



**2000  
22<sup>nd</sup> IEEE GaAs IC  
SYMPOSIUM**

# **Program**

## **Presenting:**

**A Northwest Adventure in  
Compound Semiconductors**

**Nov. 5 – 8, 2000**

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**Seattle, Washington**



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

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## SYMPOSIUM

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### **SATURDAY, NOVEMBER 4, 2000**

REGISTRATION (Short Course & Primer Course Only)

### **SUNDAY, NOVEMBER 5, 2000**

REGISTRATION (Short Course & Primer Course Only)

#### **Continental Breakfast for Short Course**

SHORT COURSE: "Linear Power Amplifiers for Voice and Data Communications"

GaAs Reliability Workshop (Registration, Workshop, and Lunch)

#### **Short Course Lunch**

REGISTRATION for Symposium (and Primer Course until 5:30)

PRIMER COURSE: "Basics of GaAs ICs"

#### **Symposium Opening Reception**

### **MONDAY, NOVEMBER 6, 2000**

REGISTRATION

#### **Continental Breakfast**

SYMPOSIUM OPENING

SESSION A: Plenary Session

PANEL SESSION 1: E-Mode PHEMT are Killing HBTs

PANEL SESSION 2: InP – Material for the New Economy

SESSION B: Advanced PA Technologies & Techniques

SESSION Late1: Late News

#### **GaAs IC Technology Exhibition Opening Reception**

### **TUESDAY, NOVEMBER 7, 2000**

REGISTRATION

#### **Continental Breakfast**

GaAs IC TECHNOLOGY EXHIBITION

SESSION C: Novel Modeling Techniques for uW & mmW Circuits

SESSION D: Advanced Device Technologies

SESSION Late2: Late News

SESSION E: High Speed Switching & Timing ICs

#### **Exhibition Luncheon**

SESSION F: Frequency Generation & Conversion Circuits

SESSION G: Simulation & Modeling

VENDOR PRODUCT FORUM: New, Improved, Low Cost, WOW

PANEL SESSION 3: Industrial Roadmap to 40 Gb/s

#### **Symposium Party**

### **WEDNESDAY, NOVEMBER 8, 2000**

REGISTRATION

#### **Continental Breakfast**

SESSION H: Low Noise Amplifiers & Techniques

SESSION I: Novel Process & Package Technologies

SESSION J: Millimeterwave Communication ICs

SESSION K: Fiber Link ICs

PANEL SESSION 4: Tomorrow's Switch: FET or MEMS?

PANEL SESSION 5: Fab or Fab-U-Less?

SESSION L: Microwave & mmW Power Amplifiers

SESSION M: Heterostructure Bipolar Transistors

#### **Close of Symposium**

Visit us on the World-Wide Web at:

<http://www.gaasic.org/>

**Coffee Breaks:**

Primer Course and Short Course Registrants (only) –

Sunday, November 5<sup>th</sup> : Cascade Foyer

Symposium Registrants -

Monday, November 6<sup>th</sup> : Grand Foyer

Tuesday, November 7<sup>th</sup>: Grand 3

Wednesday, November 8<sup>th</sup>: Grand Foyer

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## AT A GLANCE

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### Saturday

6:00 p.m.-8:00 p.m. Cascade Foyer

### Sunday

7:00 a.m.-8:00 a.m. Cascade Foyer

**7:00 a.m.-7:45 a.m. Cascade Foyer**

8:00 a.m.-4:45 p.m. Cascade 2

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

**12:20 a.m.-1:30 p.m. Elliott Bay**

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

5:30 p.m.-8:30 p.m. Cascade 2

**5:00 p.m. - 8:00 p.m. Fifth Avenue**

### Monday

7:00 a.m.-5:00 p.m. Grand Foyer 2 & 3

**7:00 a.m.-8:00 a.m. Grand Foyer**

8:00 a.m.-8:30 a.m. Grand 1 & 2

8:30 a.m.-11:30 a.m. Grand 1 & 2

1:00 p.m.-2:30 p.m. Grand 1

1:00 p.m.-2:30 p.m. Grand 2

3:00 p.m.- 4:20 p.m. Grand 1

3:00 p.m.- 4:20 p.m. Grand 2

**5:00 p.m.-7:00 p.m. Grand 3**

### Tuesday

7:00 a.m.-5:00 p.m. Grand Foyer

**7:30 a.m.-8:30 a.m. Grand 3**

7:30 a.m.-4:00 p.m. Grand 3

8:30 a.m.-10:00 a.m. Grand 1

9:00 a.m.-10:00 a.m. Grand 2

10:30 a.m.- TBD a.m. Grand 1

10:30 a.m.- 11:50 a.m. Grand 2

**noon.-1:30 p.m. Grand 3**

1:30 p.m.-3:10 p.m. Grand 1

1:30 p.m.-3:10 p.m. Grand 2

3:30 p.m.-5:00 p.m. Grand 1

3:30 p.m.-5:00 p.m. Grand 2

**7:00 p.m.-10:00 p.m. Theme Party**

### Wednesday

7:00 a.m.-12:00 noon Grand Foyer

**7:30 a.m.-8:30 a.m. Grand Foyer**

8:30 a.m.-9:40 a.m. Grand 1

8:30 a.m.-10:00 a.m. Grand 2

10:30 a.m.-11:50 a.m. Grand 1

10:30 a.m.-12:10 p.m. Grand 2

1:00 p.m.-2:40 p.m. Grand 1

1:00 p.m.-2:40 p.m. Grand 2

3:10 p.m.-4:30 p.m. Grand 1

3:10 p.m.-4:30 p.m. Grand 2

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# CHAIRMAN'S MESSAGE

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On behalf of the organizing committee and the IEEE EDS, MTT-S, and SSCS, I invite you to be a part of the upcoming 2000 IEEE GaAs IC Symposium. This year's symposium will be held November 5th to the 8th in the beautiful city of Seattle, Washington at the Westin Hotel. Over the last 22 years, the IEEE GaAs IC Symposium has become the preeminent international forum on developments in integrated circuits using GaAs, InP, SiGe, GaN, SiC and other compound semiconductor devices. In 2000, the Symposium continues its tradition of presenting the best from around the world in high frequency microelectronics. This year's program continues to demonstrate the strong growth in commercial wireless and digital communications. Major focus areas of this year's GaAs IC Symposium, organized by John Sitch and the Technical Program Committee, include state-of-the-art circuits and technology for:

- Wireless and broadband communications
- Very high-speed digital communications
- Highly-efficient, linear, power amplifiers
- Interface electronics and signal processing
- Millimeter-wave systems

The technical sessions will highlight all aspects of technology: device development and fabrication, characterization and modeling, IC design and testing, high volume manufacturing, reliability, and system applications. The 22nd IEEE GaAs IC Symposium continues our tradition of providing focused educational opportunities through our Short Course and Primer Course, both held on Sunday, November 5th. Tim Henderson has organized a very interesting and highly applicable one-day Short Course on "Linear Power Amplifiers" taught by five industry experts. In addition, Stephen Long and Donald Estreich will once again present our Primer Course on the "Basics of GaAs ICs" which is not only an excellent tutorial but is presented within the context of this year's symposium submissions. You have the opportunity to learn of new products from the approximately 40 exhibitors in the GaAs IC Technology Exhibition and potential customers for the latest commercially available GaAs ICs can learn about these in the Vendor Product Forum. To complement the full technical program, we have provided several social events to allow interactions with colleagues while catching up with the newest technology available on the market. These events include the Sunday evening Opening Reception, the Monday evening Technology Exhibition Reception, and the Tuesday evening Theme Party "A Northwest Experience" at Kiana Lodge, a six acre waterfront retreat on Puget Sound. Finally, I want to announce the winner of our 3rd Outstanding Paper Award from the 1999 Symposium to C. R. Bolognesi, N. Matine, M. W. Dvorak, X G. Xu, S. P. Watkins from Simon Fraser University, Burnaby BC, Canada for their paper "InP/GaAsSb/InP DHBTs With High Ft And Fmax For Wireless Communication Applications." We hope you'll join us in Seattle for the 22nd IEEE GaAs IC Symposium.

Jim Komiak  
Chairman  
2000 IEEE GaAs IC Symposium

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# **CORPORATE BENEFACTORS**

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This year, we are proud to continue with the GaAs IC Symposium Corporate Benefactors Program. This program allows companies interested in our technical area 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.

This year's Advanced Benefactors at the writing of the advance program are:

**ANADIGICS  
And  
SUMITOMO ELECTRIC  
And  
EMCORE**

We thank them for their generosity, and look forward to the continued support from the corporate sector in future years.

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# GENERAL INFORMATION

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## IEEE 22nd GaAs IC Symposium

November 5-8, 2000

Westin Hotel

Seattle, Washington

### REGISTRATION

	<u>Advance</u> (Received by Oct 2)	<u>Regular</u> (After Oct 2 or on site)
<b>Symposium Registration</b>		
IEEE Member	\$380	\$430
Non-IEEE	\$430	\$480
Student	\$120	\$145
<b>Special 1-day Registration</b> (sessions only, no digest or social)		
IEEE Member	\$200	\$225
Non-IEEE	\$225	\$250
<b>Short Course</b>		
Student Registration	\$365	\$395
	\$100	\$125
<b>GaAs IC Primer Course</b>		
Regular Registration	\$180	\$180
Student Registration	\$60	\$60
<b>Technical Digest Only</b>	\$65	\$65
<b>Short Course Notes Only</b>	\$85	\$85
<b>Digest CD ROM Only</b>	\$75	\$75
<b>Primer Course Notes Only</b>	\$55	\$55
<b>Extra Reception Ticket</b>	\$25	\$25
<b>Extra Theme Party Ticket</b>	\$50	\$50

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 are admittance to: the Sunday Opening Reception; the GaAs IC Technology Exhibition Opening Reception on Monday; all exhibits; the Vendor Product Forums; and the exciting Tuesday evening Theme Party. The special 1-day registration fee, however, does not include the digest and 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**, complete the enclosed Advance Registration Form with your remittance of the appropriate fee (check or credit card) **BY October 2, 2000** to:

Registrar, 2000 IEEE GaAs IC Symposium  
c/o IEEE  
445 Hoes Lane  
P.O. Box 1331  
Piscataway, NJ 08855-1331  
USA  
Tel: (732) 981-3415  
FAX (732)465-6447

email: GaAs00reg@ieee.org

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 "2000 IEEE GaAs IC Symposium" 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 preregister** 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 Cascade Foyer of the Westin Hotel on Saturday and Sunday morning and the Grand Foyer of the Westin Hotel for Sunday evening through Wednesday. The operating hours will be as follows:

### Short & Primer Course Registration only

Saturday, November 4	6:00 p.m. - 8:00 p.m.
Sunday, November 5	7:00 a.m. - 8:00 a.m.
Sunday, November 5	5:00 p.m. - 5:30 p.m.(Primer)

### Symposium Registration

Sunday, November 5	5:00 p.m. - 8:00 p.m.
Monday, November 6	7:00 a.m. - 5:00 p.m.
Tuesday, November 7	7:00 a.m. - 5:00 p.m.
Wednesday, November 8	7:00 a.m. - 12:00 noon

## **Refund Policy:**

Please note that after October 2, 2000, your Advance Registration fee, Short Course fee, GaAs IC Primer fee, and fees for additional Symposium Technical Digest, or Reception/Party ticket fees are not refundable. Full refunds less \$50 handling fee will be granted for cancellations received in writing by October 2, 2000. The letter to the Symposium Registrar (see address at IEEE above) requesting the refund should state the preregistrant'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 2, 2000.**

## ACCOMMODATIONS

### Hotel Reservations:

A block of rooms has been reserved at special discounted rates for Symposium participants at our headquarters hotel, the Westin Hotel in downtown Seattle. Its circular twin towers offer spectacular views of the city and waterfront. It is located in the heart of downtown near the famous Pike Place Market, Pioneer Square, across from the monorail ride to Seattle Center and the Space Needle and within walking distance to shopping, entertainment, various restaurants and coffeehouses. It is about 13 miles from the Sea-Tac airport.

The hotel offers rooms with climate control, cable TV, radio, telephones with voice messaging and internet access, minibar and refrigerator. Rooms are available for non-smokers and with wheelchair access. It also features 24-hour room service, 3 restaurants, a lobby court bar with piano entertainment, indoor pool, jacuzzi, sauna, fitness center, a business center and a gift shop.

Address/Phone Number:

The Westin Seattle Hotel  
1900 Fifth Avenue  
Seattle, WA 98101-1281  
206-728-1000

The Symposium and the Exhibition will be held exclusively at the Westin Hotel. We ask you to please support your Symposium and more fully enjoy all the activities by staying at our official headquarters hotel.

Room reservations should be made as soon as possible, and no later than October 6, 2000. Rooms are available at the special Symposium group rates of \$164 single or double per night. These rates do not include room taxes, currently 15.6% per night. Rates are net for travel agents. A limited number of rooms have been set aside for the use of bonafide U.S. government employees at the prevailing government rate of \$104 single or double.

To make a reservation, please call the hotel at 206-728-1000 and ask for Reservations. Be certain to request the Special Group Rate for the IEEE GaAs IC Symposium. Please do not call any regional hotel chain 800 number, since they will not be aware of our special arrangements.

It is strongly recommended that you call the hotel direct thereby obtaining an immediate confirmation. If you choose to mail or fax your request, be sure to follow up on it. After the October 6, 2000 deadline, rooms will be on a space available basis at possibly higher rates. Check-in time is 4 p.m. or later; check-out time is 12 noon. If necessary, you may cancel your reservation at the Westin up to 72 hours prior to your scheduled arrival. There will be a \$25 charge per day for early check-outs.

## TRANSPORTATION

### Special Airfares:

Special discounted airfares have been negotiated with Continental and United Airlines. Continental Airlines is offering a 13 percent discount off the lowest available super-saver fares and coach fares. United Airlines is offering a 12 percent discount off the lowest available super-saver and coach fares. If booked 60 days in advance, Continental is offering an advanced booking incentive that increases the discount by

an additional 5 percent. Where super-saver fares or Saturday night stays are not applicable, Continental is also offering zone fares. Discounted airfares are available on other airline carriers. Please call IEEE Travel Services for availability. Some restrictions apply and airfares are guaranteed to be the lowest available at the time of ticketing. Special rates have also been negotiated with Avis rental car company.

Travel arrangements using the designated air carriers, or the carrier of your choice, can be made through IEEE Travel Services by calling (800)TRY-IEEE, (800-879-4333). Outside the United States, call (732) 562-5387 between the hours of 8:30 a.m. and 5:30 p.m. EST. Monday through Friday. When calling, please advise the Travel Counselor that you are traveling in connection with the 2000 IEEE GaAs IC Symposium. Or, you may visit our new on-line travel service web site at [www.ieetravelonline.org](http://www.ieetravelonline.org). This secure site offers simple, convenient service through which you can search, reserve, and ticket your travel anytime, anywhere.

You may also fax requirements to the IEEE Travel Service at (732) 562-8815. When faxing, please be sure to include your travel dates, departure, and return times, and phone and fax numbers. A Travel Counselor will contact you promptly.

## **Airport Transportation:**

Contact Greyline Shuttle Service at 206-626-6088. Approximately 30 minute trip to and from airport. Departs Westin Hotel from 6th Ave. entrance. Pay driver. Cash or traveler's checks only. Adult one-way \$8.50, round-trip \$14.00, children 2-12 one-way \$6.00, and \$10.00 round-trip.

Taxi fare from/to the airport is approx \$25.

Driving Directions to the Westin Seattle Hotel:

### *Northbound on I-5 (from Sea-Tac Airport)*

Take left-hand exit # 165 (Seneca Street).

Take immediate right onto 6<sup>th</sup> Avenue.

Follow 6<sup>th</sup> Avenue for six blocks passing Stewart Street.

The hotel is located on the left side of the street.

### *Southbound on I-5*

Take exit # 166 (Stewart/Denny Streets).

Stay in right lane and take a right onto Stewart Street.

Follow Stewart Street for nine blocks.

Turn right onto 6<sup>th</sup> Avenue.

The hotel is located on the left side of the street.

### *Westbound on I-90*

Take I-5 north exit.

Take exit # 165A (Madison Street)

Turn left at light onto Madison Street.

Turn right onto 6<sup>th</sup> Avenue.

Follow 6<sup>th</sup> Avenue for eight blocks passing Stewart Street.

The hotel is located on the left side of the street.

## **ADDITIONAL INFORMATION**

### **Message Desk:**

A Symposium Message Desk will be in operation in the Registration area during registration hours from Sunday, November 5 at 5 pm to Wednesday, November 8 at noon. Please advise callers who wish to

reach you during the day to ask the hotel operator for the IEEE GaAs IC Symposium message desk. The Hotel's main telephone number is: 206-728-1000

Please check the message board periodically during the Symposium.

## **Distribution of Relevant Information:**

The GaAs IC 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 GaAs IC industry. Printed material of any form will not be allowed to indiscriminately proliferate 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:**

The Technical Sessions, Vendor Product Forums and Panel Sessions will all take place in the Westin Hotel's Grand Ballrooms 1 and 2; the Short Course and Primer Course will take place in the Cascade 2 Ballroom; the GaAs IC Tech Exhibition will be held in the Grand 3 Ballroom adjoining the Technical Sessions. Please refer to the 'Symposium at a Glance' (inside front cover) and the locator map (inside back cover) for specific 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 GaAs IC Symposium.

## **Breakfasts:**

On Sunday, November 5 a continental breakfast will be available for Short Course registrants only in the Cascade Foyer. There will be a complimentary continental breakfast for all Symposium attendees to be held in the Grand Foyer on Monday and Wednesday and at the GaAs IC Technical Exhibition on Tuesday in the Grand 3 Ballroom.

## Coffee Breaks:

The locations of coffee breaks will be as follows:

Short Course Registrants (only) –	
Sunday, November 5 <sup>th</sup> :	Cascade Foyer
Primer Course Registrants (only) –	
Sunday, November 5 <sup>th</sup> :	Cascade Foyer
Symposium Registrants –	
Monday, November 6 <sup>th</sup> :	Grand Ballroom Foyer
Tuesday, November 7 <sup>th</sup> :	Grand 3 Ballroom
Wednesday, November 8 <sup>th</sup>	Grand Ballroom Foyer

## Symposium Social Events:

### SYMPOSIUM OPENING RECEPTION

We welcome you to Seattle on Sunday evening, November 5 from 5:00 p.m. to 8:00 p.m. in the Fifth Avenue Room of the Westin Hotel. 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, and extra tickets may be purchased at registration for \$25.

### EXHIBITION OPENING RECEPTION

Our exhibitors are hosting a reception to mark the exhibition opening on Monday, November 6 from 5:00 p.m. to 7:00 p.m. Every Symposium participant is invited to enjoy the hors d'oeuvres, to schmooze and cruise the exhibits in the Grand 3 Ballroom of the Westin Hotel.

### EXHIBITION LUNCH

On Tuesday at 12 noon the Exhibition Luncheon will be hosted in the Grand 3 Ballroom of the Westin Hotel. 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 7, from 7:00 pm to 10:00 pm. This year we are having a truly Northwest experience. The party will consist of a scenic cruise on Puget Sound followed by a delicious salmon bake at the secluded Kiana Lodge. Kiana Lodge is a private six-acre waterfront retreat near Poulsbo, about one hour from Seattle by boat. Nestled among Northwest firs and cedars, the lodge was built in the 1930s. It was originally a lodge and clubhouse for Seattlelites looking for an escape from busy city life. In 1944, the lodge was purchased from the original owners and was renamed "Kiana," which means, "Garden of the Gods" in the local Native American language.

Getting to the lodge is half the fun. You will arrive at Pier 55 by motorcoach where you will board the elegant Spirit of Seattle or the Good Time III, for a picturesque cruise across the Puget Sound. Once there, the lodge's friendly and courteous staff will greet you. They will invite you to explore the surroundings and enjoy the tall firs, cedars, and flowers surrounding this unique setting. If the beach is more to your liking, you can stroll along the shoreline and enjoy the magnificent beauty only Puget Sound can offer.

The aroma of salmon cooking over an open pit of alder coals will fill the air as you get ready to enjoy a truly Northwest buffet-style meal. As the sun begins to set, you will enjoy another treat as the shimmering Seattle skyline comes into view. This fascinating atmosphere and the good food and refreshments will provide an excellent atmosphere to

meet with colleagues old and new. One free admission to the Symposium Party is included with each full registration, and extra tickets can be purchased at the registration center for only \$50.

## **Seattle Attractions:**

Seattle also known as the Emerald City is one of the most sought out destinations. Nearby the hotel are several exciting venues to visit and enjoy including the famous Space Needle and the Pike Place Market. For the more adventurous, the Museum of Flight, the Seattle Art Museum, the Seattle Aquarium, the Underground Tour, Mt. Ranier and the Klondike Gold Rush National Park are reachable.

## **Weather:**

Seattle has significant variance in temperatures and weather patterns in early November. The average maximum in early November is in the low 60s and the average minimum is in the low 40s. Also, Seattle is well known for its rainfall. Be prepared for rain and some chilly weather.

## **Election Day:**

Tuesday, November 7<sup>th</sup> is an election day in the United States. All citizens are urged to cast absentee ballots at home before traveling to the symposium.

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# SYMPOSIUM HIGHLIGHTS

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## Technical Program:

This year's quality technical program focuses on III-V and other compound semiconductor integrated circuits and their associated technologies. The program explores the utilization of these technologies in analog, microwave, millimeter-wave, digital, mixed-signal, and optoelectronic ICs. Featured components of the program are: 53 regular and invited papers; the Short Course "**Linear Power Amplifiers for Voice and Data Communications**"; the GaAs IC Primer Course (for those wishing to get better acquainted with III-V IC technology and to set the stage for this year's technical sessions); and 5 thought-provoking & informative Panel Sessions. The technical papers and panel sessions illustrate the ever increasing frequencies and data rates that GaAs is bringing to the commercial market place. In the commercial arena, we are once again pleased to present a Vendor Product Forum (announcing the latest in III-V IC products, simulation software, foundry services, and measurement capability), and the Technology Exhibition. We've tried to arrange the sessions to minimize overlap of common interests while providing opportunities for informal discussions.

This year's Technical Sessions truly reflect the international scope of the Symposium with 42 % of the papers coming from outside North America. Similarly we have expert Panel Session participants coming from around the globe to provide a broad perspective on five controversial and thought-provoking topics:

1. **E-Mode PHEMTs are killing HBTs**
2. **InP Technology for the New Economy**
3. **Industry Roadmap to 40Gb/s**
4. **Tomorrow's Switch - FETs or MEMS?**
5. **Fab or Fab-u-less?**

As we approach the (real) millennium, we are featuring a Plenary Session that looks forward to the future of compound semiconductor ICs. We hope you will share in our excitement over this year's outstanding technical program which offers a variety of stimulating sessions and plenty of opportunities to exchange ideas (and phone numbers) with new business associates and old friends.

## Short Course:

This year the GaAs IC Symposium will present the fifteenth in a series of Short Courses applicable to various aspects of GaAs technology. This year's course entitled "Linear Power Amplifiers for Voice and Data Communications", a hot topic for today's and tomorrow's designs, will consist of a series of tutorial and exemplary presentations and will be held on Sunday, November 5<sup>th</sup> from 8:00 a.m. to 4:45 p.m.

This one day course is designed to provide participants with insights into the technology underlying power amplifier linearity. The instructors are experts from leading companies in the field.

Because space is limited, **ADVANCE REGISTRATION FOR THIS COURSE IS ENCOURAGED**. Registration includes attendance at the course, a book of materials prepared by the Short Course team, a continental breakfast, lunch, and two refreshment breaks. Please note the deadline for Advance Registration of October 2, 2000. For additional information, please contact the Short Course Coordinator:

Tim Henderson

TriQuint Semiconductor Texas  
P.O. Box 833938  
Richardson, TX 75083 USA  
Phone: 972-994-8538  
Fax: 972-994-8505  
Email: thenderson@tqtx.com

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

### **GaAs IC Primer Course:**

The GaAs IC Symposium will again offer an introductory-level class, "Basics of GaAs ICs," intended for professionals in the electronics industry with little or no experience in GaAs integrated circuits or anyone who wants an excellent review. The class covers analog/microwave and digital ICs and their applications. The material is designed to provide a brief overview of concepts and issues unique to GaAs ICs so that participants will be better able to profit from the Symposium Technical Program. The class is taught by Donald B. Estreich, a Hewlett-Packard manager with 20 years experience in design and application of GaAs analog and microwave ICs, and Steven Long, a University of California, Santa Barbara professor, also with 20 years experience in GaAs IC development. The class will be held Sunday evening, November 5th, from 5:30 p.m. to 8:30 p.m.

The registration fee is \$180 for professionals and \$60 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:

Brad Nelson  
Stanford Microdevices  
Sunnyvale, CA  
Phone: 408-616-5400

Registration for the class is as noted in "Symposium at a Glance". A limited number of copies of the handouts will be available to symposium registrants, subject to availability. The cost is \$55.

## 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 topics are as follows:

Panel Session 1:

**" E-Mode PHEMTs are killing HBTs"**

Monday, November 6<sup>th</sup>; 1:00 p.m. - 2:30 p.m.

Panel Session 2:

**" InP Technology for the New Economy "**

Monday, November 6<sup>th</sup>; 1:00 p.m. - 2:30 p.m.

Panel Session 3:

**" Industry Roadmap to 40Gb/s"**

Tuesday, November 7<sup>th</sup>; 3:30 p.m. – 5:00 p.m.

Panel Session 4:

**" Tomorrow's Switch - FETs or MEMS?"**

Wednesday, November 8<sup>th</sup>; 1:00 p.m. - 2:40 p.m.

Panel Session 5:

**" Fab or Fab-u-less?"**

Wednesday, November 8<sup>th</sup>; 1:00 p.m. - 2:40 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).

## Vendor Product Forum:

The 2000 Vendor Product Forum, coordinated by Mohammad Madihian of NEC USA Inc, will provide an opportunity for potential customers, business partners, or other interested parties to learn about some of the latest products from our industry. The forum will be held on Tuesday, November 7<sup>th</sup> from 3:20 p.m. to 4:50 p.m.

This session lasts about 90 minutes with six speakers from reputable companies. Each vendor is given 15 minutes which includes questions. The session will cover various products from RFIC and  $\mu$ -wave/mm-wave MMICs to RF/Microwave Simulation Software, Foundry Services, and Measurements.

## **GaAs IC Technology Exhibition:**

The 2000 GaAs IC Technology Exhibition will be held concurrently with the IEEE GaAs IC Symposium on November 6 and 7 in the Grand 3 Ballroom of the Westin Hotel. The Exhibition is open to all Symposium registrants. A wide variety of companies who sell state-of-the-art compound semiconductor integrated circuits as well as companies who sell critical products and services to the III-V IC industry will be represented. The early list of exhibitors already includes:

ADVANCED CERAMICS CORP  
AGILENT TECHNOLOGIES-EEsof EDA GROUP  
AIRTRON-Division of LITTON  
AIXTRON, INC  
AMERICAN XTAL TECHNOLOGY  
ANRITSU COMPANY  
CASCADE MICROTECH, INC  
CHA INDUSTRIES  
COMPOUND SEMICONDUCTOR MAGAZINE  
EMCORE CORPORATION  
EPITRONICS  
FREIBERGER COMPOUND MATERIALS USA, INC  
III-V's REVIEW - ELSEVIER  
INTEGRATED SYSTEMS ENGINEERING, INC  
IQE  
KOPIN CORPORATION  
M/A-COM  
MBE TECHNOLOGY USA, INC  
MOTOROLA  
PICOGIGA, INC  
PROCOMP INFORMATICS  
RIBER  
STRATEDGE CORPORATION  
SUMITOMO ELECTRIC  
TEGAL CORPORATION  
TEMESCAL, part of BOC Coating Technology  
VG SEMICON  
WAFER TECHNOLOGY LTD

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 6 and 7:30 a.m. and 4:00 p.m. on

Tuesday, November 7. The Exhibition will also host the Exhibition Opening Reception on Monday evening from 5:00 until 7:00 and the Exhibition Luncheon from noon until 1:30 p.m. on Tuesday. All Symposium coffee breaks on Tuesday including breakfast 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: vipmtgs@aol.com. Or visit the GaAs IC Symposium's website at [www.gaasic.org](http://www.gaasic.org) to download forms or for more information on the Exhibition.

### **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 GaAs IC Symposium website at

<http://www.gaasic.org/>

In addition, extended abstracts for these papers will appear in the Symposium Digest.

### **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 7<sup>th</sup>. The cost of the paper bound digest, if ordered through Advance Registration or purchased on-site, is \$65. The CD ROM Digest for 2000 will also be offered for the first time for \$75. A limited number of digests from previous years will be available for \$25. Digests will also be available 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 2000 IEEE GaAs IC 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 GaAs IC Symposium.

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# SHORT COURSE

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**Sunday, November 5, 2000**  
**Westin Hotel, Seattle**  
**Cascade 2**  
**8:00 a.m. - 4:45 p.m.**

## **“Linear Power Amplifiers for Voice and Data Communications”**

**Course Coordinator: Tim Henderson**

*Triquint Semiconductor Texas  
Dallas, Texas.*

Phone: (972)994-8538

Fax: (972)994-8508

thenderson@tqtx.com

### **Short Course Description**

To a large extent, the future of the GaAs industry is dependent on how GaAs technology addresses the needs of the telecommunications industry. The high level of performance required for next generation voice and data communications will drive the development of GaAs technology. This course will focus on a key component, the linear power amplifier.

The course starts with a discussion of the tradeoffs between different device technologies and then describes circuit design techniques for improved amplifier linearity. Then, emphasis is given to several applications in the forefront of voice and data communications; base stations, CATV, and wireless receivers. System, circuit and device requirements for these applications will be described in detail. Finally, all short course instructors will offer their opinions on the future trends of the technology.

### **Instructors for the Short Course**

**Lawrence Larson** *UCSD*

**Alan Katz** *TCNJ*

**Phil Miguez** *Motorola Broadband Communications*

**John Sevic** *UltraRF*

**Tom Apel** *TriQuint Semiconductor*

In the unlikely event that a listed instructor is unable to participate, an alternate instructor may be substituted.

## Who Should Attend

This Short Course is a must for everyone interested in linear power amplifier applications and design, from system designers to device engineers. Our lectures will cater to a range of interests and experience levels from rookie to veteran. The course is designed to give all attendees a solid overview of device, circuit, and systems considerations for the design of linear power amplifiers.

## Short Course Schedule

The Short Course will be held on Sunday, November 5<sup>th</sup>, starting with a continental breakfast in the Cascade Foyer. Instruction will begin promptly at 8:00 a.m. in Cascade 2. Lunch will be provided for all Short Course attendees at 12:20 p.m. in the Elliott Bay Room. There will be morning and afternoon refreshment breaks. The course will end at 4:45 p.m.

- 7:00 a.m.    **Registration (Cascade Foyer)**  
                  **Continental Breakfast (Cascade Foyer)**
- 8:00 a.m.    **Introduction and Overview**  
                  Tim Henderson, *TriQuint Semiconductor*
- 8:05 a.m.    **Technology Tradeoffs**  
                  Lawrence Larson, *University of California at San Diego*
- 9:25 a.m.    **Circuit Linearization Techniques**  
                  Alan Katz, *The College of New Jersey*
- 10:45 a.m.   **Coffee Break (Cascade Foyer)**
- 11:00 a.m.   **Base Station Applications and Linear PA Design**  
                  John Sevic, *UltraRF*.
- 12:20 p.m.   **Lunch (Elliott Bay)**
- 1:30 p.m.    **Cable TV Applications and Linear PA Design**  
                  Phil Miguelez, *Motorola Broadband Communications*
- 2:50 p.m.    **Coffee Break (Cascade Foyer)**
- 3:05 p.m.    **Wireless Phone Applications and Linear PA Design**  
                  Tom Apel, *TriQuint Semiconductor*
- 4:25 p.m.    **Questions and Discussion**
- 4:45 p.m.    Close of Short Course

## Short Course Pre-Registration

So that we may properly plan for attendance, we encourage you to pre-register for the Short Course. 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 **\$365** for those that pre-register, and **\$395** for those that register on-site. The price for students is **\$100** for those that pre-register, and **\$125** 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 **\$85** each.

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# GaAs IC PRIMER COURSE

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**Sunday, November 5, 2000**

**Westin Hotel**

**Cascade 2**

**5:30 p.m. - 8:30 p.m.**

**"Basics of GaAs ICs"**

**Course Coordinator:**      **Brad Nelson**  
Stanford Microdevices  
Sunnyvale, CA  
(408)-616-5400

**Instructors:**              **Stephen I. Long**  
University of California  
Santa Barbara, CA

**Donald B. Estreich**  
Agilent  
Santa Rosa, CA

**Course Objective and Description:**

The popular primer course "Basics of GaAs ICs" is an introductory-level class intended for professionals in the electronic industry with little or no experience in GaAs 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; MOS and bipolar devices; and fabrication technology. 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 GaAs integrated circuits along with the intended applications will be described.

Instructors Stephen I. Long and Donald B. Estreich each have over 20 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:**

5:30 p.m.    Introduction  
5:35 p.m.    GaAs History, Materials, and Processes  
6:00 p.m.    Device Operation  
6:30 p.m.    Discussion  
6:40 p.m.    Break  
6:50 p.m.    Digital Circuits  
7:30 p.m.    Analog/RF/Microwave Circuits  
8:10 p.m.    Summary and Discussion  
8:30 p.m.    Close

## **OTHER MEETINGS**

### **2000 GaAs Reliability Workshop:**

The 15<sup>th</sup> annual Workshop on GaAs Reliability, sponsored by 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, will be held in conjunction with the IC Symposium on Sunday, November 5, 2000, from 8:00 a.m. to 5:00 p.m. at the Westin Hotel.

The workshop will bring together researchers, manufacturers and users of GaAs and other III-V compound semiconductor devices. Papers presenting the latest results, including work-in-progress, and new developments in all aspects of GaAs reliability will be presented. Potential authors are requested to submit an electronic copy of a one to two page comprehensive summary, suitable for a 15 minute presentation, to: Dr. Wallace T. Anderson, Technical Program Chairman, at [anderson@estd.nrl.navy.mil](mailto:anderson@estd.nrl.navy.mil), Naval Research Laboratory, Code 6835, Washington DC 20375, phone (202) 767-1755. The deadline for receipt of submissions is August 20, 2000, and the Advanced Program will be published on our WEB site when available. Late news papers of significant interest will also be considered.

Registration for the workshop is \$95.00 in advance, or \$125.00 at the door. To pre-register, mail your name, Post Office address, email address, and phone number with a check for \$95 to: EIA/JEDEC, JC-14.7 Workshop, 2500 Wilson Boulevard, Arlington, VA 22201-3834 by October 23, 2000. Registration includes a full day of GaAs reliability papers, two breaks, a luncheon and a copy of the Proceedings. Late registration will be available from 7:30 a.m. to 8:30 a.m. on the morning of the workshop. For further information or to download a pre-registration form, visit our WEB site at [www.jedec.org](http://www.jedec.org) and click on GaAs, or contact: Anthony A. Immorlica, Jr., Workshop Chairman, Sanders, A Lockheed Martin Co., 65 Spit Brook Road, NHQ01-461, Nashua, NH, (603) 885-1100, [anthony.a.immorlica@lmco.com](mailto:anthony.a.immorlica@lmco.com).

### **SEMI Compound Semiconductor Standards and ASTM Committee Meetings:**

The next SEMI Compound Semiconductor Standards Meeting is scheduled during the Symposium for Monday November 6, 2000, from 8:00-10:00 p.m. in a room to be determined.

SEMI and ASTM have held joint meetings for over 3 years and continue to develop test methods and specifications as a cooperative effort.

The SEMI Compound (GaAs, InP) Semiconductor Standards Committee would like to invite 2000 IEEE GaAs IC Symposium attendees interested in the development of internationally approved standards for Wafer Specifications (GaAs, InP, SiC dimensions/orientation, electrical properties), Epitaxy Layer Specifications, non-destructive mobility measurements, eddy current probe measurement resolution, test methods for etch pit density (EPD), room temperature resistivity mapping and investigations of electronic data interchange (EDI) codes for wafer marking to attend the next Compound Semiconductor meeting.

Based in Mountain View, CA, Semiconductor Equipment and Materials International (SEMI) is an international trade association serving 1,700 companies and participating in the \$55 billion

semiconductor and flat panel display equipment and materials markets.  
SEMI maintains offices in Austin, Beijing, Brussels, Hsinchu,  
Moscow, Tokyo, Seoul, Singapore, Boston, and Washington, DC

For additional information, please contact:

Co-Chair James Oliver  
Northrop-Grumman  
P.O. Box 1521 M/S 3K13  
Baltimore, MD 21203  
Phone/Fax: (410)765-0117 / (410)765-7370  
[james\\_d\\_oliver@md.northgrum.com](mailto:james_d_oliver@md.northgrum.com)

Co-Chair Russ Kremer  
[rkremer@gateway.net](mailto:rkremer@gateway.net)

SEMI Standards Engineer  
Alana Martinez  
SEMI  
805 East Middlefield Road  
Mountain View, CA 94043

Phone/Fax: (650)-940-6974 / (650)940-7943  
[amartinez@semi.org](mailto:amartinez@semi.org)

**Monday, November 6, 2000**

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# **SYMPOSIUM PROGRAM**

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## **REGISTRATION AND CONTINENTAL BREAKFAST**

7:00 a.m.- 5:00 p.m.

**Registration – Grand Foyer 2 & 3**

7:00 a.m. - 8:00 a.m.

**Continental Breakfast Grand Foyer**

## **SYMPOSIUM OPENING**

8:00 a.m. - 8:30 a.m.

**Grand 1 & 2**

**Introduction and Awards Presentation**

**2000 Symposium Chairman**

Jim Komiak, *Sanders, A Lockheed-Martin Company*

**2000 Technical Program Chairman**

John Sitch, *Nortel Networks*

## **SESSION A: PLENARY SESSION**

8:30 a.m.

**Grand 1 & 2**

**Chairpersons:** Tony Immorlica, *Sanders, a Lockheed Martin Company*

Chris Bozada, *US Air Force*

8:30 a.m.

A.1 **THE INTERNATIONAL TECHNOLOGY ROADMAP FOR SEMICONDUCTORS: PAST, PRESENT AND FUTURE**, (*Invited Paper*), Paolo Gargini, *Director Technology Strategy, Intel Fellow*.

9:00 a.m.

A.2 **REVIEW OF SILICON-GERMANIUM BICMOS TECHNOLOGY AFTER 4 YEARS OF PRODUCTION AND FUTURE DIRECTIONS**, (*Invited Paper*), S. Subbanna, G. Freeman, D. Ahlgren, J. Johnson, J. Imbornone, \*P. Bacon, R. Najarian, \*\*D. Herman and \*\*B. Meyerson, *IBM MicroElectronics, Hopewell Junction, NY, \*IBM MD, Lowell, MA, \*\*IBM Research, Yorktown Hts, NY*

9:30 a.m.

A.3 **GaN HFET TECHNOLOGY FOR RF APPLICATIONS**, (*Invited Paper*), Chanh Nguyen, Miroslav Micovic, Danny Wong, Ara Kurdoghlian, Paul Hashimoto, Paul Janke, Loren McCray & Jeong Moon. *HRL Labs., LLC., 3011 Malibu Canyon Rd., Malibu, CA 90265*

10:00 a.m. - 10:30 a.m.

**Coffee Break**

10:30 a.m.

- A.4 **MEMS, FET AND PIN-DIODE CIRCUITS: A COMPARISON** (Invited Paper), Gabriel M. Rebeiz, *EECS Department, The University of Michigan, Ann Arbor, MI 48109-2122*

11:00 a.m.

- A.5 **InP-HBT OPTOELECTRONIC INTEGRATED CIRCUITS FOR PHOTONIC ANALOG-TO-DIGITAL CONVERSION**, (Invited Paper), T. Broekaert, W. Ng, J. Jensen, D. Yap, R. Walden. *HRL Laboratories, LLC., 3011 Malibu Canyon Rd., Malibu, California 90265.*

11:30 a.m.

**End of Session A**

**Break for Lunch**

11:30 a.m. - 1:00 p.m.

**PANEL SESSION 1:  
E-MODE PHEMT'S ARE KILLING HBT'S**

1:00 p.m. - 2:30 p.m.

Grand 1

Organizers and Moderators: Brad Nelson, Stanford Microdevices  
Mitch Shifrin, Hittite Microwave

Handset power amplifiers have been dominated by GaAs HBT's in the past few years. Tomorrows 3G power amplifier suppliers are lining up to pitch their parts and E-mode PHEMT's have begun to take market share. This highly lucrative market has tremendous competition and excitement. When will PHEMT's squash the HBT's? The panelists will be encouraged to address the following issues and others of pertinence: linearity, DC switching / leakage, power control, integration capabilities, robustness to VSWR / over-voltage, low power output efficiency and the always illusive cost trades. Come listen and contribute to a hotly debated topic and find out where the money is going.

Panel Members:

Julio Costa	<i>Motorola</i>
Gene Tkachenko	<i>Alpha Industries</i>
Rob Christ	<i>TriQuint Semiconductor</i>
Dave Halchin	<i>RF Micro Devices</i>
TBD	<i>Anadigics</i>

**PANEL SESSION 2:  
InP TECHNOLOGY FOR THE NEW ECONOMY**

1:00 p.m. - 2:30 p.m.

Grand 2

Organizers and Moderators: Bill Peatman, Motorola  
Jim Sowers, Loral

As the wireless and optical telecommunications infrastructure continues the push to higher bandwidths (e.g. 40 Gb/s switches and >30GHz wireless links), volume manufacturing of very high performance InP technologies poses serious questions and tantalizing opportunities to those seeking to participate in this lucrative business.

This panel will focus primarily on two questions; 1) what substrate technology will provide the best performance/cost advantage (InP

substrate or GaAs with metamorphic buffer), and 2) what device technology, HBT and/or HFET, will offer the best cost/performance advantage for a given application. This panel discussion is likely to set the stage for what will become one of the principal developments in compound semiconductor technology for the New Economy.

Panelists include:

Dave Cheskis *Anadigics*  
Ira Deyhimy *Vitesse*  
Steve Lardizabal *Raytheon*  
Amy Liu *QED/IQE*  
Pierre Mandeville *Nortel*  
Dominique Pons *UMS*  
Dwight Streit *TRW*

## **SESSION B: ADVANCED PA TECHNOLOGIES & TECHNIQUES**

3:00 p.m.

### **Grand 1**

**Chairpersons:** Brad Nelson, *Stanford Microdevices*  
Dave Osika, *Anadigics*

3:00 p.m.

B.1 **A MINIATURE 44% EFFICIENCY GaAs HBT POWER AMPLIFIER MMIC FOR W-CDMA APPLICATIONS**, H. Kawamura, K. Sakuno, T. Hasegawa, M. Hasegawa, H. Koh and H. Sato, *Advanced Technology Research Laboratories, Sharp Corporation, 2613-1 Ichinomoto-cho, Tenri-shi, Nara 632-8567, Japan*

3:20 p.m.

B.2 **A SINGLE SUPPLY MINIATURE PA MMIC FOR MULTI-MODE DIGITAL HANDSETS USING QUADI-ENHANCEMENT MODE PHEMT**, Toshiaki Moriuchi, Warren Abey, Rached Hajji, Wayne Kennan, Tomohiro Nakamura, Shigeru Maruyama, Takashi Kitawada and Yasunori Nonaka, *Fujitsu Quantum Devices, Ltd., Fujitsu Compound Semiconductor, Inc., Kokubo Kogyo-Danchi, Showa-Chou, Nakakoma-gun, Yamanashi-Ken 409-3883, Japan*

3:40 p.m.

B.3 **BROAD-BAND MICROWAVE POWER AMPLIFIERS IN GaN TECHNOLOGY**, K. Krishnamurthy, S. Keller, U.K. Mishra, M.J.W. Rodwell, S.I. Long, *Department of ECE, University of California, Santa Barbara, CA 93106*

4:00 p.m.

B.4 **A FULLY INTEGRATED FRONT-END FOR 2.4 GHZ LOW POWER APPLICATIONS**, Frederic Villain, *Hittite Microwave Corporation, 12 Elizabeth Drive, Chelmsford, MA 01824*

4:20 p.m.

**End of Session B**

## **SESSION LATE1:**

3:00 p.m.

### **Grand 2**

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**GaAs Technology Exhibition**  
**Opening Reception**  
**Grand 3**  
**5:00 p.m. - 7:00 p.m.**

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**Tuesday, November 7, 2000**

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## **REGISTRATION AND CONTINENTAL BREAKFAST**

7:00 a.m.- 5:00 p.m.

**Registration – Grand Foyer 2 & 3**

7:30 a.m. - 8:30 a.m.

**Continental Breakfast Grand 3**

## **SESSION C: NOVEL MODELING TECHNIQUES FOR uW & mmW CIRCUITS**

8:30 a.m.

**Grand 1**

**Chairpersons:** Dave Halchin, *RF Micro Devices*  
Mitchell Shifrin, *Hittite Microwave Corp.*

8:30 a.m.

C.1 **MICROWAVE & MILLIMETER-WAVE AMPLIFIER  
DESIGN VIA LOAD-PULL TECHNIQUES** (Invited Paper),  
Yasushi Itoh, *Mitsubishi Electric Corporation, Information  
Technology R&D Center, Ofuna 5-1-1, Kamakura, Kanagawa,  
247-8501, Japan*

9:00 a.m.

C.2 **AN UNIVERSAL METHOD FOR CALCULATING AND  
EXTRACTING THE LF AND RF NOISE BEHAVIOUR OF  
NONLINEAR DEVICES**, R. Follmann, J. Berben, D. Koether  
and I. Wolff, *Institute of Mobile and Satellite Communication  
Techniques IMST GmbH, D-47475 Kamp-Lintfort, Germany*

9:20 a.m.

C.3 **FREQUENCY RANGE EXTENSION OF OPTIMAL  
EFFICIENCY CLASS-E POWER AMPLIFIERS**, P.  
Watson, L. Kehias, R. Neidhard, R. Welch, T. Quach, R.  
Worley, and T. Jenkins, *AFRL/SND, AFRL/SNDM, Bldg. 620,  
2241 Avionics Circle, Ste 20, Wright-Patterson, AFB, OH  
45433-7322*

9:40 a.m.

C.4 **MILLIMETER-WAVE BANDWIDTH, SiGe-HBT  
TRAVELING WAVE AMPLIFIERS**, Mehran Mokhtar<sup>1,2\*</sup>,  
Boris Kerzar<sup>2</sup>, Yinggang Li<sup>1</sup>, Bertil Hansson<sup>1</sup>, Katsuyoshi  
Washio<sup>3</sup>, Takashi Harada<sup>4</sup> and Thomas Lewin<sup>1</sup>, *1. Ericsson  
Microwave System AB, HSERC, 431 84 Molndal Sweden, 2.  
Royal Institute of Technology, Department of Electronics/FMI,  
Electrum 229, 164 40 Stockholm, Sweden, 3. Hitachi Ltd.,  
Central Research Laboratory, 1-280 Higashi-Koigakubo  
Kokubunji, Tokyo 185-8601, Japan, 4. Hitachi Ltd, Device  
Development Center, 6-16-3, Shinmachi, Ome-shi, Tokyo, 198-  
8512, Japan, \*Mehran Mokhtari is an employee of HRL-  
Laboratories, Malibu, CA since May 2000*

10:00 a.m.

**End of Session C**

## **SESSION D: ADVANCED DEVICE TECHNOLOGIES**

9:00 a.m.

**Grand 2**

**Chairpersons:** Chris Bozada, *US Air Force*  
Marc Rocchi, *OMMIC, Limeil*

9:00 a.m.

D.1 **RF CHARACTERISTICS OF PnP GaAs/InGaAsN HETEROJUNCTION BIPOLAR TRANSISTORS**, A. G. Baca<sup>1</sup>, P. C. Chang<sup>1</sup>, N. Y. Li<sup>2</sup>, H. Q. Hou<sup>2</sup>, C. Monier<sup>3</sup>, S. J. Pearton<sup>3</sup>, *1. Sandia National Laboratories, P.O. Box 5800, MS-0603, Albuquerque, NM 87185-0603, 2. EMCORE Corporation, Albuquerque, NM, 07123, 3. University of Florida, Gainesville, FL 32611*

9:20 a.m.

D.2 **SUPER LOW-DISTORTION AND HIGH POWER HETERO GaAs MESFETS WITH ASYMMETRICAL LDD STRUCTURE**, K. Otobe, K. Nakata, and S. Nakajima, *Optoelectronics R&D Laboratories, Sumitomo Electric Industries, Ltd., 1, Taya-cho, Sakae-ku, Yokohama, 244-8588, Japan*

9:40 a.m.

D.3 **POWER AMPLIFIERS FOR 3.5GHZ W-CDMA APPLICATIONS**, W. Peatman, O. Hartin, B. Knappenberger, M. Miller, and R. Hooper, *Motorola SPS, 2100 E. Elliot Road, Tempe, AZ 85284*

10:00 a.m.

**End of Session D**

10:00 a.m. - 10:30 a.m.

**Coffee Break**

## **SESSION LATE2:**

10:30 a.m.

**Grand 1**

## **SESSION E: HIGH SPEED SWITCHING & TIMING ICs**

10:30 a.m.

**Grand 2**

**Chairpersons:** Bill Davenport, *TriQuint Semiconductor*  
Steve Long, *University of California*

10:30 a.m.

E.1 **IMPROVED InGaAs/InP DHBT TECHNOLOGY FOR 40 GBIT/S OPTICAL COMMUNICATION CIRCUITS**, J. Godin, M. Riet, S. Blayac, P. Berdagner, J.-L. Benchimol, A. Konczykowska, P. Andre, N. Kauffmann, A. Kasbari, *OPTO*,

*Groupement d'Interet Economique, Route de Nozay, 91460  
Marcoussis, France, France Telecom R&D*

10:50 a.m.

- E.2 **A LOW POWER 72.8 GHZ STATIC FREQUENCY DIVIDER IMPLEMENTED IN AlInAs/InGaAs HBT IC TECHNOLOGY**, M. Sokolich, C. Fields, B. Shi, Y. K. Brown, M. Montes, R. Martinez, A. R. Kramer, S. Thomas III, M. Madhav, *HRL Laboratories, LLC, 3011 Malibu Canyon Road, Malibu, CA 90265-4799*

11:10 a.m.

- E.3 **49.2 GHZ HEMT STATIC FREQUENCY DIVIDER USING AN ANALOG/MICROWAVE DESIGN APPROACH**, G. Raghavan, M.G. Case, M.Matloubian, C.W.Pobanz, M.Micovic, Hu, C.Ngo, P.Janke & K.McCalla, *HRL Labs., LLC., 3011 Malibu Canyon Rd., Malibu, CA 90265-4799 (310)317-5265, fax (310)317-5450*

11:30 a.m.

- E.4 **A 1GB/S DESKEW IC FOR RAMBUS AUTOMATIC TEST APPLICATION**, Andre Hendaman and Allan Armstrong, *Vitesse Semiconductor Corp., 741 Calle Plano, Camarillo, CA 93012*

11:50 a.m.

**End of Session E**

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## **Exhibition Lunch**

### **Grand 3**

### **12:00 noon – 1:30 p.m.**

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#### **SESSION F: FREQUENCY GENERATION & CONVERSION CIRCUITS**

1:30 p.m.

**Grand 1**

**Chairpersons:** Steve Consolazio, *Northrop Grumman*  
Kevin Kobayashi, *Stanford Microdevices*

1:30 p.m.

- F.1 **GaAs MESFET-BASED MMIC VCO WITH LOW PHASE NOISE PERFORMANCE**, C-H. Lee, S. Han, B. Matinpour, and J. Laskar, Georgia Institute of Technology, Petit Microelectronics Research Center, 791 Atlantic Drive, Atlanta, GA 30332-0269

1:50 p.m.

- F.2 **38 GHZ LOW PHASE NOISE CPW MONOLITHIC VCO'S IMPLEMENTED IN MANUFACTURABLE AlInAs/InGaAs HBT IC TECHNOLOGY**, A. Kurdoghlian, M. Sokolich, M. Matlobian, M. Case, g. Raghavan, Miro Micovic, S. Thomas III, C.H. Fields, *HRL Laboratories, LLC, 3011 Malibu Canyon Road, Malibu, CA 90265-4799*

2:10 p.m.

- F.3 **LOW POWER, LOW NOISE GaAs UP-CONVERTER MMIC FOR A BROADBAND SUPERHETERODYNE L-BAND RECEIVER**, Frank Ellinger, Rolf Vogt, and Werner Bachtold, *Swiss Federal Institute of Technology (ETH) Zurich, Laboratory for Electromagnetic Fields and Microwave Electronics, CH-8092 Zurich, Switzerland*

2:30 p.m.

- F.4 **AN MCM UNP CONVERTER FOR DOUBLE CONVERSION DATA TUNER APPLICATIONS**, J.W. Bao, J. Van Saders, D. Stofman, M. Anderson, D. Xu, N. Scheinberg, S. Madapur, M. Chin, *Anadigics, Inc., 35 Technology Drive, Warren, NJ 07059*

2:50 p.m.

- F.5 **SINGLE MMIC TRANSMITTER MODULE FOR FOUR CHANNEL OPTICAL SUBCARRIER MULTIPLEXED COMMUNICATIONS APPLICATIONS**, S. Han, C-H. Lee, B. Matinpour, J. Laskar, and \*D. J. Blumenthal, *School of ECE, Georgia Institute of Technology, 791 Atlantic Drive NW, Atlanta, GA 30332, \*Department of ECE, University of California at Santa Barbara, Santa Barbara, CA 93106*

3:10 a.m.

**End of Session F**

## **SESSION G: SIMULATION & MODELING**

1:30 p.m.

**Grand 2**

**Chairpersons:** Young-Kai Chen, *Lucent Technologies*  
Malcolm Stubbs, *Communications Research Centre*

1:30 p.m.

- G.1 **INDUSTRIAL APPLICATION OF HETEROSTRUCTURE DEVICE SIMULATION** (Invited Paper), V. Palankovski, R. Quay, and S. Selberherr, *Institute for Microelectronics, TU Vienna, Gusshausstr. 27-29, A-1040 Vienna, Austria*

2:00 p.m.

- G.2 **THE ROLE OF ELECTROMAGNETIC ANALYSIS IN THE RFIC DESIGN FLOW**, (Invited Paper), John C. Moore, *Agilent Technologies, 1400 Fountaingrove Parkway, Santa Rosa, CA 95403*

2:30 p.m.

- G.3 **FORECASTING METHOD FOR HEMT MMIC LARGE-SIGNAL RF YIELD**, R. Tsai, T.C. Chen, M. Nishimoto, L.W. Yang, W. Okamura, and R. Lai, *TRW, Inc., Redondo Beach, CA 90278*

3:00 p.m.

- G.4 **NUMERICAL ANALYSIS OF ELECTRON TUNNELING THROUGH HETERO-INTERFACES AND SCHOTTKY BARRIERS IN HETEROSTRUCTURE**, Devices, E. Lyumkis, R. Mickevicius, O. Penzin, B. Polsky, and K. El Sayed, *Integrated Systems Engineering, Inc., 111 North Market Street, San Jose, CA 95113*

3:20 p.m.

**End of Session G**

3:10 a.m. - 3:30 a.m.

**Coffee Break**

**VENDOR PRODUCT FORUM**

**Low Noise? High Power? Low Cost? Or What?**

3:30 p.m. - 5:00 p.m.

**Grand 1**

**Organizer:** Mohammad Madihian, *NEC USA Inc*

**Moderators:** Mohammad Madihian, *NEC USA Inc*  
Norman Chiang, *California Eastern Labs*  
Mehran Mokhtari, *HRL*

**Forum Members:**

Javed Patel, *Anadigics*  
Andreas Nitschke, *Infineon*  
Warren Barabash, *RF Micro Devices*  
Toshio Shino, *Toshiba*  
Manny Quijije, *TRW*  
Sanjiv L. Shah, *Raytheon*

New product introduction, technical specifications accompanied by actual performance data for RFIC,  $\mu$ -wave/ *mm*-wave MMIC, Opto-electronic IC, and more. Manufacturability of these products in high volumes, reliability data, ease of use, faster time-to-market, customer re-use capability, excellent cost/performance ratio, price trends and availability. These products include: C-band 2-W high gain high efficiency MMICs, S-band low cost 1-W MMIC with SMD package for WLL residential and base station applications, S-band 3-W & 8-W MMICs for W-CDMA applications, InGaP HBT PA modules for GSM/DCS and linear wireless handsets, HBT based trans-impedance amplifiers for OC 48 and OC192 applications, mixers, switches, receivers, millimeter wave integrated transceivers and more for point-to-point and point-to-multipoint broadband systems.

**PANEL SESSION 3:  
INDUSTRY ROADMAP TO 40 GB/S**

3:30 p.m. - 5:00 p.m.

**Grand 2**

**Organizer/Moderator:**

Allan Armstrong, *Vitesse Semiconductor*  
Tho Vu., *Top-Vu Technology*

To satisfy the never-ending thirst for bandwidth, the high-speed communications IC community is hard at work creating digital communications ICs to serialize data and transport across optical fiber at increasingly higher data rates. With 2.5 Gb/s physical layers well in hand and 10 Gb/s in volume production, R&D is now focusing on 40 Gb/s. How will such data rates be achieved? What process technologies will be successful? What circuit techniques will be used? When will such products be manufacturable and reliable? How will new technologies such as parallel optical interconnect, all-optical

switching, and DWDM affect network architecture? How will IC opportunities be affected by these changes?

**Panel Members:**

K. C. Wang, *Conexant*  
Seshadri Subbanna, *IBM*  
John Sitch, *Nortel Networks*  
Daniel Rosenthal, *Calient Networks*  
Al Yuen, *Alvesta*  
Alan Eli Willner, *USC*

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***Symposium Theme Party***  
***Seattle Boat***  
***7:00 p.m. - 10:00 p.m.***

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**Wednesday, November 8, 2000**

**REGISTRATION AND CONTINENTAL  
BREAKFAST**

7:00 a.m.- 12:00 noon

**Registration – Grand Foyer 2 & 3**

7:00 a.m. - 8:00 a.m.

**Continental Breakfast Grand Foyer**

**SESSION H: LOW NOISE AMPLIFIERS &  
TECHNIQUES**

8:30 a.m.

**Grand 1**

**Chairpersons:** Vincent Hietala, *Sandia National Labs.*  
Tim Shirley, *Agilent*

8:30 a.m.

H.1 **MMIC LOW-NOISE AMPLIFIERS AND APPLICATIONS ABOVE 100 GHZ**, (*Invited Paper*) \*R. Lai, \*\* T. Gaier, M. Nishimoto, S. Weinreb, K. Lee, M. Barsky, R. Raja, M. Sholley, G. Barber, D. Streit, \**TRW One Space Park, Redondo Beach, CA 90278*, \*\**Jet Propulsion Laboratory*

9:00 a.m.

H.2 **A LOW NOISE ON-CHIP MATCHED MMIC LNA OF 0.76DB NOISE FIGURE AT 5 GHZ FOR HIGH SPEED WIRELESS LAN APPLICATIONS**, B.G. Choi, Y.S. Lee, C.S. Park, and \*K.S. Yoon, *School of Engineering, Information and Communications University, 58-4 Hwaam, Yusong, Taejon 305-348 Korea*, \**Dept. of Eletronics and Information Engineering, Korea University, Chochiwon, Choongnam 339-700, Korea*

9:20 a.m.

H.3 **AN ULTRA-LOW DC POWER ULTRA-FLAT MULTI-OCTAVE MHEMT LNA MMIC**, O.S.A. Tang, K.C. Hwang, P.C. Chao, K. Nichols, D. Hogue, K.H.G. Duh, P.M. Smith, M. Lang, \*S. Valenti, \*R. Melcher and \*W. Taft, *Sanders, A Lockheed Martin Co., Nashua, NH 03060-0868*, \**Lockheed Martin Commercial Space, Systems, Newton, PA 18940*

9:40 a.m.

**End of Session H**

**SESSION I: NOVEL PROCESS & PACKAGING  
TECHNOLOGIES**

8:30 a.m.

**Grand 2**

**Chairpersons:** Brad Krongard, *Tyco Electronics M/A-Com*  
Jim Sowers, *Space Systems/Loral*

8:30 a.m.

I.1 **THREE-DIMENSIONAL MMIC TECHNOLOGY FOR LOW-COST MILLIMETER-WAVE MMICS**, (*Invited Paper*) Kenjiro Nishikawa, Kenji Kamogawa, \*Masami Tokumitsu, \*\*Ichihiko Toyoda, \*Suehiro Sugitani, and Katsuhiko Araki, *NTT Network Innovation Laboratories*, \**NTT Photonics Laboratories*, \*\**NTT Electronics Corp., Hikari-noka, Yokosuka, 239-0847, Japan*

9:00 a.m.

- 1.2 POWER FLIP-CHIP ASSEMBLY FOR SPACE APPLICATION USING HBT IN KU BAND**, O. Vendier, S. George, J-P. Fraysse, E. Rogeaux, C. Drevon, J-L. Cazaux, \*D. Floriot, \*\*H. Blanck, \*\*\*P. Auxemery, \*\*\*\*W. de Ceuninck, \*\*\*\*\*P-A. Rolland, *Alcatel Space – 26 av JF Champollion, BP1187, 31037-Toulouse Cedex 1, France*, \*Thomson-CSF – LCR, *Domaine de Corbeville 91404, Orsay Cedex, France*, \*\*United Monolithic Semiconductors GmbH, *Wilhem-Runge Strasse 11 –D-89081 ULM Germany*, \*\*\*United Monolithic Semiconductors SAS, *Route Departementale 128, 91401 Orsay Cedex – France*, \*\*\*\*Institute for Material Research, *Wetenschapsapark – 3590 Diepenbeek – Belgium*, \*\*\*\*\*Institute d-Electronique et de Microelectronique du Nord, *Cite Scientifique, Avenue Poincare, BP69-59652 Villeneuve d-Ascq Cedex – France*

9:20 a.m.

- 1.3 BROADBAND LOW ACTUATION VOLTAGE RF MEM SWITCHES**, Shyh-Chiang Shen, David Caruth, and Milton Feng, *Center for Compound Semiconductor Materials, Dept. of Electrical and Computer Engineering, University of Illinois at Urbana-Champaign, Urbana-Champaign, IL 61801-2355*

9:40 a.m.

- 1.4 KA-BAND PLANAR GUNN OSCILLATORS USING FLIP-CHIP GAAS GUNN DIODES FABRICATED BY BORON ION IMPLANTATION**, Takashi Yoshida, Tadayoshi Deguchi, Kiyoshi Kawaguchi and Atsushi Nakagawa, *Research Laboratory, New Japan Radio Co., Ltd., 2-1-1 Fukuoka, Kamifukuoka, Saitama 356-8510, Japan*

10:00 a.m.

**End of Session I**

10:00 a.m. - 10:30 a.m.

**Coffee Break**

## **SESSION J: MILLIMETERWAVE COMMUNICATION ICs**

10:30 a.m.

**Grand 1**

**Chairpersons:** Mohammad Madihian, *NEC USA Inc*  
Steve Consolazio, *Northrop Grumman*

10:30 a.m.

- J.1 A HIGH IP<sub>3</sub>, SUBHARMONICALLY PUMPED MIXER FOR LMDS APPLICATIONS**, Paul Blount and Charles Trantanello, *Hittite Microwave Corporation, 12 Elizabeth Drive, Chelmsford, MA 01824*

10:50 a.m.

- J.2 A 60 GHZ INTEGRATED SUB-HARMONIC RECEIVER MMIC**, C.A. Zelle, A.R. Barnes, D.C. Bannister and R.W. Ashcroft, *Microwave Circuit Design and Prototyping Group, Microwave Sensors, DERA, St. Andrews Road Malvern, WR14 3PS, Great Britain*

11:10 a.m.

J.3 **A 60GHZ-BAND COPLANAR-MMIC CHIPSET FOR 500MBPS ASK TRANSCEIVERS**, Kenichi Maruhashi, Masaharu, Ito and Keiichi Ohata, *Photonic and Wireless Devices Research Laboratories, NEC Corporation, 2-9-1 Seiran, Otsu, Shiga 520-0833, Japan*

11:30 a.m.

J.4 **A 77 GHZ COPLANAR WAVEGUIDE MMIC BPSK VECTOR MODULATOR REALIZED USING InP TECHNOLOGY**, T. Lodhi, D.L. Edgar, H. McLelland, S. Ferguson, C.R. Stanley, I.G. Thayne, *University of Glasgow, Nanoelectronics Research Center, Department of Electronics and Electrical Engineering, Glasgow G12 8LT, Scotland*

11:50 a.m.

**End of Session J**

## **SESSION K: FIBER LINK ICs**

10:30 a.m.

**Grand 2**

**Chairpersons:** The'Linh Nguyen, *Finisar Corporation*  
Marko Sokolich, *HRL Laboratories*

10:30 a.m.

K.1 **TWO-DIMENSIONAL 8X8 PHOTORECEIVER ARRAY AND VCSEL DRIVERS FOR HIGH-THROUGHPUT OPTICAL DATA LINKS**, Vincent M. Hietala, Carl Chun\*\*, Joy Laskar\*, K.D. Choquette, K.M. Geib, A.A. Allerman, and J.J. Hindi, *\*Sandia National Laboratories, P.O. Box 5800, Albuquerque, NM 87185-0874, \*\*Georgia Institute of Technology, Atlanta, GA 30332*

10:50 a.m.

K.2 **AUTO GAIN CONTROL TRANS-IMPEDANCE AMPLIFIER WITH LOW NOISE AND WIDE INPUT DYNAMIC RANGE FOR 10GBPS OPTICAL COMMUNICATION SYSTEMS**, Hitoshi Ikeda, Tomoyuki Ohshima, Masanori Tsunotani, Shouhei Seki and Tamotsu Kimura, *Component Division, Oki Electric Industry Co. Ltd., 550-1 Higashiasakawa Hachioji, Tokyo 193-8550, Japan*

11:10 a.m.

K.3 **49-GHZ PREAMPLIFIER WITH A TRANSIMPEDANCE GAIN OF 52 DBohm USING INP HEMTS**, H. Shigematsu, M. Sato, T. Suzuki, T. Takahashi, K. Imanishi, N. Hara, H. Ohnishi, and Y. Watanabe, *Fujitsu Laboratories LTD., 10-1 Morinosato-Wakamiya, Atsugi 243-01, Japan*

11:30 a.m.

K.4 **A 10 GB/S LASER/MODULATOR DRIVER IC WITH DUAL-MODE ACTIVELY MATCHED OUTPUT BUFFER**, Hans Ransijn, Greg Salvador, Dwight Daugherty, Ken Gaynor, *Lucent Technologies, 2525 N 12 St., Reading, PA 19612*

11:50 a.m.

K.5 **A 10-GB/S ALGAAS/INGAAS P-HEMT DISTRIBUTED EA DRIVER WITH A D-FLIP-FLOP FOR OPTICAL FIBER LINKS**, M. Miyashita, \*K. Yamamoto, K. Andoh, \*\*N. Okada, \*\*K. Motoshima, and A. Takemoto, *High Frequency &*

*Optical Semiconductor Division, \*System LSI Development Center, \*\*Information Technology R&D Center, Mitsubishi Electric Corporation, 4-1 Mizuhara, Itami, Hyogo 664-8641, Japan*

12:10 a.m.

**End of Session K**

**Break for Lunch**

12:10 p.m. - 1:00 p.m.

## **PANEL SESSION 4: TOMORROW'S SWITCH - FET OR MEMS?**

1:00 p.m.-2:40 p.m.

### **Grand 1**

Panel Organizers and Moderators:

Brad Krongard, *Tyco Electronics M/A-Com*

Malcolm Stubbs, *Communications research Centre*

FET switches are common components in today's microwave subsystems, however, the emerging MEMS technology is attracting a lot of interest in the microwave community and has demonstrated significant performance advances in the switching arena. While FET technology has an established history, MEMS is the new "kid on the block" and therefore has a long way to go before it becomes accepted. This panel will try to shed some light on the future of the two technologies.

This panel will focus primarily on three questions:

- 1) what is the current state of FET and MEMS switch technologies;
- 2) what will be the cost/performance/reliability trade offs between the two technologies;
- 3) will one of the technologies disappear in the future, or is there a place for both?

Panel Members:

Jeffrey F. DeNatale, *Rockwell*

Karl Freidhoff, *Northrop Grumman*

David Johnson, *Alpha*

Mehran Mokhtari, *HRL*

Wayne Struble, *M/A-COM*

## **PANEL SESSION 5: FAB OR FAB-U-LESS?**

1:00 p.m.-2:40 p.m.

### **Grand 2**

Panel Organizers and Moderators:

Mitchell Shifrin, *Hittite*

Norm Chiang, *California Eastern Laboratories*

Along with the exploding growth of the wireless industry there has also been a corresponding explosion of fabless semiconductor companies dedicated to wireless design. In fact fabless companies even have their own association! What is going on here? Are there more specifications then designers to address them? Is it better to separate designers from process folks since at times they tend to be at each others throats? While this model is relatively common to the Silicon industry it is new to III-V's. Is this the trend of the future or a mere

aberration? We have assembled a panel of industry experts that come from companies with a vastly different structures. Let's hear what they have to say on the subject.

Panel Members:

Nan-Lei Larry Wang, *EiC*

Sanjay Moghe, *RF Solutions*

Derek Houghton, *SiGe Microsystems*

Wing Yau, *Global Communication Semiconductors*

Kin Tan, *Stanford Microdevices*

Brad Krongard, *MA/COM*

**Coffee Break** 2:40 p.m. - 3:10 p.m.

## **SESSION L: MICROWAVE & MMW POWER AMPLIFIERS**

3:10 p.m.

### **Grand 1**

**Chairpersons:** Norman Chiang, *California Eastern Laboratories*  
Doug Teeter, *RF Micro Devices*

3:10 p.m.

L.1 A 6W C-Band High Power MMIC Amplifier for Space Radar Application, Y. Butel, T. Adam, B. Cogo, M. Soulard, 26 AV. JF Champolion-BP 1187-31037, Toulouse-France

3:30 p.m.

L.2 K-Band 76% PAE InP Double Heterojunction Bipolar Power Transistors and A 23-GHz Compact Linear Power Amplifier MMIC, \*W. Okamura, \*\*L.W. Yang, \*A. Gutierrez-Aitken, \*E. Kaneshiro, \*J. Lester, \*D. Sawdai, \*P.C. Grossman, \*\*\*K. Kobayashi, \*H.C. Yen, \*A. Oki, \*P. Chin, \*T. Block, \*TRW Electronics and Technology Division, One Space Park, Redondo Beach, CA 90278, \*\*National Taiwan University, \*\*\*Stanford Microdevices

3:50 p.m.

L.3 A Compact, 1 Watt, Balanced Power Amplifier MMIC for K-band Applications, Steven A. Brown, TriQuint Semiconductor Texas, P.O. Box 833938, Richardson, TX 75083

4:10 p.m.

L.4 1-Watt Ka-Band Coplanar High Power MMIC Amplifiers using 0.15  $\mu\text{m}$  GaAs PHEMTs, A. Bessemoulin, member, IEEE, H. MaBler, A. Hulsmann, M. Schlechtweg, member, IEEE, Fraunhofer Institute for Applied Solid-state Physics, TullastraBe 72, D-79108 Freiburg, Germany

4:30 p.m.

**End of Session L**

## **SESSION M: HETEROSTRUCTURE BIPOLAR TRANSISTORS**

3:10 p.m.

### **Grand 2**

**Chairpersons:** Tim Henderson, *TriQuint Semiconductor Texas*  
Jan-Erik Mueller, *Infineon Technologies*

3:10 p.m.

M.1 **200 GHZ INP/GAAS<sub>x</sub>SB<sub>1-x</sub>/INP DOUBLE HETEROJUNCTION BIPOLAR TRANSISTORS**, C.R. Bolognesi, M.W. Dvorak, O. Pitts, and S.P. Watkins, *Compound Semiconductor Device Laboratory – CSDL, School of Engineering Science and Department of Physics, Simon Fraser University, 8888 University Drive, Burnaby, BC, Canada, V5A 1S6*

3:30 p.m.

M.2 **AVALANCHE BREAKDOWN IN HBTS: VARIATION WITH COLLECTOR CURRENT AND EFFECT ON LINEARITY**, Jonathan Scott and Tom Low, *Microwave Technology Center, Agilent Technologies, 1400 Fountaingrove Parkway, Santa Rosa, CA 95403*

3:50 p.m.

M.3 **INTERACTION OF DEGRADATION MECHANISMS IN BE-DOPED GAAS HBTS**, Darrell Hill, John Parsey, *Motorola DigitalDNA™ Laboratories, 2100 E. Elliot Road, EL720, Tempe, AZ 85284*

4:10 p.m.

M.4 **CURRENT GAIN MODULATION AND 1/F NOISE CONTROL OF GAAS BASED HBTS THROUGH ON-LEDGE SCHOTTKY DIODES**, Pingxi Ma, M.F. Chang, \*Yuefei Yang, \*\*Peter Zampardi, \*R.T. Huang, \*\*\*Jerry Sheu, \*\*\*and G.P. Li, *Electrical Engineering Department, University of California, Los Angeles, CA 90095-1594, \*Global Communication Semiconductor Incorporation, Torrance, CA 90505, \*\*Conexant Systems, Newbury Park, CA 91320, \*\*\*Electrical and Computer Engineering, University of California, Irvine, CA 92697*

4:30 p.m.

**End of Session M**

**Close of Symposium**

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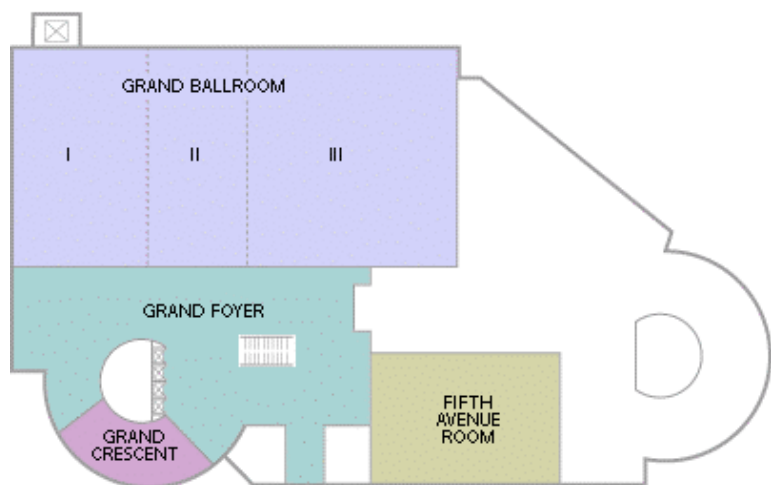
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**Notes**

## Hotel Floor Plan

### Grand Ballroom Level



### Mezzanine Level

