BCTM PROCEEDINGS

PROCEEDINGS

OF THE 2001 BIPOLAR/BiCMOS CIRCUITS AND TECHNOLOGY MEETING

2001

Minneapolis, Minnesota
September 30–October 2, 2001

Sponsored by

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PROCEEDINGS OF THE 2001 BIPOLAR/BiCMOS CIRCUITS AND TECHNOLOGY MEETING

SPONSORED BY
IEEE ELCTRON DEVICES SOCIETY

IN COOPERATION WITH

IEEE SOLID-STATE CIRCUITS SOCIETY
IEEE TWIN CITIES SECTION

September 30 – October 2, 2001

Papers have been printed without editing as received from the authors.

All opinions expressed in the Proceedings are those of the authors and are not binding on the Institute of Electrical and Electronics Engineers.

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Welcome from the Chairmen

Welcome to the 2001 IEEE Bipolar/BiCMOS Circuits and Technology Meeting. We have another strong technical program highlighting ongoing advances in bipolar circuits and technology for everybody in the Bipolar/BiCMOS community.

BCTM will offer a short course on Sunday, September 30, entitled "Modeling and Measurement Methods for High Speed Circuit Design." There will be four very tightly linked talks taking the course participant from process and device design, through measurements and compact model generation, to final circuit design. Dr. Jeffrey Johnson, IBM, will discuss "Process and Device Simulation for SiGe Technology Development." Dr. David Pehlke, Ericsson, will discuss "Production RF Measurements". Mr. Joerg Berkner, Infineon, will discuss "Bipolar Model Parameter Extraction", while Dr. Klaus Runge, GTRAN, will discuss key parameters required for circuit design in a talk entitled, "High Speed ICs for Optical Communications."

The meeting will open with the keynote speech by Behrooz Abdi who is the VP and general manager of the Radio Products Division at Motorola. Dr. Abdi will speak on his vision in technology for the mobile world. Dr. Michael Roukes, Caltech, a world-renowned expert in Nano technology and Nano Electro-Mechanical Systems (NEMS) will present the luncheon speech. His talk, entitled "Nano Electro Mechanical Systems (NEMS)" will provide great insights into the current development and future possibilities of RF MEMs.

This year there will be a total of 11 technical sessions, including 8 invited talks. Once again, we feature an excellent mix of both academic and industrial papers from around the world, covering all aspects of Bipolar/BiCMOS technology. As for many years now, conference participants will be asked to vote for the best student paper. The award will be presented at next year's conference.

For the second year, there will be a special session for "Emerging Technologies/New Technology Directions". Three widely recognized experts will provide their views on disciplines that may in the future become relevant to bipolar and BiCMOS technologies. The first two talks will describe bipolar devices fabricated in GaN and SiC, and the third talk will take a look into the future of analog circuit design.

This is the last conference at Minneapolis before BCTM will travel around to other locations. BCTM 2002 and 2003 will be held in Monterey, CA and Toulouse, France, respectively. As we travel globally, it is our sincere hope that BCTM will better serve a larger number of the worldwide members of the Bipolar/BiCMOS community.

We express our appreciation to the 2001 BCTM committee members for their diligence in assembling an outstanding program. It is our great pleasure to extend to you a hearty welcome to the 2001 IEEE Bipolar/BiCMOS Circuits and Technology Meeting in Minneapolis.

Ken O
BCTM 2001 General Chairman

Hiroshi Iwai
BCTM 2001 Program Chairman

BCTM 2001 EXECUTIVE AND TECHNICAL PROGRAM COMMITTEES

BCTM EXECUTIVE COMMITTEE

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John Long (University of Toronto)
Alain Chantre (ST Microelectronics)
Shahriar Moinian (Agere Systems)
Marise Bafleur (LAAS/CNRS)

BCTM 2001 Executive and Program Committees

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BCTM 2001 General Chairman

Hiroshi Iwai
BCTM 2001 Program Chairman

Executive Committee

Row 1 (left to right): Hiroshi Iwai, Kenneth O
Row 2 (left to right: David Harame, John Long, Janice Jopke, Colin McAndrew
Row 3 (left to right): Marise Bafleur, Alain Chantre, Derek Bowers, Rob Fox, Ross Teggatz, Peter Zampardi, Shahriar Moinian, Yih-Feng Chyan

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Left to right: Alvin Joseph, Cliff King, Pete Zampardi

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Left to right: Mohammed Darwish, Marise Bafleur, Rik Jos, Frank Thiel

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Left to right: James Parkers, Michael Schröter, Jeroen Paasschens, Shahriar Moinian, Laurence Nagel, Shaun Simpkins

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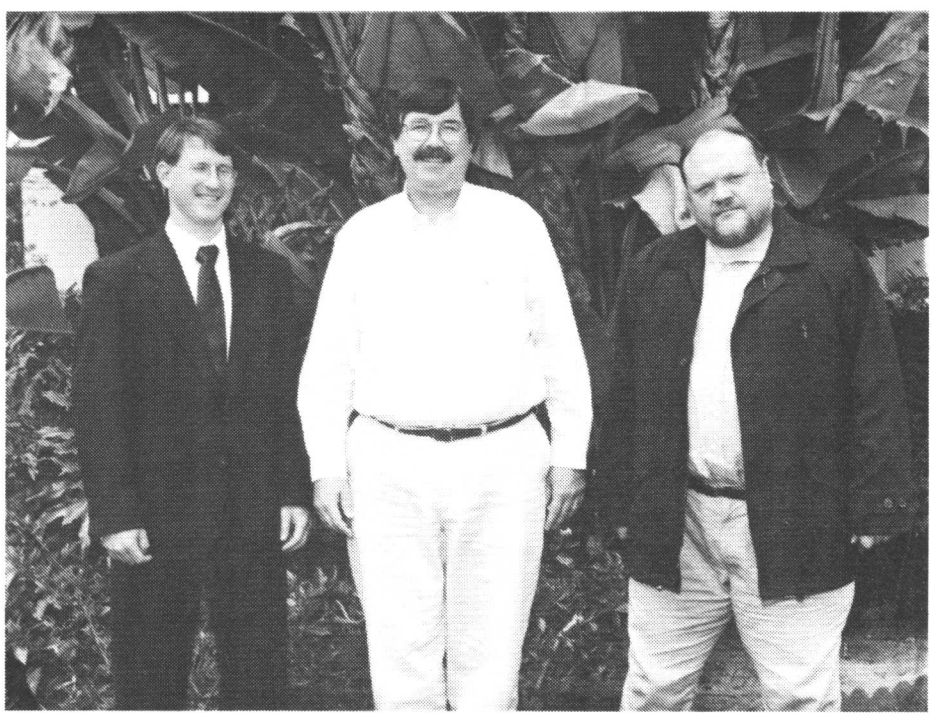
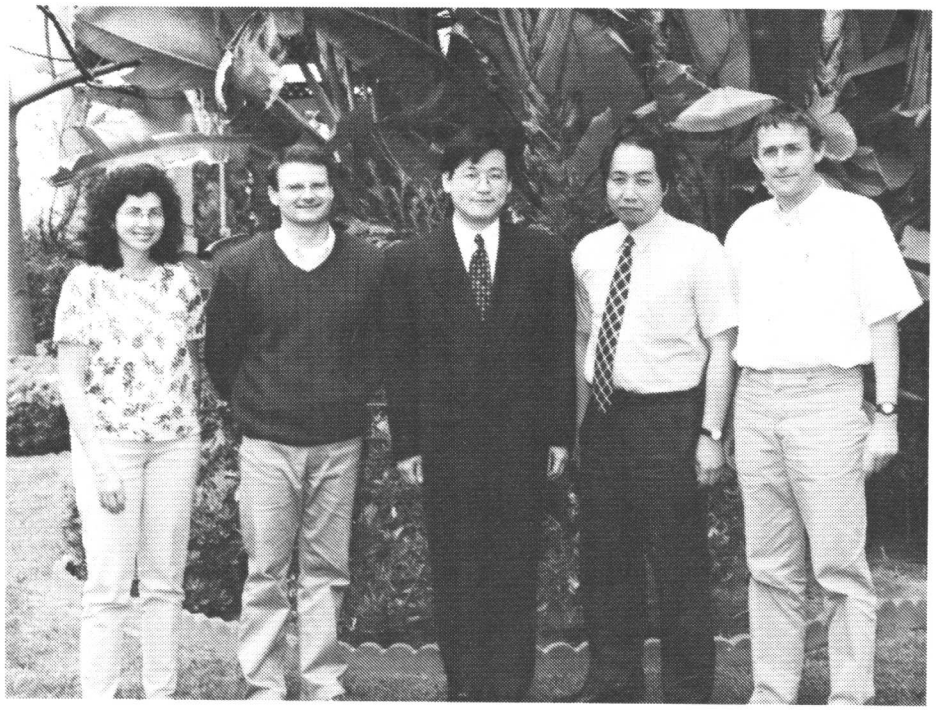


Left to right: Dan Mavencamp, Rob Fox, Derek Bowers

Process Technology Subcommittee



Left to right: Vida Ilderem, Angelo Pinto, Yih-Feng Chyan, Yasuhiro Katsumata, Alain Chantre

RF Subcommittee

Left to right: Paul Davis, Leo de Vreede, David Ngo, Larry Larson, Scott Williams, John Long

2001 BCTM

SCHEDULE AT A GLANCE

Sunday — September 30		
8:45 AM — 5:15 PM	Short Course: Modeling and Measurement Methods for High Speed Circuit Design	
7:00 PM	Registration/Reception	
Monday — October 1 Registration open from 7:00 AM in Ballroom Atrium		
8:00 AM	Opening Remarks and Announcements	
8:15 AM — 9:00AM	Keynote Speaker - Behrooz Abdi Technology for the Mobile World Ballrooms 1 and 2	
9:00 AM	Coffee and Cookies in Ballroom Atrium	
9:20 AM — 11:00 AM	**1.** Advanced Bipolar Ballroom 3	**2.** Adv. Silicon and SiGe Transistor Modelling Ballroom 4
11:00 AM	Visit Vendor Exhibitions	
11:30 AM	Lunch + Luncheon Speaker: Dr. Michael Roukes Ballrooms 1 and 2	
1:20 PM — 3:00 PM	**3.** 0.25um BiCMOS Technology Ballroom 3	**4.** Device Physics of Adv. Bipolar Devices Ballroom 4
3:00 PM	Coffee in Ballroom Atrium	
3:20 PM — 5:25 PM	**5.** RF Systems and Components Ballroom 3	**6.** Characterization and Extraction Techniques Ballroom 4
Author Interviews Immediately After Sessions		
7:00PM	Dinner Banquet Radisson Hotel - Scandinavian Ballroom (Across from the Marriott)	
Tuesday — October 2		
8:00 AM — 10:15 AM	**7.** Special Session: Emerging Technology/New Directions Ballroom 3	
10:15 AM	Coffee and Cookies in Ballroom Atrium	
10:30 AM — 11:45 AM	**8.** High Speed Circuit Design Ballroom 3	**9.** 0.18um BiCMOS Technology Ballroom 4
11:45 AM	Lunch / Exhibition Reception in Atrium	
1:50 PM — 3:55 PM	**10.** RF Building Blocks Ballroom 3	**11.** Smart Power and Adv. Power Devices Ballroom 4
Author Interviews Immediately After Sessions		

CALL FOR PAPERS

2002 BIPOLAR/BiCMOS CIRCUITS AND TECHNOLOGY MEETING

DOUBLETREE HOTEL – MONTEREY, CA

http://www.ieee-bctm.org/

Short Course: September 29, 2002, Conference: September 30-October 1, 2002

The Bipolar/BiCMOS Circuits and Technology Meeting (BCTM) provides a forum for technical communication focused on the needs and interests of the bipolar and BiCMOS community. Papers covering the design, performance, fabrication, testing and application of bipolar and BiCMOS integrated circuits, bipolar phenomena, and discrete bipolar devices are solicited. All papers must be suitable for a twenty-minute presentation. Text and figures must not have been presented at other conferences or published in any scientific or technical publications prior to BCTM.

CONFERENCE HIGHLIGHTS

- Short course
- Invited papers on new directions in Bipolar/BiCMOS circuits and technology
- Special session on emerging technologies
- Presentation of the BCTM 2001 Best Student Paper Award
- Vendor exhibits
- CD-ROM complimentary with registration

Papers are solicited in the following areas:

ANALOG/DIGITAL CIRCUIT DESIGN: Analog ICs - Digital ICs - Mixed analog/digital ICs - Novel design concepts and methods - DACs and ADCs - Amplifiers - Integrated filters - Communications ICs - Sensors - Gate arrays - Cell libraries - Voltage references - Analog subsystems within a VLSI chip - Packaging of high-performance ICs.

RADIO FREQUENCY CIRCUIT DESIGN: Low noise amplifiers - Automatic gain control - VCOs Active mixers - Active gyrators - Power amplifiers - Switches - Noise suppression techniques - Frequency synthesizers - Radio subsystems - Packaging of RF components - Designing with integrated passive components at RF frequencies – Optical networking ICs

WIRELINE COMMUNICATIONS: LAN, WAN, FDDI, Ethernet, Metro, Fiber channel, SONET, ATM, ISDN, xDSL, optical data links - Power-line/phone-line networks - Cable modems, broadband circuits - MUX/DEMUX – Clock and data recovery - Error coding and correction - Crosspoint switches - Laser and modulator drivers - Preamplifiers - AGC amplifiers - Decision circuits - Equalizers.

DEVICE PHYSICS: New device physics phenomena in Si, SiGe, and III-V devices - Device design issues and scaling limits - Hot electron effects and reliability physics - Transport and high field phenomena - Noise - Linearity/Distortion - Novel measurement techniques - ESD phenomena.

MODELING/SIMULATION: Improved BJT and HBT models - Behavioral modeling techniques - Parameter extraction methods and test structures - RF and thermal simulation techniques - Modeling of passives, interconnect and packages - Statistical modeling - Device, process and circuit simulation.

PROCESS TECHNOLOGY: Advances in processes and device structures demonstrating high speed, low power, low noise, high current, high voltage, etc. - BiCMOS processes - Advanced process techniques – Si and Si-C homojunction bipolar/BiCMOS devices, III-V and SiGe heterojunction bipolar/BiCMOS devices - Fabrication of high-performance passive components including MEMs.

POWER DEVICES: Discrete and integrated bipolar/BiCMOS power devices, RF power devices, high-voltage ICs - Automotive electronics, disc drives, display drivers, power supplies, electric utility, medical electronics, motor controls, regulators, amplifiers, converters, aerospace electronics - BiCMOS circuits for power device control – CAD/modeling of power devices - Packaging of power devices.

STUDENT PRESENTATION OF PAPERS ENCOURAGED

BEST STUDENT PAPER AWARD: Papers presented by students and based upon their own work will be considered for the Best Student Paper Award if the abstract is identified as a student paper at the time of submission. The award presentation will be made at the 2002 BCTM.

PRE-CONFERENCE PUBLICITY: The accepted summaries will be used for publicity purposes and portions of these abstracts may be quoted in pre-conference magazine articles publicizing the conference. If this is not acceptable, authors must contact Jan Jopke.

FURTHER INFORMATION: BCTM is sponsored by the IEEE Electron Devices Society, in cooperation with IEEE Solid-State Circuits Society and the IEEE Twin Cities Section. All questions or inquiries for further information regarding this conference should be directed to the Conference Manager, Jan Jopke. The 2002 Conference Chair is Hiroshi Iwai, Tokyo Institute of Technology, Yokohama, Japan. The Technical Program Chair is Colin McAndrew, Motorola, Tempe, AZ.

EXHIBITS: BCTM welcomes exhibits by design, test/measurement, and CAD/modeling vendors related to the topics covered by the conference. Please contact Jan Jopke for details.

If you know of people who may have a paper to contribute and have not received this Call for Papers, please bring it to their attention.

IMPORTANT DEADLINES FOR AUTHORS

Friday, March 22, 2002	Receipt of abstract and summary
Monday, May 20, 2002	Notification of acceptance to be mailed
Friday, July 5, 2002	Receipt of proceedings manuscript

PREPARATION OF ABSTRACT AND SUMMARY

Authors may submit an abstract and summary either electronically (PDF **only**), or on paper (55 hard copies). Electronic submission is preferred.

The abstract and Summary must include:

1) Title of presentation
2) Principal author name, affiliation, complete address, telephone and FAX numbers, and e-mail address
3) Person to whom correspondence should be sent, if other than the principal author
4) Identification as regular, invited or student paper
5) Suggested area (Analog/Digital Circuit Design, RF Circuit Design, Device Physics, Modeling/Simulation, Process Technology, Power Devices) in which their abstract best fits
6) A 35 word factual abstract, which will be used (for accepted papers) in the Advance Program
7) A summary of the work to be presented at the conference. The summary should clearly state:
   i) The purpose of the work
   ii) The manner and degree to which it advances the art
   iii) Specific results which have been obtained and their significance

The summary will consist of up to three pages of text on normal letter-size paper with at least 2 cm margins on all sides and at least 10 point type font, and a fourth page of figures, drawings and photos. Those submitting are urged to give a complete account of the work in the context of its application. The most common causes of rejection are lack of specific results, insufficient description for the work to be understood, and omission of data showing realization of the concept. The factual abstract is not used in paper selection. Its only use is in the Advance Program booklet. Abstracts may be edited without consultation to accommodate the Advance Program format. The abstract should be factual without arguments or claims, and contain 35 or fewer words. The factual abstract goes on the first page of the summary, immediately following the title/author block; for hard copy submissions, each of the 55 copies of the abstract/summary should be stapled.

All submissions will be acknowledged. If you do not receive confirmation of receipt of your submission do not assume that it has been received; contact Jan Jopke for verification.

The authors of accepted papers will receive an author kit that will include instructions on preparation of an extended abstract of no more than four pages (including figures, eight for invited papers) for the Proceedings and CD-ROM of the 2002 BCTM. Publication of an Extended Abstract does not preclude a fuller account in an IEEE journal, and authors are encouraged to do so. A Special Issue of the IEEE Journal of Solid-State Circuits will include selected papers from BCTM 2002.

SUBMISSION AND CONTACT INFORMATION

Jan Jopke, CCS Associates, Conference Manager, E-mail: prairie66@qwest.net
6611 Countryside Drive, Eden Prairie, MN 55346, USA TEL 612-934-5082, FAX 612-934-6741

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Monday PM — Ballroom 4
Session chair: Jeroen Paasschens
Co-chair: James Parker

7. Special Session: Emerging Technology/New Directions

Tuesday AM — Ballrooms 1 and 2
Session chair: David Harame

8. High Speed Circuit Design

Tuesday AM — Ballroom 3
Session chair: Dan Mavencamp
Co-chair: Rob Fox