, Microelectronics Research Center, University of Texas at Austin, USA

1:50 PM II.A-2

N Incorporation into ALD HfO₂ Gate Dielectric Using Ion Implantation

H.-J. Li^a, T. Pompl^b, C. Young, T. Rhoad, J. Saulters, J. Peterson, M. Gardner^c, G.A. Brown, G. Bersuker, P. M. Zeitzoff, J. Price, P. Y. Hung, A. Diebold and H. R. Huff, International SEMATECH, 2706 Montopolis Drive, Austin, TX 78741, Assignments from ^aInfineon, and ^cAdvanced Micro Devices, ^bInfineon Technologies AG, 81739, Otto-Hahn-Ring 6 Munich, Germany

2:10 PM II.A-3

Relaxation of FN Stress Induced V_{th} Shift at NMOSFETs with HfSiON Gate Dielectric and TiN Gate Electrode

R. Choi^{a,c}, B. H. Lee^b, K. Mathews^c, J. H. Sim^{a,c}, G. Bersuker^c, L. Larson^c and J. C. Lee^a.
^aThe University of Texas at Austin, ^bIBM assignee, ^cInternational SEMATECH, 2706 Montopolis Drive, Austin, TX 78741 USA

2:30 PM II.A-4

A Novel Surface Passivation Process for HfO₂ Ge MOSFETs

N. Wu¹, Q. Zhang¹, C. Zhu¹, D. S. H. Chan¹, M. F. Li^{1,2}, N. Balasubramanian², A. Y. Du², A. Chin³, J. K. O. Sin⁴, and D.-L. Kwong⁵, ¹Silicon Nano Device Lab, Dept. of ECE, National University of Singapore, Singapore, 119260, ²Institute of Microelectronics, Singapore, 117685, ³Dept. of Electronics Eng., National Chiao Tung Univ., Taiwan, ⁴Dept. Of EEE, HKUST, Kowloon, Hong Kong, ⁵Dept. of ECE, The Univ. of Texas at Austin, Austin, TX, 78712, USA

2:50 PM Break

3:10 PM II.A-5

Low Workfunction Fully Silicided Gate on SiO₂/Si and LaAlO₃/GOI n-MOSFETs

D. S. Yu¹, A. Chin¹, B. F. Hung¹, W. J. Chen², C. X. Zhu³, M.-F. Li³, S. Y. Zhu³, and D. L. Kwong⁴, ¹Dept. of Electronics Eng., National Chiao Tung Univ., Nano Sci. Tech. Center, Univ. System of Taiwan, Hsinchu, Taiwan, ²ROC Graduate Inst. of Materials Eng., National Pingtung University of Science and Technology, Pingtung, Taiwan, ³Si Nano Device Lab., Dept. of Electrical & Computer Eng., National Univ. of Singapore, Singapore, ⁴Dept. of Electrical & Computer Engineering, The Univ. of Texas, Austin, TX 78712, USA

3:30 PM II.A-6

Electrical Properties of p- and n-Type Silicon Nanowires

Y. Wang¹, M. Cabassi¹, T.-T. Ho¹, K.-K. Lew², J. Redwing², and T. Mayer¹, ¹Dept. of Electrical Engineering and ²Dept. of Materials Science and Engineering, The Pennsylvania State University, University Park, PA 16802

3:50 PM II.A-7

Impact of Reducing RTA Temperature on Sub-10nm Ultra-Thin Body SOI

J.-H. Yang, J. Oh, W.-J. Cho, C.-G. Ahn, K. Im, I.-B. Baek, J. Park, and S. Lee, Future Technology Research Division, Electronics and Telecommunications Research Institute, 161 Gajeong-dong, Yuseong-gu, Daejeon, 305-350, Korea

4:10 PM II.A-8

Vertical Tunnel Diodes on High Resistivity Silicon

Y. Yan, J. Zhao, Q. Liu, W. Zhao, and A. Seabaugh, Dept. of Electrical Engineering, University of Notre Dame, IN 46556-5637

Session II.B.

Session Organizer: **Bobby Brar,**
Rockwell Scientific Company

1:20 PM II.B-1 *Invited*

**High Power AlGaIn/GaN Heterojunction
FETs for Base Station Applications**

Y. Ando, Y. Okamoto, T. Nakayama, T. Inoue,
K. Hataya, H. Miyamoto, M. Senda, K. Hirata,
M. Kosaki, N. Shibata, and M. Kuzuhara, R&D
Association for Future Electron Devices, c/o NEC
Corporation, 2-9-1 Seiran, Otsu 520-0833 Japan

1:50 PM II.B-2

**Effect of Gate Recessing on Linearity
Characteristics of AlGaIn/GaN HEMTs**

A. Chini, D. Buttari, R. Coffie, L. Shen, T. Palacios,
S. Heikman, A. Chakraborty, S. Keller, and U. K.
Mishra, ECE Dept., University of California, Santa
Barbara, CA 93106

2:10 PM II.B-3

**Linearity Performance of GaN HEMTs
with Field Plates**

Y.-F. Wu, A. Saxler*, T. Wisleder, M. Moore,
R. P. Smith*, S. Sheppard*, P. M. Chavarkar, and
P. Parikh, Cree Santa Barbara Technology Center,
Goleta, CA 93117, *Cree Inc., 4600 Silicon Drive,
Durham, NC 27703

2:30 PM II.B-4

**Ion Implantation for Unalloyed Ohmic Contacts
to AlGaIn/GaN HEMTs**

H. Yu^{1,3}, L. McCarthy², S. Rajan², S. Keller², S. P.
DenBaars^{1,3}, J. S. Speck^{1,3}, and U. K. Mishra^{2,3},
¹Materials Dept., ²ECE Dept., ³ERATO JST, UCSB
Group, University of California, Santa Barbara,
CA 93106

2:50 PM Break

3:10 PM II.B-5

**Improved High Power Thick-GaN-Capped
AlGaIn/GaN HEMTs Without Surface Passivation**

L. Shen, D. Buttari, S. Heikman, A. Chini, R.
Coffie, L. McCarthy, A. Chakraborty, S. Keller,
S. P. DenBaars, U.K. Mishra, ECE Dept., Uni-
versity of California, Santa Barbara, CA 93106

3:30 PM II.B-6

**Use of Multichannel Heterostructures to Improve
the Access Resistance and f_T Linearity in
GaN-based HEMTs**

T. Palacios, A. Chini, D. Buttari, S. Heikman, S.
Keller, S. P. DenBaars, and U. K. Mishra, ECE
Dept., University of California, Santa Barbara,
CA 93106

3:50 PM II.B-7

**Influence of the Heterostructure Design
on Noise Figure of AlGaIn/GaN HEMTs**

C. Sanabria, H. Xu, T. Palacios, A. Chakraborty,
S. Heikman, U. K. Mishra, R. A. York, ECE Dept.,
University of California, Santa Barbara, CA
93106

4:10 PM II.B-8

GaN Based Piezo Sensors

M. Neuberger, T. Zimmermann, P. Benkart, M.
Kunze¹, I. Daumiller¹, A. Dadgar², A. Krost², E.
Kohn, Dept. of Electron Devices and Circuits,
University of ULM, 89081, Germany, ¹MicroGaN
GmbH, Albert Einstein Allee 45, 89081 Ulm, Ger-
many, ²Dept. of Experimental Physics, Otto von
Guericke Univ. Magdeburg, 39016 Magdeburg,
Germany

4:30 PM II.B-9

10 kV, 123 mΩ-cm² 4H-SiC Power DMOSFETs

S.-H. Ryu, S. Krishnaswami, M. O'Loughlin, J.
Richmond, A. Agarwal, and J. Palmour, Cree,
Inc., Durham, NC, 27703, A. R. Hefner, Natnl.
Inst. of Standards and Tech., Gaithersburg MD
20899-8124

Monday PM, June 21, 2004,
5:30 PM – 9:30 PM
Center for Continuing Education (CCE)

Session III. Poster Session

Session Organizer:
Lynn Loo, University of Texas at Austin

Carbon Nanotube Devices

III-1

Direct Measurements of the AC Performance of Carbon Nanotube Field Effect Transistors

D. V. Singh* and K. A. Jenkins, IBM T. J. Watson Research Center, Yorktown, Heights, NY 10598, *IBM Semiconductor Research and Development Center, (SRDC), Research Division, IBM T. J. Watson Research Center, Yorktown Heights, NY 10598

III-2

Novel Self-Defined Field Emission Transistors with PECVD-Grown Carbon Nano-Tubes on Silicon Substrates

J. Koohsorkhi, H. Hoseinzadegan, S. Mohajerzadeh and M.D. Robertson, Thin Film Laboratory, ECE Dept., University of Tehran, Iran.

III-3

Fabrication of Complimentary Single-Electron Inverter in Single-Wall Carbon Nanotubes

D. Tsuya^{1,2}, M. Suzuki^{1,3}, Y. Aoyagi², K. Ishibashi^{1,3},
¹Advanced Device Laboratory, The Institute of Physical and Chemical Research (RIKEN), 2-1, Hirosawa, Wako, Saitama 351-0198, Japan,
²Interdisciplinary Graduate School of Science & Engineering, Tokyo Institute of Technology, 4259, Nagatsuta, Midori-ku, Yokohama 226-8503, Japan,
³CREST, Japan Science and Technology (JST), Kawaguchi, Saitama, 332-0012, Japan

Devices for Displays & Imaging

III-4

a-Si:H TFT Phosphorescent OLED Active Matrix Pixels Fabricated on Polymeric Substrates

J. A. Nichols¹, T. N. Jackson¹, M. H. Lu², and M. Hack²,
¹Dept. of Electrical Engineering, The Pennsylvania State University, 121 Electrical Engineering East, University Park, PA 16802,
²Universal Display Corporation, 375 Phillips Blvd., Ewing, NJ 08618

Device Modeling

III-5

Study of Subthreshold Electron Mobility Behavior in SOI MESFETs

T. Khan, D. Vasileska and T. J. Thornton, Arizona State University, Tempe, AZ 852387-5706

III-6

A Combined Model for Si-Based Resonant Interband Tunneling Diodes Grown on SOI

N. Jin¹, D. Liu¹, S.-Y. Chung¹, R. Yu², W. Lu¹, P. R. Berger^{1,2} and P. E. Thompson³,
¹Dept. of Electrical and Computer Engineering, The Ohio State University, Columbus, Oh 43210,
²Dept. of Physics, The Ohio State University, Columbus, Oh 43210,
³Naval Research Laboratory, Code 6812, Washington, DC 20375-5347

III-7

Simulation of Interface Roughness in DG MOS-FETs Using Non-Equilibrium Greens Functions

J. Fonseca and S. Kaya, SEECS, Ohio University, Athens, OH 45701

III-V Field-Effect and Bipolar Transistors

III-8

C_{BC} Reduction in InP Heterojunction Bipolar Transistor with Selectively Implanted Collector Pedestal

Y. Dong, A. Griffith, M. Dahlström, and M. J. W. Rodwell, Dept. of Electrical and Computer Engineering, University of California at Santa Barbara, Santa Barbara, CA 93106

III-9

A New Two-Step Technology Using SiNx Passivation and Pt-Buried Gate Process and its Application to 0.15 μm $\text{Al}_{0.6}\text{InAs}/\text{In}_{0.65}\text{GaAs}$ HEMTs

D.-H. Kim, K.-M. Lee, J.-H. Lee* and K.-S. Seo, ISRC and School of EECS, Seoul National University and *Wavics, Co., LTD, San56-1, Shillim-Dong, Kwanak-Gu, Seoul, Republic of Korea

III-10

Planar Device Isolation for InP-Based DHBTs

N. Parthasarathy, Y. Dong, D. Scott, M. Urteaga, and M. J. W. Rodwell, Dept. of Electrical and Computer Engineering, University of California at Santa Barbara, Santa Barbara, CA 93106

Magnetic Devices

III-11

Shape Engineering of Dipole-Coupled Nanomagnets for Magnetic Logic Devices

A. Imre, G. Csaba, L. Zhou, A. Orlov, G. H. Bernstein, W. Porod and V. Metlushko*, Center for Nano Science and Technology, University of Notre Dame, Notre Dame, IN 46556, *Dept. of Electrical Engineering and Computer Science, University of Illinois, Chicago, IL 60607

Millimeter Wave and Ultrafast Devices

III-12

Influence of the Access Resistance in the rf Performance of mm-wave AlGaIn/GaN HEMTs

T. Palacios, S. Rajan, L. Shen, A. Chakraborty, S. Heikman, S. Keller, S. P. DenBaars, and U. K. Mishra, Dept. of Electrical and Computer Engineering, University of California at Santa Barbara, Santa Barbara, CA 93106

Nonvolatile, Static and Dynamic Memory

III-13

A Novel Program-Erasable Capacitor Using High- κ AlN Dielectric

C. H. Lai¹, M. W. Ma¹, C. F. Cheng¹, A. Chin¹, S. P. McAlister², C. X. Zhu³, M.-F. Li³ and D. L. Kwong⁴
¹Dept. of Electronics Eng., National Chiao Tung Univ., Nano Sci, Tech. Center, Univ. System of Taiwan, Hsinchu, Taiwan, ROC, ²National Research Council of Canada, Ottawa, Canada, ³Si Nano Device Lab., ⁴Dept. of Electrical & Computer Engineering, National Univ. of Singapore, Singapore, ⁴Dept. of Electrical & Computer Engineering, The Univ. of Texas, Austin, TX 78712

Optical Sources and Detectors

III-14

Low Noise GaAs-Based Avalanche Photodiodes for Long Wavelength Applications

B. K. Ng¹, J. P. R. David², W. M. Soong², J. S. Ng², C. H. Tan², H. Y. Liu², M. Hopkinson² and P. N. Robson^{2,1}Nanyang Technological University, School of EEE, Nanyang Avenue, Singapore 639798, ²University of Sheffield, Dept. of EEE, Mappin Street, Sheffield, S1-3JD, UK

III-15

Resonant Tunneling Quantum Dot Infrared Photodetector (RT-QDIP): Separating Dark Current and Photocurrent

X. H. Su, A. D. Stiff-Roberts, S. Chakrabarti, J. Singh, and P. Bhattacharya*, Solid State Electronics Laboratory, Dept. of Electrical Engineering and Computer Science, University of Michigan, Ann Arbor, MI 48109-2122

Organic Emitters and Transistors

III-16

An Organic Thin-Film Transistor with Photolithographically Patterned Top Contacts and Active Layer

G. Gu, M. G. Kane, J. E. Doty, and A. H. Firester, Sarnoff Corp., CN5300, Princeton, NJ 08543

III-17

Directly Lithographic Top Contacts for Pentacene Organic Thin-Film Transistors

C.-C. Kuo and T. N. Jackson, Center for Thin Film Devices, Dept. of Electrical Engineering, The Pennsylvania State University, 121 Electrical Engineering East, University Park, PA 16802

Plastic Electronics

III-18

Tunneling and Depletion-Mode TFTs Fabricated by Low-Temperature Stress-Assisted Cu-Induced Lateral Growth and Metal-Free Crystallization of Germanium

B. Hekmatshoar, S. Mohajerzadeh, D. Shahrjerdi, and M. D. Robertson, Thin Film Laboratory, ECE Dept., University of Tehran, Tehran, Iran

III-19

Short Channel Amorphous-Silicon TFTs on High-Temperature Clear Plastic Substrates

K. Long, H. Gleskova, S. Wagner, and J. C. Sturm, Princeton Institute for the Science and Technology of Materials, (PRISM), Dept. of Electrical Engineering, Princeton University, Princeton, NJ 08544

III-20

Conductive Copper Patterning by Nanotransfer Printing

K. Felmet¹, Y. Sun², and Y.-L. Loo¹, ¹Dept. of Chemical Engineering, Center for Nano- & Molecular Science and Technology, University of Texas at Austin, Austin, TX 78712, ²Dept. of Chemistry and Biochemistry, University of Texas at Austin, Austin, TX 78712

Quantum-Effect and Single-Electron Devices

III-21

Single-Electron-Transistor Behavior in Deep Sub-0.1 μm Planar-Doped-Barrier FETs

I. Pestic^{1,4}, A. Mutlu^{1,5}, N. Gunther¹, M. Rahman¹, J. Schulze², W. Hansch³, and I. Eisele², ¹Santa Clara University, Electron Devices Laboratory, 500 El Camino Real, Santa Clara, CA 95053-0569, ²University of German Federal Armed Forces Munich, Institute of Physics, Werner-Heisenberg-Weg 30, 85577 Neubiberg, Germany, ³Technical University Munich, Dept. of Technical Electronics, Arcis Straße 21, 80333, Munich, Germany, ⁴Sivaco International, 4701 Patrick Henry Dr., Bldg, #2, Santa Clara, CA 95054, ⁵Intel Corp., Design Reliability Tech., 2200 Mission College Blvd., SC9-09, Santa Clara, CA 95054

III-22

Simulation Study of Tunneling Devices with Quantum Confinement in Source and Drain

Y. Katayama and S. E. Laux*, IBM Tokyo Research Laboratory, Shimotsuruma, Yamato, Kanagawa 242-8502, Japan, * IBM Semiconductor Research and Development Center (SRDC), Research Division, T. J. Watson Research Center, Yorktown Heights, NY 10598

III-23

A Floating Gate Single Electron Memory Device with Al_2O_3 Tunnel Barriers

K. K. Yadavalli, N. R. Anderson, T. A. Orlova, A. O. Orlov, and G. L. Snider, Dept. of Electrical Engineering, University of Notre Dame, Notre Dame, IN 46556

Reliability

III-24

Hot Carrier Reliability of HfSiON NMOSFETs with Poly and TiN Metal Gate

J. H. Sim^{1,3}, B. H. Lee², R. Choi^{1,3}, K. Matthews³, D. L. Kwong¹, L. Larson³, P. Tsui³, and G. Bersuker³, ¹The University of Texas at Austin, ²IBM assignee, ³International SEMATECH, 2706 Montopolis Drive, Austin, TX 78741

III-25

Threshold Voltage Instability of Ultra-Thin HfO_2 NMOSFETs: Characteristics of Polarity Dependences

S. J. Rhee, C. Y. Kang, Y. H. Kim, C. S. Kang, H.-J. Cho, R. Choi, C. H. Choi, M. S. Akbar, and J. C. Lee, Microelectronics Research Center, Dept. of Electrical and Computer Engineering, The University of Texas at Austin, Austin, TX 78758

Sensors

III-26

Polar Heterostructure for Multi-function Devices: Theoretical Studies

Y.-R. Wu and J. Singh, Dept. of Electrical Engineering and Computer Science, University of Michigan, Ann Arbor, 1301 Beal Ave., Ann Arbor, MI 48109

III-27

Polymeric Substrate Microcrystalline-Silicon Strain Sensor

L. Zhou and T. Jackson, Center for Thin Film Devices and Materials Research Institute, Dept. of Electrical Engineering, Penn State University, University Park, PA 16802

SiGe, SiGeC, and SiC Devices

III-28

Laterally-Scaled Si/SiGe n-MODFETs with in Situ and Ion-Implanted p-Well Doping

S. J. Koester, K. L. Saenger, J. O. Chu, Q. C. Ouyang, J. A. Ott, D. F. Canaperi, J. A. Tornello, C. V. Jahnes, and S. E. Steen, IBM T. J. Watson Research Center, P.O. Box 218, Yorktown Heights, NY 10598

III-29

Overgrown Si/SiGe Resonant Interband Tunnel Diode for Integration with CMOS

S. Sudirgo¹, R. Vega¹, R. P. Nandgaonkar¹, K. D. Hirschman¹, S. L. Rommel¹, A. K. Kurinec¹, P. E. Thompson², N. Jin³, and P. R. Berger³, ¹Dept. of Microelectronic Engineering, 82 Lomb Memorial Dr., Rochester, NY 14623, ²Naval Research Laboratory, Code 6812, Washington DC, 20375-5347, ³Dept. of Electrical Engineering, The Ohio State University, Columbus, OH 43210

Silicon CMOS/BiCMOS

III-30

Schottky-Barrier-Height Engineering for Strained-Si MOSFETs

K. Ikeda, Y. Yamashita, A. Endoh, K. Hikosaka, and T. Mimura, Fujitsu Laboratories, Ltd., 10-1 Morinosato-Wakamiya, Atsugi, Kanagawa 243-0197, Japan

III-31

Device Optimization for Digital Sub-Threshold Operation

B. C. Paul, and K. Roy, School of Electrical and Computer Engineering, Purdue University, West Lafayette, IN 47907-1285

Silicon Scaled and Nanoscale Devices

III-32

A Study of Source/Drain-On-Insulator Structure for Extremely Scaled MOSFETs

Z. Zhang, S. Zhang*, C. Feng, and M. Chan, Dept. of Electrical and Electronic Engineering, HKUST, Hong Kong, *Institute of Microelectronics, Peking University, PRC

SOI and 3-D Devices

III-33

Modeling of Narrow-Width SOI Devices: The Impact of Quantum Mechanical Size Quantization Effects and Unintentional Doping on Device Operation

S. S. Ahmed and D. Vasilevska, Dept. of Electrical Engineering, Arizona State University, Tempe, AZ 85287-5706

III-34

Three-Dimensional Multi-Bridge-Channel MOSFET (MBCFET) Fabricated on Bulk Si-Substrate

S.-Y. Lee^{1,2}, E.-J. Yoon¹, S.-M. Kim¹, C. W. Oh¹, M. Li¹, D.-W. Kim¹, I. Chung², D. Park¹ and K. Kim¹,¹Device Research Team, R&D Center, Samsung Electronics Co., Kiheung-Eup, Yongin-City, Kyungki-Do, Korea, ²School of Information and Computer Engineering, Sungkyunkwan Univ., Kyungki-Do, Korea

Spin-Based Devices

III-35

Electronic and Magnetic Properties of Ferromagnetic p-(In,Mn)As/n-InAs Heterojunctions

S. J. May and B. W. Wessels, Dept. of Materials Science and Engineering, Northwestern University, Evanston, IL 60208

Thin Film Transistors

III-36

Flexible Substrate a-Si:H TFTs for Space Applications

L. Zhou and T. Jackson, Center for Thin Film Devices and Materials Research Institute, Dept. of Electrical Engineering, Penn State University, University Park, PA 16802, E. Brandon and W. West, NASA Jet Propulsion Laboratory, Pasadena, CA 91109

III-37

Fabrication and Testing of Pentacene TFTs that Use Water-Dispersible Polyaniline Electrodes

K. S. Lee, G. B. Blanchet*, F. Gao, Y.-L. Loo, Chemical Engineering, University of Texas at Austin, Austin, TX, *DuPont Central Research, Willmington DE

III-38

A Printable Form of Single Crystal Silicon for High Performance Thin Film Transistors on Plastic

E. Menard, D.-Y. Khang, K. Lee, R. Nuzzo and J. A. Rogers, University of Illinois at Urbana-Champaign, 1304 W. Green St., Urbana, IL 61082

Tunneling and Hot-Electron Devices

III-39

Resonant Tunneling Permeable Base Transistor Based Pulsed Oscillator

E. Lind, P. Lindström, A. Nauen, and L.-E. Wernersson, Solid State Physics / Nanometer Consortium, Lund University, Box 118, S-22100 Sweden

Tuesday AM, June 22, 2004
RM. 102 DeBartolo

Session IV.A.
Carbon Nanotube Transistors

Session Organizer:

**Joerg Appenzeller, IBM T. J. Watson
Research Center**

Session Chairman:

Jing Guo, Purdue University,

9:00 AM IV.A-1

**Novel Structures Enabling Bulk Switching in
Carbon Nanotube FETs**

Y.-M. Lin, J. Appenzeller, and Ph. Avouris, IBM
T. J. Watson Research Center, Yorktown Heights,
NY 10598

9:20 AM IV.A-2

**An Extended Model for Carbon Nanotube
Field-Effect Transistors**

J. Knoch, S. Mantl, Y.-M. Lin*, Z. Chen*, Ph.
Avouris* and J. Appenzeller*, Institute for Thin
Films and Interfaces and cni - Center of Nanoelec-
tronic Systems for Information Technology, Forsch-
ungszentrum Jülich, D-52454 Jülich, Germany,
* IBM T. J. Watson Research Center, Yorktown
Heights, NY 10598

9:40 AM IV.A-3

**Air-Stable Chemical Doping of Carbon Nanotube
Transistors**

J. Chen, C. Klinke, A. Afzali, and Ph. Avouris, IBM
T. J. Watson Research Center, Yorktown Heights,
NY 10598

10:00 AM IV.A-4

**Complex Band Structure-Based Non-Equilibrium
Green's Function (NEGF) Transport Studies for
Ultra-Scaled Carbon Nanotube (CNT) Transistors**

T. Xia*, L. F. Register, S. K. Banerjee, Micro-
electronics Research Center, University of Texas
at Austin, R9950, Austin, TX 78758

10:20 AM IV.A-5

**Coherent Transport of Hole in p-type
Semiconductive Carbon Nanotube**

T. Kamimura^{1,4}, C. K. Hyon⁴, A. Kojima⁴, M.
Maeda^{2,4}, and K. Matsumoto^{1,3,4},¹Osaka Univ.
ISIR, 8-1 Mihogaoka, Ibaraki-shi, Osaka, 567-
0047, Japan, ²Univ. of Tsukuba, ³National Institute
of Advanced Industrial Science and Technology,
⁴CREST/JST

10:40 AM Break

Tuesday AM, June 22, 2004
RM. 102 DeBartolo

Session IV.B
Nitride Transport

Session Organizer:

**Yifeng Wu,
CREE Santa Barbara Technology Center**

Session Chairman:

Thomas Jenkins, Air Force Research Labs

11:00 AM IV.B-1

**Comparative Analysis of Hot Phonon Effects in
Nitride and Arsenide Channels for HEMTs**

A. Matulionis, Semiconductor Physics Institute,
Vilnius, Lithuania

11:20 AM IV.B-2

**Velocity Overshoot Effects and Transit Times in
III-V Nitride HFETs: a Monte Carlo Study**

M. Singh, Y.-R. Wu and J. Singh, Dept. of Electrical
Engineering and Computer Science, University of
Michigan, 1301 Beal Ave., Ann Arbor, MI 48109

Tuesday AM, June 22, 2004
RM. 141 DeBartolo

Session IV.C.
Photonic Devices

Session Organizer:

**John O'Brien,
University of Southern California**

Session Chairman: **Kent Choquette,
University of Illinois**

9:00 AM IV.C-1 *Invited*

**Materials and Device Developments for
Ultraviolet LEDs and Laser Diodes**

M. Bergmann, T. Kuhr, K. Haberern, C. Hussell,
A. Abare, and D. Emerson, Cree, Inc., 4600 Silicon
Drive, Durham, NC 27703

9:30 AM IV.C-2 *Invited*

Progress in Quantum Dots for Nanophotonic Devices

Y. Arakawa, Research Center for Advanced Science and Technology, University of Tokyo, 4-6-1 Komaba, Meguro-ku, Tokyo 153-8505 Japan

10:00 AM IV.C-3

Optical Near-Field Enhancement of Metal-Aperture VCSEL with Nanometal Particle

J. Hashizume, and F. Koyama, Microsystem Research Center, P&I Lab., Tokyo Institute of Technology, 4259 Nagatsuta, Midori-ku, Yokohama, Kanagawa, 226-8503, Japan

10:20 AM IV.C-4

Characteristics of High-Performance 1.0 μm and 1.3 μm Quantum Dot Lasers: Impact of p-Doping and Tunnel Injection

S. Fathpour, Z. Mi, S. Chakarabarti, and P. Bhattacharya, Solid-State Electronics Laboratory, Dept. of Electrical Engineering and Computer Science, University of Michigan, Ann Arbor, MI 48109-2122

10:40 AM Break

11:00 AM IV.C-5

The Role and Suppression of Carrier Leakage in 1.5 μm GaInNAsSb/GaAs Lasers

S. R. Bank, M. A. Wistey, H. B. Yuen, L. L. Goddard, and J. S. Harris, Solid State and Photonics Laboratory, Stanford University, 126X CIS-X Via Ortega, Stanford, CA 94305

11:20 AM IV.C-6

High-Temperature Spin-Polarized Quantum Dot Light-Emitting Diodes

M. Holub, S. Fathpour, S. Chakarabarti, J. Topol'ancik, P. Bhattacharya, and Y. Lei*, Solid-State Electronics Laboratory, Dept. Of Electrical Engineering and Computer Science, University of Michigan, Ann Arbor, MI 48109-2122, *Electron Microscopy Center, Material Science Division, Argonne National Laboratory, Argonne, IL 60439

**Tuesday PM, June 22, 2004
RM. 101 DeBartolo**

**Session V. Invited Session:
Out-of-the-Box Electronics**

Session Organizer:

**Theresa Mayer
Pennsylvania State University**

1:20 PM V-1 *Invited*

Electron Y-Branch Switches

L. Worschech, D. Hartmann, S. Reitzenstein and A. Forchel, Technische Physik, Universität Würzburg, Am Hubland, 97074 Würzburg, Germany

1:50 PM V-2 *Invited*

Optical Manipulation of Magnetism in III-V-Based Ferromagnetic Semiconductors and its Device Application

H. Munekata, Tokyo Institute of Technology, 4259 Nagatsuta, Midori-ku Yokohama 26-8503, Japan

2:20 PM V-3 *Invited*

Physical Limits of Binary Logic Switch Scaling

C. Lent, University of Notre Dame, Notre Dame, IN 46556

2:50 PM Break

**Tuesday PM, June 22, 2004
RM. 102 DeBartolo**

Session V.A Detectors

Session Organizer:

**Fumio Koyama,
Tokyo Institute of Technology**

Session Chairman:

**Hiroo Munekata,
Tokyo Institute of Technology**

3:10 PM V.A-4

High-Efficiency, Ge-on-SOI Lateral PIN Photodiodes with 29 GHz Bandwidth

S. J. Koester, J. D. Schuab, G. Dehlinger, J. O. Chu, Q. C. Ouyang, and A. Grill, IBM T. J. Watson Research Center, P.O. Box 218, Yorktown Heights, NY 10598

3:30 PM V.A-5

A Low-Temperature Si/SiGe Impact Diode for Improved Infrared Sensing

J. A. Meteer¹, S. S. Eikenberry², J. E. Huffman³, and E. C. Kan¹, ¹Electrical and Computer Engineering, Cornell University, Ithaca, NY 14853, ²Dept. of Astronomy, University of Florida, Gainesville, FL 32611, ³Lawrence Semiconductor Research Laboratory, Tempe, AZ 85282

3:50 PM V.A-6

Fabrication and Characterization of Solar-Blind Al_{0.6}Ga_{0.4}N MSM Photodetectors with Low Dark Current

N. Biyikli, T. Kartaloglu, O. Aytur, T. Tut^{*}, I. Kimukin^{*}, and E. Ozbay^{*}, Bilkent University, Electrical & Electronics Engineering Dept., Bilkent Ankara, 06800 Turkey, ^{*} Bilkent University, Dept. of Physics, Bilkent Ankara, 06800 Turkey

Tuesday PM, June 22, 2004
RM. 141 DeBartolo

Session V.B Organic Devices

Session Organizer:

Alberto Salleo, Palo Alto Research Center

3:10 PM V.B-4

Full-Swing Pentacene Organic Thin-Film Transistor Inverter with Enhancement-Mode Driver and Depletion-Mode Load

C. A. Lee, S. H. Jin, K.D. Jung, J. D. Lee, and B.-G. Park, Inter-University Semiconductor Research Center (ISRC) and School of Electrical Engineering, Seoul National University, San 56-1, Shinlim-dong, Kwanak-gu, Seoul 151-742, Korea

3:30 PM V.B-5

Single-Monolayer Inkjetted Oligothiophene Organic TFTs Exhibiting High Performance and Low Leakage

P. C. Chang,^{1*} S. E. Molesa¹, A. R. Murphy², J. M. J. Fréchet², and V. Subramanian¹, ¹Dept. of Electrical Engineering and Computer Sciences and ²Dept. of Chemistry, University of California, Berkeley, 94720, ^{*}144MB Cory Hall, Berkeley, CA 94720-1770

3:50 PM V.B-6

Channel Confined Kinesin-Microtubule Biomolecular Nanomotors

Y. M. Huang, M. Uppalapati^{*}, W. O. Hancock^{*}, T. N. Jackson, Center for Thin Film Devices and Materials Research Institute, Dept. of Electrical Engineering, ^{*}Dept. of Bioengineering, 218 Hallowell Building, Penn State University, University Park, PA 16802

Wednesday AM, June 23, 2004
RM. 101 DeBartolo

Session VI.A Joint DRC/EMC Invited Session:

Session Chairman:

**Theresa Mayer,
Pennsylvania State University**

10:00 AM VI.A-1 *Invited*

Characterization of Silicon-Based Molecular Resonant Tunneling Diodes with Scanning Tunneling Microscopy

N. P. Guisinger, R. Basu, M. E. Greene, A. S. Baluch and M. C. Hersam, Dept. of Materials Science and Engineering, Northwestern University 2220 Campus Drive, Evanston, IL 60208-3108

10:40 AM VI.A-2 *Invited*

IR Emission from Schottky Barrier Carbon Nanotube FETs

R. Martel³, J. Misewich², J. C. Tsang¹ and Ph. Avouris¹, ¹IBM T. J. Watson Research Center, Kitchewan Road, Yorktown Heights, NY 10598, ²Materials Science Dept., Brookhaven National Lab, Upton NY 11973, ³Université de Montréal, C. P. 6128 Succursale Centre-Ville, Montréal, H3C-3J7 Canada

11:20 AM VI.A-3 *Invited*

Measurement of Electron Transport and Mechanical Properties of Single Molecules

N. Tao, B. Xu and X. Xiao, Dept. of Electrical Engineering & Center for Solid State Electronics Research, Arizona State University, Temp, AZ 85287

Wednesday AM, June 23, 2004
RM. 131 DeBartolo

Session VI.B
Aggressively-Scaled FETs

Session Organizer:
Lars-Erik Wernersson,
University of Lund, Sweden

10:00 AM VI.B-1

4-Terminal FinFETs with High Threshold
Voltage Controllability

Y. X. Liu, M. Masahara, K. Ishii, T. Sekigawa, H. Takashima, H. Yamauchi, T. Tsutsumi, K. Sakamoto and E. Suzuki, Nanoelectronics Research Institute, (NeRI), National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba Central 2, 1-1-1 Umezono, Tsukuba-shi, Ibaraki 305-8568, Japan

10:20 AM VI.B-2

Fin Width Scaling Criteria of Body-Tied
FinFET in Sub-50 nm Regime

H. J. Cho, J. D. Choe, M. Li, J. Y. Kim*, S. H. Chung*, C. W. Oh, E.-J. Yoon, D.-W. Kim, D. Park, and K. Kim**, R&D Center Samsung Electronics Co, San 24, Kiheung-Eup, Yongin-City, Kyungki-Do, Korea, 449-711

10:40 AM VI.B-3

A New Fabrication Method for Self-Aligned
Nanoscale I-MOS (Impact-Ionization MOS)

W. Y. Choi, B. Y. Choi, D.-S. Wo, J. D. Lee, and B.-G. Park, Inter-University Semiconductor Research Center (ISRC) and School of Electrical Engineering, Seoul National University, San 56-1, Shinlim-dong, Kwanak-gu, Seoul 151-742, Korea

11:00 AM VI.B-4

Nano-scale MOSFETs with Programmable
Virtual Source/Drain

B. Y. Choi, Y.-K. Lee, W. Y. Choi, I. H. Park, D.-S. Wo, J. D. Lee, and B.-G. Park, C.-W. Oh², S. Chung¹, and D. Park², Inter-University Semiconductor Research Center (ISRC) and School of Electrical Engineering, Seoul National University, San 56-1, Shinlim-dong, Kwanak-gu, Seoul 151-742, Korea, ¹C&M System LSI and ²Device Research Team, R&D Center, Samsung Electronics Co., San#24, Nongseo-Ri, Kiheung-Eup, Yongin-City, Kyunggi-Do 449-711, Korea

11:20 AM VI.B-5

Scaling Issues of n-Channel Vertical Tunnel
FET with δp^+ SiGe Layer

K. K. Bhuiwarka, J. Schulze, and I. Eisele, Institute of Physics, University of the German Federal Armed Forces, Munich D-85577 Neubiberg, Germany

11:40 AM VI.B-6

SOI MOSFET-Based Quantum Tunneling Device
– FIBTET

K. R. Kim, H. H. Kim, K.-W. Song, J. I. Huh, J. D. Lee, and B.-G. Park, Inter-University Semiconductor Research Center (ISRC) and School of Electrical Engineering, Seoul National University, San 56-1, Shinlim-dong, Kwanak-gu, Seoul 151-600, Korea

Wednesday PM, June 23, 2004
RM. 101 DeBartolo

Session VII.A
Joint DRC/EMC Invited Session:

Session Chairman:
Vitaly Podzorov, Rutgers University

Session Chairman:
Alberto Salleo, Palo Alto Research Center

1:30 PM VII.A-1 Invited

Nanowire Thin-Films: a New Electronic
Materials Technology for Thin-Film Devices and
High Performance Large-Area Electronics

S. Empedocles, Nanosys., Inc., 2625 Hanover St., Palo Alto, CA 94304

2:10 PM VII.A-2 Invited

Printing of Polymer Field-Effect Transistors

H. Sirringhaus, Cavendish Laboratory, University of Cambridge, UK

2:50 PM VII.A-3

Digital Lithography for Thin-film Transistor
Fabrication:

W. S. Wong¹; R. Lujan¹; S. E. Ready¹; M. L. Chabiny¹; A. C. Arias¹; R. A. Street¹; ¹Palo Alto Research Center, 3333 Coyote Hill Rd., Palo Alto, CA 94304 USA

3:10 PM Break

3:30 PM VII.A-4 *Invited*

Pentacene Based RFID Transponder Circuitry

P. F. Baude, D. A. Ender, T. W. Kelley, M. A. Haase, D. V. Muyres, and S. D. Theiss, 3M Company, St. Paul, MN 55109

4:10 PM VII.A-5

Hole Mobility in Organic Single Crystal Field Effect Transistors

C. Goldmann¹; C. Krellner¹; K. P. Pernstich¹; S. Haas¹; David J. Gundlach¹; Bertram Batlogg¹; ¹Laboratory for Solid State Physics, ETH Zurich, HPF-F9, Zurich 8093 Switzerland

4:30 PM VII.A-6

An 8 V Organic Complementary Logic Process for Flexible Polymeric Substrates

H. Klauk, M. Halik, T. Zschieschang, F. Eder, G. Schmid, and C. Dehm, Infineon Technologies, New Memory Platforms, Materials and Technology, 91052 Erlangen, Germany

**Wednesday PM, June 23, 2004
RM. 131 DeBartolo**

**Session VII.B
High Speed Technology**

Session Organizer:

**Tetsuya Suemitsu,
NTT Photonic Laboratories,
Atsugi, Japan**

Session Chairman:

**Keisuke Shinohara,
Rockwell Scientific Company,
Thousand Oaks, CA**

1:50 PM VII.B-1

Collector Vertical Scaling and Performance Tradeoffs in 300 GHz SiGe HBTs

J.-S. Rieh, M. Khater, K.T. Schonenberg, F. Pagette, P. Smith, T.N. Adam, K. Stein, D. Ahlgren, and G. Freeman, IBM Semiconductor R&D Center, 2070 Rt. 52, M/S AE1, Hopewell Junction, NY 12533

2:10 PM VII.B-2

Narrow Mesa InGaAs/InP DHBTs with Simultaneously High f_c and $f_{max} > 400$ GHz

Z. Griffith, M. Dahlström, and M. J. W. Rodwell, X.-M. Fang*, D. Lubyshev*, Y. Wu* J. M. Fastenau* and W. K. Liu*, Dept. of Electrical and Computer Engineering, University of California, Santa Barbara, CA 93106, *IQE Inc., 119 Technology Drive, Bethlehem, PA 18015

2:30 PM VII.B-3

280 GHz f_c InP DHBT with 1.2 μm^2 Base-Emitter Junction Area in MBE Regrown-Emitter Technology

Y. Wei, D. W. Scott, Y. Dong, A. C. Gossard, and M. J. Rodwell, Dept. of Electrical and Computer Engineering, University of California, Santa Barbara, CA 93106

2:50 PM VII.B-4

Deep Submicron InP DHBT Technology with Electroplated Emitter and Base Contacts

M. Urteaga¹, P. Rowell¹, R. Pierson¹ and B. Brar¹, M. Dahlström², Z. Griffith², and M. J. W. Rodwell², S. Lee³, N. Nguyen³ and C. Nguyen³, ¹Rockwell Scientific Company, Thousand Oaks, CA, ²ECE Dept., UC Santa Barbara, CA, ³Global Communication Semiconductors, Torrance, CA

3:10 PM *Break*

3:30 PM VII.B-5

50 GHz Resonant Tunneling Diode Relaxation Oscillator

P. Chahal, F. Morris, and G. Frazier, Raytheon Co., 13532 N. Central Expressway, MS 35, Dallas, TX 75243

4:10 PM VII.B-6

Low-Voltage, High-Performance InAs/AlSb HEMTs with Power Gain Above 100 GHz at 100 mV Drain Bias

J. Bergman, G. Nagy, G. Sullivan, A. Ikhlassi, and B. Brar, C. Kadow*, H.-K. Lin*, A. Gossard*, and M. Rodwell*, Rockwell Scientific Company, Thousand Oaks, CA 91360, *University of California, Santa Barbara, CA 91630

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