



SOLID-STATE CIRCUITS



IEEE Solid-State Circuits Society Quarterly Newsletter

2000 Symposium on VLSI Circuits

The Symposium on VLSI Circuits will meet 14–17 June 2000 in Honolulu. This year the technical program committee has reviewed close to 200 submissions to the conference and selected 62 papers for presentation at the Symposium. The three days of technical presentations and informal evening rump sessions are a companion conference to the Symposium on VLSI Technology, which precedes it at the same hotel. The one-day overlap in the schedules for the Technology and Circuits meetings features both a short course, “High-speed circuits for optical and

wireline communications” and a Joint Rump Session on “Circuits and system technology in the year 2010.”

The scope of Circuits Symposium covers all aspects of VLSI circuits, such as:

- Circuits for digital, analog, memory, communications, and signal processing applications, including A/D and D/A converters, mixed analog/digital functions, and interface circuits
- Systems and architectures related to VLSI circuits
- Fundamentals related to the above subjects, including innovative circuits and device structures.

- New system-on-a-chip circuit applications such as MEMS

The emphasis is on circuit design. Papers are chosen on the basis of originality and quality. Although the circuits need not necessarily be implemented in a semiconductor chip, measured results, particularly for analog submissions, are key selection criteria. There will be four invited papers on emerging VLSI circuit technologies, including papers on MEMS, ESD, mobile communications and the future of memory.

Paper Sessions

Here is a sampling of the papers scheduled for presentation. For a full

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The 2000 Custom Integrated Circuits Conference (CICC'00)

The 22nd Custom Integrated Circuits Conference (CICC) will be held Sunday, 21 May through Wednesday, 24 May, 2000 in Orlando, Florida. The lineup of events is summarized in Table I. Educational sessions are

presented in four subject areas on Sunday. There will be 21 technical paper sessions composed of 129 papers on Monday through Wednesday in four parallel sessions. In

Continued on page 3 →

Table 1. CICC'2000 Schedule

Sunday, May 21	Education Sessions	9a.m. - 5 p.m.
Monday – Wednesday, May 22–24	Paper Sessions	8:30 a.m. - 5 p.m.
Monday, May 22	Exhibits	2 p.m. - 8 p.m.
Monday, May 22	Open Hospitality Night	5:30 p.m. - 8 p.m.
Tuesday, May 23	Exhibits	11 a.m. - 7 p.m.
Tuesday, May 23	Panel 1	2 p.m. - 4 p.m.
Tuesday, May 23	Happy hour	5:30 p.m. - 7 p.m.
Tuesday, May 23	Panels 2, 3	8 p.m. - 10 p.m.

Fellows for 2000 Announced

See page 6.

ABOUT THE VENUE

The Hilton Hawaiian Village is a lush 22-acre resort on Waikiki's premier beach, conveniently located near Iolani Palace, Pearl Harbor, Waikiki Aquarium, Honolulu Zoo, and Bishop Museum. Guests can enjoy snorkeling, sailing, surfing, windsurfing, scuba diving, and more. Atlantis Submarines offers dives daily. Other amenities include a business center and exceptional dining at Bali-by-the-Sea, Golden Dragon, and 13 other restaurants and lounges. The Rainbow Express Children's Program provides supervised activities for young people.

list of papers, times, etc. please refer to the Advance Program which is available on the VLSI Symposium Web site at www.vlsisymposium.org.

"An 8-Bit/Color 1024 x 768 microdisplay with analog in-pixel pulse width modulation and retinal averaging offset correction," presented by T. N. Blalock of Agilent Labs

"Sub-Picosecond Jitter SiGe BiCMOS Transmit and Receive PLLs for 12.5Gbaud Serial Data Communication," presented by D. Friedman of IBM's T. J. Watson Research Center

"A 5.2-GHz CMOS Receiver with 62-dB Image Rejection," presented by B. Razavi of UCLA

"1.6 Gb/s/pin 4-PAM Signaling and Circuits for a Multi-Drop Bus," presented by J. L. Zerbe of Rambus

"A Single-Chip 2.4GHz Direct-Conversion CMOS Receiver for Wireless Local Loop using One-third Frequency Local Oscillator," presented by K. Lee of Global Communications Technology Inc.

"A bit-line leakage compensation scheme for low-voltage SRAMs," presented by K. Agawa of Toshiba

"A clock distribution network for microprocessors," presented by P. Restle of IBM's T. J. Watson Research Center

"A new model for thermal Channel noise of deep submicron MOSFETs and its application in RF-CMOS design," presented by G. Knoblinger of Infineon Technologies

"A 12b 105Msample/S, 850mW analog to digital converter," pre-

sented by C. Michalski of Analog Devices

"An SOI-BiCMOS RF-transmitter for personal digital cellular Communication (PDC)," presented by S. V. Kishore of Silicon Wave

Invited Speakers

Invited papers are always a high point of the Symposium and focus on both technical information and business implications of technology change by leaders in their fields. This year Dr. Ajith Amerasekera of Texas Instruments will give a presentation on ESD technology for the upcoming years. Dr. Khalil Najafi of the University of Michigan will give an invited paper on the burgeoning MEMS technology area, which has produced and promises to continue to produce innovations based on unique applications of processing technology. In the other talks, Dr. Kiyohito Nagata of NTT will peer into the future of mobile communications systems and Dr. Hwang of Samsung will give an overview of the technology and business aspects of the memory business in the future.

Rump Sessions

Evening Rump Sessions are organized around a controversial topic, and experts are recruited to present their divergent views. All aspects of the issue are explored, and a spirited discussion ensues; active audience participation is encouraged! This year the Rump Session topics for the Circuit Symposium are:

- How to Prosper in a World of Embedded DRAM
- Are Analog CMOS Technologies Near Extinction?

ABOUT THE SYMPOSIA

The VLSI Symposia began in 1981 with the Symposium on VLSI Technology, an international conference on current semiconductor research and development. Its sponsors continue to be the IEEE Electron Devices Society, IEEE Solid-State Circuits Society, and the Japan Society of Applied Physics in cooperation with the Institute of Electronics, Information, and Communication Engineers of Japan. Its intent was to provide an intense but limited-size forum for Japanese and U.S. researchers and engineers to more openly discuss and exchange new ideas and directions. The Symposium on VLSI Technology has alternated each year between sites in the United States and in Japan. In 1987, the first Symposium on VLSI Circuits was held in conjunction with the Technology Symposium in recognition of the growing interest in providing the same small but intense and open forum for discussing circuit and system implementations. For many reasons, these meetings have remained linked to provide opportunities for technologists and circuit and system designers to interact with one another. These interactions are augmented with workshops, invited speakers, and several evening rump sessions. The meetings are organized to give participants substantial time to interact at breaks, meals, and numerous evening events.

VLSI Circuits Short Course

Dr. Behzad Razavi of UCLA has organized an excellent one-day Short Course on Wednesday, 14 June 2000. The topic is "High-speed circuits for optical and wireline communications." The agenda includes talks by noted experts, including:

- "Analog Front End Design for ADSL," Richard Hester, Texas Instruments
- "ADSL Circuit Design," Bernhard Zojer, Infineon
- "Gigabit Ethernet System Overview," Silesh Rao, Level One Communications
- "Gigabit Ethernet Implementation Issues," Kamran Azadet, Lucent
- "Optical Standards Overview," Noboru Ishihara, NTT
- "Broadband Circuits for Fiber," Edi Sackinger, Lucent
- "Overview of Clock Recovery Techniques," Behzad Razavi, UCLA
- "Clock Recovery Circuits for SONET," Yuriy Greshishchev, Nortel Networks

This Short Course is an intense one-day course intended to give attendees an excellent overview of the topic as well as to provide the latest developments in the area. This represents a rare opportunity to have such noteworthy presenters describing work in such timely technical areas and promises to continue the record of successful, engaging, and highly educational Short Courses.

FURTHER INFORMATION

For registration and other information, visit the VLSI SYMPOSIA home page at: www.vlssymposium.org or contact the Conference Managers at:

Secretariat (USA)
Widerkehr and Associates
101 Lakeforest Boulevard
Suite 270
Gaithersburg, MD20877
Tel: +1 301 527 0900
Fax: +1 301 527 0994
Email: vlis98@aol.com

Secretariat (Japan)
c/o Business Center for Academic
Societies Japan, Conference Dept.
5-16-9 Honkomagome, Bunkyo-ku
Tokyo 113, Japan
Tel: +81 3 5814 5800
Fax: +81 3 5814 5823
Email: vlisymp@bcasj.or.jp

- Package Modeling: What Is Needed to Make These Models More Useful?

A closer look at the Rump Session on Embedded Memory gives a good idea of the opportunity these sessions provide for candid discussion of areas of interest by experts in these areas. This session, moderated by Betty Prince of Memory Strategies, will include Masao Taguchi of Fujitsu, Chung Wang of TSMC, Tohru Furuyama of Toshiba, Rob Bicevskis of ATI Technologies, Dinesh Venkatchalam of Level One, and Dick Foss of MOSAID. This group promises a highly informative and controversial discussion in an informal, off-the-record discussion typical of all VLSI Symposia Rump Sessions.

Overlap Day

Another special feature of these Symposia is the one-day overlap in the schedules for the Technology and Circuits meetings. This is an excellent opportunity to meet with members of the opposite discipline to share experiences, frustrations and ideas for future improvements. In addition to these chance meetings, there is also a Joint Rump Session organized by members of both the Circuits and Technology committees. This year's topic is "Circuits and systems technology in the year 2010." ●



Bill Bidermann
2000 VLSI Circuits
Symposium Chair
SSCS Meetings
Committee

IEEE Solid-State
Circuits Society
bill@bidermann.com

CICC'00 *continued*

In addition, there is a keynote session on Monday morning and three panel discussion sessions on Tuesday afternoon and evening. Exhibits from suppliers will be open on Monday afternoon and Tuesday. There will be a Hospitality night on Monday and a Happy Hour on Tuesday evening.

Education Sessions

These sessions are presented by leading industry and university pro-

fessionals that have been invited to provide a broad overview in four major areas of interest. The presentations are tutorial in nature and serve to refresh the practicing engi-

neer's skills in traditional design methods. The four sessions will run in parallel. The titles of the presentations and the presenters are listed here.

1. Selected Topics in System-on-a-Chip

"Wireless system-on-a-chip" *Syed Aon Mujtaba*

"Embedded RAM design and applications" *Betty Prince*

"Functional verification: challenges and solutions for today's SoC device"

Peter Paterson

"Issues in SOI CMOS technology and design" *Ghavam Shahidi*

2. Current Issues in IC Design

"Modeling for circuit simulation" *Colin McAndrew*

"High speed D/A converter design" *Doug Mercer*

Continued on next page →

“Design of pipelined analog-to-digital converters” *Pat Rakers*
“Theory and design of crystal oscillators” *Prof. Eric Vittoz*

3. Wireless

“RF system design” *Peter Kinget*
“Design of front-end circuits for wireless” *Ranjit Gharpurey*
“PLLs and frequency synthesizers” *Thomas Lee*
“RF CMOS devices and circuits” *Tajinder Manku*

4. Broadband communications: Architecture and IC development

“Modem fundamentals” *John Kesterson*
“ADSL arch and IC design - ASIC perspective” *Damien Macq*
“Cable modem: system, architecture and circuits” *Jonathan Min*

Technical Paper Sessions

A total of 129 technical papers will be presented on Monday, Tuesday, and Wednesday in 25 sessions. Included are eight invited papers authored by industry and academia experts. The session topics are:

Monday a.m.

Oversampled Analog-to-Digital Converters

- Advanced Communications Subsystems
- Device and Semiconductor-Process Integration for SOC

Monday p.m.

Test and Reliability

- Key Methods for Successful SoCs
- Innovations in Programmable Devices
- Low-Power Low-Voltage Wireless Systems

Tuesday a.m.

MOS Device Modeling

- System-on-A-Chip: From Concept to Consumer
- High Speed Data Conversion
- Embedded Memory

Tuesday p.m.

High-Speed Data Communication/Storage

- Radio Integration: Architecture, Components and Technology

Wednesday a.m.

Analog Techniques

- Low Power and Dynamic Design Techniques

- Noise Analysis and Circuit Modeling for RF Applications
- Digital and Hybrid Signal Processing

Wednesday p.m.

CAD Methods For Deep Sub-Micron Designs

- IP Development and Protection
- Audio and Visual Signal Processing
- Oscillators, PLLs and Applications

Panel Discussion Sessions

There will be three panel discussion sessions. The first is scheduled in the afternoon on Tuesday. The other two will be held Tuesday evening. Each will have a panel of experts leading the discussion.

1. Timing Closure — Can Synthesis and Physical Design Really Get Along?
2. Outsourcing Design: Blessing or Curse?
3. SOC: Does It Make Dollars and Sense?

Keynote Speech

Computers and Communications convergence in the World of SoC by *Joe Pumo, Motorola*

This talk will provide an overview of the four capabilities that build on one another to make SoC a reality. The four capabilities are Manufac-

turing Technology, Silicon Implementation, Reusable IP Portfolio and System Design.

Luncheon Speech

The luncheon speech provides a diversion from the heavily technical paper sessions. The focus is an entertaining talk to stretch the horizons of the attendees beyond the issues of today's ICs:

Of Hummingbirds and Undiscovered Worlds: Optical Interferometry and NASA's Quest for Habitable Planets

By Dr. Rudolf Danner, Space Interferometry Mission, Jet Propulsion Laboratory.

Exhibits

An exhibit area will provide the latest technical information on new products relevant to the design of integrated circuits. The social events on Monday evening (Open Hospitality Night) and Tuesday evening (Happy Hour) provide an opportunity for attendees to network with their colleagues and the exhibitors.

Additional Information

Registration forms can be downloaded from the website <http://www.ieee.org/conference/cicc>. For additional information and general inquiries about the CICC, please contact the Conference Manager, Melissa Widerkehr, CICC, 101 Lakeforest Boulevard, Suite 270, Gaithersburg, MD 20877. Tel: (301) 527-0900/207. Email: cicc@his.com. ●



Rahesh Kumar
CICC Steering Committee
SSCS Meetings Committee

IEEE Solid-State Circuits Society
rakeshk@cadence.com

Formation of the IEEE Sensors Council

Most electronic devices interface somehow to the "real world"; and the interface essentially is a sensor or actuator, although it may not be called that. Despite the prevalence of sensors today, the IEEE currently has no society that is dedicated to the topic. Many IEEE publications and conferences publish selected papers on sensors and their applications that are relevant to their technical area, but they are usually organized around a particular technology (e.g., semiconductors) and not the problems faced with sensors in general.

The newly formed IEEE Sensors Council hopes to serve the sensor community with new publications, conferences, and technical committees. Its fields of interest and activities are the theory, design, fabrication, manufacturing, and application of devices for sensing and transducing physical, chemical, and biological phenomena, with emphasis on the electronics and

physics aspects of sensors and integrated sensor-actuators. A majority of IEEE societies including the SSCS, have joined the new Council and sent representatives to the first meeting in November 1999. Dr. John Vig, who originally proposed the formation of the Council, was elected president.

The first objective for the new Council is to launch an IEEE publication devoted to sensors. Unlike integrated circuits, where we are observing a concentration on only a few key processes, sensors deal with an ever-increasing variety of physical, chemical, and biological phenomena. The field of interest statement of the proposed journal reflects this variety and includes mechanical, thermal, optical, magnetic, radiation, microwave, chemical, and biological sensors. Also of interest are packaging, interconnects, telemetry, characterization, noise, CAD, and, of course, applications. The proposed journal is quite a bit broader than many other IEEE

publications. This gives it an opportunity to bring together a wide range of expertise; however, a special effort may be required to form a loyal author- and readership.

A new IEEE publication must complete several steps before the first issue is in the hands of the readers. The first step is approval by the IEEE Technical Advisory Board (TAB). The necessary documents are now being prepared and include detailed objectives and a financial plan, which includes a request for a \$100,000 loan from TAB to cover startup expenses during the first three years. After that the publication is expected to be self-supporting. Publication is expected to start in the first half of 2001. ●



Bernard Boser
Representative to Sensors Council

IEEE Solid-State
Circuits Society
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berkeley.edu

Circuits and Devices for RF Wireless Networks: The ISSCC 2000 Short Course on CD-ROM

For the rf circuit designer or experienced analog designer, this course provides an overall perspective of competing Si-based RFIC devices and a detailed description of possible circuit designs of key RF wireless transceiver building blocks 2.4/5.6 GHz and above.

This CD-ROM includes:

1. Complete slideshow and audio of the four presentations of 10 February 2000
2. Bibliographies of relevant papers
3. pdf files of more than 25 of the IEEE papers cited
4. pdf files of the actual presentation slides to print

Presenters:



John D. Cressler,
Auburn
University



Allen Podell
Independent
Consultant



Barrie Gilbert,
Analog
Devices, Inc.



Lawrence Larson,
University of
California,
San Diego

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Call for Nominations for Administrative Committee Election

The IEEE Solid-State Circuits Society invites its members to nominate candidates for the Society's Administrative Committee (AdCom).

Nominations by the Membership

SSCS members can nominate candidates by petition. Nominees will automatically be placed on the ballot provided:

- The nominee is presently a member of the IEEE Solid-State Circuits Society.
- The petition is supported by at least ten identifiable signatures of present members of the Society.
- The nominee is both aware of and agrees to the petition.
- The petition is received by the Chair of the Nominations Committee by 1 May 2000.

Mail petitions to:
IEEE SSCS Executive Office
445 Hoes Lane
Piscataway, NJ 08855-1331

All petitions should be accompanied by a personal photograph and a short biography (200 words or less) including areas of interest.

The Office of Elected AdCom Member

- The term of office is three years beginning 1 January 2001.
- An AdCom member may be reelected to a second consecutive term.
- The five nominees receiving the highest number of votes from the members at large will be elected.

The AdCom oversees the operation of the Society, sets policy and direction and has fiscal and budgetary responsibility. Currently the AdCom meets twice a year, with the

ISSCC in February and in August. Elected AdCom members are expected to attend these meetings. In addition, much of the committee work is carried on by email, telephone, and fax throughout the year.

The Solid-State Circuits Society currently sponsors *The Journal of Solid-State Circuits*, The International Solid-State Circuits Conference, the Custom Integrated Circuits Conference, the VLSI Circuits Symposium, and the Solid-State Circuits and Technology Committee's workshops. In addition, the Society cosponsors or technically cosponsors a number of other conferences and meetings and is involved with other publications.

The SSCS needs enthusiastic and involved members on its AdCom. It is an interesting and valuable experience to the members and of great importance to the success of the Society. ●

SSCS Members Honored as 2000 IEEE Fellows

An IEEE Fellow is a member of unusual distinction in the profession. It is a recognition conferred only by invitation of the Board of Directors upon a person of outstanding and extraordinary qualifications and experience in IEEE designated fields, who has made important individual contributions to one or more of these fields. A nominee must be a Senior Member of the Institute and have been a member in any grade for at least five years prior to the year of election.

A nomination for Fellow must be accompanied by references from at least five current IEEE Fellows. No more than one-tenth of one percent of the total Institute membership may be advanced to Fellow grade in any given year. Each nom-

ination is evaluated by the relevant technical society or council and all nominations are then rated and ranked by the 26-member Fellows Committee. Multiple reviewers produce a composite viewpoint that is used in recommending to the Board of Directors suitable candidates for election to Fellow grade.

IEEE conferred the distinction of Fellow on 248 of its members of the class of 2000. Here are 7 of 22 new Fellows who are members of the Solid-State Circuits Society and received their Fellow Certificates at the ISSCC February 7. The remaining 15 will be introduced in our July issue.

Abbas El Gamal Stanford University Stanford, CA

For pioneering application of probability and statistics to develop

new methods for the analysis and design of integrated circuits.

Abbas El Gamal received the Ph.D. degree in electrical engineering from Stanford University, Stanford, CA, in 1978.

From 1978–1980, he was Assistant Professor of electrical engineering at the University of Southern California. He was on leave from Stanford University from 1984–1988, first as Director of LSI Logic Research Lab, where he developed silicon compilation technology and DSP and image processing ASICs and then as cofounder and Chief Scientist of Actel corporation, an FPGA supplier. From 1990 to 1995, he was a cofounder and Chief Technical



Officer of Silicon Architects, which is now part of Synopsys. He is currently Professor of electrical engineering at Stanford. His research interests include: CMOS image sensors and digital cameras, image processing, FPGAs and mask programmable gate arrays, VLSI CAD, and information theory. He has authored or coauthored over 100 papers and holds 20 patents in these areas.

Mark Alan Horowitz
Stanford University Stanford, CA

For contributions to the design of high-speed digital integrated circuits and systems.

Mark Horowitz received the B.S. and M.S. degrees from the Massachusetts Institute of Technology, Cambridge, in 1978, and the Ph.D. degree from Stanford University, Stanford, CA in 1984, all in electrical engineering.

Since September 1984, he has been with the Computer Systems Laboratory at Stanford University where he is currently the Director and Yahoo! Founders Professor of electrical engineering and computer science. His research area is in digital design. He has led a number of processor design projects at Stanford including MIPS-X, one of the first processors to include an on-chip instruction cache, and TORCH, a statically-scheduled superscalar processor. He has also worked in a number of other chip design areas, including high-speed memory design, high bandwidth interfaces, and fast floating points. In 1990, he took leave from Stanford to help start Rambus Inc., a company that designs high-bandwidth memory interface technology. His current research includes multiprocessor design, low-power circuits, memory design, and processor architecture.

Dr. Horowitz received a 1985 Presidential Young Investigator Award and an IBM Faculty Development Award. In 1993, he received a Best Paper Award at the 1994 International Solid State Circuits Conference.



Ronald W. Knepper
Boston University, Boston MA

For contributions to semiconductor device design, modeling, and circuits.

Ronald W. Knepper received the B.A. degree in physics and pre-engineering from Juniata College, Huntingdon, PA, in 1965. He received the B.S., M.S., and Ph.D. degrees in electrical engineering from Carnegie-Mellon University, Pittsburgh, PA, in 1965, 1966, and 1969, respectively.

He joined the IBM Corporation, Hopewell Junction, NY, in 1969, working in circuit design and device modeling for early FET and bipolar memory and logic chip products. From 1979 to 1991, he was manager of bipolar memory design, process modeling, exploratory devices, and advanced bipolar devices. He contributed to the circuit development and semiconductor modeling of early IBM technologies in SRAM and DRAM memory, CMOS and E/D MOS technologies, and high-speed bipolar cache for mainframe applications. He holds 14 patents and has received several IBM achievement awards for contributions in these areas. In 1991, he became a Senior Technical Staff Member and Senior Manager of technology modeling at the Semiconductor Research and Development Center. During 1994–1995, he was with Stanford University as the IBM Visiting Scholar at the Center for Integrated Systems. Returning to the IBM SRDC Microelectronics in 1995, he worked on technical strategy and competitive technology assessment until his retirement in 1999. He is presently Professor of Electrical and Computer Engineering at Boston University, Boston, MA. Research interests include VLSI technology scaling, interconnect performance modeling, low-power SOI devices, and SiGe BICMOS technology.

Prof. Knepper served on the IEEE BCTM organizing and technical pro-



gram committees from 1989 to 1994 and chaired the modeling subcommittee during 1992–1994. He served as an editor of *Solid-State Electronics* and has been actively involved as an SRC mentor and IBM TAB representative to the SRC/NL CSMS CRADA.

James B. Kuo
National Taiwan University
Taipei, Taiwan

For contributions to modeling CMOS VLSI devices.

James B. Kuo received the B.S.E.E. degree from National Taiwan University, Taipei, in 1977, the M.S.E.E. degree from Ohio State University, Columbus, in 1978, and the Ph.D. degree in electrical engineering from Stanford University, Stanford, CA in 1985.

He was with Penril Data Communications, Maryland, and Racal Vadic, California (1978–1981) as a research engineer working on integrating telecommunication modem chips using CMOS technology. After receiving his Ph.D., he worked as an engineering research associate in the IC Lab of Stanford University, working on BiCMOS devices. Since 1987, he has been with National Taiwan University, where he currently is a Professor. His research expertise is in the field of low-voltage CMOS VLSI circuits and SPICE compact modeling of deep-submicron bulk and SOI CMOS and BiCMOS VLSI devices.

Dr. Kuo serves as a member in the international advisory board of the *IEEE Circuits and Devices Magazine* and Chair of the membership committee for the IEEE Electron Devices Society. He is a Distinguished Lecturer of the IEEE Electron Devices Society. He has published over 100 international journal papers and authored eight books including *Low-Voltage CMOS VLSI Circuits* (Wiley, 1999) and *CMOS VLSI Engineering: Silicon*


Continued on next page →



On-Insulator (SOI) (Kluwer, 1998). He has graduated over 35 M.S. and Ph.D. students specializing in CMOS circuit designs and device modeling who are currently working in leading U.S. and Taiwan's microelectronics companies.

Khalil Najafi
University of Michigan
Ann Arbor, MI

For contributions to biomedical microelectromechanical systems technology.

 **Khalil Najafi** received the B.S., M.S., and Ph.D. degrees in electrical engineering from the Department of Electrical Engineering and Computer Science, University of Michigan, Ann Arbor in 1980, 1981, and 1986, respectively.


From 1986 to 1988, he was a Research Fellow, from 1988 to 1990 an Assistant Research Scientist, from 1990 to 1993 an Assistant Professor, from 1993 to 1998 an Associate Professor, and since September 1998 a Professor and the Director of the Solid-State Electronics Laboratory, Department of Electrical Engineering and Computer Science, at the University of Michigan. His research interests include micromachining technologies, solid-state micromachined sensors, actuators, and MEMS, analog integrated circuits, implantable biomedical microsystems, hermetic micropackaging, and low-power wireless sensing/actuating systems.

Dr. Najafi was awarded a National Science Foundation Young Investigator Award from 1992 to 1997, was the recipient of the Beatrice Winner Award for Editorial Excellence at the 1986 International Solid-State Circuits Conference, and of the 1990 Paul Rappaport Award for coauthoring the best paper published in the *IEEE Transactions on Electron Devices*.

In 1994, he received the University of Michigan's "Henry Russel Award" for outstanding achievement and scholarship and was selected "Professor of the Year" in 1993. In 1998, he was named the Arthur F Thurnau Professor for outstanding contributions to teaching and research and received the College of Engineering's Research Excellence Award. He has been active in the field of solid-state sensors and actuators for more than 15 years and has been involved in several conferences and workshops dealing with solid-state sensors and actuators, including the International Conference on Solid-State Sensors and Actuators, the Hilton-Head Solid-State Sensors and Actuators Workshop, and the IEEE/ASME Micro Electro-mechanical Systems (MEMS) Workshop. He is the Editor of *Solid-State Sensors* for the *IEEE Transactions on Electron Devices*, Associate Editor of the *IEEE Transactions on Biomedical Engineering*, and an Associate Editor of the *Journal of Micromechanics and Microengineering*, published by the Institute of Physics Publishing.

Henry Samuelli
Broadcom Corporation
Irvine, CA

For contributions to VLSI architectures and realizations for high-bit-rate digital communication systems.

 **Henry Samuelli** received the B.S., M.S., and Ph.D. degrees in electrical engineering from the University of California, Los Angeles (UCLA) in 1975, 1976, and 1980, respectively.

From 1980 to 1985, he was with TRW, Inc., Redondo Beach, CA, where he was a Section Manager in the Digital Processing Laboratory of the Electronics and Technology Division. His group was involved in

the hardware design and development of military satellite and digital radio communication systems. From 1980 to 1985, he was also a part-time instructor in the Electrical Engineering Department at UCLA. In 1985, he joined UCLA full-time and is currently a Professor in the Electrical Engineering Department. His research interests are in the areas of digital signal processing, communications systems engineering, and CMOS integrated circuit design for applications in high-speed data transmission systems. In 1988, he cofounded PairGain Technologies, Inc., a telecommunications equipment manufacturer, and in 1991 he cofounded Broadcom Corporation, an integrated circuit supplier to the broadband communications industry. Since 1995, he has been on leave of absence from UCLA while serving full-time as Chief Technical Officer of Broadcom where he is responsible for all research and development activities for the company.

Dr. Samuelli is the recipient of the 1988/1989 TRW Excellence in Teaching Award of the UCLA School of Engineering and Applied Science, the Meritorious Paper Award of the 1991 Government Microcircuit Applications Conference, and the 1995 Best Paper Award from the *Journal of Solid-State Circuits*.

Joannes M. J. Sevenhans
Alcatel Antwerpen, Belgium

For contributions to the design of solid-state telecommunications transceivers.

 **Jan Sevenhans** received the Master's degree in 1979 and the Ph.D. degree in 1984 from the KU Leuven in Belgium.

He has worked at Alcatel Bell since 1987 on analog and RF circuit design for telecom applications in GSM, ADSL, ISDN, POT's,

etc. in CMOS and bipolar technology, focusing mainly on transceiver circuit and architecture design. He started in analog circuit design at Alcatel, where he joined the team on the first single-chip ISDN U-interface with sigma delta switched capacitor a/d and d/a conversion in the analog front-end. The Alcatel ASIC design center was applying sigma delta a/d for speech since the early 1980s. In the late 1980s, he converted the switched capaci-

tor speech circuits to switched current circuit techniques in pure digital CMOS in cooperation with universities in Praag and Oostende. He also did some work on gmC filters for GSM low pass and then went into Silicon RF integration for the GSM zero-IF or Homodyne receivers, which have been in production since 1991. He was also involved in the definition of the first generation ADSL analog front-end for Alcatel. He continued his work

on CCD-imagers for facsimile applications in Imec-Leuven on buttable arrays for X-ray imagers. In 1983–1984 he spent two years in Agfa Gevaert prototyping a video hardcopy machine based on acoustic optical laser modulation rotating in a drum.

Dr. Sevenhans joined the European ISSCC program committee in 1995 and has been on the Technology Directions and the Telecom Subcommittee since 1998. ●

45 SSCS Millennium Medal Recipients Recognized At ISSCC



SSCS recipients of the IEEE Third Millennium Medals are: Rear l-r: Willy M. Sansen, Richard K. Hester, Masaharu Kubo, Ashwin H. Shah, Charles W. Gwyn, Toshiaki Masuhara, Minoru Nagata, Kurt Hoffmann, David Pricer, Asad A. Abidi Middle l-r: Robert G. Swartz, James D. Meindl, William J. Spencer, Stewart S. Taylor, John D. Cressler, Timothy J. Tredwell, Peter W. Verhofstadt, Jack A. A. Raper, Richard C. Jaeger, Alan B. Grebene, Gerhard Fettweis. Front l-r: Joseph Borel, Earl E. Swartzlander, Jr., Richard D. Baertsch, Rudy J. Van De Plassche, John H. Wuorinen, Stephen H. Lewis, Hajime Sasaki, Bruce A. Woolley, Paul R. Gray, John Trnka

Not present: Gary L. Baldwin, Mark Barber, Horst H. Berger, Franklin H. Blecher, Frank W. Hewlett, Jr., Hajime Ishikawa, Paul G. Jespers, John G. Linvill, Robert G. Meyer, Gordon E. Moore, Harry E. Mussman, Takao Nakano, Yasuo Tarui, Michiyuki Uenohara.

The 45 Solid-State Circuits Society recipients of the IEEE Third Millennium Medals were recognized at the ISSCC on Monday, 6 February. The recipients were honored at the reception on Monday evening, with those in attendance receiving their Medals. In addition, John

Linvill, Gordon Moore, and Jim Meindl received their Medals at the ISSCC plenary session for their seminal contributions to the Solid-State Circuits Council, the predecessor of the SSCS. Prof. Linvill was the earliest Council Chair and the first Chair of the Transistor Circuits Conference, the predecessor of the

ISSCC. Prof. Meindl was the founding editor of the *Journal of Solid-State Circuits* and stayed in that position for five years, longer than any other editor. Dr. Moore was the earliest Vice-Chair of the Council and subsequently became its Chair.

Continued on next page →

Millenium Medal *continued*



The Third Millennium Medals were created by the IEEE in celebration of the new millennium. The IEEE left the criteria for awarding the Medals up to each entity. The Society decided to award its allocation of the medals to individuals who have rendered outstanding service to the Society

and Council over the years and who played important roles in their success. 45 Medals were allocated to the Society. While this number does not come close to covering the innumerable persons who have contributed to the Society and its meetings and publications, the Society is pleased to have the opportunity to recognize a number of those whose time and effort have contributed so much to its progress. ●



IEEE Millennium Medals recipients for seminal contributions to the Solid-State Circuits Council, the predecessor of the SSCS are l-r: John Linvill, the first chair of the Council as well as first Chair of the Transistor Circuits Conference, the predecessor of the ISSCC; Gordon Moore, the earliest Vice-Chair of the Council and later its Chair; and Jim Meindl the founding editor of the *Journal of Solid-State Circuits*; are congratulated by President Bruce Wooley.

Review of Fall Workshop on MEMS Interface Circuits

The IEEE Solid-State Circuits and Technology Committee (SSCTC) held its annual fall workshop 14-15 October 1999 in Arlington, VA. The workshop on “MEMS Interface Circuits” was organized by Steve Garverick and Darrin Young of Case Western Reserve University. Presentations were interdisciplinary and included technology, modeling, and simulation of a variety of micro-machined transducers as well as details of interface circuit design for these devices.

The 17 presentations during the workshop were divided into five areas: Electrostatic Actuators, Capacitive Sensors, Modeling and CAD, Wireless Sensing and Communication, and Inertial Sensors. Speakers represented seven international universities, eight corporations, and a government agency.

R. Meier (Texas Instruments) used 3-D graphics to explain the mechanics of a digital micromirror and the technique for biasing it into an unstable position to allow rapid switching according to row-column addressing. K. Fukatsu (Tokimec) and I. Lyusternik (CWRU) described their micromotors with electrostatically

levitated rotors, the former using independent, continuous-time control loops for each of the six control dimensions (x, y, z, and rotation/tilt about each), and the latter using a single, time-multiplexed, discrete-time control loop.

Three presenters described their work in data acquisition from MEMS capacitive sensors. R. Carley (CMU) described an experimental integrated sensor array with $0.02\text{-aF}/\sqrt{\text{Hz}}$ noise spectral density, i.e., 20-aF resolution for 1-MHz signal bandwidth. K. Su (Microsensors) presented a general-purpose, programmable IC for MEMS capacitive sensors that has achieved $4\text{ aF}/\sqrt{\text{Hz}}$ resolution in the presence of relatively large packaging capacitance, employing a combination of switched-capacitor and continuous-time filters that use time-constant multiplier circuits to implement the relatively low cut-off frequencies (e.g., 100 Hz) required by inertial and other sensors. A. Chavan (UM) described an IC that includes five pressure sensors and interface to a general-purpose computer, including an on-chip high-voltage generator for stimulation of the sensors.

The Modeling and CAD area featured presentations by G. Fedder (CMU) and M. da Silva (Microcosm Technologies). Wireless Sensing and Communication included talks by D. Young (UCB), W. Kaiser (UCLA), M. Gaitan (NIST), and C. Hagleitner (SFIT). The session on Inertial Sensors featured N. Yazdi (ASU), L. Spangler (Ford Microelectronics), A. Seshia (UCB), J. Geen (Analog Devices), and M. Shaw (Motorola).

Information regarding this and previous SSCTC workshops has been posted at www.sscs.org/ssctw/. This year's fall SSCTC Workshop will be held Thursday, 12 October and Friday, 13 October 2000, in Arlington, VA at the Key Bridge Marriott. Please refer to the Web page for more details as they become available. ●



Steve Garverick
SSCTC Cochair

IEEE Solid-State
Circuits Society
slg9@po.cwru.edu

The IEEE Solid-State Circuits Society Predoctoral Fellowship for 2000–2001

The IEEE Solid-State Circuits Society is offering a predoctoral fellowship in solid-state circuits for the academic year 2000–2001. The fellowship includes a stipend of \$15,000, tuition and fees up to a maximum of \$8,000, and a grant of \$2,000 to the department in which the recipient is registered.

Applicants must have completed at least one year of graduate study, be in a Ph.D. program in the area of solid-state circuits, and be a member of the IEEE. The award will be made on the basis of academic record and promise, graduate study program, and need.

An application should include these items:

- A short (one-page) biography—Please include your IEEE membership number.
- Academic records—Copies of all relevant undergraduate and graduate transcripts.
- Graduate study plan—This should include a summary of what has been completed and what is planned (about two pages is appropriate). Please include a list of any publications authored or coauthored. A copy of each publication is desirable. Please explain the work to be com-

pleted in the remainder of your graduate study program, why you think it is important, and what is novel about your approach. Finally, indicate how important it is for you to receive this support.

- Letters of recommendation—At least two letters of recommendation are required; one should be from the principal advisor. These letters should address academic record, accomplishments and promise, graduate study research program, and need.

The deadline for submission is 15 May 2000, and the results will be announced by 15 July 2000.

Nominations should be sent to:

Richard C. Jaeger, Chairman
Solid-State Circuits Society Awards Committee
Alabama Microelectronics Center
Electrical and Computer Engineering Dept.
420 Broun Hall
Auburn University, AL 36849
Tel: +1 334 844 1871
Fax: +1 334 844 1888
Email: jaeger@eng.auburn.edu

Chapters News

I am pleased to begin this issue by announcing that six SSCS chapters have been inaugurated since my last column. I'd like to take the opportunity to welcome the following new members: Aachen, Germany (H. Blume); Greece (CAS/SSCS: A. Skodras); Minsk, Belarus (Poland section: S. Mulyarchik); New South Wales, Australia (CAS/SSC: N. Weste); Novosibirsk (student chapter: I. Novikov); and Ukraine (ED/MTT/CPMT/SSC: N. Voitovich). This brings our total strength to 30 chapters. As ever, if you would like to participate in chapter activities please contact the relevant office; address and email information is available at the SSCS home page, www.sscs.org/info/society/chapter.htm. And if you would like to start a new or joint

chapter in your section, you can contact me or Ms. Anne O'Neill of the SSCS office.

The second SSCS Chapter meeting was held during the week of the ISSCC on 9 February 2000 over lunch. Twenty people attended and 10 chapters were represented (Boston, Dallas, Iran, Ireland, Los Angeles, Santa Clara, Seoul, Taipei, West Switzerland, and Zurich). The meeting was a good opportunity for everyone to get to know each other and to share chapter experiences. Anne O'Neill gave a brief presentation about the Distinguished Lecture series and encouraged representatives to take advantage of this unique service provided to chapters at no cost. A list of Distinguished Lecturers can be obtained by sending an email to [ieee.org. Anne also invited the chapters to submit brief write-ups of their activities for publication in the SSCS newsletter.](mailto:info.distlect.ssc@</p></div><div data-bbox=)

Several representatives described their chapter best practices. Peter Kennedy (Ireland) talked about his chapter's membership drive and reported on several technical events it had co-organized. T. Masuhara, reporting on behalf of T. Imamura, described a group of activities sponsored and cosponsored by the Japan Chapter. M. K. Lee and K. S. Yoon provided some background on the Seoul Chapter, which has been involved in educational, professional, and outreach programs. The Seoul Chapter also sponsored the visits of several

Continued on next page →

Distinguished Lecturers, organized local meetings, and arranged the Asia-Pacific Conference on ASICs. P. Yu of the Dallas Chapter talked about his group's activities and mentioned that they had also invited several Distinguished Lecturers. C. K. Wang reported on the International Analog VLSI workshop organized by the Taipei Chapter, and various other projects, such as the organization of circuit design short courses and a membership drive among university students. Finally, A. Abidi talked about the activities of the Los Angeles Chapter and shared his experience of best chapters practices.

New Outstanding Chapter Award

I am pleased to announce that the AdCom approved an "Outstanding Chapter Award" at the February meeting in San Francisco, a prize that aims to acknowledge the excellent work done by the various chapters. It will be given to a chapter that has shown consistently excellent leadership and outstanding initiative in organizing activities. Selection will be based on several factors: the quality and quantity of activities and programs, the accrual of practical benefits for local members, demonstrations of successful outreach to the professional community, and growth in chapter size. Nominations for the award can be made by members of the SSCS Chapters Committee, SSCS AdCom members, or any individual SSCS member. Nominations need to be made using the Chapters Award Nomination form available on the SSCS Web site. All nominations need to be received by 31 April. The award will be given to a Chapter Representative during the week of the ISSCC. The award will consist of a certificate and a check of \$1,000.



Jan Van der Spiegel
*Chapter Chairs
Coordinator*

IEEE Solid-State
Circuits Society
jan@ee.upenn.edu



The meeting of SSCS chapters chairs at the ISSCC 9 February 2000.

Top row, l-r: Paul Yu, Dallas chapter; CK Wang, Taiwan chapter; Asad Abidi, Los Angeles/Orange County; Quiting Huang, Zurich Chapter; Peter Kennedy, Ireland chapter; Jay Rajagopalan, Santa Clara Valley Chapter; Mortara Alessandro, West Switzerland Chapter, Bill Hunt, Ireland Chapter.

Front row, l-r: Jan Van der Spiegel, SSCS Chapters Coordinator; Moon-Key Lee and Kwang S. Yoon, Seoul Chapter; Azhand Movaghar, Vice-Chair Baltimore Chapter; Joe Borel, organizing Grenoble, France chapter; Jonathan David, member SSCS Chapters Committee.

Absent for photo: Sergio Bampi, organizing a Brazil chapter; Ali Fotowat, Shariff University Iran, Faculty advisor; Chris Mangelsdorf, member SSCS Chapters Committee; and Toshiaki Masuhara, Tokyo Chapter.

Activities Report of IEEE/SSCS Beijing Chapter

Activities in 1999

IEEE/SSCS Beijing Chapter is a new chapter that was established in late 1999. The major activities in 1999 have been the organization and establishment of the chapter. Formalities started in June 1999, and the IEEE approved the Chapter in October 1999. Even before the establishment of the IEEE/SSCS Beijing Chapter, all IEEE/SSCS members in China had been participating in academic activities as individuals.

In fact, most IEEE/SSCS members are involved in a variety of activities. For example, Professor Wang Yangyuan served as the Conference Honorary Chair of ICDA2000, one of the eight associated conferences of WCC2000, 16th IFIP World Computer Congress. Professor Tang Xiaofang served as the secretary of WCC2000. Another example is the training course con-

ducted by experts in integrated circuits design. In April 1999, Professor Willy Sansen of KU Leuven, one of the SSCS Distinguished Lecturers, conducted a successful two-week course in Shanghai, China. More than 80 engineers from Chinese industries, including IEEE/SSCS members participated. In August 1999, Professor Zhihua Wang of Tsinghua University conducted a summer short course on structural VLSI design at Tsinghua University. More than 60 engineers from industry and teachers from universities participated in the activity.

The Plans for Chapter Activities

1. To hold a formal election by the members by mail for the officers of an IEEE/SSCS Beijing. A working meeting will be held in August 2000, during the WCC2000, to discuss election plans.

2. To organize training course to be led by one or more invited SSCS Distinguished Lecturers and/or local experts.

3. To participate in the 2000 EDA Technique Competition among graduates students.

Starting in 1996, an EDA Technique Competition among graduates students has been held every two years in China. Competition is by teams. Each university can select one or two teams with three students per team. The two-part competition lasts two days. The first part is an examination that tests each student's knowledge of EDA and VLSI design. The second part requires completion of a design according to a given specification. Each team completes a design, including the necessary documentation and simulation. The score for each team is the weighted sum of

the score of each student for the two parts of the competition. In 1996 and 1998, students from more than 20 universities in China took part in the Competition. The IEEE/SSCS Beijing Chapter plans to participate in the organization of the Competition as a Chapter body.

Activities of the Ireland Chapter Software Radio and Noise in Mixed-Signal ICS

Professor Fred Harris of San Diego State University presented a lecture



Participants at Ireland Chapter Roundtable Discussion on Reliability and Design for Test of Microelectronics. I-r: John Jennings (Xilinx), Peter Kennedy (University College Cork), Paul Furlong (S3), James O'Riordan (S3), Stephen Sunter (LogicVision), Manuel d'Abreu (Level One), Erik Jan Marinissen (Philips), Javier Arguelles (S3).

at University College Dublin entitled "An Easy Trap: Digital Radios are not Digitized Analog Radios." The lecture, which was co-sponsored by the IEEE Signal Processing Society, was videotaped and later shown in Cork.

"Modelling and Simulation of the Interference due to Digital Switching in Mixed-Signal ICs" was the topic of a lecture by Peter Feldmann of Bell Laboratories which was cosponsored by the MTT, AP, ED, and LEOS Societies.

Reliability and Design for Test of Microelectronics

The SSCS Ireland Chapter hosted a roundtable discussion at University College Dublin on "Reliability and Design for Test of Microelectronics."

Panelist Erik Jan Marinissen from Philips Research focused on DFT challenges. Stephen Sunter of LogicVision addressed design for high fault coverage, design for diagnosis, and design for lifetime testing. Manuel d'Abreu from Level One discussed reliability problems resulting from current and future trends in processing technology.

The event was cosponsored by Silicon and Software Systems (S3).

Continued on next page →

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Willy Sansen
Christer Svensson

Other Representatives:
Representative from CAS to SSCS
Eby G. Friedman
Representative to CAS from SSCS
T. R. Viswanathan

Chairs of Standing Committees:

Awards	Richard C. Jaeger
Chapters	Jan Van der Spiegel
Educational Activities	Kevin O'Connor
Meetings	Mark Horowitz
Membership	Stephen Kosonocky
Nominations	Robert G. Swartz
Publications	Richard C. Jaeger

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For detailed contact information, see the Society Web page: www.sscs.org/info/

For questions regarding Society business, contact the SSCS Executive Office.

Contributions for the July issue of the newsletter must be received by 1 May at the SSCS Executive Office.

Anne O'Neill, Executive Director
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445 Hoes Lane, P.O. Box 1331
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Email: sscs@ieee.org

Chapter Chair on the Move

Peter Kennedy, Chairman of the Ireland Chapter, has been appointed Professor of Microelectronics at University College Cork.

ESSDERC Comes to Ireland

ESSDERC 2000, the 30th European Solid-State Device Research Conference, will be held in Cork, Republic of Ireland, 11–13 September 2000. The main themes of the conference include CMOS devices and reliability, micro-systems and packaging, interconnect and integrated passive devices, process and device modeling and simulation, silicon based solid-state devices, and silicon integrated technology and manufacturing. There are also two Short Courses to be held on Reliability for Advanced Technologies and Nanoscale Technology.

Further information can be obtained from www.nmrc.ucc.ie/ or by sending an email to essderc2000@nmrc.ucc.ie.

Regional Meetings

16th International Federation for Information Processing IFIP World Computer Congress 2000

21–25 August 2000

Beijing, China

www.wcc2000.org

International Program Committee

Chair: Benjamin W. Wah (USA)

Vice Chairs: Yang Fuqing (China), Reinhard Posch (Austria)

The main technical components of the Congress will be the following eight federated conferences, together with various keynote and plenary speeches, panels, workshops, Youth Summit, Pioneer Day, a student competition, and a major industry exhibition. Technical visits to Chinese universities and research institutes will be arranged upon mutual interest.

- Communication Technologies
- Chip Design Automation
- Educational Uses of Information and Communication Technologies

- Software—Theory and Practice
- Signal Processing
- Intelligent Information Processing
- Information Technology for Business Management
- Information Security

International Conference on Communications, Computers & Devices ICCCD 2000

14–16 December 2000

Tutorials: 14 December 2000

Indian Institute of Technology, Kharagpur, India

www.iitkgp.ernet.in/ccd2000

Paper deadline: 14 April 2000

The topics of interest include but are not limited to:

- Telecommunications
- Switching and Networking
- Signal Processing
- Computers
- Pattern Recognition & Computer Vision
- Electromagnetics
- Photonics
- Electron Devices & VLSI Circuits
- Emerging & Next Generation Technologies in Communications, Computers & Devices ●

Membership Report

Membership in the Solid-State Circuits Society grew by 8% from December 1998 to December 1999, to a total of 13,237. This puts us third in overall growth compared with all other IEEE societies, following closely behind the IEEE Microwave Theory and Techniques Society at 12% and the IEEE Communications Society at 10.5% during the same period. Clearly the growth of these societies represents industry trends, which have also been reflected in the stock prices of those companies working in those areas over the past year.

Growth in the Solid-State Circuits Society has also come from very successful promotions at our conferences. With the very kind help of Linda Dreisbach, the EDS/SSCS membership promotion at the 1999 IEEE International Electron Devices Meeting this past December recruited 109 new SSCS and EDS members. With Linda's help, we've been able to continue offering staffed membership desks at our major conferences.

Tell Us What You Think

Have you visited the Solid-State Circuits Society Web page lately (www.sscs.org/info)? Let us know what you think. If you have any suggestions on how the Society can better serve its members or what you would like to see on the web page, send an email to sscs@ieee.org.

New SSCS Senior Members

Congratulations are extended to the following SSCS members for their recent promotion to IEEE Senior grade:

Ching-Yuh Tsay

Jie Si

Dietrich W. Vook ●



Steve Kosonocky
Membership Chair

IEEE Solid-State
Circuits Society
stevekos@us.ibm.com

Events Calendar *continued from page 16*

Also posted on www.sscs.org/meetings

Technically Cosponsored Meetings

AP-ASIC

Asia-Pacific Conference on ASICs

www.ap-asic.org

28-30 August 2000

Cheju, Korea

Deadline for submission of camera-ready pdf papers:

30 March 2000

Contact: AP-ASIC'00

Research Institute of ASIC Design

Yonsei University, Seoul, Korea

Tel: +82 2 361 3523

Fax: +82 2 364 8162

Email: asic2000@ap-asic.org

ESSCIRC 2000

European Solid-State Circuits Conference

www.eescirc.org

19-21 September 2000

Kista Technology Park, Stockholm, Sweden

Paper deadline: 7 April 2000

Contact: Hannu Tenhunen

Royal Institute of Technology

Kista, Sweden

Tel: +46 8 752 1142

+46 70 733 5748

Fax: +46 8 752 1140

Email: hannu@ele.kth.se

BCTM: IEEE Bipolar/BiCMOS Circuits and Technology Meeting

ectm.et.tudelft.nl/www/BCTM/

24-26 September 2000

Minneapolis Marriott City Center

Minneapolis, MN

Contact: Janice Jopke

CCS Associates

Eden Prairie, MN

Tel: +1 612 934 5082

Fax: +1 612 934 6741

Email: jopke@aol.com

GAASIC

Gallium Arsenide Integrated Circuits Symposium

www.gaasic.org

5-8 November 2000

Westin Hotel, Seattle, WA

Paper deadline: 12 May 2000

Contact: James J. Komiak

Sanders, A Lockheed Martin Co.

Nashua, NH

Email: james.j.komiak@lmco.com

2001 VLSI-TSA

International Symposium on VLSI Technology, Systems, and Applications

www.erso.itri.org.tw/VLSI-TSA/

18-20 April 2001

Taipei Taiwan, R.O.C.

Paper Deadline: 20 October 2000

Contact: Ran-Hong Yan

Lucent Technologies

Holmdel, NJ

Tel: +1 732 949 7695

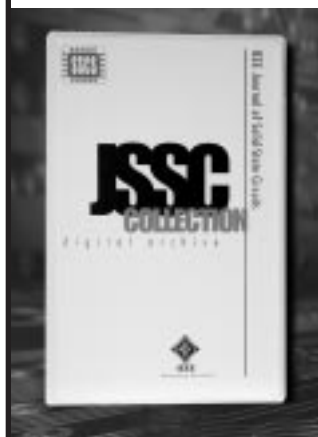
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SSCS EVENTS CALENDAR

Also posted on www.sscs.org/meetings

2000 CICC

Custom Integrated Circuit Conference

www.his.com/~cicc/

21–24 May 2000

Caribe Royale, Lake Buena Vista, FL

Paper deadline: passed

Contact: Ms. Melissa Widerkehr
Widerkehr and Associates
Gaithersburg, MD

Tel: +1 301 527 0902

Fax: +1 301 527 0994

Email: cicc@his.com

2000 Symposium on VLSI Circuits

www.bcasj.or.jp/vlsi_sym/

14–17 June 2000

Hilton Hawaiian Village, Honolulu, HI

Deadline for receipt of summaries: passed

Contact: Ms. Melissa Widerkehr
Widerkehr and Associates
Gaithersburg, MD

Tel: +1 301 527 0902

Fax: +1 301 527 0994

Email: vlsi00@aol.com

Contact: c/o Business Center for Academic
Societies Japan, Conference Dept.
5-16-9 Honkomagome, Bunkyo-ku
Tokyo 113-8622, Japan

Tel: +81 3 5814 5800

Fax: +81 3 5814 5823

Email: vlsisym@bcasj.or.jp

2001 ISSCC

International Solid-State Circuits Conference

www.isscc.org

Monday–Wednesday, 5–7 February 2001

San Francisco Marriott Hotel, San Francisco, CA

Paper submission deadline: 8 September 2000

Contact: Courtesy Associates
Washington, DC

Tel: +1 202 331 2000

Fax: +1 202 331 0111

Email: ISSCC@courtesyassoc.com

2000 SSCTC Workshop

www.sscs.org/ssctw/

Thursday–Friday, 12–13 October 2000

Key Bridge Marriott, Arlington, VA

Contact: Suzanne Demarie
Courtesy Associates
Washington, DC

Tel: +1 202 331 2000

Fax: +1 202 973 8722

Email: SSCTC@courtesyassoc.com

Continued on page 15

**The 1998-99 JSSC CD-ROM will be
mailed to SSCS members in May.**

Send corrections of your address along
with your member number to:

address-change@ieee.org

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