



**28<sup>th</sup> IEEE COMPOUND  
SEMICONDUCTOR IC  
(CSIC) SYMPOSIUM  
(Formerly IEEE GaAs IC Symposium)**

# Program Presenting:

## **Betting the Ranch on Compound Semiconductors**

And Introducing CS-Week 2006  
A Co-location of CSIC Symposium, CS-MAX  
and the Key Conference

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**Nov 12<sup>th</sup> – Nov 15<sup>th</sup>, 2006**

**Henry B. Gonzalez  
Convention Center  
San Antonio, TX, USA**



**CO-SPONSORED BY**  
The IEEE Electron Devices Society,  
The IEEE Solid-State Circuits Society and  
The IEEE Microwave Theory and Techniques Society

IEEE  
445 HOES LANE  
PISCATAWAY, NJ 08855

28<sup>th</sup> IEEE Compound Semiconductor IC (CSIC) Symposium  
Nov 12<sup>th</sup> – Nov 15<sup>th</sup>, 2006 – San Antonio, TX, USA  
SCIC WWW URL: <http://www.csics.org>

First Class  
U.S. Postage  
Paid  
IEEE  
Piscataway, NJ  
Permit No. 52

# SYMPOSIUM

## San Antonio Convention Center Floor Plan

### Saturday, November 11<sup>th</sup>, 2006

REGISTRATION (Short Course & Primer Course Only)

### Sunday, November 12<sup>th</sup>, 2006

REGISTRATION (Short Course & Primer Course Only)

#### Continental Breakfast for Short Course

SHORT COURSE 1: GaN Circuits and Applications

SHORT COURSE 2: RF and High Speed CMOS

ROCS Workshop (Registration, Workshop, and Coffee Breaks)

ROCS Workshop (Lunch)

#### Short Course Lunch

REGISTRATION for Symposium (and Primer Course until 4:00)

PRIMER COURSE: Basics of Compound Semiconductor ICs

#### Symposium Opening Reception

### Monday, November 13<sup>th</sup>, 2006

REGISTRATION

#### Continental Breakfast

SYMPOSIUM OPENING

SESSION A: Plenary Session

SESSION B: W-Band and Beyond

SESSION C: Emerging Oxide-Semiconductor Device and Circuit Technologies

SESSION D: Millimeter Wave Frequency Conversion

PANEL SESSION 1: Reconfigurable and Tunable Networks

#### CS-Week Technology Exhibition Opening Reception

### Tuesday, November 14<sup>th</sup>, 2006

REGISTRATION

#### CS-Week Technology Exhibition

#### Continental Breakfast

SESSION E: GaN MMICs

SESSION F: Reliability and Simulation

SESSION G: Advanced III-V HEMTs

SESSION H: OEIC

#### Exhibition Luncheon

PANEL SESSION 2: Compound Semiconductor MOSFETs: Fact or Fiction? And who cares?

SESSION I: RF GaAs Based Amplifiers

#### Symposium Party – “An Evening at Rio Cibolo”

### Wednesday, November 15<sup>th</sup>, 2006

REGISTRATION

#### Continental Breakfast

SESSION J: III-V HBTs

SESSION K: Automotive Radar

SESSION L: Advanced Technologies

PANEL SESSION 3: Can we trust parasitic extractors at high frequencies?

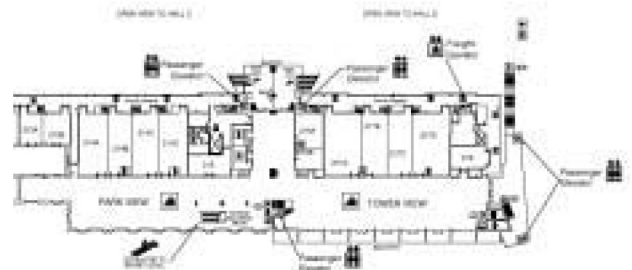
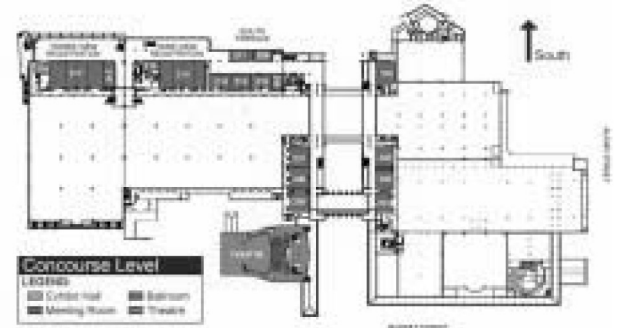
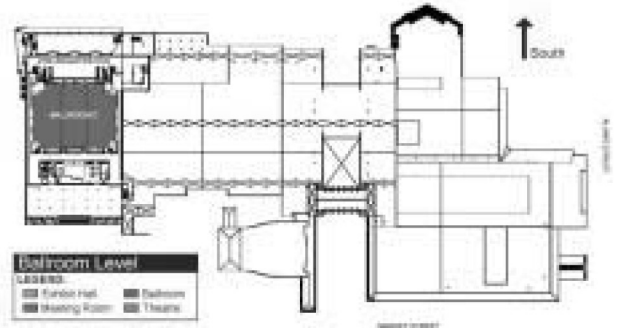
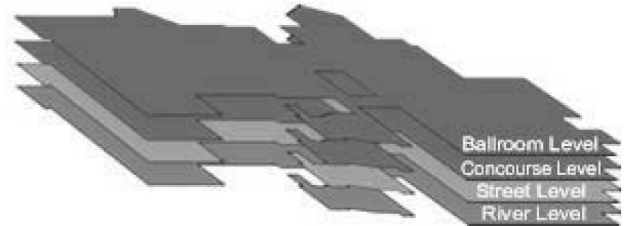
SESSION M: High Speed Digital Circuits

PANEL SESSION 4: PA Technology for WiMAX - Can challengers take on LD MOS at 3.5GHz and beyond ?

SESSION N: Wide Bandgap Technology

#### Close of Symposium

Visit us on the World-Wide Web at: <http://www.csics.org/>



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# AT A GLANCE

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## Saturday, November 11<sup>th</sup>, 2006

6:00 p.m. – 8:00 p.m. Tower View Foyer

## Sunday, November 12<sup>th</sup>, 2006

7:00 a.m. – 8:00 a.m. Tower View Foyer  
**7:00 a.m. – 8:00 a.m. Tower View Foyer**  
8:30 a.m. – 3:45 p.m. Room 217 C  
8:30 a.m. – 3:45 p.m. Room 217 D  
8:00 a.m. – 5:00 p.m. Room 213  
12:00 p.m. – 1:30 p.m. Room 217 A  
**12:00 p.m. – 1:30 p.m. Room 217 B**  
3:00 p.m. – 8:00 p.m. Tower View Foyer  
4:00 p.m. – 7:00 p.m. Room 217 C  
**6:00 p.m. – 8:00 p.m. The Grotto**

## Monday, November 13<sup>th</sup>, 2006

7:00 a.m. – 5:00 p.m. Tower View Foyer  
**7:00 a.m. – 8:00 a.m. Tower View Foyer**  
8:00 a.m. – 8:30 a.m. Room 217 A & B  
8:30 a.m. – 11:30 a.m. Room 217 A & B  
1:00 p.m. – 2:20 p.m. Room 217 A  
1:00 p.m. – 3:00 p.m. Room 217 D  
  
3:10 p.m. – 4:30 p.m. Room 217 A  
3:10 p.m. – 4:40 p.m. Room 217 D  
**5:00 p.m. – 7:00 p.m. Ballroom C1-C2**

## Tuesday, November 14<sup>th</sup>, 2006

7:00 a.m. – 5:00 p.m. Tower View Foyer  
**7:00 a.m. – 4:00 p.m. Ballroom C1-C2**  
**7:00 a.m. – 8:00 a.m. Ballroom C1-C2**  
8:00 a.m. – 9:50 a.m. Room 217 A  
8:00 a.m. – 9:30 a.m. Room 217 D  
10:10 a.m. – 11:40 a.m. Room 217 A  
10:10 a.m. – 11:20 a.m. Room 217 D  
**11:10 a.m. – 1:30 p.m. Ballroom C1-C2**  
2:00 p.m. – 3:30 p.m. Room 217 A  
  
2:00 p.m. – 3:40 p.m. Room 217 D  
**7:00 p.m. – 10:00 p.m. Rio Cibolo Ranch**

## Wednesday, November 15<sup>th</sup>, 2006

7:00 a.m. – 12:00 p.m. Tower View Foyer  
**7:00 a.m. – 8:00 a.m. Tower View Foyer**  
8:00 a.m. – 9:50 a.m. Room 217 A  
8:00 a.m. – 9:00 a.m. Room 217 D  
10:10 a.m. – 11:30 a.m. Room 217 A  
10:10 a.m. – 11:40 a.m. Room 217 D  
1:00 p.m. – 2:20 p.m. Room 217 A  
1:00 p.m. – 2:30 p.m. Room 217 D  
  
3:00 p.m. – 5:00 p.m. Room 217 A  
**5:00 p.m.**

MAIL COMPLETED REGISTRATION FORM AND FEES TO:

Registrar, 2006 IEEE CSIC Symposium  
c/o VIP Meetings & Conventions  
1515 Palisades Drive, Suite 1  
Pacific Palisades, CA 90272 USA

Place  
Stamp  
Here

# CHAIRMAN'S MESSAGE

On behalf of the organizing committee and the IEEE Electron Devices Society, the Microwave Theory and Techniques Society, and the Solid-State Circuits Society, I invite you to be a part of the 2006 IEEE Compound Semiconductor IC (CSIC) Symposium, formerly the IEEE GaAs IC Symposium. This year's symposium will be held November 12<sup>th</sup> – November 15<sup>th</sup> in San Antonio, Texas at the Henry B. Gonzalez Convention Center.

The CSIC Symposium has become the preeminent international forum on developments in integrated circuit technologies using GaAs, InP, SiGe, GaN, SiC and other advanced semiconductor devices. Our strong technical program brings the latest advances in high-frequency and high-speed circuits and technology. The program includes papers from both commercial and newly emerging military applications. Special emphasis is on the application of compound semiconductors to aerospace & defense, wireless, fiber, and automotive systems.

This year we are offering two short courses for the price of one. They cover current hot topics in advanced semiconductors including RF and High Speed CMOS and GaN Technology and its IC Applications. Both will be taught by leading experts from industry and the government. In addition, we offer our Primer Course that is an excellent tutorial presented within the context of our Symposium technical program.

This will be our 2<sup>nd</sup> year co-locating with the Key Conference to offer an exciting week of compound semiconductors. The Key Conference is a must for senior management and market analysts, focusing on the major technological and market trends that will dominate the future of the compound semiconductor industry. The combined event is called Compound Semiconductor Week 2006 (CS-Week 2006) and features the separate and respective technical programs of CSIC Symposium and the Key Conference with one unified CS-Week 2006 Technology Exhibition.



We are providing several social events to allow interaction with colleagues. Events include the Sunday Evening Opening Reception, the Monday evening CS-Week 2006 Technology Exhibition Opening Reception, the Tuesday CS-Week 2006 Technology Exhibition Luncheon, and the Tuesday evening CS-Week Theme Party – “An Evening at Rio Cibolo Ranch”.

Finally, I would like to announce the winners of our Ninth **Outstanding Paper Award from the 2005 Symposium**. They are *Shahriar Shahramian, Anthony Chan Carusone and Sorin P. Voinigescu, “A 40-GSamples/Sec Track & Hold Amplifier in 0.18µm SiGe BiCMOS Technology”* Edward S. Rogers Sr. Department of Electrical and Computer Engineering University of Toronto, Toronto, Ontario, Canada. Join us for the presentation of the award to the authors at the Symposium opening on Monday November 13<sup>th</sup>.

We hope you'll join us for Compound Semiconductor Week 2006 and contribute to the advancement of our industry!

**Mitchell Shifrin, Chair**  
2006 IEEE CSIC SYMPOSIUM



## COMPOUND SEMICONDUCTOR WEEK 2006 San Antonio, Texas \* November 12 - 15, 2006

### ADVANCE REGISTRATION FORM

Register Today via ...

FAX: (310) 459-0605  
WEB: vipmeetings.com/conferences/csweek2006.html  
PHONE: (800) 926-3976 or (310) 459-0600

MAIL: CS WEEK 2006  
c/o VIP MEETINGS & CONVENTIONS  
1515 Palisades Drive, Suite I  
Pacific Palisades, CA 90272-2167

**Attendee Information (please print):**

Last Name \_\_\_\_\_ First Name \_\_\_\_\_  
Company/ Affiliation \_\_\_\_\_  
Address (for confirmations) \_\_\_\_\_  
City, State, Postal Code \_\_\_\_\_  
Country \_\_\_\_\_ e-mail \_\_\_\_\_  
Phone \_\_\_\_\_ Fax \_\_\_\_\_

**Registration Fees:**

	<b>GOLD PASS</b>	<b>by Oct. 6</b>	<b>after Oct. 6</b>	<b>Amount</b>
Full access to both conferences & their events		\$1545	\$1775	\$ _____

	<b>CSIC Symposium</b>		<b>Key Conference</b>		
	<b>by Oct. 6</b>	<b>after Oct. 6</b>	<b>by Oct. 6</b>	<b>after Oct. 6</b>	
<b>FULL REGISTRATION</b>					
IEEE or IOP Member	\$480	\$530	\$1165	\$1345	\$ _____
Non-Member	\$530	\$600	\$1295	\$1495	\$ _____
Student	\$200	\$250	-	-	\$ _____
Ex-Chairman	\$200	\$250	-	-	\$ _____
<b>1-DAY REGISTRATION</b> (Sessions, Technical Digest & CD-ROM only, no social events)					
Select Day:	<input type="checkbox"/> Mon	<input type="checkbox"/> Tue	<input type="checkbox"/> Wed	<input type="checkbox"/> Mon	<input type="checkbox"/> Tue
IEEE or IOP Member	\$250	\$300	\$645	\$745	\$ _____
Non-Member	\$300	\$350	\$695	\$795	\$ _____
<b>SHORT COURSE</b>	\$350	\$450	-	-	\$ _____
Student	\$200	\$300	-	-	\$ _____
<b>PRIMER COURSE</b>	\$175	\$175	-	-	\$ _____
Student	\$75	\$75	-	-	\$ _____

**EXTRAS**

- CSICS Technical Digest only: # \_\_\_\_\_ \$75 each
- CSICS Digest CD ROM only: # \_\_\_\_\_ \$100 each
- Full KEY CONF Proceedings (incl. CD): N/A
- Short Course Notes only: # \_\_\_\_\_ \$100 each
- Primer Course Notes only: # \_\_\_\_\_ \$50 each
- Extra CSICS Reception Ticket (Sun): # \_\_\_\_\_ \$30 each
- Extra KEY CONF Cocktail Party Ticket (Tue): N/A
- Extra Joint Theme Party Ticket (Tue): # \_\_\_\_\_ \$75 each

**TOTAL AMOUNT ENCLOSED: \$ \_\_\_\_\_**

**IEEE, IOP Member or STUDENT ID Number:** \_\_\_\_\_

(Required if registering as Member or Student)

♦ **Cancellation Policy:** Registrations are non-transferable. To receive a full refund, less \$100 Handling Fee, all cancellations must be made in writing and received by October 6, 2006. After this date, all registration fees are non-refundable.

**Method of Payment** (For the above selected total registration fee):

CREDIT CARD:  MasterCard  Visa  AMEX  Discover  
I agree to have the above fees charged to my credit card account by VIP Meetings & Conventions.

CC#: \_\_\_\_\_ Exp. Date: \_\_\_\_\_

CC Holder Name: \_\_\_\_\_ Signature: \_\_\_\_\_

CHECK Drawn on a US bank and in US Dollars and made payable to **VIP Meetings & Conventions**.

WIRE TRANSFER Contact VIP M&C for Bank Account information

**Total Enclosed \$ \_\_\_\_\_**

Check here if you require special accommodations to fully participate. Attach detailed description of your needs.

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# CORPORATE BENEFACTORS

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This year, we are pleased to continue with the IEEE Compound Semiconductor IC Symposium Corporate Benefactors Program. This program allows companies interested in compound semiconductors to show their support of the Symposium by making contributions towards the cost of some of our social events.

These additional resources enable the Symposium to increase the quality of our event, as well as allowing companies an opportunity for some tasteful promotional activities. To discuss any of the benefactor opportunities in more depth, please contact:

David Round  
Tel: +44 (0) 20 8773 9944  
Fax: +44 (0) 20 8181 6178  
E-mail: davidr@sunbeammedia.co.uk

As of this printing the Corporate Benefactors for the 2006 Compound Semiconductor IC Symposium are as follows.

## **Gold Level Benefactors :**

RF MICRO DEVICES, INC.



KLA-Tencor Corporation



## **General Benefactors:**

American Xtal Technology  
Air Products and Chemicals, Inc.  
OMMIC  
HRL Laboratories LLC

Rohm and Haas Co  
FCM  
OSEMI, Inc.

## **Special Benefactors:**

The Symposium Web Site [www.csics.org](http://www.csics.org) has become a critical tool for the dissemination of information for prospective attendees of the Symposium. Every year, the web site must be updated and maintained to effectively serve this purpose. We would like to acknowledge the following benefactor for providing the Symposium web site support for the 2006 CSIC Symposium:



Comments regarding the web site or any publicity materials should be directed to the Publicity Chair, Walter Wohlmuth. Links to our corporate benefactors appear on our symposium website.

Additional publicity for the Symposium is being provided by:



# GENERAL INFORMATION

## IEEE 28th CSIC Symposium Nov 12<sup>th</sup> - Nov 15<sup>th</sup>, 2006 San Antonio Convention Center San Antonio, Texas

### REGISTRATION

	<u>Advance</u> (Received by Oct. 6 <sup>th</sup> )	<u>Regular</u> (After Oct. 6 <sup>th</sup> or on site)
<b>Symposium Registration</b>		
IEEE Member	\$480	\$530
Non-IEEE	\$530	\$600
Student	\$200	\$250
<b>Special 1-day Registration</b> (includes sessions, CD, and digest but no social)		
IEEE Member	\$250	\$300
Non-IEEE	\$300	\$350
<b>Short Course</b>		
Student Registration	\$200	\$300
<b>Primer Course</b>		
\$175		
Student Registration	\$75	\$75
<b>Technical Digest Only</b>	\$75	\$75
<b>Short Course Notes Only</b>	\$100	\$100
<b>Digest CD ROM Only</b>	\$100	\$100
<b>Primer Course Notes Only</b>	\$50	\$50
<b>Extra Reception Ticket</b>	\$30	\$30
<b>Extra Theme Party Ticket</b>	\$75	\$75

The full Symposium registration fee includes: attendance at all technical sessions and panels; one copy of the Technical Digest and CDROM; continental breakfasts; and morning and afternoon coffee breaks. Also included is admittance to: the Sunday Opening Reception; the CS-Week Technology Exhibition Opening Reception on Monday and exhibition lunch on Tuesday; all exhibits; and the exciting Tuesday evening Theme Party. The special 1-day registration fee includes the CD and digest, however, does not include the social activities. Additional copies of the Technical Digest and of the Short Course Notes will be available for purchase at the Symposium.

For **ADVANCE REGISTRATION** register either through the website <http://www.vipmeetings.com/conferences/csweek2006.html> or complete the enclosed Advance Registration Form with your remittance of the appropriate fee (check or credit card) **By October 6<sup>th</sup>, 2006**. You may Advance Register until November 1<sup>st</sup>, however prices will increase after the October 6<sup>th</sup> deadline.

Send your registration to:

Registrar, 2006 IEEE Compound Semiconductor IC Symposium  
c/o VIP Meetings & Conventions  
1515 Palisades Dr. Suite I  
Pacific Palisades, CA 90272 USA  
Tel: (310) 459-0600 or (800) 926-3976  
FAX (310) 459-0605

email: [csweek@vipmeetings.com](mailto:csweek@vipmeetings.com)

The remittance is payable by checks in U.S. dollars only, by personal/company check drawn on a U.S. bank, U.S. currency traveler's checks, or international money order. Checks must be made payable to "VIP Meetings & Conventions" and must be encoded with the bank number, account number, and check number. Credit cards and wire transfers may also be used. Bank drafts from non-U.S. banks and foreign currency are unacceptable and will be returned.

When you register for the Conferences, the contact information you provide (including your name, address, phone, and email address) may be shared with CSIC, IOPP, and vendor exhibitors.

**We urge you to pre-register** to reduce your costs and to simplify your check-in at the Symposium. Your Technical Digest and registration materials will be ready for you at the Advance Registration Desk.

### Registration Center:

The Symposium Registration Center is located in the San Antonio Convention Center Tower View Foyer on Saturday through Wednesday. The operating hours will be as follows:

#### Short & Primer Course Registration only

Saturday, November 11 <sup>th</sup>	6:00 p.m. – 8:00 p.m.
Sunday, November 12 <sup>th</sup>	7:00 a.m. – 8:00 a.m.
Sunday, November 12 <sup>th</sup>	3:00 p.m. – 4:00 p.m. (Primer)

#### Symposium Registration

Sunday, November 12 <sup>th</sup>	3:00 p.m. – 8:00 p.m.
Monday, November 13 <sup>th</sup>	7:00 a.m. – 5:00 p.m.
Tuesday, November 14 <sup>th</sup>	7:00 a.m. – 5:00 p.m.
Wednesday, November 15 <sup>th</sup>	7:00 a.m. – 12:00 noon

### Refund Policy:

Please note that after October 6<sup>th</sup>, 2006, your Advance Registration fee, Short Course fee, Primer Course fee, and fees for additional Symposium Technical Digest, or Reception/Party ticket fees are not refundable. Full refunds less \$100 handling fee will be granted for cancellations received in writing by October 6<sup>th</sup>, 2006. The letter to the Symposium Registrar (see address at VIP Meetings above) requesting the refund should state the pre-registrant's name and to whom the refund check should be made payable. All refunds will be processed after the Symposium. **NO PRE-REGISTRATION REFUNDS WILL BE GRANTED AFTER October 6<sup>th</sup>, 2006.**

# ACCOMMODATIONS

## Hotel Reservations:

A block of rooms has been reserved at a special discounted group rate for Symposium and CS Week participants at our headquarters hotel, San Antonio Marriott Riverwalk.

### SAN ANTONIO MARRIOTT RIVERWALK

711 East Riverwalk

San Antonio, TX 78205

Rate \$185 Single / Double plus 16.75 % tax

Rating: AAA Four Diamond

Cancellation Policy: 72 hours prior to arrival

Located in the heart of Downtown the Marriott Riverwalk offers sweeping balcony views of the city and the San Antonio Riverwalk below. Indulge in your choice of a historical, cultural, or culinary experience with your choice of rich flavors and intoxicating aromas along the River Walk, all a few steps away. An incredible location, this San Antonio Riverwalk hotel is located one block away from the San Antonio Convention Center where all the CS WEEK meetings will be held. The hotel combines gracious Marriott service and amenities, including high speed internet access, with a comfortable, casual feel.

Complimentary services include coffee/tea in-room, newspaper delivered to room. Other guest services include concierge desk, full-service business center, safe deposit boxes.

The Cactus Flower Café & Restaurant is open for breakfast, lunch and dinner offering both traditional and southwestern fare

The hotel also features an indoor and outdoor pool, whirlpool, spa and fitness center

Room amenities include air conditioning, alarm clock, coffee maker/tea service, luxurious bedding - down comforters, custom duvets, cotton-rich linens, down/feather pillows, hair dryer.

For a daily rate of \$9.95, you get, in your guest room:

1. High-speed Internet access
2. Unlimited local phone calls
3. Unlimited long distance calls (within the US).

Parking: Self: \$19, Valet: \$25

To make Hotel Reservations: Please call VIP Meetings & Conventions at (800)-926-3976 or (310)-459-0600 or visit our website [www.vipmeetings.com/conferences/csweek2006.html](http://www.vipmeetings.com/conferences/csweek2006.html). Please do not call the hotel direct (they will refer you back to VIP) or any regional hotel chain 800 number, since they will NOT be aware of our special arrangements. For any questions, email VIP at [reservations@vipmeetings.com](mailto:reservations@vipmeetings.com).

We ask you to please support your Symposium and more fully enjoy all the activities by staying at our official headquarters hotel, the San Antonio Marriott Riverwalk. The Symposium relies on attendees staying at the headquarters hotel to reduce the costs of the meeting rooms. To guarantee room and rate availability, room reservations should be made as soon as possible, and no later than Monday, October 16, 2006. After this date, rate and rooms will be on space available basis. Reservations are honored on a first-come, first-served basis.

All requests for reservations will receive a reservation acknowledgement from VIP Meetings & Conventions within one business day. The hotel's phone and fax number and additional information will be printed on the acknowledgment. Hotel's cancellation policy is 72 hours prior to arrival. If you need to cancel, please contact VIP Meetings at the numbers above.

## TRANSPORTATION

### Driving directions to the Marriott Rivewalk from the San Antonio Airport (SAT):

Take 281 South approx. 7 miles to the Commerce Street exit. Turn right onto Commerce 4. Continue 0.3 miles and then turn left onto Alamo Plaza, proceeding around the orange statue to make the turn. Turn left again onto East Market. The San Antonio Marriott Riverwalk will be on the left. Enter the hotel on Market Street. The total driving time for the 8 miles is approximately 15 minutes. The direct hotel number is (210)-224-4555. On-site parking is available for \$19 daily. Valet parking is available for \$25 daily.

### Other ground transportation from the San Antonio Airport (SAT):

Taxi service is available at the airport. Estimated taxi fare from the airport to the hotel is \$20-25.

The hotel does not provide its own shuttle service to/from the airport, however there is a shared-ride shuttle service available from 7 am to 1 am daily. Shuttles depart for downtown hotels approximately every 15 minutes. Tickets are sold curbside, outside the baggage area, at Terminals 1&2. The shuttle service fee is \$14 one way, \$24 round trip. The shuttle service does make several stops, so allow plenty of extra time if you are using this service. The SATRANS Airport Express phone number is 210-281-9900.

For more information, please visit:

<http://www.sanantonio.gov/aviation/>

## ADDITIONAL INFORMATION

### Message Desk:

A Symposium Message Desk will be in operation in the Registration area during registration hours from Sunday, November 12<sup>th</sup> at 5 p.m. to Wednesday, November 15<sup>th</sup> at noon. Please advise callers who wish to reach you during the day to ask the hotel operator for the IEEE CSIC Symposium message desk. The San Antonio Marriott Riverwalk main telephone number is 1-(210)-224-4555. The main desk will transfer you to the registration desk. Please check the message board periodically during the Symposium.

### Distribution of Relevant Information:

The CSIC Symposium will provide an officially designated area near the registration desk to serve as the proper display area for those in need of space to disseminate free material relevant to the CSIC industry. Printed material of any form will not be allowed to be indiscriminately proliferated in the registration area, hallways, lobbies, or other gathering areas, in proximity to the Symposium, technical sessions, evening social activities, panel sessions, or the exhibition.

### Meeting Room Locations:

#### No Photographic and/or Recording Equipment:

No photographic or recording equipment will be permitted at any time during the technical sessions of the IEEE CSIC Symposium.

### Breakfasts:

On Sunday, November 12<sup>th</sup>, a continental breakfast will be available for Short Course registrants only in the Tower View Foyer. On Monday and Wednesday, the complimentary breakfast for all Symposium attendees will be held in the Tower View Foyer. On Tuesday, there will be a complimentary continental breakfast for all Symposium attendees to be held in Ballroom C1-C2, in the exhibition area.

### Coffee Breaks:

The locations of coffee breaks will be as follows:

Short Course Registrants (only) –  
Sunday, November 12<sup>th</sup>: Tower View Foyer

ROCS Registrants (only) –  
Sunday, November 12<sup>th</sup>: Room 213

Primer Course Registrants (only) –  
Sunday, November 12<sup>th</sup>: Tower View Foyer

Symposium Registrants –  
Monday, November 13<sup>th</sup>: Tower View Foyer  
Tuesday, November 14<sup>th</sup>: Ballroom C1-C2  
Wednesday, November 15<sup>th</sup>: Tower View Foyer

### Symposium Social Events:

#### SYMPOSIUM OPENING RECEPTION

We welcome you to San Antonio on Sunday evening, November 12<sup>th</sup> from 6:00 p.m. to 8:00 p.m. in The Grotto of the San Antonio Convention Center. Come and meet up with your old friends and make new acquaintances over light hors d'oeuvres and wine, beer, or soft drinks. One free admission is included with your registration including two drink tickets, and extra tickets may be purchased at registration for \$30.

#### EXHIBITION OPENING RECEPTION

Our exhibitors are hosting a reception to mark the exhibition opening on Monday, November 13<sup>th</sup> from 5:00 p.m. to 7:00 p.m. Every Symposium participant is invited to enjoy the hors d'oeuvres and schmooze and cruise the exhibits in Ballroom C1-C2 at the San Antonio Convention Center.

#### EXHIBITION LUNCH

On Tuesday, November 14<sup>th</sup>, from 11:30 a.m. to 1:30 p.m., the Exhibition Luncheon will be hosted in the Ballroom C1-C2 at the San Antonio Convention Center. The lunch is free to all Symposium participants, so come along, visit with the exhibitors, ask questions, make deals and find out what is going on in our industry.

#### SYMPOSIUM PARTY

Join us for the Symposium Theme Party on Tuesday, November 14<sup>th</sup>, from 5:00pm to 10:00pm at Rio Cibolo Ranch on the outskirts of San Antonio. Buses leaving the conference hotel between 4:30 and 5:15 will transport you to this working Longhorn ranch a short 20 min. ride from downtown. There you will enjoy a true Texas experience with a mini rodeo, an old west casino, folk music and a real down-home barbeque. There may also be some games of skill to help reveal your inner cowboy.

Wear your best western attire (Stetson, western shirt, bolo tie, jeans and boots) or just come-as-you-are. Either way you're sure to get into the spirit of this out-of-the-ordinary CSICS experience. The event will be held outdoors in the evening so you may want to bring a light jacket. The average high temperature in San Antonio in November is 62 °F or 17 °C and it's plenty warm by either the locomotive size barbeque or the campfire. There will be Texas Lawmen on the premises so please leave your six-shooters safely at home. There will be an early bus returning to San Antonio at about 8:30 pm for those wishing to explore San Antonio nightlife.

The easygoing southwestern atmosphere, good food and refreshments will provide an excellent opportunity to meet with colleagues old and new. One free admission to the Symposium Party is included with each full registration. Extra tickets can be purchased at the registration center for only \$75.

### San Antonio Attractions:

San Antonio has many attractions which celebrate its rich heritage and historical significance. Visit the most famous spot in Texas, the Alamo which is within walking distance of the Symposium hotel at 300 Alamo Plaza. Don't forget to stroll or take a cruise along the beautiful River Walk and enjoy lush green plantings and explore the numerous shops, restaurants, and nightclubs that find home in this enchanting setting. The IMAX Theatre Rivercenter is also nearby and features a documentary of the 13-day siege and fall of the Alamo. La Villita is a unique historic district that offers shopping, dining, and historical exhibits. "El Mercado" which is patterned after an authentic Mexican market offers 32 shops. Other highlights include the San Antonio Botanical Gardens, the San Antonio Museum of Art, the San Antonio Zoological Gardens and Aquarium.

### Weather:

The daily average maximum temperatures for October and November are 81F and 71F, respectively, with daily average minimums of 59F and 48F, respectively. Average rainfall is 2.8 inches for October and 1.8 inches for November.

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# SYMPOSIUM HIGHLIGHTS

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## Technical Program:

The technical program for the 2006 IEEE CSIC Symposium consists of 58 technical papers, four panel sessions, an Industry Exhibit, and 2 Short Courses, “GaN Circuits and Applications” and “RF and High Speed CMOS.” We will also be offering our annual introductory level class “Basics of Compound Semiconductor ICs” (Primer Course). This year we have invited 15 papers on a wide range of important topics encompassing device engineering to circuit application using advanced compound and other related semiconductor technologies. In addition, we will continue the tradition of including important “late breaking news” papers.

Exciting new developments from a variety of compound semiconductor disciplines will be presented. There is a tremendous amount of activity in the wireless and optical communication areas, as well as a strong interest in military electronics.

## Short Course 1: “GaN Circuits and Applications”

### Short Course Description

Gallium Nitride technology has improved to the point where considerable efforts are now devoted to advanced circuit and product developments in GaN. This course offers the student detailed instruction on circuit design techniques as well as several design examples by leaders in the GaN industry and academia.

### Topics Covered and Instructors:

- a) GaN-based PA and LNA Circuit Design - Bob York
- b) Advanced Switch Mode PA Techniques with Wide Bandgap Semiconductors - Bill Pribble
- c) Design Techniques for High Linearity, High Efficiency GaN PA Architectures - Mathew Poulton
- d) Advanced Architectures and Linearization Techniques for GaN Power Amplifiers - Peter Asbeck
- e) Microwave/mm-wave AlGaIn/GaN HEMT Circuits and Applications - Michael Schlechtweg
- f) GaN Technology: Impact of Device Technology on Amplifier and Oscillator Performance - Sylvain Delage

## Short Course 2: “RF and High Speed CMOS”

### Short Course Description

CMOS technology continues to push toward higher frequencies and into markets traditionally the province of the compound semiconductors. This short course offers students an exciting array of topics from specialized CMOS technology, circuit design examples spanning the range 3 – 60 GHz and techniques for dealing with the challenging area of device/circuit interactions.

### Topics Covered and Instructors:

- a) Nanoscale Bulk and SOI CMOS Technology – O. Plouchart
- b) Device/Circuit Co-Design for High Speed Digital Circuits – S. Voinigescu
- d) mm-Wave IC Design: The Transition from III-V to CMOS Circuit Techniques – P. Yue, M. Rodwell
- c) CMOS Design for UWB Applications – M. Tiebout
- e) CMOS RF Switch Design and Applications – D. Kelly

Registration for the course is as noted in “Registration”. A limited number of Short Course Notes will be available after the course for purchase by Symposium registrants, subject to availability.

### Direct questions to:

William Peatman, Short Course Coordinator  
ANADIGICS, INC.  
(908) 668-5000 x5842  
[wpeatman@anadigics.com](mailto:wpeatman@anadigics.com)

## Primer Course: Basics of Compound Semiconductor ICs

The popular primer course “Basics of Compound Semiconductor ICs” is an introductory-level class intended for professionals in the electronic industry with little or no experience in compound semiconductor IC technology. It also provides an excellent review for those with more experience. The course covers: digital and analog/RF/microwave circuits; III/V materials including wide bandgap GaN and SiC; MOS and bipolar devices. The course is tailored to provide background for symposium participants to better understand and appreciate the papers presented, including a glossary of those ever-cryptic acronyms. Throughout the course, comparisons among the compound semiconductor technologies will be presented as well as comparisons with silicon technologies. Also, a number of compound semiconductor integrated circuits along with the intended applications will be described.

Instructors Stephen I. Long and Donald B. Estreich each have over 25 years of experience working with compound semiconductor ICs. A copy of their viewgraphs with an extensive bibliography will be distributed to each Primer Course registrant. Ample discussion time will provide an opportunity for participants to have questions answered by the instructors.

### **Course Agenda:**

- |           |                                  |
|-----------|----------------------------------|
| 4:00 p.m. | Introduction                     |
| 4:05 p.m. | Compound Semiconductor Materials |
| 4:30 p.m. | Device Operation                 |
| 5:00 p.m. | Discussion                       |
| 5:10 p.m. | Break                            |
| 5:20 p.m. | Analog/RF/Microwave Circuits     |
| 6:00 p.m. | RFIC Design Examples             |
| 6:40 p.m. | Summary and Discussion           |
| 7:00 p.m. | Close                            |

The registration fee is \$175 for professionals and \$75 for students. The fee includes a handout containing a copy of the overheads with an extensive reference list. Space is limited, so ADVANCE REGISTRATION IS HIGHLY RECOMMENDED. For additional information, please contact the Primer Course Coordinator:

### Direct questions to:

David Halchin, Primer Course Organizer and Chair  
RFMD  
7628 Thorndike Rd.  
Greensboro, NC 27409 USA  
(336)-931-8123

Registration for the class is as noted in “Registration”. A limited number of copies of the handouts will be available to symposium registrants, subject to availability. The cost is \$50.

## Panel Sessions:

This year we have four exciting Panel Sessions spread over the 3 days of the technical sessions. These are intended to be timely, thought-provoking, educational, and possibly even controversial. **The 4 panel topics are as follows:**

Panel Session 1:

### “Reconfigurable and Tunable Networks”

Monday, November 13<sup>th</sup>, 3:00-4:30 p.m.

Panel Session 2:

### “Compound Semiconductor MOSFETs: Fact or Fiction? And who cares?”

Tuesday, November 14<sup>th</sup>, 1:00-3:30 p.m.

Panel Session 3:

### “Can we trust parasitic extractors at high frequencies?”

Wednesday, November 15<sup>th</sup>, 3:30-5:00 p.m.

Panel Session 4:

### “PA Technology for WiMAX - Can challengers take on LDMOS at 3.5GHz and beyond ?

Wednesday, November 15<sup>th</sup>, 3:30-5:00 p.m.

Please see the “Symposium Program” section later in this brochure for more complete descriptions of each of these Panel Sessions (listed according to their day and time).

## CS-Week Technology Exhibition:

The 2006 CS Week Technology Exhibition will be held concurrently with both the IEEE CSIC Symposium and the KEY Conference on November 13 and 14 in Ballroom C1-C2 of the San Antonio Convention Center. The Exhibition is open to all Symposium registrants. The combined exhibition gives companies and attendees access to the entire array of compound semiconductor products and services, i.e., materials, manufacturing, device technology, integrated circuits, related services, commercial and military applications. The early list of exhibitors already includes:

ACCEL-RF CORPORATION  
AIR PRODUCTS & CHEMICALS, INC.  
AMERICAN XTAL TECHNOLOGY  
BANDWIDTH SEMICONDUCTOR, LLC  
BOC EDWARDS  
EMCORE CORPORATION  
EPICHEM GROUP  
EPIWORKS, INC.  
INTELLIGENT EPITAXY TECHNOLOGY, INC  
IQE / WAFER TECH  
KLA-Tencor  
MATHESON TRI-GAS  
MBE TECHNOLOGY Pte Ltd  
NIKKO MATERIALS USA, Inc.  
OSEMI, INC  
PICOGIGA INT'L-(THE SOITEC GROUP)  
RIBER  
ROHM and HAAS ELECTRONIC MATERIALS  
SAES PURE GAS, INC.  
SONNET SOFTWARE, INC  
SUMIKA ELECTRONIC MATERIALS, INC  
SUMITOMO ELECTRIC SEMI MAT INC  
SYNOPSYS, INC  
VEECO INSTRUMENTS  
WILLIAMS ADVANCED MATERIALS

The Exhibition will feature informative and interesting displays with corporate representatives on hand between the hours of 5:00 p.m. and 8:00 p.m. on Monday, November 13 and 7:00 a.m. to 4:00 p.m. on Tuesday, November 14. The Exhibition will also host the Exhibition Opening Reception on Monday evening from 5:00 p.m. until 8:00 p.m. and the Exhibition Luncheon from 12:00 p.m. until 2:00 p.m. on Tuesday. All Symposium coffee breaks on Tuesday will be held in the exhibition area.

There is still time for additional organizations to participate in the Exhibition. Interested parties should contact Mr. Harry Kuemmerle of VIP Meetings & Conventions, Pacific Palisades, CA at (310) 459-4691, Fax (310) 459-0605, e-mail: [harry.k@vipmeetings.com](mailto:harry.k@vipmeetings.com). Or visit the VIP Meetings & Conventions' website at [www.vipmeetings.com/conferences/csweek2006.html](http://www.vipmeetings.com/conferences/csweek2006.html)

Click on **exhibition** to download application forms or for additional information on the Exhibition, including the latest list of exhibitors.

## Late-Breaking News Papers:

We have solicited papers containing late-breaking news for the Symposium Program. The times and locations of these presentations will be posted at the Symposium, as well as on the CSIC Symposium website at <http://www.csics.org/>

In addition, extended abstracts for these papers will appear in the Symposium Digest. Late news paper submissions are due Aug 9<sup>th</sup>, 5 p.m. EDT. Submissions must be submitted in 4 page extended abstract format and camera ready for digest printing. Submit abstracts at the symposium web site at <http://www.csics.org/>

## Technical Digest:

Extra copies of the Technical Digest can be purchased by Symposium registrants through Advance Registration. A limited number of digests will also be available for sale at the Registration Desk after 1:00 p.m. on Tuesday, November 14<sup>th</sup>. The cost of the paper bound digest, if ordered through Advance Registration or purchased on-site, is \$75. The CD ROM Digest for 2006 will also be offered for \$100. Both current and past digests will be available through IEEE after the Symposium by mail from the IEEE Customer Service Center, 445 Hoes Lane, Piscataway, NJ 08854 at (800) 701-4333.

## Outstanding Paper Award:

The 2006 IEEE CSIC Symposium will select a contributed paper for the Outstanding Paper Award. All contributed regular papers (not the invited papers) will automatically be considered as candidates. Symposium attendees will have an opportunity to provide feedback through a Symposium questionnaire as well as to the Session Chairpersons. The award winner will be publicly announced shortly after this year's Symposium with the award formally presented at next year's Compound Semiconductor IC Symposium.

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# SHORT COURSES

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**Sunday, November 12<sup>th</sup>, 2006**  
**San Antonio Convention Center**  
**Room 217 C & D**  
**8:30a.m. - 3:45p.m.**

**Course Coordinator:** William Peatman  
ANADIGICS, INC.  
(908) 668-5000 x5842  
wpeatman@anadigics.com

**Course Co-Chairs:** Primit Parikh  
Cree, Inc., SBTC

Sorin Voinigescu  
University of Toronto

This year the CSIC Symposium will hold two short courses. One course covers GaN Circuits and Applications and the other course covers RF and High Speed CMOS.

## “GaN Circuits and Applications”

Gallium Nitride technology has improved to the point where considerable efforts are now devoted to advanced circuit and product developments in GaN. This course offers the student detailed instruction on circuit design techniques as well as several design examples by leaders in the GaN industry and academia.

### Topics Covered and Instructors:

- GaN-based PA and LNA Circuit Design - Bob York
- Advanced Switch Mode PA Techniques with Wide Bandgap Semiconductors - Bill Pribble
- Design Techniques for High Linearity, High Efficiency GaN PA Architectures - Mathew Poulton
- Advanced Architectures and Linearization Techniques for GaN Power Amplifiers - Peter Asbeck
- Microwave/mm-wave AlGaIn/GaN HEMT Circuits and Applications - Michael Schlechtweg
- GaN Technology: Impact of Device Technology on Amplifier and Oscillator Performance - Sylvain Delage

### Short Course Schedule

The course will be held on Sunday November 12<sup>th</sup> and will begin with a continental breakfast. A lunch will be provided as well as a morning refreshment break.

7:00 a.m. **Registration and Breakfast**

8:30 a.m. **Introduction and Overview**

8:45 a.m. **GaN-based PA and LNA Circuit Design**  
Bob York, UCSB

9:45 a.m. **Coffee Break**

10:00 a.m. **Advanced Switch Mode PA Techniques with Wide Bandgap semiconductors**

Bill Pribble, Cree Inc.

11:00 a.m. **Design Techniques for High Linearity, High Efficiency GaN PA Architectures**

Mathew Poulton, RF Micro Devices

12:00 p.m. **Lunch**

1:30 p.m. **Advanced Architectures and Linearization Techniques for GaN Power Amplifiers**

Peter Asbeck, UCSD

2:30 p.m. **Microwave/mm-wave AlGaIn/GaN HEMT Circuits and Applications**

Michael Schlechtweg, Fraunhofer Institute IAF

3:30 p.m. **GaN Technology: Impact of Device Technology on Amplifier and Oscillator Circuit Performance**

Sylvain Delage, Alcatel-Thales III-V Lab

4:30 p.m. **Questions and Discussion**

4:45 p.m. **Close of Short Course**

## “RF and High Speed CMOS”

CMOS technology continues to push toward higher frequencies and into markets traditionally the province of the compound semiconductors. This short course offers students an exciting array of topics from specialized CMOS technology, circuit design examples spanning the range 1 – 60 GHz and techniques for dealing with the challenging area of device/circuit interactions.

### Topics Covered and Instructors:

Nanoscale Bulk and SOI CMOS Technology – O. Plouchart  
Device/Circuit Co-Design for High Speed Digital Circuits – S. Voinigescu  
mm-Wave IC Design: The Transition from III-V to CMOS Circuit Techniques – P. Yue, M. Rodwell  
CMOS Design for UWB Applications – M. Tiebout  
CMOS RF Switch Design and Applications – D. Kelly

### Short Course Schedule

The course will be held on Sunday November 12<sup>th</sup> and will begin with a continental breakfast. A lunch will be provided as well as a morning refreshment break.

7:00 a.m. **Registration and Breakfast**

8:30 a.m. **Introduction and Overview**

8:45 a.m. **Nanoscale Bulk and SOI CMOS Technology**  
O. Plouchart, IBM Semiconductor R&D Center

9:45 a.m. **Coffee Break**

10:00 a.m. **Device/Circuit Co-Design for High Speed Digital Circuits**  
S. Voinigescu, U. of Toronto

11:00 a.m. **mm-Wave IC Design: The Transition from III-V to CMOS Circuit Techniques**  
P. Yue, M. Rodwell, UCSB

12:00 p.m. **Lunch**

1:30 p.m. **CMOS Design for UWB Applications**  
M. Tiebout, Infineon

2:30 p.m. **CMOS RF Switch Design and Applications**  
D. Kelly, Peregrine Semiconductor

3:30 p.m. **Questions and Discussion**

3:45 p.m. **Close of Short Course**

## Who Should Attend

The short courses are a must for everyone interested in knowing the latest in advanced design technologies and their applications to both defense and commercial markets. Our lecturers will cater to a range of interests and experience levels. The course is designed to give all attendees a solid overview of the device technology from device physics fundamentals through specific circuit examples and applications.

## Short Course Pre-Registration

So that we may properly plan for attendance, we encourage you to pre-register for the Short Courses. A limited number of registrations will be available on-site immediately prior to the start of the course. The price for the Short Course is \$350 for those that pre-register, and \$450 for those that register on-site. The price for students is \$200 for those that pre-register, and \$300 for on-site registration. The registration fee includes the lectures, a book of Short Course Notes, continental breakfast, lunch, and morning/afternoon refreshments. Additional copies of the Short Course Notes may be purchased for \$100 each.

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# PRIMER COURSE

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**Sunday, November 12<sup>th</sup>, 2006**  
**San Antonio Convention Center**  
**Room 217 C**  
**4:00 p.m. - 7:00 p.m.**

## “Basics of Compound Semiconductor ICs”

**Instructors:** **Stephen I. Long**  
*University of California, Santa Barbara, CA*  
**Donald B. Estreich**  
*Agilent Technologies, Santa Rosa, CA*

**Course Coordinator:** **David Halchin**  
*RFMD*

### Course Objective and Description:

The popular primer course “Basics of Compound Semiconductor ICs” is an introductory-level class intended for professionals in the electronic industry with little or no experience in compound semiconductor IC technology. It also provides an excellent review for those with more experience. The course covers: digital and analog/RF/microwave circuits; III/V wide bandgap materials including GaN and SiC; MOS and bipolar devices. The course is tailored to provide background for symposium participants to better understand and appreciate the papers presented, including a glossary of those ever-cryptic acronyms. Throughout the course, comparisons among the compound semiconductor technologies will be presented as well as comparisons with silicon technologies. Also, a number of compound semiconductor integrated circuits along with the intended applications will be described.

Instructors Stephen I. Long and Donald B. Estreich each have over 25 years of experience working with compound semiconductor ICs. A copy of their viewgraphs with an extensive bibliography will be distributed to each Primer Course registrant. Ample discussion time will provide an opportunity for participants to have questions answered by the instructors.

### Course Agenda:

4:00 p.m. Introduction  
4:05 p.m. Compound Semiconductor Materials  
4:30 p.m. Device Operation  
5:00 p.m. Discussion  
5:10 p.m. Break  
5:20 p.m. Analog/RF/Microwave Circuits  
6:00 p.m. RFIC Design Examples  
6:40 p.m. Summary and Discussion  
7:00 p.m. Close

The registration fee is \$175 for professionals and \$75 for students. The fee includes a handout containing a copy of the overheads with an extensive reference list. Space is limited, so **ADVANCE REGISTRATION IS HIGHLY RECOMMENDED**. For additional information, please contact the Primer Course Coordinator:

#### Direct questions to:

David Halchin, Primer Course Organizer and Chair  
RFMD, 7628 Thorndike Rd., Greensboro, NC 27409 USA  
(336)-931-8123

Registration for the class is as noted in “Registration”. A limited number of copies of the handouts will be available to symposium registrants, subject to availability. The cost is \$50.

## OTHER MEETINGS

### ROCS Workshop

(formerly GaAs Reliability Workshop)

Room 213 – San Antonio Convention Center

8:00 a.m. - 5:00 p.m.

The 21<sup>st</sup> annual ROCS Workshop - formerly known as the GaAs Reliability Workshop - will be held in conjunction with CSIC Symposium on Sunday November 12<sup>th</sup>, 2006, at the Marriott Riverwalk Hotel, San Antonio, Texas. This meeting is sponsored by the JEDEC JC-14.7 Committee on GaAs Reliability and Quality Standards and the EIA, and with co-sponsorship of the Electron Devices Society of the IEEE.

The ROCS Workshop brings together researchers, manufacturers and users of compound semiconductor materials, devices and circuits. Papers presenting latest results, including work-in-progress and new developments in all aspects of compound semiconductor reliability will be presented. Potential authors are invited to submit an electronic copy of a one to two page comprehensive summary, suitable for a 15 minute presentation, to: Peter Ersland, erslandp@tycoelectronics.com (978)-656-2817. The deadline for receipt of submissions is September 4<sup>th</sup>, 2006; late papers of significant interest will be considered up to the Workshop. The Advanced Program will be published at <http://www.jedec.org/home/gaas/> approximately one month prior to the meeting.

Advance registration for the workshop is \$150.00 for JEDEC and IEEE members and \$175.00 for non-members; on-site registration is \$200.00 at the door. To pre-register, mail your name, Post Office address, email address, and phone number with a check to: EIA/JEDEC, ROCS Workshop, 2500 Wilson Boulevard, Arlington, VA 22201-3834 by October 30<sup>th</sup>, 2006. Visa, MasterCard and American Express credit cards are also accepted. Registration includes a full day of ROCS presentations, two breaks, a luncheon and a copy of the Proceedings. Late registration will be available from 7:30 a.m. to 8:00 a.m. on the morning of the workshop. For further information or to download a pre-registration form, visit our WEB site at <http://www.jedec.org/home/gaas/>, or contact: Dr. Anthony A. Immorlica, Jr., Workshop Chair, BAE SYSTEMS, P.O. Box 868, MER15-1351, Nashua, NH 03061-0868, (603) 885-1100, anthony.a.immorlica@baesystems.com.

## SYMPOSIUM PROGRAM

Monday, November 13<sup>th</sup>, 2006

### REGISTRATION AND CONTINENTAL BREAKFAST

7:00 a.m. – 5:00 p.m.

Registration – Tower View Foyer

7:00 a.m. – 8:00 a.m.

Continental Breakfast – Tower View Foyer

### SYMPOSIUM OPENING

8:00 a.m. – 8:30 a.m.

Room 217 AB – San Antonio Convention Center

Introduction and Awards Presentation

2006 Symposium Chair

Mitch Shiffrin, *Hittite Microwave*

2006 Technical Program Chair

Mohammad Madihian, *NEC Laboratories America*

### SESSION A: PLENARY SESSION

8:30 a.m. – 11:30 p.m.

Room 217 AB – San Antonio Convention Center

Chairpersons: Bill Peatman, *ANADIGICS*  
Marko Sokolich, *HRL Laboratories, LLC*

8:30 a.m.

A.1 **Optimizing Technology Choices for Handsets (Invited)**  
J. D. Neal, *RFMD, Greensboro, USA*

9:00 a.m.

A.2 **Energy Efficient Wide Bandgap Devices (Invited)**  
J. W. Palmour, *Cree Inc., Durham, USA*

9:30 a.m.

A.3 **From 100 GHz to Terahertz Electronics - Activities in Europe (Invited)**  
M. Schlechtweg, *Fraunhofer Institute IAF, Freiburg, Germany*

10:00 a.m. – 10:30 a.m. **Coffee Break**

10:30 a.m.

A.4 **Advanced SiGe BiCMOS and CMOS platforms for Optical and Millimeter-Wave Integrated Circuits (Invited)**  
P. Chevalier<sup>1</sup>, D. Gloria<sup>1</sup>, P. Scheer<sup>1</sup>, S. P. Voinigescu<sup>2</sup>, T. O. Dickson<sup>2</sup>, E. Laskin<sup>2</sup>, S. T. Nicolson<sup>2</sup>, T. Chalvatzis<sup>2</sup>, K.H.K. Yau<sup>2</sup>, S. Pruvost<sup>1</sup>, F. Giancesello<sup>1</sup>, F. Pourchon<sup>1</sup>, P. Garcia<sup>1</sup>, J.-C. Vildeuil<sup>1</sup>, A. Chantre<sup>1</sup>, C. Garnier<sup>1</sup>, O. Noblanc<sup>1</sup>, <sup>1</sup>*STMicroelectronics, Crolles, France*, <sup>2</sup>*University of Toronto, Toronto, Canada*

11:00 a.m.

A.5 **Challenges and Opportunities for Compound Semiconductors in the Mobile Handset Roadmap (Invited)**  
A. Anwar, C. Taylor, *Strategy Analytics, US*

Monday, November 13<sup>th</sup>, 2006

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11:30 a.m.

End of Session A

11:30 a.m. – 1:00 p.m. **Break for Lunch**

### **SESSION B: W-Band and Beyond**

1:00p.m. – 2:20 p.m.

**Room 217 A – San Antonio Convention Center**

**Chairpersons:** Charles Campbell, *TriQuint Semiconductor*  
Francois Colomb, *Raytheon*

1:00 p.m.

B.1 **An 84 GHz Bandwidth and 20 dB Gain Broadband Amplifier in SiGe Bipolar Technology**

S. Trotta<sup>1</sup>, H. Knapp<sup>1</sup>, K. Aufinger<sup>1</sup>, R.R. Meister<sup>1</sup>, J. Böck<sup>1</sup>, W. Simbürger<sup>1</sup>, A.L. Scholtz<sup>2</sup>, <sup>1</sup>*Infineon AG, Munich, Germany*,  
<sup>2</sup>*Technische Universität Wien, Vienna, Austria*.

1:20 p.m.

B.2 **120-GHz Tx/Rx Waveguide Modules for 10-Gbit/s Wireless Link System**

T. Kosugi<sup>1</sup>, M. Tokumitsu<sup>1</sup>, K. Murata<sup>1</sup>, T. Enoki<sup>1</sup>, H. Takahashi<sup>2</sup>, A. Hirata<sup>2</sup>, T. Nagatsuma<sup>2</sup>, <sup>1</sup>*NTT Corporation, 3-1, Morinosato Wakamiya, Atsugi-shi, Japan*, <sup>2</sup>*NTT Corporation, 3-1, Morinosato Wakamiya, Atsugi-shi, Japan*.

1:40 p.m.

B.3 **Coplanar 94 GHz Metamorphic HEMT Low Noise Amplifiers**

M. Kärkkäinen<sup>1</sup>, M. Varonen<sup>1</sup>, M. Kantanen<sup>2</sup>, T. Karttaavi<sup>2</sup>, R. Weber<sup>3</sup>, A. Leuther<sup>3</sup>, M. Seelmann-Eggebert<sup>3</sup>, T. Närhi<sup>4</sup>, K. Halonen<sup>1</sup>, <sup>1</sup>*Helsinki University of Technology, Espoo, Finland*,  
<sup>2</sup>*VTT, Technical Research Centre of Finland, Espoo, Finland*,  
<sup>3</sup>*Fraunhofer Institute for Applied Solid-State Physics (IAF), Freiburg, Germany*, <sup>4</sup>*European Space Agency (ESA/ESTEC), Noordwijk, The Netherlands*.

2:00 p.m.

B.4 **Demonstration of a Sub-Millimeter Wave Integrated Circuit (S-MMIC) using InP HEMT with a 35-nm Gate**

W. R. Deal<sup>1</sup>, S. Din<sup>1</sup>, V. Radisic<sup>1</sup>, J. Padilla<sup>1</sup>, G. Mei<sup>1</sup>, W. Yoshida<sup>1</sup>, P. Liu<sup>1</sup>, J. Uyeda<sup>1</sup>, M. Barsky<sup>1</sup>, T. Gaier<sup>2</sup>, A. Fung<sup>2</sup>, L. Samoska<sup>2</sup>, R. Lai<sup>1</sup>, <sup>1</sup>*Northrop Grumman Space and Mission Systems, Redondo Beach, USA*, <sup>2</sup>*Jet Propulsion Laboratory, Pasadena, USA*.

2:20 p.m.

End of Session B

2:30 p.m. – 3:10 p.m.

**Coffee Break**

Monday, November 13<sup>th</sup>, 2006

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### **SESSION C: Emerging Oxide-Semiconductor Device and Circuit Technologies**

1:00p.m. – 3:00 p.m.

**Room 217 D – San Antonio Convention Center**

**Chairpersons:** Kenjiro Nishikawa, *NTT*  
Mike Golio, *HVVi Semiconductor*

1:00 p.m.

C.1 **High Mobility III-V MOSFET Technology (Invited)**

M. Passlack, R. Droopad, K. Rajagopalan, and J. Abrokwhah, *Freescale Semiconductor Inc., 2100 East Elliot Road, Tempe, AZ 85284 USA*.

1:30 p.m.

C.2 **Microwave-Frequency InAlP-oxide/GaAs MOSFETs**

Y. Cao, J. Zhang, T. H. Kosel, D. C. Hall, and P. Fay, *University of Notre Dame, Notre Dame, IN 46556 USA*.

1:50 p.m.

C.3 **Carbon Nanotube Based Memory Using CMOS Production Techniques (Invited)**

R. F. Smith, D. K. Brock, J. W. Ward, and B. M. Segal, *Nantero, Inc., 25-D Olympia Avenue, Woburn, MA 01801 USA*.

2:20 p.m.

C.4 **A 1.2V, 60-GHz Radio Receiver With On-chip Transformers and Inductors in 90-nm CMOS**

D. Alldred, B. Cousins, and S. P. Voinigescu, *University of Toronto, 10 King's College Rd. Toronto, ON, M5S 3G4, Canada*.

2:40 p.m.

C.5 **Frequency Scaling and Topology Comparison of mm-wave CMOS VCOs**

K. W. Tang<sup>1</sup>, S. Leung<sup>1</sup>, N. Tieu<sup>1</sup>, P. Schvan<sup>2</sup>, and S. P. Voinigescu<sup>1</sup>, <sup>1</sup>*University of Toronto, 10 King's College Rd. Toronto, ON, M5S 3G4, Canada*, <sup>2</sup>*NORTEL, 3500 Carling Av. Ottawa, ON, K2H 8E9, Canada*.

3:00 p.m.

End of Session C

2:30 p.m. – 3:10 p.m.

**Coffee Break**

### **SESSION D: Millimeter Wave Frequency Conversion**

3:10p.m. – 4:30 p.m.

**Room 217 A – San Antonio Convention Center**

**Chairpersons:** Peter Katzin, *Hittite Microwave Corp.*  
Jan-Erik Mueller, *Infineon Technologies*

3:10 p.m.

D.1 **A Ka-band High Power Frequency Doubler in SMT Package**

S. Nam, F. Traut, J. Cuggino, *Hittite Microwave Corporation, Chelmsford, MA 01824, USA*.

**Monday, November 13<sup>th</sup>, 2006**

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3:30 p.m.

- D.2 **A Reliable K-band Sub-harmonic Mixer for Satellite Converters**  
A. Adahl, H. Zirath, *Department of Microtechnology and Nanoscience, Chalmers University of Technology, Sweden*

3:50 p.m.

- D.3 **A Ka-band Monolithic Doubly-Balanced Mixer**  
C.H. Lin, C.M. Lin, J.C. Chiu, T.Y. Tsai, Y.H. Wang,  
*Institute of Microelectronics, Department of Electrical Engineering, National Cheng-Kung University, Tainan, 701 Taiwan*

4:10 p.m.

- D.4 **A 3-34 GHz GaAs PHEMT Distributed Mixer with Low DC Power Consumption**  
C.H. Chiu, K.H. Liang, H.Y. Chang, Y.J. Chan,  
*Department of Electrical Engineering, National Central University, Chungli, 32001 Taiwan*

4:30 p.m.

**End of Session D**

## **PANEL SESSION 1:**

### **Reconfigurable and Tunable Networks**

3:10 p.m. – 4:40 p.m.

**Room 217 D – San Antonio Convention Center**

**Moderators:** Peter Zampardi, *Skyworks Solutions, Inc.*  
Charles Campbell, *TriQuint Semiconductor*

Tunable or reconfigurable circuits are becoming a critical element in many modern electronics applications. For example, future generation wireless handsets are expected to operate multimode and multiband anywhere in the world. To address this need in a reasonable form factor, reconfiguration of matching networks and filters are highly desirable. Another increasing requirement for portable electronics is that they adapt to the environment they are in to protect the circuit and/or allow operation at reduced power consumption. Finally, these tunable circuits may enable tunable filters, phase shifters, and other circuits or architectures that enable new applications in sensing, defense and communications.

This panel session will discuss the status and state-of-the-art of several proposed technologies for achieving reconfigurable/tunable electrical networks.

Key Points to Discuss:

1. Integration potential with current electronics (on MMIC or package)
2. Reliability and packaging status/concern
3. Technology performance (Tuning range, on/off impedance, operating frequencies, quality factors, required operating voltages)

**Monday, November 13<sup>th</sup>, 2006**

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#### **Panel Members:**

Robert York *UCSB/Agile Technologies*  
Keith Manssen *Paratek Technologies*  
Rik Jos *Philips Semiconductor*  
Brandon Pillans *Raytheon*

4:40 p.m.

**End of Panel Session 1**

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**CS-Week Technology Exhibition**  
**Opening Reception**  
**Ballroom C1 –C2**  
**5:00 p.m. - 8:00 p.m.**

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Tuesday, November 14<sup>th</sup>, 2006

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## REGISTRATION AND CONTINENTAL BREAKFAST

7:00 a.m. – 5:00 p.m.

Registration – Tower View Foyer

7:00 a.m. – 8:00 a.m.

Continental Breakfast – Ballroom C1-C2

## SESSION E: GaN MMICs

8:00 a.m. – 9:50 a.m.

Room 217 A – San Antonio Convention Center

**Chairpersons:** Pete Zampardi, *Skyworks*  
Freek van Straten, *Philips*

8:00 a.m.

E.1 **MMIC Class-F Power Amplifiers using Field-Plated AlGaIn/GaN HEMTs**

S. Gao<sup>1</sup>, H. Xu<sup>2</sup>, U. K. Mishra<sup>2</sup> and R.A. York<sup>2</sup>, <sup>1</sup>*University of Northumbria, Newcastle Upon Tyne, UK*, <sup>2</sup>*University of California, Santa Barbara, CA*

8:30 a.m.

E.2 **GaN Wide Band Power Integrated Circuits**

J. P. Conlon, N. Zhang, M. J. Poulton, J. B. Shealy, R. Vetury, D. S. Green, J. D. Brown, S. Gibb, *RF Micro Devices, Inc., Charlotte, NC, USA*

8:50 a.m.

E.3 **Wideband Dual-Gate GaN HEMT Low Noise Amplifier for Front-End Receiver Electronics**

M.Aust, A. Sharma, Y.C. Chen, M. Wojtowics, *Northrup Grumman, One Space Park, Redondo Beach, CA, USA*

9:10 a.m.

E.4 **GaN MMIC for Millimeter-Wave Applications**

K. S. Boutros, W. B. Luo, Y. Ma, G. Nagy, and J. Hacker, *Rockwell Scientific Company LLC, Thousand Oaks, CA*.

9:30 a.m.

E.5 **A GaN HEMT Class F Amplifier at 2 GHz with 80 % PAE**

D. Schmelzer and S.I. Long, *University of California, Santa Barbara, CA, USA*.

9:50 p.m.

End of Session E

9:50 a.m. – 10:10 a.m.

Coffee Break

Tuesday, November 14<sup>th</sup>, 2006

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## Session F: Reliability and Simulation

8:00a.m. – 9:30 a.m.

Room 217 D – San Antonio Convention Center

**Chairpersons:** Walter Wohlmuth, *RFMD*  
Rik Jos, *Philips Semiconductors*

8:00 a.m.

F.1 **The Physics of Reliability for High Voltage AlGaIn/GaN HFET's (Invited)**

R. J. Trew, Y. Liu, W. Kuang, G. L. Bilbro, *North Carolina State University, Raleigh, USA*.

8:30 a.m.

F.2 **Field-Plate Optimization of AlGaIn/GaN HEMTs**

V. Palankovski<sup>1</sup>, S. Vitanov<sup>1</sup>, R. Quay<sup>2</sup>, <sup>1</sup>*TU Vienna, Vienna, Austria*. <sup>2</sup>*Fraunhofer Inst. for Solid-State Physics, Freiburg, Germany*.

8:50 a.m.

F.3 **Characterization and Modeling of Wire Bond Interconnects up to 100 GHz**

D. Jahn, R. Reuter, Y. Yin, J. Feige, *Freescale Halbleiter GmbH, Munich, Germany*.

9:10 a.m.

F.4 **A Generic, Scalable Model Applicable to MIM Capacitors of Arbitrary Electrical Length**

M. Asahara<sup>1</sup>, C. F. Campbell<sup>2</sup>, W. R. Frensley<sup>3</sup>, <sup>1</sup>*The University of Texas of Dallas, Richardson, USA*, <sup>2</sup>*TriQuint Semiconductor, Richardson, USA*, <sup>3</sup>*The University of Texas of Dallas, Richardson, USA*.

9:30 a.m.

End of Session F

9:50 a.m. – 10:10 a.m.

Coffee Break

## SESSION G: Advanced III-V HEMTs

10:10 a.m – 11:40 a.m.

Room 217 A – San Antonio Convention Center

**Chairpersons:** Marc Rocchi, *OMMIC*  
Robert Trew, *North Carolina State University*

10:10 a.m.

G.1 **Indium Antimonide based Technology for RF Applications (Invited)**

T. Ashley, L. Buckle, M. T. Emeny, M. Fearn, D. G. Hayes, K. P. Hilton, R. Jefferies, T. Martin, T. J. Phillips, J. Powell, A. D. Tang, D. J. Wallis, P. J. Wilding, *QinetiQ, Malvern, UK*

10:40 a.m.

G.2 **Deep UV Stepper Based 0.15 $\mu$ m High Power 150mm GaAs pHEMT Process for Millimeter Wave Applications**

T. Lodhi, J. McMonagle, R. Davis, M. Brookbanks, S. Combe, M. Clausen, M. O'Keefe, A. Collar, J. Atherton, *Filtronix Compound Semiconductors, Newton Aycliffe, United Kingdom*

Tuesday, November 14<sup>th</sup>, 2006

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11:00 a.m.

- G.3 **High Performance Dual Recess 0.15 $\mu$ m PHEMT for Multi-Function MMIC Applications**  
M. Kao, S. Nayak, R. Hajji, S. E. Hillyard, A. A. Ketterson  
*TriQuint Semiconductor, Richardson, USA*

11:20 a.m.

- G.4 **Quick Thermal Evaluation Software for GaAs Power MESFETs**  
A. Dhanotia<sup>1</sup>, D. S. Rawal<sup>2</sup>, <sup>1</sup>Dhirubhai Ambani *Institute of Information and Communication Technology, Gandhinagar, India,*  
<sup>2</sup>*Solid State Physics Laboratory, Delhi, India*

11:40 a.m.

**End of Session G**

11:40 p.m. – 1:30 p.m.

**Break for Lunch**

## SESSION H: OEIC

10:10 a.m. – 11:20 a.m.

**Room 217 D – San Antonio Convention Center**

**Chairpersons:** Koichi Murata, *NTT Photonics Laboratories*  
Todd Kaplan, *Linear Technology*

10:10 a.m.

- H.1 **10Gb and 40Gb Transceiver Modification (Invited)**  
C. Gunn, *Luxtera Inc., 1819 Aston Avenue, Suite 102, Carlsbad, CA 92008 USA.*

10:40 a.m.

- H.2 **Low Voltage 12.5Gb/s SiGe BiCMOS Laser Diode Driver Using a Bias Current Modulation Canceling Technique**  
A. Maxim, *Maxim Inc., Fiber Communications Division, Austin, TX, 78735 USA.*

11:00 a.m.

- H.3 **A Nonlinear Electronic Equalizer Implemented in InGaP/GaAs HBT Technology for Dispersion Compensation of Gigabit Optical Fiber Links**  
A. G. Metzger and P. M. Asbeck, *University of California, San Diego, 9500 Gilman Dr., La Jolla, CA 92093 USA*

11:20 a.m.

**End of Session H**

11:20 a.m. – 1:30 p.m.

**Break for Lunch**

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## CS-Week Technical Exhibition

### Lunch

### Ballroom C1-C2

**11:40 a.m. – 1:30 p.m.**

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Tuesday, November 14<sup>th</sup>, 2006

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## PANEL SESSION 2: Compound Semiconductor MOSFETs: Fact or Fiction? And who cares?

2:00 p.m. – 3:30 p.m.

**Room 217 A – San Antonio Convention Center**

**Moderators:** Mike Golio, *HVVi Semiconductor*  
Sorin Voinigescu, *University of Toronto*

This panel session will examine the recent resurgence of interest in oxide on compound semiconductor devices. Panelists will be asked to address a number of critical questions for this technology. Can reliable, manufacturable oxides be grown on compound semiconductors? Will performance advantages be sufficient to make these technologies commercially viable? What applications might benefit from compound semiconductor oxide devices and what is the competition?

### Panel Members:

Matthias Passlack *Freescale Semiconductor*  
David Braddock *OSEMI, Inc.*  
Patrick Fay *University of Notre Dame*

3:30 p.m.

**End of Panel Session 2**

## SESSION I: RF GaAs Based Amplifiers

2:00p.m. – 3:40 p.m.

**Room 217 D – San Antonio Convention Center**

**Chairpersons:** Francois Colomb, *Raytheon*  
Pete Zampardi, *Skyworks*

2:00 p.m.

- I.1 **A Novel E-mode PHEMT Linearized Darlington Cascode Amplifier**  
K. W. Kobayashi, *Sirenza Microdevices, Torrance, USA.*

2:20 p.m.

- I.2 **A High-Power Low-Distortion GaAs HBT Power Amplifier with 3.3 V Supply for 5-6 GHz Broadband Wireless Applications**  
T. Oka, M. Hasegawa, M. Hirata, Y. Amano, Y. Ishimaru, H. Kawamura, K. Sakuno, *Sharp Corporation, Tenri, Japan.*

2:40 p.m.

- I.3 **Ultra Linear 3.5GHz RF Front-End for OFDM System**  
P. Cortese, S. David, T. Le Toux, J. Mayock, I. Pilcher, J. Sanham, *Filtron compound semiconductors, Newton Aycliffe, United Kingdom.*

3:00 p.m.

- I.4 **A Fully Matched Ku-band 9W PHEMT MMIC High Power Amplifier**  
C. Lin<sup>1</sup>, H. Liu<sup>1</sup>, C. Chu<sup>1</sup>, H. Huang<sup>1</sup>, M. Houg<sup>1</sup>, Y. Wang<sup>1</sup>, C. Liu<sup>2</sup>, C. Chang<sup>2</sup>, C. Wu<sup>2</sup>, C. Chang<sup>2</sup>, <sup>1</sup>*National Cheng-Kung University, Tainan, Taiwan,* <sup>2</sup>*Transcom, Inc., Tainan, Taiwan.*

Tuesday, November 14<sup>th</sup>, 2006

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3:20 p.m.

- I.5 **Broadband Dual-Gate Balanced Low Noise Amplifiers**  
W. R. Deal, M. Biedenbender, P. Liu, C. Namba, S. Chen, M. Sergeant, J. Uyeda, M. Siddiqui, R. Lai, B. Allen, *Northrop Grumman Space and Mission Systems, Redondo Beach, USA.*

3:40 p.m.

End of Session I

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***Symposium Theme Party***  
***An Evening at Rio Cibolo Ranch***  
***5:00 p.m. - 9:00 p.m.***

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Wednesday, November 15<sup>th</sup>, 2006

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**REGISTRATION AND CONTINENTAL BREAKFAST**

7:00 a.m. – 5:00 p.m.

**Registration – Tower View Foyer**

7:00 a.m. – 8:00 a.m.

**Continental Breakfast – Tower View Foyer**

**Session J: III-V HBT's**

8:00 a.m. – 9:50 a.m.

**Room 217 A – San Antonio Convention Center**

**Chairpersons:** Dave Halchin, *RFMD*  
Bill Peatman, *ANADIGICS*

8:00 a.m.

- J.1 **InGaP/GaAs Merged HBT-FET (BiFET) Technology and Applications to the Design of Handset Power Amplifiers (Invited)**

A. G. Metzger, P. J. Zampardi, M. H. Sun, J. Li, C. Cismaru, L. G. Rushing, K. P. Weller, R. V. Ramanathan, *Skyworks Solutions Inc., Newbury Park, CA, USA*

8:30 a.m.

- J.2 **InGaP-Plus – A Major Advance in GaAs HBT Technology**

A. Gupta, W. Peatman, M. Shokrani, W. Krystek, T. Arell, *ANADIGICS, Inc., Warren, NJ, USA*

8:50 a.m.

- J.3 **Fundamental Difference in Power Handling Between CE and CB HBTs**

H.Li, N. Jiang, G. Wang, Z. Mai, *University of Wisconsin-Madison, Madison, WI, USA*

9:10 a.m.

- J.4 **InP DHBT IC technology with Implanted Collector-Pedestal and Electroplated Device Contacts**

M. Urtega<sup>1</sup>, K. Shinohara<sup>1</sup>, R. Pierson<sup>1</sup>, B. Brar<sup>1</sup>, Z. Griffith<sup>2</sup>, N. Parthasarathy<sup>2</sup>, M. Rodwell<sup>2</sup>, <sup>1</sup>*Rockwell Scientific Corporation, Thousand Oaks, CA, USA*, <sup>2</sup>*University of California Santa Barbara, Santa Barbara, CA, USA*

9:30 a.m.

- J.5 **Reliability Study of InGaP/GaAs HBTs for 28V Operation**

H. F. Chau<sup>1</sup>, B. J. Lin<sup>1</sup>, Y. Chen<sup>1</sup>, M. Kretschmar<sup>1</sup>, C. Lee<sup>2</sup>, N. L. Wang<sup>1</sup>, X. Sun<sup>1</sup>, W. Ma<sup>1</sup>, S. Xu<sup>1</sup>, P. Hu<sup>1</sup>, <sup>1</sup>*WJ Communications, San Jose, USA*, <sup>2</sup>*National Chao-Tung University, Hsinchu, ROC*

9:50 a.m.

End of Session J

9:40 a.m. - 10:10 a.m.

**Coffee Break**

**SESSION K: Automotive Radar**

8:00a.m. – 9:00 a.m.

**Room 217 D – San Antonio Convention Center**

**Chairpersons:** Charles Campbell, *TriQuint Semiconductor*  
Jan-Erik Mueller, *Infineon Technologies*

8:00 a.m.

K.1 **An 80 GHz SiGe Quadrature Receiver Frontend**  
B. Dehlink<sup>1,2</sup>, H. Wohlmuth<sup>3</sup>, K. Aufinger<sup>1</sup>, F. Weiss<sup>1,2</sup>, A. Scholtz<sup>2</sup>,  
<sup>1</sup>Infineon AG, Neubiberg, Germany, <sup>2</sup>Vienna University of  
Technology, Vienna, Austria, <sup>3</sup>Frequentis GmbH, Vienna, Austria.

8:20 a.m.

K.2 **A 77 GHz Transceiver for Automotive Radar System Using a  
120 nm In<sub>0.4</sub>AlAs/In<sub>0.35</sub>GaAs Metamorphic HEMTs**  
K. Kim<sup>1</sup>, W. Choi<sup>1</sup>, S. Kim<sup>1</sup>, G. Seol<sup>1</sup>, K. Seo<sup>1</sup>, Y. Kwon<sup>1</sup>, <sup>1</sup>Seoul  
National University, Seoul, Korea.

8:40 a.m.

K.3 **Single-Chip 24-GHz Synthesizer for a Radar Application**  
R. Kozhuharov<sup>1</sup>, A. Jirskog<sup>2</sup>, N. Penndal<sup>2</sup>, H. Zirath<sup>1,3</sup>, <sup>1</sup>Chalmers  
University of Technology, Göteborg, Sweden, <sup>2</sup>Saab Rosemont,  
Jönköping, Sweden, <sup>3</sup>Ericsson AB, Mölndal, Sweden.

9:00 a.m.

**End of Session K**

9:40 a.m. - 10:10 a.m.

**Coffee Break**

**SESSION L: Advanced Technologies**

10:10 a.m. – 11:30 a.m.

**Room 217 A – San Antonio Convention Center**

**Chairpersons:** Freek van Straten, *Philips*  
Peter Katzin, *Hittite Microwave Corp*

10:10 a.m.

L.1 **DARPA RF Micro Electro Mechanical Systems Program  
(Invited)**  
J. D. Evans, *C Microsystems Technology Office, Defense Advanced  
Research Projects Agency, 3701 North Fairfax Avenue, Arlington,  
VA 22203, USA.*

10:40 a.m.

L.2 **High Performance Sensors for Direct Detection Imaging  
(Invited)**  
J. Lynch, J. Schulman, H. Moyer, *HRL Laboratories, LLC., Malibu,  
CA 90265, USA.*

11:10 a.m.

L.3 **InGaP-GaAs HBT Statistical Modeling for RF Power Amplifier  
Designs**  
J. Hu, P. Zampardi, H. Shao, K. Kwok, and C. Cismaru, *Skyworks  
Solutions, Inc., Newbury Park, CA 91320, USA.*

11:30 a.m.

**End of Session L**

11.30 p.m. – 1:00 p.m.

**Break for Lunch**

**PANEL SESSION 3:**

**Can we trust parasitic extractors at high frequen-  
cies?**

10:10 a.m. – 11:40 a.m.

**Room 217 D – San Antonio Convention Center**

**Moderators:** Douglas S. McPherson, *ITT A/CD*  
Jaesik Lee, *Lucent Technologies*

Parasitic extraction tools are indispensable for the design of robust integrated circuits. Developed primarily for verifying the correct operation of digital circuits where the inputs and outputs are discrete on or off signals, the same tools have proven equally successful at predicting the behavior of AMS and RFIC circuits as well. However, the emergence of ultra-high-speed communications and sensor applications presents a new and much more demanding challenge that cannot be solved by mere RC extraction. This is because the frequencies of interest now extend into the millimeter-wave range and the technologies exhibit minimum features of 90 nm or less. In recognition of this fact, tool developers have enhanced their parasitic extraction products to include full RLC extraction, as well as cross-coupling and substrate effects. Although these enhancements are a welcome addition to the high-speed designer's tool kit, how accurate is the parasitic extractor for predicting circuit performance at data rates of 40+ Gb/s or frequencies of 60+ GHz? Can users be confident that the tools have been validated against foundry silicon at comparable speeds? Can parasitic extractors replace the 3D electromagnetic-field simulator or will it simply be incorporated? The panelists will provide their own perspectives and articulate how parasitic extraction tools will or should evolve to meet the new challenges. The issues of speed, complexity, reliability, and cost will form the basis of the ensuing discussion.

**Panel Members:**

Baribrata Biswas	<i>Synopsys, Inc.</i>
Matt D'Amore	<i>Northrop Grumman Corporation</i>
Mehran Mokhtari	<i>Vitesse Semiconductor Corporation</i>
Jean-Olivier Plouchart	<i>IBM</i>
Carey Robertson	<i>Mentor Graphics Corp.</i>
Rachid Salik	<i>Cadence Design Systems, Inc.</i>

11:30 a.m.

**End of Panel Session 3**

11.40 p.m. – 1:00 p.m.

**Break for Lunch**

**SESSION M: High-Speed Digital Circuits**

1:00p.m. – 2:20 p.m.

**Room 217 A – San Antonio Convention Center**

**Chairpersons:** Herbert Knapp, *Infineon Technologies*  
William Skones, *Northrop Grumman*

1:00 p.m.

M.1 **A 100-Gb/s 1:4 Demultiplexer in InP DHBT Technology**  
J. Hallin, T. Kjellberg, and T. Swahn, *Chalmers University of Technology, Microwave Electronics Laboratory, MC2, 412 96 Göteborg, Sweden.*

1:20 p.m.

M.2 **94-Gb/s 2<sup>9</sup>-1 PRBS Bit Error Detector IC in InP DHBT Technology**  
T. Kjellberg, J. Hallin, and T. Swahn, *Chalmers University of Technology, Microwave Electronics Laboratory, 412 96 Göteborg, Sweden.*

1:40 p.m.

M.3 **Low-Power Circuits for a 2.5-V, 10.7-to-86-Gb/s Serial Transmitter in 130-nm SiGe BiCMOS**  
T. O. Dickson and S. P. Voinigescu, *Edward S. Rogers, Sr. Department of Electrical and Computer Engineering, University of Toronto, 10 King's College Road, Toronto, ON, Canada M5S 3G4.*

2:00 p.m.

M.4 **A 70 Gbps 16:1 Multiplexer and a 60 Gbps 1:16 Demultiplexer in a SiGe BiCMOS Technology**  
B. A. Randall, S. M. Currie, K. E. Fritz, G. D. Rash, J. L. Fasig, B. K. Gilbert, and E. S. Daniel, *Mayo Clinic, 200 First Street SW, Rochester, MN 55905.*

2:20 p.m.

**End of Session M**

2:30 p.m. – 3:00 p.m.

**Coffee Break**

**PANEL SESSION 4:**

**PA Technology for WiMAX - Can challengers take on LDMOS at 3.5GHz and beyond ?**

1:00 p.m. – 2:30 p.m.

**Room 217 D – San Antonio Convention Center**

**Moderators:** Rik Jos, *Philips Semiconductors*  
Walter Wohlmuth, *RFMD*

A number of technologies and products are competing for insertion within WiMAX systems currently under development. The high-power performance characteristics, power amplifier linearity and associated linearization techniques, and improved reliability in the field of GaN FETs and high-voltage GaAs FETs have opened up the field of potential technologies to be used in these systems. LDMOS, however, is a well-entrenched technology for high-power applications that continues to march forward in regards to performance.

These panelists will discuss and debate the merits and demerits of the competing technologies and their product performance characteristics. Systems requirements and technology drivers from WiMAX vendors will be presented and discussed. Development trends towards higher functionality, increased PAE at back-off power levels, commercial aspects such as time to market and cost per Watt, and roadmaps for further products as well as cost reduction will be debated.

**Panel Members:**

Pierre Piel	<i>Motorola (LDMOS and High-voltage GaAs FETs)</i>
Korne Vennema	<i>Philips (LDMOS)</i>
Bill Pribble	<i>Cree (GaN on SiC HEMTs)</i>
Matthew Poulton	<i>RFMD (GaN on SiC HEMTs)</i>
Toshi Kikkawa	<i>Fujitsu (GaN on SiC HEMTs)</i>
Chris Rauh	<i>Nitronex (GaN on Silicon HEMTs)</i>
TBD	<i>WiMAX forum representative</i>

2:30 p.m.

**End of Panel Session 4**

2:30 p.m. – 3:00 p.m.

**Coffee Break**

**Session N: Wide Bandgap Technology**

3:00 p.m. – 5:00 p.m.

**Room 217 A – San Antonio Convention Center**

**Chairpersons:** Rik Jos, *Philips Semiconductors*  
Primit Parikh, *Cree*

3:00 p.m.

N.1 **CVD Diamond - The Next Generation Electronic Material (Invited)**  
Erhard Kohn, Andrej Denisenko  
*Univ. of Ulm, Germany*

3:30 p.m.

N.2 **High Voltage and High Switching Frequency Power-Supplies using a GaN-HEMT (Invited)**  
Wataru Saito, Ichiro Omura, Tomokazu Domon<sup>1</sup> and Kunio Tsuda<sup>2</sup>  
*Toshiba Corp. Semiconductor Comp., <sup>1</sup>Toshiba Business and Life Service, <sup>2</sup>Toshiba Corporate R&D Center, Kawasaki, Japan*

4:00 p.m.

N.3 **High-quality InAlN/GaN high electron mobility transistors on Si(111) by metalorganic chemical vapor deposition**  
Noriyuki Watanabe, Haruki Yokoyama, Masanobu Hiroki, Yasuhiro Oda, Takuma Yagi<sup>1</sup> and Takashi Kobayashi<sup>1</sup>, *NTT Photonics Lab., <sup>1</sup>NTT Advanced Technology Corporation, Kanagawa, Japan*

4:20 p.m.

N.4 **A Planar Integration Process for E/D-mode AlGaIn/GaN HEMT DCFL Integrated Circuits**  
Ruonan Wang, Yong Cai, Zhiqun Cheng, C.W. Tang, Kei May Lau and Kevin J. Chen, *Hong Kong University of Science and Technology, Kowloon, Hong Kong*

4:40 p.m.

N.5 **X-band AlGaIn/GaN HEMT with over 80W Output Power**  
Kazutaka Takagi, Kazutoshi Masuda, Yasushi Kashiwabara, Hiroyuki Sakurai, Keiichi Matsushita, Hisao Kawasaki, Yoshiharu Takada<sup>1</sup> and Kunio Tsuda<sup>1</sup>, *Komukai Operations Toshiba Corporation, <sup>1</sup>Toshiba Corporate R&D Center, Kawasaki, Japan*

5:00 p.m.

**End of Session N**

5:00 p.m.

**Close of Symposium**

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School of Engineering, ICU  
KOREA

### IEEE ADVISORS

**Peter Staecker**  
MTT-S Liaison  
(781) 861-7643  
p.staecker@ieee.org

**Herbert S. Bennett**  
EDS Liaison  
NIST  
Gaithersburg, MD

**Elsie Cabrera**  
Conference Management Services  
(800) 810 4333  
e.cabrera@ieee.org

## TECHNICAL PROGRAM COMMITTEE

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### CONSULTANTS

**Harry Kuemmerle, III**  
**Diane Conti**  
Registration, Meeting & Exhibit Management  
VIP Meetings & Conventions  
Pacific Palisades, CA

### SYMPOSIUM HEADQUARTERS

The San Antonio Marriott Riverwalk Hotel and the  
Henry B. Gonzalez Convention Center in San Antonio.

# SYMPOSIUM CHECKLIST

NOTES

## HOTEL RESERVATIONS

### Reserve rooms on line at:

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### by October 6<sup>th</sup> to qualify for advanced registration fees.

## EXHIBITOR INFORMATION

Contact: **Harry Kuemmerle, III**

VIP Meetings & Conventions

1515 Palisades Dr. Suite I

Pacific Palisades, CA 90272-2167

Tel: (310) 459-4691

FAX (310) 459-0605

Email: [harry.k@vipmeetings.com](mailto:harry.k@vipmeetings.com)

## NOTES