



**27th IEEE COMPOUND
SEMICONDUCTOR IC
(CSIC) SYMPOSIUM**
(Formerly IEEE GaAs IC Symposium)

Program

Presenting:

Compound Semiconductor Oasis

And Introducing CS-Week 2005
A Co-location of CSIC Symposium, CS-MAX
and the Key Conference

Oct 30th – Nov 2nd, 2005
Hyatt Grand Champions
Palm Springs, CA, USA



Sponsored by
the IEEE Electron Devices Society

Technically Co-Sponsored by
the IEEE Solid-State Circuits Society and
the IEEE Microwave Theory and Techniques Society

IEEE
445 HOES LANE
PISCATAWAY, NJ 08855

27th IEEE Compound Semiconductor IC (CSIC) Symposium
Oct 30th – Nov 2nd, 2005 – Palm Springs, CA USA
CSIC WWW URL: <http://www.csics.org>

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

SYMPOSIUM

SATURDAY, OCTOBER 29TH, 2005

REGISTRATION (Short Course & Primer Course Only)

SUNDAY, OCTOBER 30TH, 2005

REGISTRATION (Short Course & Primer Course Only)

Continental Breakfast for Short Course

SHORT COURSE 1: Compound Semiconductor IC Design for Automotive Radars and Sensor Networks

SHORT COURSE 2: GaN Technology and its Wireless/Microwave/Millimeter-wave IC Applications

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, OCTOBER 31ST, 2005

REGISTRATION

Continental Breakfast

SYMPOSIUM OPENING

SESSION A: Plenary Session

SESSION B: 40Gbs Fiber Blocks

PANEL SESSION 1: Consumer Wireless Markets for Filter Technology

SESSION C: Front End MMICs

SESSION D: Advanced III-V Technologies

CS-Week Technology Exhibition Opening Reception

TUESDAY, NOVEMBER 1ST, 2005

REGISTRATION

Continental Breakfast

CS-Week Technology Exhibition

SESSION E: High Speed Data Converters I

SESSION F: Silicon Technologies for RF Applications

SESSION G: High Speed Data Converters II

SESSION H: GaN Technologies I

Exhibition Luncheon

SESSION I: Power Amplifiers

SESSION J: GaN Technologies II

PANEL SESSION 2: DDS – How Close to Reality for GHz RF Systems?

PANEL SESSION 3: Automotive Radar at 77 GHz: System Architecture, MMIC

Design and Packaging

Symposium Party – “Caribbean Nights”

WEDNESDAY, NOVEMBER 2ND, 2005

REGISTRATION

Continental Breakfast

SESSION K: Low-Power Datacom

SESSION L: Signal Generation & Switching

PANEL SESSION 4: Will CMOS Take Over All Digital Applications Below 80 Gb/s or Will ABCS, SiGe, and InP Be Able to Carve a Niche?

PANEL SESSION 5: GaN – The Ultimate High Power, High Voltage Reliable Basestation PA Technology?

SESSION M: High Frequency Power Amplifiers

SESSION N: High-Voltage GaAs Basestation Technologies

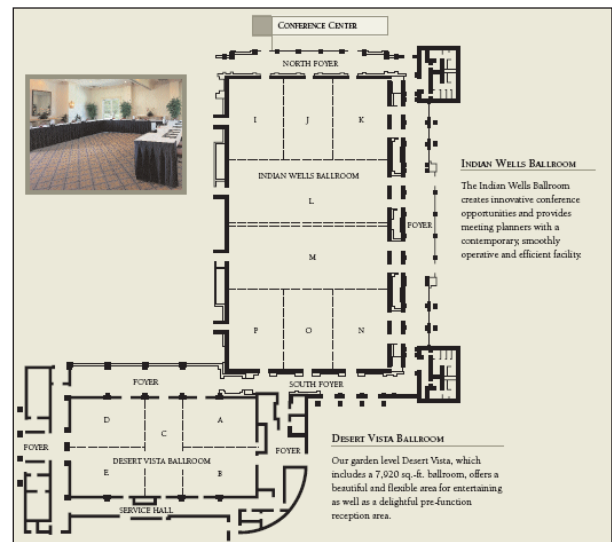
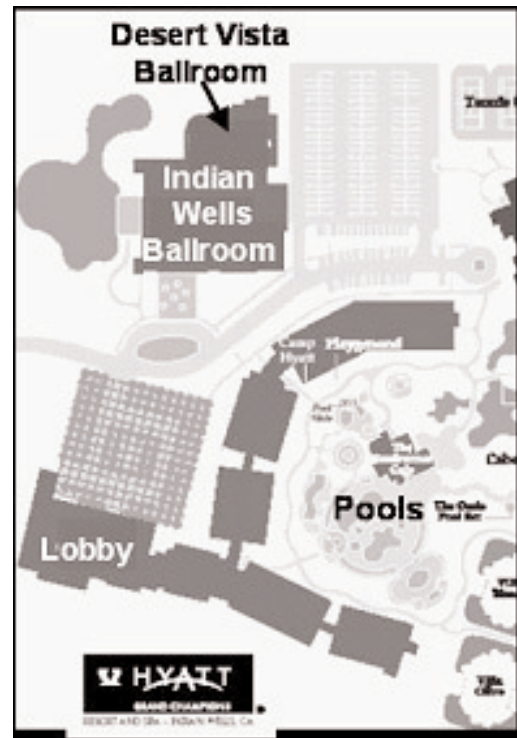
SESSION O: High-Speed Datacom

SESSION P: New Concepts in Signal Amplification & Protection

Close of Symposium

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

The Hyatt Grand Champions Resort & Spa at Indian Wells



AT A GLANCE

SATURDAY, OCTOBER 29TH, 2005

6:00 p.m. – 8:00 p.m. IW Ballroom Registration Counters

SUNDAY, OCTOBER 30TH, 2005

7:00 a.m. – 8:00 a.m. IW Ballroom Registration Counters

7:00 a.m. – 8:00 a.m. DV N. Foyer

8:30 a.m. – 3:30 p.m. DV Ballroom A

8:15 a.m. – 3:30 p.m. DV Ballroom B

8:00 a.m. – 5:00 p.m.

12:00 p.m. – 1:30 p.m.

12:00 p.m. – 1:30 p.m.

3:00 p.m. – 8:00 p.m. IW Ballroom Registration Counters

4:00 p.m. – 7:00 p.m. DV Ballroom A

6:00 p.m. – 8:00 p.m. Verbena Terrace

MONDAY, OCTOBER 31ST, 2005

7:00 a.m. – 5:00 p.m. IW Ballroom Registration Counters

7:00 a.m. – 8:00 a.m. DV N. Foyer

8:00 a.m. – 8:30 a.m. DV Ballroom ABC

8:00 a.m. – 12:00 p.m. DV Ballroom ABC

1:00 p.m. – 2:30 p.m. DV Ballroom AB

1:00 p.m. – 2:30 p.m. DV Ballroom DE

3:00 p.m. – 4:50 p.m. DV Ballroom AB

3:00 p.m. – 5:00 p.m. DV Ballroom DE

5:00 p.m. – 8:00 p.m. IW Ballroom

TUESDAY, NOVEMBER 1ST, 2005

7:00 a.m. – 5:00 p.m. IW Ballroom Registration Counters

7:00 a.m. – 8:00 a.m. IW Ballroom

7:00 a.m. – 4:00 p.m. IW Ballroom

8:00 a.m. – 9:40 a.m. DV Ballroom AB

8:00 a.m. – 9:40 a.m. DV Ballroom DE

10:00 a.m. – 11:40 a.m. DV Ballroom AB

10:00 a.m. – 11:30 a.m. DV Ballroom DE

11:30 a.m. – 1:30 p.m. IW Ballroom

1:30 p.m. – 2:50 p.m. DV Ballroom AB

1:30 p.m. – 2:50 p.m. DV Ballroom DE

3:30 p.m. – 5:00 p.m. DV Ballroom AB

3:30 p.m. – 5:00 p.m. DV Ballroom DE

7:00 p.m. – 10:00 p.m. Resort Pool (DV Ballroom Backup)

WEDNESDAY, NOVEMBER 2ND, 2005

7:00 a.m. – 12:00 p.m. IW Ballroom Registration Counters

7:00 a.m. – 8:00 a.m. DV N. Foyer

8:00 a.m. – 10:00 a.m. DV Ballroom AB

8:00 a.m. – 10:10 a.m. DV Ballroom DE

10:30 a.m. – 12:00 p.m. DV Ballroom AB

10:30 a.m. – 12:00 p.m. DV Ballroom DE

1:00 p.m. – 2:20 p.m. DV Ballroom AB

1:00 p.m. – 2:20 p.m. DV Ballroom DE

3:00 p.m. – 5:00 p.m. DV Ballroom AB

3:00 p.m. – 5:00 p.m. DV Ballroom DE

5:00 p.m.

IW – Indian Wells, DV – Desert Vista

MAIL COMPLETED REGISTRATION FORM AND FEES TO:

Registrar, 2005 IEEE CSIC Symposium
c/o VIP Meetings & Conventions
1515 Palisades Drive, Suite I
Pacific Palisades, CA 90272 USA

Place
Stamp
Here

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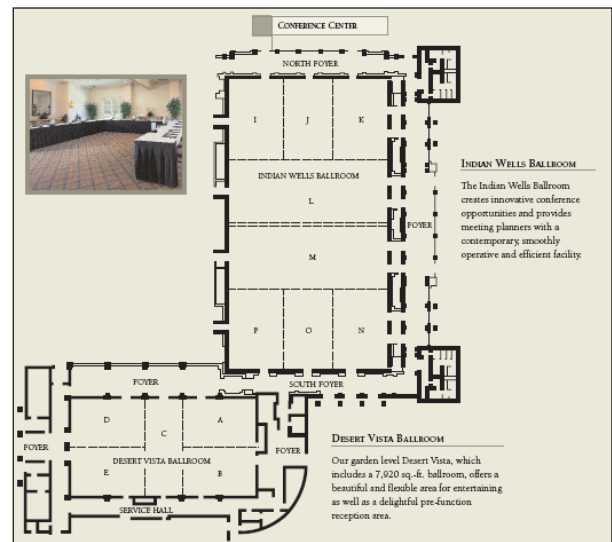
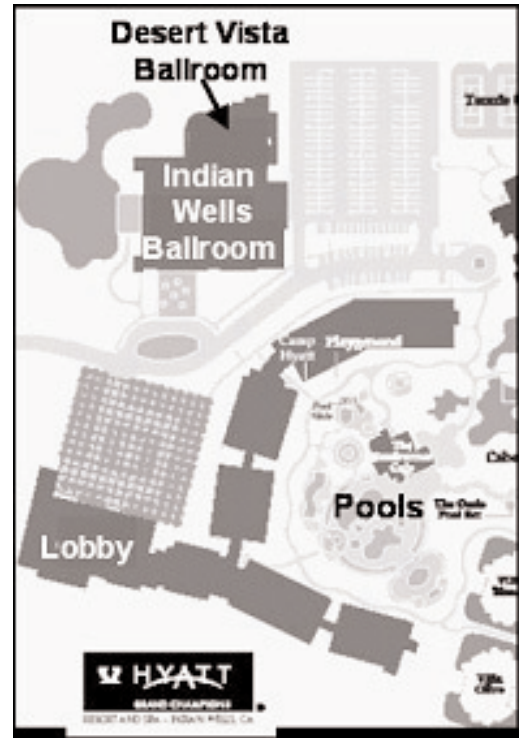
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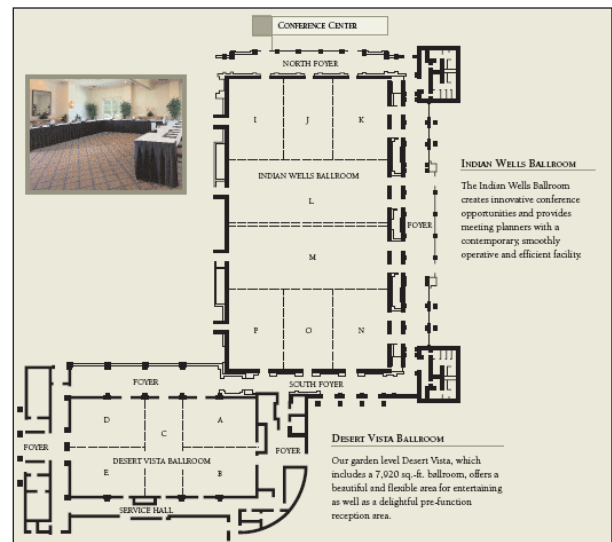
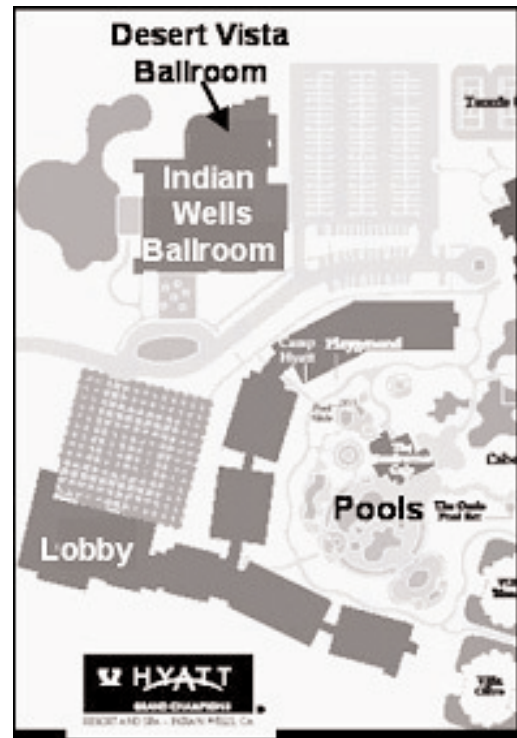
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CHAIRMAN'S MESSAGE

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 2005 IEEE Compound Semiconductor IC (CSIC) Symposium, formerly the IEEE GaAs IC Symposium. This year's symposium will be held October 30th – November 2nd in Palm Springs, California at the Hyatt Grand Champions Resort and Spa.

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 the current hot topics of Compound Semiconductor IC Design for Automotive Radars and Sensor Networks and GaN Technology and its Wireless/Microwave/Millimeter-wave 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 2nd year co-locating with CS-MAX to offer an exciting week of compound semiconductors. CS-MAX offers a strong manufacturing oriented technical program and an exhibition background with a wide breadth that compliments the device, IC design and application presentations of the CSIC Symposium. In addition, the Key conference will also be joining our co-location and provide a 1 day track of executive-marketing sessions. The combined event is called Compound Semiconductor Week 2005 (CS-Week 2005) and features the separate and respective technical programs of CSIC Symposium, CS-MAX, and the Key conference with one unified CS-Week 2005 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 2005 Technology Exhibition Opening Reception, the Tuesday CS-Week 2005 Technology Exhibition Luncheon, and the Tuesday evening CS-Week Theme Party – “Caribbean Nights”.

Finally, I would like to announce the winners of our Eighth **Outstanding Paper Award from the 2004 Symposium**. They are *Herbert Zirath, Rumen Kozhuharov, Mattias Ferndahl*, for their paper titled “*A x2 Coupled Colpitt VCO with Ultra Low Phase Noise*” from the Microwave Electronics Laboratory, Dept. Microtechnology and Nanoscience Chalmers University of Technology, Göteborg, Sweden. Herbert Zirath is also at Ericsson AB, Mölndal, Sweden.

We hope you'll join us for Compound Semiconductor Week 2005 and contribute to the advancement of our industry!

Kevin Kobayashi, Chair
2005 IEEE CSIC SYMPOSIUM



COMPOUND SEMICONDUCTOR WEEK 2005 Palm Springs, California * October 29 - November 2, 2005

ADVANCE REGISTRATION FORM

Register Today via ...

FAX: (310) 459-0605
WEB: www.vipmeetings.com/conferences/csweek2005.html
PHONE: (800) 926-3976 or (310) 459-0600

MAIL: CS WEEK 2005
c/o VIP MEETINGS & CONVENTIONS
1515 Palisades Drive, Suite I
Pacific Palisades, CA 90272-2167

Attendee Information (please print):

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

	CSIC Symposium		CS-MAX		Key Conference		Amount
	by Sept. 30	after Sept. 30	by Sept. 30	after Sept. 30	by Sept. 30	after Sept. 30	
FULL REGISTRATION							
IEEE or IOP Member	\$480	\$530	\$450	\$495	\$625	\$695	\$ _____
Non-Member	\$530	\$600	\$495	\$545	\$695	\$765	\$ _____
Student	\$200	\$250	-	-	-	-	\$ _____
1-DAY REGISTRATION (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 <input type="checkbox"/> Wed				
IEEE or IOP Member	\$250	\$300	\$250	\$300	-	-	\$ _____
Non-Member	\$300	\$350	\$300	\$350	-	-	\$ _____
SHORT COURSE	\$350	\$450	-	-	-	-	\$ _____
Student	\$200	\$300	-	-	-	-	\$ _____
PRIMER COURSE	\$175	\$175	-	-	-	-	\$ _____
Student	\$75	\$75	-	-	-	-	\$ _____
EXTRAS							
- Technical Digest only:	# _____	\$75 each	# _____	\$75 each	N/A	N/A	\$ _____
- Digest CD ROM only:	# _____	\$100 each	# _____	\$100 each	N/A	N/A	\$ _____
- Short Course Notes only:	# _____	\$100 each	N/A	N/A	N/A	N/A	\$ _____
- Primer Course Notes only:	# _____	\$50 each	N/A	N/A	N/A	N/A	\$ _____
- Extra Reception Ticket (Sun):	# _____	\$30 each	N/A	N/A	N/A	N/A	\$ _____
- Extra Theme Party Ticket (Tue):	# _____	\$75 each	# _____	\$75 each	# _____	\$75 each	\$ _____
- Extra Cocktail Party Ticket (Wed):	N/A	N/A	N/A	N/A	# _____	\$50 each	\$ _____
- Golf Outing (Tue):	# _____	\$85 each	# _____	\$85 each	# _____	\$85 each	\$ _____

COMBINED REGISTRATION DISCOUNT (subtract only if registering for at least 2 Full Conferences) **\$ -100.00**

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 September 30, 2005. 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 selected total registration 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.

CORPORATE BENEFACTORS

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. If your company is interested in participating, please contact the Symposium Chair, Kevin Kobayashi at 310-257-0569. Opportunities for contributions at all levels are still available.

As of this printing the Corporate Benefactors for the 2005 Compound Semiconductor IC Symposium are as follows.

General Benefactors:



Theme Party (Hors D'Oeuvres or Dessert) or Opening Reception:



Special Benefactors:

The Symposium Web Site 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 2005 CSIC Symposium:



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

Additional publicity for the Symposium is being provided by:



GENERAL INFORMATION

IEEE 27th CSIC Symposium
Oct 30th - Nov 2nd, 2005
Hyatt Grand Champions
Palm Springs, California

REGISTRATION

	<u>Advance</u> (Received by Sept. 30 th)	<u>Regular</u> (After Sept 30 th or on site)
Symposium Registration		
IEEE Member	\$480	\$530
Non-IEEE	\$530	\$600
Student	\$200	\$250
Special 1-day Registration		
(includes sessions, CD, and digest but no social)		
IEEE Member	\$250	\$300
Non-IEEE	\$300	\$350
Short Course		
Student Registration	\$200	\$300
Primer Course		
Student Registration	\$75	\$75
Technical Digest Only		
	\$75	\$75
Short Course Notes Only		
	\$100	\$100
Digest CD ROM Only		
	\$100	\$100
Primer Course Notes Only		
	\$50	\$50
Extra Reception Ticket		
	\$30	\$30
Extra Theme Party Ticket		
	\$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/csweek2005.html> or complete the enclosed Advance Registration Form with your remittance of the appropriate fee (check or credit card) **By Sept 30th, 2005** to:

Registrar, 2005 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: reservations@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.

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 Symposium Hotel on Saturday through Wednesday. The operating hours will be as follows:

Short & Primer Course Registration only

Saturday, October 29 th	6:00 p.m. – 8:00 p.m.
Sunday, October 30 th	7:00 a.m. – 8:00 a.m.
Sunday, October 30 th	3:00 p.m. – 4:00 p.m. (Primer)

Symposium Registration

Sunday, October 30 th	3:00 p.m. – 8:00 p.m.
Monday, October 31 st	7:00 a.m. – 5:00 p.m.
Tuesday, November 1 st	7:00 a.m. – 5:00 p.m.
Wednesday, November 2 nd	7:00 a.m. – 12:00 noon

Refund Policy:

Please note that after Sept. 30th, 2005, 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 Sept. 30th, 2005. 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 Sept 30th, 2005.**

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, the Hyatt Grand Champions.

The Hyatt Grand Champions is an extraordinary 34-acre AAA Four Diamond award-winning property, which completed an incredible \$65 Million expansion in January '03. Guests will discover exquisite European-style guest rooms and villas encompassed by incomparable amenities including two Ted Robinson-designed championship golf courses, tennis, an unrivaled spa, and celebrated restaurants. Six free-form swimming pools include our new Oasis serpentine lap-pool. This pool is geared towards adult executives and is surrounded by 15 luxurious cabanas that are complete with Internet access, TV's, telephones, ceiling fans and private Oasis Pool Bar service.

Guests will be in awe of the resort's new floating spa paradise, Agua Serena. Tucked-away in an intimate oasis and surrounded by a lagoon, the 30,000 square foot spa offers services designed to transform body, mind, and spirit within its intimately elegant in-door/out-door treatment rooms, like no other spa in the world.

In case there is time, on property are two 18-hole Ted Robinson-designed championship golf courses featuring lush greens, rolling fairways, pristine lakes and breathtaking views. The Golf Resort at Indian Wells is a natural blend of traditional club atmosphere with the relaxed resort ambiance that is so very Indian Wells.

Additionally, The Golf Resort of Indian Wells offers the Callaway Golf Performance Center, a renowned golf school, on-site practice center, Grand View Restaurant and Lounge, and fully stocked pro shop and club stores.

A \$10 resort fee is added to the room charge daily, and includes: local and 800 calls, incoming faxes, in-room safe, bike usage, individual tennis play and access to Health and Fitness center, daily newspaper, in-room coffee and tea.

Located in exclusive Indian Wells, California, 15 miles from Palm Springs International Airport, 60 miles from Ontario International and 120 miles from LAX.

Hotel Address/Rate Information:

HYATT GRAND CHAMPIONS RESORT & SPA
44-600 Indian Wells Lane
Indian Wells, CA 92210

Room Rate: \$160 Single/Double plus 9.25% tax plus \$10 Resort Fee

Cancellation Policy: 48 hours prior to arrival

Room availability cannot be guaranteed after October 7th, 2005.

Rating: AAA Four Diamond

Total Block: 275

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/csweek2005.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.

We ask you to please support your Symposium and more fully enjoy all the activities by staying at our official headquarters hotel. The Symposium relies on attendees staying at the Hyatt Grand Champions 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 Friday, September 30th, 2005. 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 48 hours prior to arrival. If you need to cancel, please contact VIP Meetings at the numbers above.

TRANSPORTATION

Airport Transportation:

The Hyatt Grand Champions Hotel is located in exclusive Indian Wells, California, 15 miles from Palm Springs international airport (approx 20 minutes), 60 miles from Ontario international (mid-way between Los Angeles and Palm Springs-approx 1.45 hrs) and 120 miles from LAX (approx 2.45 hrs).

Most major airlines serve Palm Springs, some are year-round, others provide seasonal service.

The Hyatt does not have an airport shuttle. Rental cars are available at the Palm Springs airport. Taxi is approximately \$45 one way.

Driving directions to Palm Springs:

If you are arriving into LAX, Ontario, San Diego or John Wayne (Orange County) airports then obtain directions to Interstate 10 East.

Once on Interstate 10 East and upon reaching Palm Springs; exit on Cook Street (go South on Cook), go approximately 4 miles to Hwy 111, turn left and go approximately 2 miles down to Indian Wells Lane, turn left and proceed around the drive past the Golf Resort at Indian Wells to the Hyatt Grand Champions Resort, go to free self parking area past the Hotel (valet) entrance.

If you are arriving into Palm Springs airport then; exit airport (left) onto El Cielo, turn left onto Ramon Road, turn right on Bob Hope, turn left onto Frank Sinatra, turn right onto Cook. Once on Cook follow the instructions above.

ADDITIONAL INFORMATION

Message Desk:

A Symposium Message Desk will be in operation in the Registration area during registration hours from Sunday, October 30th at 5 p.m. to Wednesday, November 2nd 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 Hyatt Grand Champions main telephone number is +1-(760)-341-1000. 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, October 30th, a continental breakfast will be available for Short Course registrants only in the Desert Vista Ballroom N. Foyer. There will be a complimentary continental breakfast for all Symposium attendees to be held in the Indian Wells Ballroom, in the exhibition area, on Tuesday. On Monday and Wednesday, the complimentary breakfast for all Symposium attendees will be held in the Desert Vista Ballroom N. Foyer.

Coffee Breaks:

The locations of coffee breaks will be as follows:

Short Course Registrants (only) –

Sunday, October 30th: DV N. Foyer

ROCS Registrants (only) –

Sunday, October 30th: Grand Salon FGH

Primer Course Registrants (only) –

Sunday, October 30th: DV N. Foyer

Symposium Registrants –

Monday, October 31st: DV N. Foyer

Tuesday, November 1st: Indian Wells Ballroom

Wednesday, November 2nd: DV N. Foyer

Symposium Social Events:

SYMPOSIUM OPENING RECEPTION

We welcome you to Indian Wells on Sunday evening, October 30th from 6:00 p.m. to 8:00 p.m. in the Verbena Terrace of the Hyatt Grand Champions Resort & Spa. 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, October 31st from 5:00 p.m. to 8:00 p.m. Every Symposium participant is invited to enjoy the hors d'oeuvres and schmooze and cruise the exhibits in the Indian Wells Ballroom at the Hyatt Grand Champions.

EXHIBITION LUNCH

On Tuesday, November 1st, from 11:30 a.m. to 1:30 p.m., the Exhibition Luncheon will be hosted in the Indian Wells Ballroom of the Hyatt Grand Champions. 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 poolside for the Symposium Theme Party on Tuesday, November 1st, 2005 from 7:00 to 10:00 p.m. The theme this year will be **Caribbean Nights: Caribbean Fare and Music** and will feature live Calypso music and a sumptuous feast of island cuisine. In the spirit of the Caribbean theme, we are asking attendees to bring and wear their favorite Hawaiian or Caribbean shirt or attire. Prizes will be given out to the shirt(s) that best captures the spirit of our theme party.

The exotic atmosphere of the pool surroundings with great music, food and refreshments will provide an excellent opportunity to enjoy the company of your colleagues and make new friends. One free admission to the Symposium Party is included with each full registration. Extra tickets may be purchased at registration for \$75.

Palm Springs Attractions:

Palm Springs has many attractions to offer: windmill farms which include 3,500-plus windmills that can generate up to one and a half percent of California's electricity; Joshua Tree National Park with the rock gardens of the San Andreas Fault, the tallest cactus garden in the state and 1000 year old Joshua Trees; the Palm Springs Aerial Tramway which is the world's largest rotating tramcar, you will experience a breathtaking journey up the sheer cliffs of Chino Canyon. The 15-minute ride starts at the 2,643 ft. Valley Station and rises to the Mountain Station with an elevation of at 8,516 ft.; the Palm Springs Air Museum which possesses an expansive collection features propeller-driven World War II aircraft in flying conditions; the Living Desert and Zoo Gardens which has a 1,200 acre wildlife and botanical park, featuring rare and endangered desert animals and African wildlife, hiking trails, picnic areas, café and gift shop; many world-class golf courses.

Weather:

There is a significant variance in temperatures over the course of a day. The average maximums for October and November are 81 and 92F, respectively, with average minimums of 63 and 57F, respectively. In the early afternoon the temperature may rise to upwards of 100F.

SYMPOSIUM HIGHLIGHTS

Technical Program:

The technical program for the 2005 IEEE CSIC Symposium consists of 69 technical papers, five panel sessions, an Industry Exhibit, and 2 Short Courses, “Compound Semiconductor IC Design for Automotive Radars and Sensor Networks” and “GaN Technology and its Wireless/Microwave/Millimeter-wave IC Applications.” We will also be offering our annual introductory level class “Basics of Compound Semiconductor ICs” (Primer Course). This year we have invited 29 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: Compound Semiconductor IC Design for Automotive Radars/Sensor Networks

Short Course Description

This course will provide an overview of compound semiconductor integrated circuit design for 24GHz/77GHz automotive radar and sensor networks. 5 experts will discuss present and future automotive radars’ functionalities, different automotive radar schemes, adoptable device/circuit topologies, latest IC chip design/development trends, and present/future challenging issues.

Topics Covered and Instructors:

SiGe Circuits for Automotive Radar Applications – Herbert Knapp (Infineon)

Latest Component Developments for Long Range and Short Range Automotive Radar Front Ends – Didier Baglieri (UMS)

77GHz/24GHz Automotive Radar Modules and Related MMIC’s – Hiroshi Kondoh (Hitachi)

Short-Range Sensing for Automotive Applications and Implications for Future Sensor Integration – Ian Gresham (M/A-COM Tycoelectronics)

Automotive Radar Sensors – Josef Wenger (Daimler Chrysler)

Short Course 2: GaN Technology and its Wireless/Microwave/Millimeter-wave IC Applications

Short Course Description

This course will provide an overview of GaN technology and its application to wireless, microwave, and millimeter-wave integrated circuit applications. 5 experts will discuss device physics and performance limitations, current device technology and reliability status, potential circuit/system applications, cost issues, latest IC chip design considerations and development trends, and present/future challenging technical issues.

Topics Covered and Instructors:

Physical Phenomena Affecting the RF Operation of AlGaN/GaN Power HFET’s – Robert J. Trew (North Carolina State Univ.)

GaN HEMTs: Are They Ready for System Insertion? – Thomas Kazior (Raytheon)

AlGaN/GaN HEMT MMICs and Hybrid PAs for High Bandwidth and High Frequency High Power Applications – Ruediger Quay (Fraunhofer)

Current Status and Prospects of GaN-based FETs and MMICs for RF Applications – Tsuyoshi Tanaka (Matsushita)

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:

Mohammad Madihian, Short Course Organizer and Chair
NEC Laboratories America, Inc.
(609)-951-2916
madihian@nec-labs.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 GaAs 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 GaAs 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:

Marko Sokolich, Primer Course Organizer and Chair
HRL Laboratories, LLC
3011 Malibu Canyon Rd
Malibu, CA 90265 USA
(310)-317-5148

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 five 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 5 panel topics are as follows:**

Panel Session 1:

“Consumer Wireless Markets for Filter Technology Filter Technology”

Monday, October 31st, 1:00-2:30 p.m.

Panel Session 2:

“DDS – How Close to Reality for GHz RF Systems?”

Tuesday, November 1st, 3:30-5:00 p.m.

Panel Session 3:

“Automotive Radar at 77 GHz: System Architecture, MMIC Design and Packaging”

Tuesday, November 1st, 3:30-5:00 p.m.

Panel Session 4:

“Will CMOS Take Over All Digital Applications Below 80 Gb/s or Will ABCS, SiGe, and InP Be Able to Carve a Niche?”

Wednesday, November 2nd, 3:30-5:00 p.m.

Panel Session 5:

“GaN – The Ultimate High Power, High Voltage Reliable Basestation PA Technology?”

Wednesday, November 2nd, 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 2005 CS-Week Technology Exhibition will be held concurrently with both the IEEE CSIC Symposium and CSMAX on October 31st and November 1st in the Indian Wells Ballroom located in the Hyatt Grand Champions. 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
Accent Optical Technologies
Agilent Technologies, Inc.
Air Products & Chemicals, Inc.
Aixtron / Thomas Swan
Akzo Nobel High Purity Metalorganics
American Xtal Technology
APT / Telemark
Bandwidth Semiconductor
BOC Edwards
CS Clean Systems, Inc.
CVD Equipment Corporation
EMCORE Corporation
Engis Corporation
Epicchem Group
Epiworks, Inc.
Evans Analytical Group
FRT of America, LLC
Hologenix, Inc.
Intelligent Epitaxy Technology, Inc.
Keithley Instruments
KLA-Tencor
M/A-COM
Matheson Tri-Gas
MBE Technology Pte Ltd
Northrop Grumman
Osemi, Inc.

Picogiga International (The SOITEC Group)
Presidio Components, Inc.
Qspec Technology, Inc.
Riber
Rohm and Haas Electronic Materials
Saint-Gobain Abrasives, Inc.
Sintec-Keramik, USA
Sonnet Software, Inc.
Sumitomo Electric
Surface Technology Systems plc
Synopsys, Inc.
Techarmonic, Inc.
Trion Technology
Veeco Instruments

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, October 31st and 7:00 a.m. to 4:00 p.m. on Tuesday, November 1st. 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. Or visit the VIP website.

Meetings & Conventions website at:

www.vipmeetings/conferences/csweek2005.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 3rd, 5 p.m. EDT. Submissions must be submitted in 4 page extended abstract format and camera ready for digest printing. E-mail abstracts to: csics_2005_abstract@hittite.com

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 1st. The cost of the paper bound digest, if ordered through Advance Registration or purchased on-site, is \$75. The CD ROM Digest for 2005 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 2005 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.

SHORT COURSES

Sunday, October 30th, 2005
Hyatt Grand Champions
Desert Vista Ballroom A and B
8:00 a.m. - 3:30 p.m.

Course Coordinator: **Mohammad Madihian**
NEC Laboratories America, Inc.
(609)-951-2916
madihian@nec-labs.com

This year the CSIC Symposium will hold two short courses. One course covers automotive radar/sensor networks and the other presents an overview of Gallium Nitride technology.

“Compound Semiconductor IC Design for Automotive Radars/Sensor Networks” (Desert Vista Ballroom A)

Short Course Description

Long-awaited automotive radars, which were originally considered for better driving safety, are no longer “car collision avoidance”-only tools. Projected complexity and functionality for forward looking radars for the next decade include “adaptive cruise control”, “automatic stop and go”, “airbag pre-crash warning”, “parking aid”, and ultimately “autonomous driving”. While the commercialization of the radar technology coincides with carmakers’ emphasis on driving safety and feature enhancement, it would not have been possible without maturity of viable microwave and millimeter wave technologies at 24GHz and 77GHz. This course will provide an overview of compound semiconductor integrated circuit design for 24GHz/77GHz automotive radar and sensor networks. 5 experts will discuss the device, circuit, and system aspects by addressing present and future automotive radars’ functionalities, different automotive radar schemes, adoptable device/circuit topologies, latest IC chip design/development trends, and present/future challenging issues.

Topics Covered and Instructors:

- a) SiGe Circuits for Automotive Radar Applications - Herbert Knapp
- b) Latest Component Developments for Long Range and Short Range Automotive Radar Front Ends - Didier Baglieri
- c) 77GHz/24GHz Automotive Radar Modules and Related MMIC’s – Hiroshi Kondoh
- d) Short-Range Sensing for Automotive Applications and Implications for Future Sensor Integration - Ian Gresham
- e) Automotive Radar Sensors - Josef Wenger

Short Course Schedule

The course will be held on Sunday October 30th and will begin with a continental breakfast. Instructors will begin promptly at 8:30 a.m. A lunch will be provided as well a morning refreshment break.

- 7:00 a.m. **Registration and Breakfast**
(IWB Reg Counters and DV Ballroom N. Foyer)
- 8:30 a.m. **Introduction and Overview (DV Ballroom A)**
Mohammad Madihian, NEC Laboratories America, Inc.
- 8:45 a.m. **SiGe Circuits for Automotive Radar Applications**
Herbert Knapp, Infineon

- 9:45 a.m. **Latest Component Developments for Long Range and Short Range Automotive Radar Front Ends**
Didier Baglieri, UMS
- 10:45 a.m. **Coffee Break (DV Ballroom N. Foyer)**
- 11:00 a.m. **77GHz/24GHz Automotive Radar Modules and Related MMIC's**
Hiroshi Kondoh, Hitachi
- 12:00 p.m. **Lunch (DV Ballroom D)**
- 1:15 p.m. **Short-Range Sensing for Automotive Applications and Implications for Future Sensor Integration**
Ian Gresham, M/A-COM
- 2:15 p.m. **Automotive Radar Sensors**
Josef Wenger, Daimler Chrysler
- 3:15 p.m. **Questions and Discussion**
- 3:30 p.m. **Close of Short Course**

**“GaN Technology and its
Wireless/Microwave/Millimeter-wave IC Applications”
(Desert Vista Ballroom B)**

Short Course Description

GaN-based devices have demonstrated significant potential and progress for use in a variety of RF power applications, such as base stations for wireless communications systems, radar transmitters, etc over the past 5 years. What were once considered university “hero” results are now being achieved routinely at industrial labs and foundries around the world. Despite this progress several major challenges remain before GaN becomes a truly viable technology and ready for system insertion. This course will provide an overview of GaN technology and its application to wireless, microwave, and millimeter-wave integrated circuit application. 5 experts will discuss device physics and performance limitations, current device technology and reliability status, potential circuit/system applications, cost issues, latest IC chip design considerations and development trends, and present/future challenging technical issues.

Topics Covered and Instructors:

- a) Physical Phenomena Affecting the RF Operation of AlGaIn/GaN Power HFET's
- b) GaN HEMTs: Are They Ready for System Insertion?
- c) AlGaIn/GaN HEMT MMICs and Hybrid PAs for High Bandwidth and High Frequency High Power Applications
- d) Current Status and Prospects of GaN-based FETs and MMICs for RF Applications
- e) GaN Technology and Microwave Integrated Circuits (ICs)

Short Course Schedule

The course will be held on Sunday October 30th and will begin with a continental breakfast. Instructors will begin promptly at 8:15 a.m. A lunch will be provided as well as a morning refreshment break.

- 7:00 a.m. **Registration and Breakfast**
(IWB Reg Counters and DV Ballroom N. Foyer)
- 8:15 a.m. **Introduction and Overview (DV Ballroom B)**
Mohammad Madhian, NEC Laboratories America, Inc.

- 8:30 a.m. **Physical Phenomena Affecting the RF Operation of AlGaIn/GaN Power HFET's**
Robert J. Trew, North Carolina State Univ.
- 9:30 a.m. **GaN HEMTs: Are They Ready for System Insertion?**
Thomas Kazior, Raytheon
- 10:30 a.m. **Coffee Break (DV Ballroom N. Foyer)**
- 10:45 a.m. **AlGaIn/GaN HEMT MMICs and Hybrid PAs for High Bandwidth and High Frequency High Power Applications**
Ruediger Quay, Fraunhofer
- 12:00 p.m. **Lunch (DV Ballroom D)**
- 1:15 p.m. **Current status and prospects of GaN-based FETs and MMICs for RF applications**
Tsuyoshi Tanaka, Matsushita
- 2:15 p.m. **GaN Technology and Microwave Integrated Circuits (ICs)**
Jeff Shealy, RF Micro Devices
- 3:15 p.m. **Questions and Discussion**
- 3:30 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.

PRIMER COURSE

Sunday, October 30th, 2005
(Desert Vista Ballroom A)
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: **Marko Sokolich**
HRL Laboratories, LLC

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 GaAs 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 GaAs 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

OTHER MEETINGS

ROCS Workshop (formerly GaAs Reliability Workshop) Grand Salon FGH 8:00 a.m. - 5:00 p.m.

The 20th annual ROCS Workshop - formerly known as the GaAs Rel Workshop - will be held in conjunction with CSIC Symposium on Sunday October 30th, 2005, at the Hyatt Grand Champions in Indian Wells, CA. 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 August 15th, 2005, and 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/default.cfm> approximately one month prior to the meeting.

Advance registration for the workshop is \$125.00 for JEDEC and IEEE members and \$150.00 for non-members; on-site registration is \$175.00 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 10th, 2005. 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/default.cfm>, 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, October 31st, 2005

REGISTRATION AND CONTINENTAL BREAKFAST

7:00 a.m. – 5:00 p.m.

Registration – IW ballroom Registration Counters

7:00 a.m. – 8:00 a.m.

Continental Breakfast – DV N. Foyer

SYMPOSIUM OPENING

8:00 a.m. – 8:30 a.m.

DV Ballroom ABC

Introduction and Awards Presentation

2005 Symposium Chair

Kevin Kobayashi, *Sirenza Microdevices*

2005 Technical Program Chair

Mitch Shiffrin, *Hittite Microwave*

SESSION A: PLENARY SESSION

8:00 a.m. – 12:00 p.m.

DV Ballroom ABC – Hyatt Grand Champions

Chairpersons: Mohammad Madihian, *NEC Labs. America, Inc.*
 Bill Peatman, *ANADIGICS*

8:30 a.m.

A.1 Challenges and Opportunities for Compound Semiconductor Devices in Next Generation Wireless Base Station Power Amplifiers

L. Larson, P. Asbeck, and D. Kimball, *Center for Wireless Communications, Dept. of ECE, University of California at San Diego, La Jolla, CA 92093 USA.*

9:00 a.m.

A.2 The Future of Compound Semiconductors for Aerospace and Defense Applications

D. C. Streit, *Northrop Grumman Space Technology, Inc., One Space Park, Redondo Beach, CA 90278 USA.*

9:30 a.m.

A.3 Trusted Foundry Program

S. H. Marvenko, *Trusted Access Programs Office (TAPO), National Security Agency.*

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

10:30 a.m.

A.4 Reliability and High Performance Wide Bandgap Semiconductors for RF Applications

M. Rosker, *Microsystems Technology Office (MTO) Defense Advanced Research Projects Agency (DARPA) 3701 North Fairfax Drive, Arlington, VA 22203 USA.*

11:00 a.m.

A.5 III-V Nanoelectronics: Challenges and Opportunities for Future Logic Applications

R. Chau, *Components Research, Logic Technology Development, Intel Corporation, 5200 N. E. Elam Young Pkwy., OR 97124 USA.*

11:30 a.m.

A.6 Automotive Applications of Microwave Technology

J. Wenger, *Environment Recognition (REI/AU) Research E/E and Information Technology (REI) DaimlerChrysler AG, P.O. Box 23 60, D-89013 Ulm (Donau) Germany.*

12:00 p.m. **End of Session A**

Monday, October 31st, 2005

12:00 p.m. – 1:00 p.m. **Break for Lunch**

SESSION B: 40Gbs Fiber Blocks

1:00 p.m. – 2:30 p.m.

DV Ballroom AB – Hyatt Grand Champions

Chairpersons: Herbert Knapp, *Infineon Technologies*
Kenjiro Nishikawa, *NTT*

1:00 p.m.

B.1 High-Speed InP-Based Mach-Zehnder Modulators for Telecom Applications (Invited)

H. Yasaka¹, K. Tsuzuki¹, N. Kikuchi¹, E. Yarnada¹, Y. Shibata¹, and T. Ishibashi², ¹*NTT Photonics Laboratories, NTT Corporation and* ²*NTT Electronics Corporation, 3-1 Morinosato Wakarniya, Atsugi, Kanagawa, 243-0198 Japan.*

1:30 p.m.

B.2 A Packaged 43-Gb/s Clock and Data Recovery IC

Z. Lao, K. Guinn, M. Delaney, J. Jensen, M. Sokolich, S. Thomas, and C. Fields, *HRL Laboratories, LLC, Malibu, CA 90265 USA.*

1:50 p.m.

B.3 A Frequency Agile 40 Gb/s Half Rate Linear Phase Detector For Data Jitter Measurement

R. Karlquist, C. Hutchinson, T. Marshall, and R. van Tuyt, *Agilent Technologies, 3500 Deer Creek Rd., MS 25U/9, Palo Alto, CA 94304 USA.*

2:10 p.m.

B.4 A 1-Tap 40-Gbps Lookahead Decision Feedback Equalizer in 0.18 μ m SiGe BiCMOS Technology

A. Garg, A. C. Carusone, and S. P. Voinigescu, *Dept. of Electrical and Computer Engineering, 10 King's College Road, University of Toronto, Toronto, Ontario, Canada.*

2:30 p.m. **End of Session B**

2:30 p.m. - 3:00 p.m. **Coffee Break**

PANEL SESSION 1:

Consumer Wireless Markets for Filter Technology

1:00 p.m. – 2:30 p.m.

DV Ballroom DE – Hyatt Grand Champions

Moderators: Walter Wohlmuth, *RF Micro Devices*
Chris Nordquist, *Sandia National Labs*

Filter technology has been undergoing an evolution in the mobile wireless markets and has found various niches in military markets with potential to capture consumer markets. There now are many different technologies vying for these markets that include in part: SAW, BAW, FBAR, and MEMS.

The panelists will present from either the point of view of purveyors of innovations in technology development and/or from the point of view of the module integration needs and requirements.

What kind of package technology is currently being used and how will that evolve or change in the future – wafer level packaging? How do these devices operate, how sophisticated are the device models and simulation tools, how are the models implemented into design tools, and what advances do you see on the horizon in regards to modeling and simulation? What design topologies are used and what are their advantages in each technology; series-shunt, ladder configurations etc.? What are the process

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and device yields? What are the costs and cycle times? Can these filter technologies be integrated with transistor technology and if so when do you foresee fully integrated front-end modules and wide-spread integration? If these technologies are not integrated with transistor technology then is a foundry model a viable business model for filter technology?

Panel Members:

Robert Aigner	<i>Infineon Technologies</i>
Ken Lakin	<i>TriQuint Semiconductor/TFR Technologies</i>
Rich Ruby	<i>Agilent Technologies</i>
Russ Reisner	<i>Skyworks Solutions</i>
Gabriel Rebeiz	<i>University of California, San Diego</i>

2:30 p.m. **End of Panel Session 1**

2:30 p.m. – 3:00 p.m. **Coffee Break**

SESSION C: Front End MMICs

3:00 p.m. – 4:50 p.m.

DV Ballroom AB – Hyatt Grand Champions

Chairpersons: Tony Quach, *AFRL/SND*
Madjid Hafizi, *Nokia*

3:00 p.m.

C.1 **Fully Integrated Millimeter-Wave CMOS Phased Arrays (Invited)**

A. Hajimiri, *California Institute of Technology (Caltech), MC 136-93, 1200 E. California Blvd., Pasadena, CA 91125 USA.*

3:30 p.m.

C.2 **X-Band Low Noise Amplifier using SiGe BiCMOS Technology**

B. Nykiel¹, H. Axtell¹, C. Cemy¹, G. Creech¹, R. Drangmeister², M. Gouker², T. James¹, A. Mattamana¹, I. Mbuko¹, R. Neidhard¹, P. Orlando¹, V. Patel¹, D. Selke¹, and T. Quach¹, ¹*Air Force Research Laboratory, 2241 Avionics Circle, Bldg. 620, Wright-Patterson AFB, OH 45433 USA.* ²*Lincoln Laboratory, Massachusetts Institute of Technology, Lexington, MA 02420 USA.*

3:50 p.m.

C.3 **A 45 dB Variable Gain Low Noise MMIC Amplifier**

M. A. Masud¹, H. Zirath^{1&2}, and M. Kelly¹, ¹*Chalmers University of Technology, Microwave Electronics Laboratory, MC2, SE-412 96, Göteborg, Sweden.* ²*Ericsson AB, Microwave and High Speed Electronics Research Centre (MHSERC), 431 84 Mölndal, Sweden.*

4:10 p.m.

C.4 **A X-Band 4-Bit mHEMT Phase Shifter**

A. I. Khalil, M. Mahfoudi, F. Traut, and M. Shifrin, *Hittite Microwave Corporation, Chelmsford, MA 01824 USA.*

4:30 p.m. **End of Session C**

CS-Week Technology Exhibition

Opening Reception

Indian Wells Ballroom

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

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SESSION D: Advanced III-V Technologies

3:00 p.m. – 5:00 p.m.

DV Ballroom DE – Hyatt Grand Champions

Chairpersons: Chris Nordquist, *Sandia National Labs*
Walter Wohlmuth, *RF MicroDevices*

3:00 p.m.

D.1 Critical Issues in Highly-Linear Power Amplifier Design (Invited)

A. Santarelli¹ and R. Paganelli², ¹*DEIS – University of Bologna, Viale Risorgimento 2, 40136 Bologna, Italy.* ²*IEIT – CNR, Viale Risorgimento 2, 40136 Bologna, Italy.*

3:30 p.m.

D.2 300 GHz InP DHBT Large Signal Model Including Current Blocking Effect and Validated by Gilbert Multiplier Circuits

J. W. Lai¹, D. Caruth¹, Y. J. Chuang¹, K. Cimino¹, R. Elder², D. Jansen², F. Stroili², M. Le³, and M. Feng¹, ¹*University of Illinois, Electrical and Computer Engineering Dept., Urbana, IL 61801 USA.* ²*BAE Systems, Information and Electronic Warfare System, Nashua, NH 03061 USA.* ³*Vitesse Semiconductor Corporation, Camarillo, CA 93012 USA.*

3:50 p.m.

D.3 Characterization and Modeling of Thermal Effects in Sub-Micron InP DHBTs

M. Sagebiel, S. Gerlach, A. Kruck, and V. Subramanian, *ATMEL Germany GmbH, Thereienstr. 2, 74072 Heilbronn, Germany.*

4:10 p.m.

D.4 GaAsSb DHBT IC Technology for RF and Microwave Instrumentation

T. S. Low, M. W. Dvorak, M. Farhoud, R. E. Yeats, M. Iwamoto, G. K. Essilfie, T. Engel, B. Keppeler, J. S. C. Chang, J. Hadley, G. Patterson, F. Kellert, N. Moll, S. R. Bahl, C. P. Hutchinson, E. Ehlers, M. E. Adamski, D. C. D'Avanzo, and T. Shirley, *Agilent Technologies, Inc., 1400 Fountaingrove Pkwy., Santa Rosa, CA 95403 USA.*

4:30 p.m.

D.5 Affordable Electronically Scanned Apertures through Heterogeneous Integration (Invited)

J. A. Navarro, *Boeing-Phantom Works, CA 90740 USA.*

5:00 p.m. **End of Session D**

CS-Week Technology Exhibition

Opening Reception

Indian Wells Ballroom

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

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REGISTRATION AND CONTINENTAL BREAKFAST

7:00 a.m. – 5:00 p.m.

Registration – IW Ballroom Registration Counters

7:00 a.m. – 8:00 a.m.

Continental Breakfast – DV N. Foyer

SESSION E: High Speed Data Converters I

8:00 a.m. – 9:40 a.m.

DV Ballroom AB – Hyatt Grand Champions

Chairpersons: William Skones, *Northrop Grumman*
Jaesik Lee, *Bell Laboratories*

8:00 a.m.

E.1 High Dynamic Range Multibit $\Sigma\Delta$ ADC Based Receiver Prototype Employing Dynamic Error Correction (Invited)
L. E. Pellon, *Lockheed Martin, Moorestown, NJ 08054 USA.*

8:30 a.m.

E.2 Resonant Tunneling Diodes and Their Application to High-Speed Circuits (Invited)
K. Maezawa, *Graduate School of Engineering, Nagoya University, Furo-cho, Chikusa-ku, Nagoya-shi, 464-8603 Japan.*

9:00 a.m.

E.3 A 40-GSamples/Sec Track & Hold Amplifier in 0.18 μ m SiGe BiCMOS Technology
S. Shahramian, A. C. Carusone, and S. P. Voinigescu, *Dept. of Electrical and Computer Engineering, 10 King's College Road, University of Toronto, Toronto, Ontario, Canada.*

9:20 a.m.

E.4 A 5-bit, 18 GS/sec SiGe HBT Track-and-Hold Amplifier
X. Li¹, W. –M Lance Kuo¹, Y. Lu¹, R. Krithivasan¹, J. D. Cressler¹, and A. J. Joseph², ¹*School of Electrical and Computer Engineering, 777 Atlantic Drive, N. W., Georgia Institute of Technology, Atlanta, GA 30332.* ²*IBM Microelectronics, Essex Junction, VT 05452 USA.*

9:40 a.m.

End of Session E

9:40 a.m. – 10:00 a.m.

Coffee Break

SESSION F: Silicon Technologies for RF Applications

8:00 a.m. – 9:40 a.m.

DV Ballroom DE – Hyatt Grand Champions

Chairpersons: Julio Costa, *RF Micro Devices*
Rik Jos, *Philips Semiconductors*

8:00 a.m.

F.1 60 GHz Circuits in SiGe HBT Technology (Invited)
W. Winkler, *IHP Microelectronics, Im Technologiepark 25, 15236 Frankfurt (Oder), Germany.*

8:30 a.m.

F.2 The Role of Doping Profile on Power Gain of SiGe HBTs Under Constant Ge Strain
N. Jiang and Z. Ma, *University of Wisconsin-Madison, Department of Electrical and Computer Engineering, 1415 Engineering Drive, Madison, WI 53706 USA.*

8:50 a.m.

F.3 Collector Optimization in Advanced SiGe HBT Technologies
Q. Z. Liu¹, B. A. Orner¹, L. Lanzerotti¹, M. Dahlstrom¹, W. Hodge¹, M. Gordon¹, J. Johnson¹, M. Gautsch¹, J. Greco¹, J. Rascoe¹, D. Ahlgren², A. Joseph², and J. Dunn¹, ¹*IBM SRDC, Essex Junction, VT 05452 USA.* ²*IBM Semiconductor Research and Development Center, Hopewell Junction, NY 12533 USA.*

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9:10 a.m.

F.4 Scalability of SOI CMOS Technology and Circuit to millimeter wave performance (Invited)

J. – O. Plouchart, J. Kim, J. Gross, R. Trzcenski, and K. Wu, *IBM Semiconductor Research and Development Center, Hopewell Junction, NY 12533 USA.*

9:40 a.m.

End of Session F

9:40 a.m. – 10:00 a.m.

Coffee Break

SESSION G: High Speed Data Converters II

10:00 a.m. – 11:40 a.m.

DV Ballroom AB – Hyatt Grand Champions

Chairpersons:

Todd Kaplan, *HRL Laboratories, LLC*

Koichi Murata, *NTT Photonics Laboratories*

10:00 a.m.

G.1 Direct Digital Synthesis for Enabling Next Generation RF Systems (Invited)

K. R. Elliott, *HRL Laboratories, LLC, 3011 Malibu Canyon Road, Malibu, CA 90265 USA.*

10:30 a.m.

G.2 An InP-based OEIC for Optical Arbitrary Waveform Generation (Invited)

A. Leven¹, J. Lin¹, P. Kondratko², U. –V. Koc¹, J. Lee¹, Y. Baeyens¹, and Y. K. Chen¹, ¹*Bell Laboratories, Lucent Technologies, Murray Hill, NJ 07933 USA.* ²*University of Illinois, Electrical and Computer Engineering Dept., Urbana, IL 61801 USA.*

11:00 a.m.

G.3 Ultra Wide-Band Digital to Analog Conversion Based on Advanced InP DHBT Technology

D. Ching, *Mixed Signal Products, Northrop Grumman Space Technology, One Space Park, Redondo Beach, CA 90278 USA.*

11:20 a.m.

G.4 A Low-Power 6GS/s Track and Hold Circuit Implemented with Antimonide Based Compound Semiconductor HBTs

K. C. Wang, K. Elliot, T. Tsen, L. Luh, and J. Cruz-Albrecht, *HRL Laboratories, LLC, 3011 Malibu Canyon Road, Malibu, CA 90265 USA.*

11:40 a.m. **End of Session G**

11:40 a.m. – 1:30 p.m. **Break for Lunch**

CS-Week Technology Exhibition
Lunch
Indian Wells Ballroom
11:40 a.m. - 1:30 p.m.

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SESSION H: GaN Technologies I

10:00 a.m. – 11:30 a.m.

DV Ballroom DE – Hyatt Grand Champions

Chairpersons: Bill Peatman, *ANADIGICS*
Peter Asbeck, *UCSD*

10:00 a.m.

H.1 Physics of GaN-based Heterostructure Field Effect Transistors (Invited)

M. S. Shur¹ and R. Gaska², ¹*ECSE Department, Rensselaer Polytechnic Institute, Troy, NY 12180 USA.* ²*Sensor Electronic Technology Inc., Columbia, SC 29209 USA.*

10:30 a.m.

H.2 Numerical Analysis of Pulsed I-V Curves and Current Collapse in GaN FETs as Affected by Buffer Trapping

H. Nakano, H. Takayanagi, K. Yonemoto, and K. Horio, *Faculty of Systems Engineering, Shibaura Institute of Technology, 307 Fukasaku, Minurna-ku, Saitama 337-8570, Japan.*

10:50 a.m.

H.3 Temperature Behavior of AlGaIn/GaN on SiC HEMTs

A. M. Darwish, B. Huebschman, R. Del Rosario, and H. Alfred Hung, *Army Research Laboratory, 2800 Powder Mill Rd., Adelphi, MD 20783 USA.*

11:10 a.m.

H.4 Non-uniform Stress Effects in GaN based Heterojunction Field Effect Transistors

N. Bargal¹, R. Mickevicius¹, V. S. Rao¹, W. Fichtner¹, R. Gaska², and M. S. Shur³, ¹*Synopsys Inc., Mountain View, CA 94043 USA.* ²*Sensor Electronic Technology Inc., Columbia, SC 29209 USA.* ³*Electrical, Computer, and Systems Engineering Dept., Rensselaer Polytechnic Institute, Troy, NY 12180 USA.*

11:30 a.m. **End of Session H**

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

CS-Week Technology Exhibition

Lunch

Indian Wells Ballroom

11:40 a.m. - 1:30 p.m.

SESSION I: Power Amplifiers

1:30 p.m. – 2:50 p.m.

DV Ballroom AB – Hyatt Grand Champions

Chairpersons: Freek E. van Straten, *Philips*
Jan-Erik Mueller, *Infineon Technologies*

1:30 p.m.

I.1 A High Efficiency Linear Power Amplifier for Portable Communications Applications

L. F. Cygan, *Wireless Technology Research Laboratory, Motorola Labs, Schaumburg, IL 60196 USA.*

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1:50 p.m.

- I.2 **A GaAs HBT Programmable Linear Power Amplifier**
H. Gao, H. Zhang, and G. P. Li, *University of California Irvine, CA 92697 USA.*

2:10 p.m.

- I.3 **An EVM-optimized Power Amplifier for 2.4 GHz WLAN Application**
M. Sagebiel, S. Gerlach, A. Kruck, and V. Subramanian, *ATMEL Germany GmbH, Theresienstr. 2, 74072 Heilbronn, Germany.*

2:30 p.m.

- I.4 **High-Efficiency Class-E Power Amplifier using Field-Plated GaN HEMTs**
H. Xu¹, S. Gao², S. Heikman¹, U. K. Mishra¹, and R. A. York¹,
¹*Department of Electrical and Computer Engineering, University of California, Santa Barbara, CA 93106 USA.* ²*School of Engineering, Northumbria University, Newcastle Upon Tyne, UK.*

2:50 p.m. **End of Session I**

2:50 p.m. – 3:30 p.m. **Coffee Break**

SESSION J: GaN Technologies II

1:30 p.m. – 2:50 p.m.

DV Ballroom DE – Hyatt Grand Champions

Chairpersons: Primit Parikh, *Cree*
Dave Halchin, *RF Micro Devices*

1:30 p.m.

- J.1 **Field-plated GaN HEMTs and Amplifiers (Invited)**
Y. –F. Wu¹, A. Saxler², M. Moore¹, T. Wisleder¹, U. K. Mishra¹, and P. Parikh¹, ¹*Cree Lighting Company, 340 Storke Road, Goleta, CA 93117 USA.* ²*Cree Inc., 4600 Silicon Drive, NC 27703 USA.*

2:00 p.m.

- J.2 **GaN MMIC Technology for Microwave and Millimeter-wave Applications (Invited)**
M. Micovic, A. Kurdoghlian, H. P. Moyer, P. Hashimoto, A. Schmitz, I. Milosavljevic, P. J. Willadsen, W. –S. Wong, J. Duvall, M. Hu, M. Wetzel, and D. H. Chow, *HRL Laboratories, LLC, 3011 Malibu Canyon Road, Malibu, CA 90265 USA.*

2:30 p.m.

- J.3 **High-Temperature Power Performance of X-Band Recessed-Gate AlGaIn/GaN HEMTs**
C. Lee, P. Saunier, and H. Tserng, *TriQuint Semiconductor Texas, 500 W. Renner Rd., Richardson, TX 75080 USA.*

2:50 p.m. **End of Session J**

2:50 p.m. – 3:30 p.m. **Coffee Break**

Tuesday, November 1st, 2005

PANEL SESSION 2: DDS – How Close to Reality for GHz RF Systems?

3:30 p.m. – 5:00 p.m.

DV Ballroom AB – Hyatt Grand Champions

Moderators: William Skones, *Northrop Grumman*
Todd Kaplan, *HRL Laboratories, LLC*

Industry and government have invested large amounts of money in the development of direct digital synthesis of GHz RF signals in the hope of overcoming the limitations of traditional RF approaches. But, can the DDS meet cost, power and spectral purity requirements? Does III/V technology have a real world speed and break down voltage advantage, or will the maturity and level of integration of SiGe make it the dominate technology for GHz clock rate digital waveform generation? Will the GHz DDS be the last bastion of large-scale bipolar logic design, or will it again be steam rolled by deep submicron CMOS? Is delta-sigma modulation the answer to traditional DDS spectral purity limitations, or are digital modulator complexity and RF filter requirements prohibitive? The panelists will provide their unique perspectives and field your questions on the current state-of-the-art, and the future of DDS technology.

Panel Members:

M.J. Choe	<i>Rockwell Scientific LLC Semiconductor</i>
Ken Elliott	<i>HRL Laboratories, LLC</i>
Hideyuki Nosaka	<i>NTT Corporation</i>
Bert Oyama	<i>Northrop Grumman</i>
Leo Pellon	<i>Lockheed Martin Maritime Sensors and System</i>

5:00 p.m. **End of Panel Session 2**

Symposium Theme Party
Caribbean Nights
Resort Pool
7:00 p.m. - 10:00 p.m.

Tuesday, November 1st, 2005

PANEL SESSION 3: Automotive Radar at 77 GHz: System Architecture, MMIC Design and Packaging

3:30 p.m. – 5:00 p.m.

DV Ballroom DE – Hyatt Grand Champions

Moderators: Charles F. Campbell, *TriQuint Semiconductor*
Edmar Carmargo, *Iterra*

What will it take for automotive radar systems to be available on cars that can be afforded by the masses? Components and subsystems operating at 77 GHz will have to be inexpensive and manufacturable while simultaneously producing repeatable RF characteristics. There are numerous possibilities to be considered that impact both MMIC and subsystem design. What MMIC design approach is best: microstrip, coplanar or 3D? What is the optimum number of chips? What is the preferred MMIC interface: bondwire, flip-chip, or backside interconnect? What are the sub-system houses looking for: bare die, low cost surface mount packages, or multichip module (MCM). This panel of IC and subsystem manufacturers will discuss these issues and present their views on how to make automotive radar reality for everyone.

Panel Members:

Marc Camiade	<i>UMS</i>
Jim Carroll	<i>TriQuint Semiconductor</i>
Yoji Ohashi	<i>Fujitsu Labs</i>
Arne Knudsen	<i>Kyocera Corporation</i>
Ian Gresham	<i>Tyco Electronics</i>

5:00 p.m.

End of Panel Session 3

Symposium Theme Party

Caribbean Nights

Resort Pool

7:00 p.m. - 10:00 p.m.

Wednesday, November 2nd, 2005

REGISTRATION AND CONTINENTAL BREAKFAST

7:00 a.m. – 5:00 p.m.

Registration – IW Ballroom Registration Counters

7:00 a.m. – 8:00 a.m.

Continental Breakfast – DV N. Foyer

SESSION K: Low-Power Datacom

8:00 a.m. – 10:00 a.m.

DV Ballroom AB – Hyatt Grand Champions

Chairpersons: Douglas S. McPherson, *Quake*
Sorin Voinigescu, *University of Toronto*

8:00 a.m.

K.1 Electrical and Optical Transceivers for Short-Range Data Communication, Fabricated in VLSI 90 nm Bulk and SOI CMOS Technology (Invited)
T. Morf¹, C. Menolfi¹, T. Toifl¹, C. Kromer², G. Sialm², M. Kossel¹, J. Weiss, P. Buchmann, C. Berger¹, and M. Schmatz¹, *IBM Research, Zurich Research Laboratory, Switzerland.*

8:30 a.m.

K.2 Bandwidth Efficient Modulation Over Fiber Optics (Invited)
K. Azadet and F. Saibi, *Agere Systems, 1110 American Parkway NE, Allentown, PA 18109 USA.*

9:00 a.m.

K.3 A Low Power 10 Gb/s Serial Link Transmitter in 90-nm CMOS
A. Rylyakov and S. Rylov, *IBM T. J. Watson Research Center, Yorktown Heights, NY 10598 USA.*

9:20 a.m.

K.4 A 60 mW per Lane, 4 x 23-Gb/s 27-1 PRBS Generator
E. Laskin and S. P. Voinigescu, *University of Toronto, Toronto, Ontario, Canada.*

9:40 a.m.

K.5 A Broadband 44-GHz Frequency Divider in 90-nm CMOS
K. –L. J. Wong¹, A. Rylyakov², and C. –K. K. Yang^{1,1} *University of California, Los Angeles, CA 90095 USA. ²IBM T. J. Watson Research Center, Yorktown Heights, NY 10598 USA.*

10:00 a.m. **End of Session K**

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

SESSION L: Signal Generation & Switching

8:00 a.m. – 10:10 a.m.

DV Ballroom DE – Hyatt Grand Champions

Chairpersons: Dan Scherrer, *Agilent Technologies*
Jan-Erik Mueller, *Infineon Technologies*

8:00 a.m.

L.1 The State-of-the-Art of Silicon-on-Sapphire CMOS RF Switches (Invited)
D. Kelly, C. Brindle, and M. Stuber, *Peregrine Semiconductor Corporation, 9450 Carroll Park Drive, San Diego, CA 92121 USA.*

8:30 a.m.

L.2 MMIC-Oscillator Designs for Ultra Low Phase Noise (Invited)
H. Zirath^{1&2}, H. Jacobsson², and M. Bao², *¹Chalmers University of Technology, Microwave Electronics Laboratory, MC2, SE-412 96, Göteborg, Sweden. ²Ericsson AB, Microwave and High Speed Electronics Research Centre (MHSERC), Mölndal, Sweden.*

9:00 a.m.

L.3 High-Power Submicron InP D-HBT Push-Push Oscillators operating up to 215 GHz
Y. Baeyens, N. Weimann, V. Houtsma, J. Weiner, Y. Yang, J. Frackowiak, A. Tate, and Y. K. Chen, *Lucent Technologies – Bell Laboratories, 600 Mountain Ave., Murray Hill, NJ 07974 USA.*

9:20 a.m.

L.4 **A Broadband Millimeter-wave Differential PHEMT Frequency Doubler MMIC**

S. Mahon, P. Beasley, J. Harvey and A. Bessemoulin, *Mimix Broadband Inc., 10795 Rockley Road, Houston, TX 77099 USA.*

9:40 a.m.

L.5 **Custom GaAs and InP Components for Radio Astronomy (Invited)**

M. A. Morgan, *National Radio Astronomy Observatory, 1180 Boxwood Estate Rd., Charlottesville, VA 22903 USA.*

10:10 a.m. **End of Session L**

10:10 a.m. - 10:30 a.m. **Coffee Break**

PANEL SESSION 4: Will CMOS Take Over All Digital Applications Below 80 Gb/s or Will ABCS, SiGe, and InP Be Able to Carve a Niche?

10:30 a.m. – 12:00 p.m.

DV Ballroom AB – Hyatt Grand Champions

Moderators: Douglas S. McPherson, *Quake Technologies, Inc.*
Koichi Murata, *NTT Photonics Laboratories*

Traditionally, CMOS has always been regarded as a technology that offers intrinsic cost and low-voltage advantages at the expense of high-speed performance. This is in contrast to advanced compound semiconductor technologies such as ABCS, SiGe, and InP, which offer high f_T/f_{MAX} combined with ultra low-noise performance, and extremely high mobility and saturated electron velocity. Although their cost increases rapidly with complexity, ICs based on these technologies have, until recently, enjoyed complete dominance at bit-rates of 10 Gb/s and above. In the last few years, a new generation of advanced CMOS circuits has emerged to challenge this position, with examples operating at serial data rates as high as 60 Gb/s. For most applications around 10 Gb/s, CMOS has already displaced SiGe as the preeminent technology, principally due to its low-cost and low-power benefits. Will this pattern repeat itself up to 80 Gb/s or will ABCS, SiGe, and InP retain an inherent advantage or evolve to counter the threat? Should CMOS eventually take over, will these technologies still have a special role to play, and if so, what is it likely to be? The panelists will present their expectations on the outcome of this challenge and will discuss the implications for foundries, semiconductor IC companies and system OEMs. The trade-offs between performance, reliability, time-to-market, and cost will feature prominently in the ensuing debate.

Panel Members:

Mark Rosker	<i>DARPA</i>
Alexander Rylyakov	<i>IBM</i>
Dan Trepanier	<i>Quake Technologies</i>
Takuji Yamamoto	<i>Fujitsu</i>
Wolfgang Walthes	<i>Infineon</i>
Dirk Leipold	<i>TI</i>
Don Hitko	<i>HRL Laboratories LLC</i>

12:00 p.m. **End of Panel Session 4**

12:00 p.m. – 1:00 p.m. **Break for Lunch**

PANEL SESSION 5: GaN – The Ultimate High Power, High Voltage Reliable Basestation PA Technology?

10:30 a.m. – 12:00 p.m.

DV Ballroom DE – Hyatt Grand Champions

Moderators: Jan-Erik Mueller, *Infineon Technologies*
Primit Parikh, *Cree – Santa Barbara Technology Center*

Wednesday, November 2nd, 2005

LDMOS has been the dominant technology for basestation PAs. For a long time, GaN has only shown great promise due its fundamental material characteristics, but recent rapid progress has been reported in overcoming barriers for system introduction. The panel will review the technology of infrastructure PAs including:

- Requirements for future infrastructure PAs and technology drivers from system's perspective
- Technology status and prospects of various semiconductor technologies for high-voltage, high-power linear PAs, with focus on reliability for new technologies
- Potential of GaN and other technology for disruptive changes in basestation PA architecture and story lines for future basestation PA technologies
- Development trends towards higher functionality, increased PAE at back-off, reduced number of parts, etc.
- Commercial aspects, like time to market and cost per Watt

The plan is to have basestation PA and device suppliers on the panel. Major technologies to be covered include: GaN HEMT, SiC MESFET, LDMOS, HV-GaAs PHEMT/MESFET.

Panel Members:

Toshihide Kikkawa	<i>Fujitsu</i>
Lawrence Larson	<i>University of California – San Diego</i>
Gordon Ma	<i>Infineon Technologies</i>
Monte Miller	<i>Freescale</i>
Jim Milligan	<i>Cree</i>
Edwin Piner	<i>Nitronex</i>

12:00 p.m. **End of Panel Session 5**

12.00 p.m. – 1:00 p.m. **Break for Lunch**

SESSION M: High Frequency Power Amplifiers

1:00 p.m. – 2:20 p.m.

DV Ballroom AB – Hyatt Grand Champions

Chairpersons: Francois Y. Colomb, *Raytheon*
Charles F. Campbell, *TriQuint Semiconductor*

1:00 p.m.

M.1 **An Indium Phosphide X-band Class-E Power MMIC with 40% Bandwidth**

P. Watson¹, T. Quach¹, H. Axtel¹, A. Mattamana¹, P. Orlando¹, V. Patel¹, W. Lee², E. Kaneshiro², A. Gutierrez-Aitken², D. Sawdai², and A. Oki², ¹*Air Force Research Laboratory, 2241 Avionics Circle, BLDG 620, Wright-Patterson AFB, OH 45433 USA.* ²*Northrop Grumman, One Space Park, Redondo Beach, CA 90278 USA.*

1:20 p.m.

M.2 **A Family of 1, 2 and 4-Watt Power Amplifier MMICs for Cost Effective VSAT Ground Terminals**

S. Mahon, A. Dadello, J. Harvey, and A. Bessemoulin, *Mimix Broadband Inc., 10795 Rockley Road, Houston, TX 77099 USA.*

1:40 p.m.

M.3 **A Highly Efficient Q-Band MMIC 2.8 Watt Output Power Amplifier Based on 0.15um InGaAs/GaAs pHEMT Process Technology**

M. V. Aust, O. Fordham, R. Grundbacher, R. To, R. Tsai, and R. Lai, *Northrop Grumman, One Space Park, Redondo Beach, CA 90278 USA.*

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2:00 p.m.

- M.4 **Ka-Band MMIC High Power Amplifier (4W at 30 GHz) with Record Compact Size**
K. –S. Kong, B. Nguyen, S. Nayak, and M. –Y. Kao, *TriQuint Semiconductor, 500 West Renner Rd., Richardson, TX 75080 USA.*

2:20 p.m. **End of Session M**

2:20 p.m. – 3:00 p.m. **Coffee Break**

SESSION N: High-Voltage GaAs Basestation Technologies

1:00 p.m. – 2:20 p.m.

DV Ballroom DE – Hyatt Grand Champions

Chairpersons: Rik Jos, *Philips Semiconductor*
Marc Rocchi, *OMMIC*

1:00 p.m.

- N.1 **Design, Performance and Application of High Voltage GaAs FETs (Invited)**
M. Miller, *Freescale Semiconductor, 2100 E. Elliot Rd., M/S EL629, Tempe, AZ 85284 USA.*

1:30 p.m.

- N.2 **Power Dependant Input Impedance of Field Plate MESFETs**
T. A. Winslow, *M/A-COM/Tycoelectronics, 5310 Valley Park Drive, Roanoke, VA 24019 USA.*

1:50 p.m.

- N.3 **28V Planar GaAs MESFETs for Wireless Base-Station Power Amplifiers**
B. Yang¹, S. Halder², P. D. Ye¹, G. Daum¹, W. H. Dai¹, M. Frei¹, K. Ng¹, J. Bude¹, J. C. M. Hwang², and G. Wilk³, ¹*Agere Systems, LVCC, American Pkwy. NE, Allentown, PA 18109 USA.* ²*Lehigh University, Bethlehem, PA 18015, USA.* ³*ASM America, 3440 E. University Drive, Phoenix, AZ 85034 USA.*

2:10 p.m.

- N.4 **Reliability Model for Predicting Long-term DC/RF Performance in GaAs PHEMTs**
Y. C. Chou, D. Leung, Q. Kan, R. Grundbacher, D. Eng, M. Biedenbender, P. H. Liu, R. Lai, T. Block, and A. Oki, *Northrop Grumman Space Technology, Redondo Beach, CA 90278 USA.*

2:30 p.m. **End of Session N**

2:30 p.m. – 3:00 p.m. **Coffee Break**

SESSION O: High-Speed Datacom

3:00 p.m. – 5:00 p.m.

DV Ballroom DE – Hyatt Grand Champions

Chairpersons: Marko Sokolich, *HRL Laboratories, LLC*
Mounir Meghelli, *IBM*

3:00 p.m.

- O.1 **Circuit Design Considerations for 100GHz Clock Rates (Invited)**
D. Hitko, *HRL Laboratories, LLC, M/S RL61A, 3011 Malibu Canyon Rd., Malibu, CA 90265 USA.*

3:30 p.m.

- O.2 **Digital ICs for High Data Rate / High Voltage Swing Applications in a Production-near SiGe Technology (Invited)**
M. Wurzer^{1,2}, J. Böck³, and T. F. Meister³, ¹*Infineon Technologies AG, Corporate Research, Otto-Hahn-Ring 6, D-81730 Munich, Germany,* ²*Vienna University of Technology, Institute of Communications and Radio-Frequency Engineering,* ³*Infineon Technologies AG, Automotive and Industrial.*

4:00 p.m.

- O.3 **A 165-Gb/s 4:1 Multiplexer in InP DHB Technology**
J. Hallin, T. Kjellberg, and T. Swahn, *Chalmers University of Technology, Microwave Electronics Laboratory, MC2, 412 96 Göteborg, Sweden.*

4:20 p.m.

- O.4 **Up to 80-Gbit/s Operations of 1:4 Demultiplexer IC with InP HBTs**
K. Sano, H. Fukuyama, K. Murata, K. Kurishima, N. Kashio, T. Enoki, and H. Sugahara, *NTT Photonics Laboratories, NTT Corporation, 3-1 Morinosato Wakamiya Atsugi-shi Kanagawa 243-0198 Japan.*

4:40 p.m.

- O.5 **80 Gbit/s monolithically integrated Clock and Data Recovery Circuit With 1:2 DEMUX using InP-based DHBs**
R. -E. Makon, R. Driad, K. Schneider, M. Ludwig, R. Aidam, R. Quay, M. Schlechtweg, and G. Weimann, *Fraunhofer Institute of Applied Solid-State Physics (IAF), Tullastr. 72, D-79108 Freiburg, Freiburg, Germany.*

5:00 p.m. **End of Session O**

5:00 p.m. **Close of Symposium**

SESSION P: New Concepts in Signal Amplification & Protection

3:00 p.m. – 5:00 p.m.

DV Ballroom DE – Hyatt Grand Champions

Chairpersons: Mohammad Madihian, *NEC*
Edmar Carmargo, *iTerra*

3:00 p.m.

- P.1 **On The Road to ESD Safe GaAs HBT MMICs (Invited)**
Y. Ma^{1&2} and G. P. Li¹, ¹*Integrated Nanosystems Research Facility, Department of Electrical Engineering and Computer Science, University of California, Irvine, CA 92697 USA.* ²*Rockwell Scientific, 1049 Camino Dos Rios, Thousand Oaks, CA 91360 USA.*

3:30 p.m.

- P.2 **ESD Protection for pHEMT MMIC Amplifiers (Invited)**
J. M. Beall and G. I. Drandova, *TriQuint Semiconductor, 500 W Renner Road, Richardson, TX 75080 USA.*

4:00 p.m.

- P.3 **A Simple Method for the Gain Improvement of Matrix Distributed Amplifiers**
E. Hamidi and M. Mohammad-Taheri, *Centre of Excellence on Applied Electromagnetic Systems, ECE Department, University of Tehran, Tehran, Iran.*

4:20 p.m.

- P.4 **Design Methodology and Applications of SiGe BiCMOS Cascode Opamps with up to 37-GHz Unity Gain Bandwidth**
S. P. Voinihescu¹, R. Beerkens², T. O. Dickson¹, and T. Chalvatzis¹, *ECE Dept., ¹University of Toronto, 10 King's College Rd., Toronto, ON, Canada. ²STMicroelectronics, Ottawa, ON, Canada.*

4:40 p.m. **End of Session P**

5:00 p.m. **Close of Symposium**

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