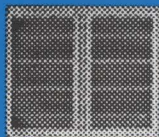


Solid-State Circuits



Newsletter

Volume 1 Number 4

October 1996

Message From The President

Robert G. Swartz *rgswartz@visa.com*
President IEEE Solid-State Circuits Council

By now, I hope you are cognizant that something special is happening at the old IEEE - a new society is being formed - the Solid-State Circuits Society. Why is this special? Many (most?) of us take for granted the technical services that the IEEE provides. Do you need information on the latest developments in your field, or an introduction to a new field? Just get a paper from the ISSCC Digest or the Journal of Solid-State Circuits, or grab a back issue of Spectrum. Want to catch up on the latest developments? Head for the conferences - ISSCC, CICC et al. Or attend a workshop or short course. Do you want to disseminate your ideas or share in some glory for a job well done - send a paper in yourself! The point is, the IEEE is the professional network that provides the muscle and sinew that links our technical community.

How does all this happen? Well, it happens because you care enough to participate in and support these activities, and because interested volunteers get together to make things happen. If you are an IC designer, then this has been pretty much a hit or miss proposition. At the national and international level, technical activities spring up - sometimes you find out about them, sometimes you don't. Sometimes they conflict among themselves or with other of your activities - you have no say. Sometimes they're too expensive, too remote, or just focus too much on things

you don't care about, while overlooking topics of greater interest. On the local level, the situation is worse. There are no organized local activities for IC designers outside of the universities and a few dedicated, isolated groups. And what local activities exist are themselves isolated.

The new Solid-State Circuits Society (SSCS) is being formed to address these and other issues. Let's open a dialog here. What would you like to see the SSCS do? Are there technical areas that you feel are not adequately covered? Is information accessible enough to you? Would you like to see the development of new educational opportunities in the design arena? Are you interested in better networking with your colleagues? What kind of local activities would you like to see? Are there novel ways that we could use the Internet to help out or add value for you? Send me your comments - I'm all ears!

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The Institute of Electrical and Electronics Engineers, Inc

Message from the President.....continued

Elsewhere in this Newsletter, you will see the results of the first elections for members of the Administrative Committee of the Solid-State Circuits Society. The elected representation is truly international (two from the U.S., two from Europe, one from Asia), covering a range of disciplines and experience. I offer my congratulations to the newly elected candidates, and thanks to all of the candidates who agreed to run, and to those of you who voted. The slate was uniformly an outstanding representation of leaders in our field.

In the last issue of the Newsletter, I asked you to comment on initiatives to offer Society publications on CD-ROM and on the World Wide Web. I received several e-mail responses. Most people wanted to proceed with CD-ROM publication of the journals. Thoughtful suggestions were that publication be frequent, that the CD information be searchable, and that it include previous years' publications. In a future issue of this Newsletter, I will ask our Society's Publications Chair to address the technical and economic issues of CD-ROM publishing. In general, everyone who commented was enthusiastic about web publication. I think this will come soon, once we have worked out protection of the electronic intellectual property, and have made sure that the Society can recover the costs of publishing its journals.

That's it for now. Please remember to send in your IEEE membership renewal.

1996 Election Results

David Pricer *dpricer@vnet.ibm.com*
Nominations Chair

Let me thank each of you who took the time and effort to vote in the Solid-State Circuits Society's first ever election. As many of you confided in me, the choices were not easy!

Robert Wangemann, IEEE Technical Activities, who supervises the mailing, receipt and counting of ballots reports the following candidates have been elected:

Nicky Lu
Chris Mangelsdorf
Willy Sansen
Eric Vittoz
Bruce Wooley

All five will take office beginning January 1, 1997 to serve for a period of three years as your representatives. During the following two years you will have the opportunity to elect a total of ten more representatives. At the completion of the phase-over in 1999; the last vestiges of Council government will be gone; and the Solid-State AdCom will be fully populated with an all-elected form of government.

Each of the elected candidates has a high degree of visibility within the solid-state community, and a general demeanor of approachability. I urge you to use THEIR services as a conduit for YOUR ideas and suggestions.

1,153 ballots were returned including 28 write-in votes. Your Nominating Committee had begun the ballot preparation process this past spring by assembling a list of 71 qualified potential candidates.

Most of the write-in names already appear on the list of 71. Nine names were either new to us, or overlooked in the original compilation. I will add these names to our resource list. Thank you for these suggestions.

I want to thank all of our candidates for agreeing to allow us to place their names on the Solid-State ballot. Engineers are notoriously reluctant to run for elected office. All of the candidates this year faced the challenge bravely.

ISSCC97 Preview

Richard K. Hester *hester@hc.ti.com*
1997 ISSCC Program Chair

Activities

The forty-fourth International Solid-State Circuits Conference activities will be held Tuesday, February 4 through Saturday, February 8, 1997. The lineup of events is summarized in Table 1. Two sessions of the short course are scheduled, accommodating up to 250 attendees. Tutorial lectures are presented in six subject areas. Three sessions of each of the six lectures are scheduled to accommodate up to 270 attendees. Twenty-five technical paper sessions comprising a total of 164 papers are planned. There are four papers in the Plenary Session, and 143 regular papers and 17 short papers in the 24 regular sessions. A total of nine panel discussion sessions will be held on the first two evenings of the conference. A social hour on Thursday afternoon completes the program.

Table 1: ISSCC97 Activity Schedule

Short Course

Tuesday, Feb. 4
8:00 am - 4:30 pm and 10:00 am - 6:30 pm

Tutorials

Wednesday, Feb. 5
8:00 am, 11:00 am and 2:00 pm

Paper Sessions

Thursday - Saturday, Feb. 6-8
8:30 am - 5:15 pm

Evening Panels

Thursday-Friday, Feb. 6-7
8:00 pm - 10:00 pm

Social Hour

Thursday, Feb. 6
5:00 pm - 6:00 pm

Conference Operations and Improvements

The magnitude of ISSCC has grown significantly over the past five years. In particular, the number of technical papers has increased about fifty percent, necessitating five parallel sessions. In addition, the popularity of the short course and the tutorials has exceeded even the most wildly optimistic predictions. This success has increased the need for hotel meeting space, and because contracts for hotel space must be signed up to seven years in advance, growing pains have been inevitable. However, each year the conference has been able to secure additional space, and, with one possible exception, there is every reason to believe that those growing pains are finally behind us. The one exception is the short course. At this writing a third session is impossible due to meeting space limitations.

Another ISSCC growing pain is dealing with the registration process complexity brought on by oversubscribed short course and tutorials. Multiple sessions of these events are scheduled in order to maintain a size where all can see the projector screen and where audience questions are possible. In prior years, when a requested session was filled, subsequent requests were shifted to the next open session without the knowledge of the attendee. This year, all tutorial and short course attendees will receive a notice confirming their registrations and providing the starting times of the sessions to which they are assigned.

In prior years the IEEE provided a technical book sales display. This year there are up to a dozen book

vendors setting up display booths in the Hill Rooms across the main hallway from the technical sessions.

Short Course

The title of the ISSCC97 Short Course is *RF Design for Personal Communication Systems*. It is a tutorial on RF circuit design providing an overall perspective of and detailed introduction to design of CMOS wireless transceiver systems. The short course consists of four 90-minute lectures. Table 2 lists the four lecturers and the titles of their talks. My own biased opinion is that this short course will be the best yet and should be over enrolled no matter how many sessions are arranged. At this time two sessions are confirmed and negotiations with the hotel for space for a third are in progress.

Table 2: Short Course Titles and Lecturers

Architectures and Technologies for CMOS RF Transceivers
Paul Gray, UC Berkeley, CA

Design of Low-Noise Amplifiers in Silicon IC Technology
Tom Lee, Stanford, CA

Integrated Voltage-Controlled Oscillators and Synthesizers
Michiel Steyaert, Katholieke U. Leuven, Belgium

Mixers and Modulators
Prof. Asad Abidi, UC, Los Angeles, CA

Tutorials

The lecturers and the titles of their presentations are shown in Table 3. All six will be presented in parallel, so it is possible to register for any combination of three. In order to reduce the registration office burden, session assignments will be made by order of receipt, filling the 8AM sessions first, the 11AM sessions next and the 2PM sessions last. Last year two of the tutorial subjects were so popular that fourth sessions were hastily organized. There is no plan to offer four sessions at this writing.

Table 3: Tutorial Titles and Lecturers

Practical Design for Analog Discrete-Time Processing
Donald Kerth, Crystal Semiconductor, Austin, TX

Clock and Data Recovery for Serial Digital Communications
Richard Walker, Hewlett-Packard, Palo Alto, CA

Microprocessor Architecture: RISC Evolution into Super-Scalers
Vojin Oklobdzija, UC Davis, CA

New DRAM Architectures
Steven Przybylski, Consultant, San Jose, CA

Making MEMS Real: Beyond the Microstructure
Jean-Paul Bardyn, CSEM, Neuchâtel, Switzerland

Circuit and Technology Trends for Low-Power/ High- Performance DSP
Anatha Chandrakasan, MIT, Cambridge, MA

Technical Paper Sessions

Three of the four papers in the Plenary Session are closely coupled to this year's conference theme, "Multimedia." Joseph Borel from SGS-Thomson will describe the technology platform concept that provides early and efficient use of the latest silicon technologies in a talk entitled, "Technologies for Multimedia Systems on a Chip." Hiroshi Yasuda from NTT will describe his vision of the realization of Internet multimedia services in "Multimedia Impact on Devices in the 21st Century." In the third multimedia related talk, "The Network Computer and Its Future," Bob Brodersen from UC Berkeley will describe how the university InfoPad research program has taken the first step toward the ideal network computer. The fourth talk is a commemoration of the 50th anniversary of the invention of the transistor. William Brinkman from Lucent Technologies will review the history of the invention and forecast the future of the transistor in his talk, "50 Years Down and 50 Years to Go: A History of the Invention of the Transistor and Where It Will Lead Us."

Thirty-seven papers (10 short) in five sessions organized by the Analog Program Subcommittee represent, perhaps, its largest ISSCC analog program ever. The session titles are Filters, Data Converters, Oversampling Data Converters, Amplifiers and Analog Techniques. Some of the session highlights are the high-speed, high-resolution ADCs in the Data Converter Session on Friday morning, the low-power and very-high-resolution oversampled converters in the Oversampled Data Converter Session on Friday afternoon, and the very-low-voltage filters in the Filter Session on Thursday afternoon.

The Communications Program Subcommittee has organized five sessions containing 31 papers (2 short). The session titles are Communication Building Blocks I and II, ATM/SONET, Serial Data Communications and Wireless Transceivers and Receivers. These sessions reflect the phenomenal

amount of activity in RF integrated circuits. Some of the highlights are the 2.2GHz BiCMOS mixer-oscillator and the 4GHz GaAs modulator in the two building block sessions, as well as the highly integrated CMOS DECT chip in the wireless session. CMOS is also used in the 1.0625 fiber-channel transceiver in the serial data session and the 40Gb/s ATM switch element in the ATM/SONET Session.

The Digital Program Subcommittee has assembled 20 papers in three sessions. Its High-Performance Microprocessor Session promises to be one of the most popular at the conference. It contains seven outstanding papers from virtually all the major players, attesting to the relentless performance increases in all four major processor architectures (Alpha, x86, PowerPC and Sparc). The estimated 40 SpecInt95 performance of the 600MHz Alpha is more than twice the performance measure ever reported at ISSCC. Three of the papers in this same session describe chips with multimedia extensions built into their cores. In addition, the Processors and Logic as well as the Clocking and IO Sessions have several significant papers describing design techniques for improving performance and lowering I/O power dissipation.

The number of Memory paper submissions this year are rather light, presumably due to the financial pressures currently facing that business. Despite this, there are six papers presented in each of the two excellent memory sessions: DRAM, and Non-Volatile Memories and SRAMs. The DRAM session presents a 4Gb chip that uses multilevel storage (2b per cell). Also significant are the DRAMS with very-low-voltage operation (0.8 - 1.0V). The Non-Volatile Memories and SRAMs Session contains impressive papers reporting very-high-speed 4Mb SRAM chips.

The Sensors, Imagers and Displays Program Subcommittee has organized two sessions with a total of twelve papers. The Imaging Circuits and Systems Session features the world's smallest active pixel sensor, a 4-million-element active pixel imager and an analog image compression system. Particularly notable in the Sensors Session is the 3-axis accelerometer.

The Signal Processing Program Subcommittee presents three sessions containing a total of 22 papers. A programmable DSP chip operating with a supply voltage as low as 0.6V sets a new standard for power per MHz instruction rate, and a hearing aid IC dissipates only 2mW from a single 0.9V battery. Both papers are in the Low-Power and Mixed-Signal Processors Session. Four papers in the Disk-Drive Signal Processing Session report the implementation of advanced read-channel algorithms that will

increase storage density as well as data rate. Equally impressive real-time MPEG2 encoding/decoding chips are presented in the Video and Multimedia Signal Processors Session.

Four Technology Directions sessions with a total of 24 papers are planned. Two Si/SiGe papers in the Silicon Germanium and Quantum Electronics set speed records. One reports a 42GHz frequency divider, and the other an 8GSample/s 4b analog-to-digital converter. Two papers in the Low-Power, Low-Voltage Circuits session describe RF chips that derive their power from the RF carrier energy in the signal transmitted to them. Applications are self-powered identification transmitters and smart-cards.

Evening Discussion Panels

This year there are a total of nine evening discussion sessions. The titles and moderators are listed in Table 4. All address important and controversial issues, and it is difficult to predict which will turn out to be the most entertaining, informative, or significant.

Table 4: Evening Discussion Sessions and Moderators

Thursday

Analog Versus DSP for Disk Drives
Richard Spencer, UC Davis, CA

RF Designers Are From Mars;
Analog Designers Are From Venus
Behzad Razavi, UCLA, Los Angeles, CA

Multimedia Networking: Wireless, Cable or Telco?
David Goodman, Rutgers U., New Brunswick, NJ

What DRAM Architecture Will Succeed the Synchronous DRAM
Nicky Lu, Etron, Hsinchu, Taiwan

Friday

"To Be EE or Not to Be?"
or "Will I be Enjoying Engineering in 10 Years?"
Eric Fossum, Photobits, Milpitas, CA

Synchronous Versus Asynchronous Design
Teresa Meng, Stanford, CA

The Future of the Net Computer and Its Impact on Microprocessors
Nick Tredennick, Tredennick Inc., Los Gatos, CA

DRAM + Logic Integration:
Which Architecture and Fabrication Process?
Osamu Kimura, NEC, Sagamihara, Japan

Is CMOS Ever Going to Make It in RF?
Russ Apfel, Consultant, Austin, TX

Summary

By all measures, the 1997 ISSCC program stacks up as an excellent one. There is a critical mass of papers in all areas to keep any attendee busy. In addition, the overall quality of the papers is outstanding. Deep down inside, I know that the Program Chair has precious little to do with such things. The ISSCC has a lot of history and momentum going for it that account for its stature among conferences and its great program this year. Nonetheless, I am quite proud to have my name associated with the program of the 1997 ISSCC.

SSCC/SSCS - ISSCC WEB Update

John Trnka trnka@vnet.ibm.com

The Solid-State Circuits Council (Society) is maintaining a home page on the World-Wide-Web at <http://www.sscs.org/>. This page can also be accessed from the "IEEE Technical Societies" reference at the IEEE home page <http://www.ieee.org/>, and then selecting "Solid-State Circuits Council". ISSCC is also available at <http://www.isscc.org/>, from the SSCC/SSCS page under "Conferences - Supported", or from the conferences reference at the IEEE home page.

A copy of this newsletter as well as previous ones can be viewed directly on the WEB by selecting the "Newsletter" under "Publications" from the SSCC/SSCS homepage.

A "What's New" section has been added to help identify updated sections more quickly. Also, an abbreviated index has been added to the top of the page. If you know where you want to go, this will help you get there faster by selecting the title from the list rather than paging down the screen. This update is available on both SSCC/SSCS and ISSCC home pages.

Information about the February workshop is available under the "Conferences - Supported" section. The 1997 Advance Program is also available from the ISSCC page, as well as registration information.

Links to related conferences have been expanded to include other IEEE conferences of interest. If you are aware of an IEEE conference of interest that is not referenced here, please send a note to: trnka@vnet.ibm.com. Other updates, additions, or suggestions are welcome as well. Many of the homepage enhancements this year were from mailed in suggestions!

Membership

Charles (Chuck) W. Gwyn
 gwyncw@smtplink.mdl.sandia.gov

In September, you should have received your 1997 IEEE Membership Invoice for renewing your membership. As noted on the form, your renewal fee automatically includes the free Solid State Circuits Society membership if you subscribe to the Journal of Solid-State Circuits (Refer to section 2 of the form). If you are not a subscriber, you can join the new Society and receive your own copy of the Journal for the normal Journal subscription fee of \$14 by adding the new society membership and publication designation in section 3 of the membership invoice form. When you renew your membership, please update your Technical Interest Profile to indicate your present technical interests. Also note the special publications available to you as a member of the new society. These optional publications are listed on page 12 of the "IEEE 1997 Guide to Renewal," provided with your invoice.

New Membership Drive

During the ISSCC in February, the Society plans to hold a special membership drive to encourage non-members to join IEEE and the new Society. Non-member conference registrants will be able to join IEEE and the Solid State Circuits Society during the conference at the IEEE Membership Desk located in

Present Journal subscribers are →
 automatically listed as members
 of the new Society

Non-Journal subscribers →
 add the Society membership with
 Journal subscription

the Registration Center. If you register and pay for the conference as a non-member you will receive a credit voucher that can be used towards your payment of IEEE and SSCS memberships. Students registering at the student non-member rate will receive a credit voucher that will entitle them to one-year of free IEEE and SSCS memberships. Credit vouchers are only valid at the ISSCC and must be redeemed at the IEEE/SSCS Membership Desk. Membership applicants must complete the IEEE Membership Application form and provide the name of an IEEE member as a reference.

Help needed!

The Solid-State Circuits Society is providing a membership table during the ISSCC and needs volunteer help to enroll new members. If you can provide help during the conference, please contact me by email at gwyncw@smtplink.mdl.sandia.gov, and note the hours during the regular 8:00 am to 5:00 pm sessions that you will be available.

1997 IEEE Membership Invoice						
MEMBERSHIP YEAR: JANUARY - DECEMBER 1997						
MEMBER NO.	GRADE	BILLING DATE	INVOICE NO.	REGION	Instructions	
					1. Update address on "Return" invoice and send to: 2. To make a donation, cross off the entire line including the price. Reminder: You cannot obtain a society membership if you subscribe to that Society's publications. 3. To make an addition, use the "Add New Society" section. New publications offered by your Society are listed here and described in the brochure. 4. Record your "Total Amount Due" and indicate "Amount Paid".	
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037-4101	IEEE Dues & Regional Assessment Solid-State Circuits Soc (Include: Jnl SSC)			1	14.00	14.00
				SUBTOTAL AMOUNT ---		
ADD NEW SOCIETY MEMBERSHIPS OR PUBLICATIONS HERE						
037-4101	Solid-State Circuits Soc (Include: Jnl SSC)			1	14.00	14.00
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IEEE Fellow Nominations

Lew Terman *terman@watson.ibm.com*

The IEEE Fellow grade is a very important honor. It is conferred upon persons with outstanding accomplishments in the fields of interest to the IEEE. Each year no more than 0.1% of the IEEE membership can be elected to Fellow. Nominees must be IEEE members for 5 years and a Senior Member (nomination for Senior Member can be done in parallel with the Fellow nomination. The Fellow nomination deadline is March 15, 1997. The nomination kit, including the nomination Guide booklet, and further information can be requested from the IEEE: *j.kilyk@ieee.org* 908-562-3843.

The Solid-State Circuits Council has been evaluating around 8-10 nominations each year. We feel the circuit community is far larger than that number would indicate, and we would like to see the number of nominations increase.

In completing the nomination form, it is highly advisable to work with the nominee. Cutting and pasting of computer printout on the form is acceptable and recommended.

Pages 2 and 3 are the heart of the nomination form; on page 2 you make the case for Fellow, and page 3 is for supporting documentation. While Section 6A asks for the most significant single contribution. "Contribution" can be interpreted reasonably broadly. It is my experience that peaks of accomplishment carry far more weight than a larger number of lower level accomplishments. Thus, this section should be sharply focused on specific outstanding work, but it should be broad enough to encompass as much of the nominee's best work as possible. In any case, specific details of the work and its impact should be given. If the nominee's work was done as a member or leader of a team, it is essential to delineate the contribution of the nominee from that of the rest of the team.

Section 6B asks for explanation of why the contribution is significant and represents Fellow-level performance. This may seem to overlap Section 6A. Don't worry about it. Again, be detailed.

Section 6C is for other contributions. Give details. This is a good place to summarize the total number of papers and issued patents of which the nominee is author or co-author.

Page 3 is for tangible and verifiable evidence of technical accomplishment. Part 1 is for the 3 most important papers, patents, product development, etc.

Each of the 3 should be accompanied by a sentence or two which explains its importance. This section should include the three items that give the best support for the case made on page 2.

Part II on page 3 is for up to 15 more items. Don't worry if you don't have room for 15 items. It is more important to include 1-2 sentences with each item which explains its importance/impact. It is desirable that this section support page 2, but it is also desirable that it show any other important work.

On Page 4, Sections 8 and 9 are for IEEE and non-IEEE activities. Don't worry if these sections are blank. Fellow grade is not awarded for professional activities. Section 10 is a list of the references. They must be IEEE Fellows, and between 5 and 8 are needed. No more than half should be from the nominee's employer. It is important that the references are enthusiastic supporters of the nomination; thus, someone (not the nominee) should contact potential references to sound out their enthusiasm and willingness. Each reference should be sent a copy of the completed nomination form with the blank reference form.

Send the IEEE Society or Council that will be evaluating the nomination the blue society evaluation form, and a copy of the final nomination. For the Solid-State Circuits Society:

Lewis Terman,
 IBM T.J. Watson Research Center
 P.O. Box 218
 Yorktown Heights, NY 10598
 (Route 134 at Taconic Parkway for express delivery)
terman@watson.ibm.com (914-845-1358 (Fax))

If the deadline is getting close for you or the references, it is acceptable to fax the completed form to the IEEE before the deadline with the original received by mail after the deadline.

These are some general thoughts on IEEE Fellow nominations. I hope they will have the effect of stimulating nominations. If you have any questions, feel free to contact me.

IN MEMORIAM
*In recognition of contributors to
 SSCC who have passed away.*

William H. Herndon, Palo Alto, CA. June 1996
 1989 ISSCC Technical Program Chair

Roy C. Flaker, Essex Junction, VT. Sept. 1996
 1997 ISSCC Program Committee member

Meetings Calendar

Charles G. Sodini
Sodini@mtl.mit.edu

ISSCC

February 6-8 1997 San Francisco, CA
Contact: Diane Suiters 202-639-4255

CICC

May 5-8, 1997 Santa Clara, CA
Contact: Melissa Widerkehr 301-527-0902

Symposium on VLSI Technology

June 10-12, 1997 Kyoto, Japan
Contact: Melissa Widerkehr 301-527-0900

Symposium on VLSI Circuits

June 12-14, 1997 Kyoto Japan
Contact: Melissa Widerkehr 301-527-0900

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