



**IEEE
SOLID-STATE
CIRCUITS SOCIETY™**
IC Innovation

January 2021

Upcoming Webinar

Advances in Clocking for Energy-Conscious IoT Systems

Presented by Prof. Sudhakar Pamarti, University of California, Los Angeles
January 15th, 2021 at 11:00 AM ET



Abstract - Clocks play a central role in IoT devices. Apart from their typical use in communications, localization, timing mixed-signal and digital logic units etc., they also serve as an always-ON time-keeper and provide timing for aggressive duty cycling of power-hungry blocks. The last two use cases have a great impact on overall system energy consumption of several IoT devices, and require clocks that are simultaneously stable and consume low energy. This talk will describe two recent techniques that lower energy consumption in stable crystal oscillators: one via quick startup of the XO and the other via a very low energy sustaining circuit.

Speaker Bio - Dr. Sudhakar Pamarti is a Professor of Electrical and Computer Engineering at the University of California, Los Angeles. He received the Bachelor of Technology degree from the Indian Institute of Technology, Kharagpur in 1995, and M.S. and Ph.D. degrees in electrical engineering from the University of California, San Diego in 1997 and 2003 respectively. He has either worked for, consulted with, or advised both software and hardware companies such as Hughes Software Systems, Rambus Inc., SiTime, Alterra, FemtoDx etc. on various aspects of wireless and wireline communications, and analog, mixed-signal, and RF integrated circuit (IC) design. His research focuses on developing various techniques, especially signal processing ones, to overcome common impairments in ICs. This includes both establishing the theoretical basis of such techniques as well as demonstrating their efficacy using record setting prototype ICs. Dr. Pamarti is a recipient of the National Science Foundation's CAREER award. He currently serves on the technical program committees of CICC and ISSCC, as a Solid State Circuits Society Distinguished Lecturer, and has, in the past, served as an Associate Editor for both Parts I and II of the IEEE Transactions on Circuits and Systems, and as a Guest Editor for the IEEE Journal of Solid State Circuits.

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Society News and Updates

In Memoriam -Edgar Sánchez-Sinencio

Edgar, a friend of many, passed away on November 20, 2020 surrounded by his family in College Station, Texas. Edgar was a leader in the analog IC design community, a highly respected mentor to his students, and a role model for both colleagues and peers.



Edgar was born in Mexico City in 1944. He received a degree in Communications and Electronic Engineering from The National Polytechnic Institute of Mexico (IPN). Early in his career, he worked for The Instituto Mexicano del Petroleo while studying advanced courses at IPN in the evenings to satisfy his insatiable curiosity of engineering. In 1970, Stanford University conferred on him the Master of Science degree. He obtained his Doctor in Philosophy degree from the University of Illinois in Champaign-Urbana for his thesis, *Computer Aided Design of Microwave Circuits*, in 1973. After receiving his doctoral degree, Edgar spent a year at the Central Research Laboratories of Nippon Electric Company as a postdoctoral researcher.

Upon his return to Mexico in 1974, he joined the Department of Electronics at the National Institute of Astrophysics Optics and Electronics (INAOE) in Tonantzintla, Puebla. At INAOE, Edgar founded the graduate program in the electronics field and promoted the creation of the Microelectronics Laboratory while serving as head of the department. The state-of-the art Microelectronics Laboratory was widely recognized in the field and provided unique opportunities for students and researchers throughout Latin America. In 1995, INAOE awarded Edgar the Honoris Causa Doctorate for his contributions in the analog integrated circuits field.

In 1983 Edgar became a professor of electrical engineering at Texas A&M University in College Station Texas, a position he held for 37 years along with the Texas Instruments' Jack Kilby Chair. He served for many years as Director of the Analog and Mixed Signal Center and was recognized as a Texas A&M University Distinguished Professor in 2005.

Graduating 58 M.Sc. and 62 PhD students, Edgar was ever so proud of his students. Edgar authored and co-authored more than 400 scientific articles in refereed publications. He also authored and co-authored and edited various books, including *Switched Capacitor Circuits*, co-authored with Phillip Allen (1984), *Low-Voltage/Low-Power Integrated Circuits and Systems*, co-authored with Andreas Andreou (1999), and *Artificial Neural Networks*, co-authored with Clifford Lau (1992).

Edgar was a co-recipient of the Guillemin-Cauer Award (1995) for his work on cellular networks and the Darlington Award (1997) for his work on high-frequency filters. He was recipient of the Texas Senate Proclamation for Outstanding Accomplishments in 1996 followed by the IEEE Circuits and Systems Society Golden Jubilee Medal in 1999 and the IEEE Circuits and Systems Society Charles A. Desoer Technical Achievement Award in 2008.

Edgar was a proud IEEE Life Fellow and was elevated to fellow grade in 1992. He has served as a member of the Board of Governors of the IEEE Circuits and Systems Society (CASS) and as Vice President of Publications for CASS. He was Editor -in Chief of the *IEEE Transactions on Circuits and Systems II: Express Briefs*. He has also served as a Distinguished Lecturer of the CASS. On two occasions he served as General Chair/Co-Chair of the IEEE Midwest Symposium on Circuits and Systems. He was a life member of the Institution of Engineering and Technology (IET). Throughout his career, Edgar was active in a large number of professional activities across the globe including offering numerous workshops and lectures, serving on organizing committees of numerous conferences, serving as guest editor on timely publications, and engaging in numerous collaborative research and outreach programs. His efforts in Latin America and South America, in particular, have played a key role in increasing IEEE activities in these regions; and more recently, his efforts to establish ties with Ghana have resulted in a

growth of CASS activities and new opportunities for students in Western Africa. Edgar co-founded Vidatronic with his former student, Moises Robinson. Specializing in enhancing the efficiency and performance of electronic devices, Edgar served as the Chief Technology Officer of the company.

With the generous support and help from his friends, industry, and former students, the endowed Edgar Sanchez-Sinencio and Yolanda F. de Sanchez Chair was created at TAMU to support a faculty member in the Department of Electrical and Computer Engineering. A scholarship fund in his name has also been established.

A. Paul Brokaw Receives the 2021 IEEE Donald O. Pederson Award in Solid-State Circuits



The recipient of the 2021 IEEE Donald O. Pederson Award in Solid-State Circuits is A. Paul Brokaw for **leadership in the design of voltage references, amplifiers, and power management, and for contributions to the principles of analog circuit design.**

A. Paul Brokaw has created many of the foundational integrated circuit topologies employed over the last four decades in successful semiconductor devices and helped establish an entire philosophy of analog circuit design. Brokaw improved on temperature-compensated bandgap circuits with what would become known as the “Brokaw Bandgap Reference,” now the dominant reference/bias source for analog and mixed-signal circuits. This work was also integral to the analog transition from bipolar to CMOS technologies. His contributions to analog-to-digital and digital-to-analog converters pushed the level of precision available in integrated converters with innovations that improved the matching accuracy of scaled reference currents over a wide dynamic range and temperature range, leading to best-selling products from Analog Devices, Inc.

An IEEE Life Fellow, Brokaw retired as an Analog Devices Fellow with Analog Devices, Inc., currently residing in Tucson, AZ, USA.

SSCS Members Receive Prestigious 2020 Wiley-IEEE Press Professional Book Award



Wiley-IEEE Press would like to congratulate our authors and Solid-State Circuits Society members Shanthi Pavan, Richard Schreier, and Gabor Temes, who are the recipients of the 2020 Wiley-IEEE Press Professional Book Award for their book, *Understanding Delta-Sigma Data Converters, 2nd edition*. The Wiley-IEEE Press Professional Book Award will annually recognize the authors of an outstanding monograph or professional book published by Wiley-IEEE Press during a three-year window prior to the year of the nomination, in a field relevant to the IEEE. To learn more about the book and the award, visit our website <https://ieeepress.ieee.org/wiley-ieee-press-awards/>. IEEE members receive a 35% discount on this book, as

well as all titles available from our publishing partner [Wiley](https://www.wiley.com). To obtain the discount code, please visit our IEEE Press [benefits](#) page.

Call for Workshop Proposals Solid-State Circuits Directions

The Solid-State Circuits Directions Committee welcomes members interested in chairing workshops to submit workshop proposals.

- Submitted papers should objectively explore uncharted territories
- Submitted papers will be peer-reviewed for content improvement
- Engagement of young innovators are strongly encouraged
- Very different from existing conference/workshop venues, i.e, no review of previously published work and covering forward-looking topics



Workshop Proposal Guidelines

Important dates for workshop application submissions:

- Workshop applications open: December 15th, 2020
- Workshop application deadline: February 1st, 2021
- Workshop acceptance notification: March 1, 2021

Proposals should be one-page long and include the following information:

- Title and description of the workshop
- Organizers and their affiliations (including short bios)

Submit workshop proposals to: SSCDirections@ieee.org.

2020-2021 International Student Circuit Contest

The IEEE SSCS International Student Circuit Contest's objective is to engage students in thought-provoking circuit analysis and design problems. Submissions are solicited by both undergraduate and graduate students who are currently enrolled in a college or university.

Can you solve the problem?

[Click here for contest details.](#)



Call for Contest Questions

SSCS is seeking new and original questions for our next circuits contest

The best questions will be published for the next contest and the author will receive US \$2K. Please send your great questions to the Contest Program Chair (antonio.lisicidni@utoronto.ca)

The question should have the following properties:

- It should be solvable by both undergraduate and graduate students
- The answer should not be found by googling the question
- If it requires simulation, a publicly-available simulation tool (such as LTspice) should be recommended.
- The solution must be kept confidential

Congratulations 2020-2021 PreDoc Winners

Congratulations to the 23 students who were awarded the 2020-2021 SSCS Predoctoral

Achievement Award. Awards are made on the basis of academic record and promise, quality of publications, and a graduate study program well matched to the charter of SSCS.

Photos and bios of the award recipients can be found [here](#).

2021-2023 SSCS Members-at-Large

The 2021-2023 Members-at-Large on the IEEE Solid-State Circuits Society Administrative Committee are Ichiro Fujimori, Rikky Muller, Kazuko Nishimura, Esther Rodriguez-Villegas, and Hoi-Jun Yoo. Please join us in congratulating the new Members-at-Large and thanking them and our other candidates -- Dina El-Damak, Don Draper, Ana Sonia Leon, Antonio Liscidini, Shanthi Pavan, Elkim Roa, and Farhana Sheikh -- for their participation and commitment to serving.

Congratulations IEEE Fellows Class of 2021



Congratulations to the SSCS members elevated to IEEE Fellow in 2021. The IEEE Grade of Fellow is conferred by the Board of Directors upon a person with an extraordinary record of accomplishments in any of the IEEE fields of interest.

- **Jun Ohta** - for contributions to CMOS image sensors and devices for biomedical applications
- **Yogesh Chauhan** - for contributions to compact modeling of Si and GaN transistors
- **Robert Henderson** - for contributions to solid-state single photon imaging
- **Ahmed Ali** - for leadership in high-speed analog-to-digital converter design and calibration
- **Benton Calhoun** - for contributions to sub-threshold integrated circuits and self-powered systems
- **Inyup Kang** - for leadership in development of chip-set technologies for cellular communications
- **Ali Keshavarzi** - for contributions to low-power circuits and devices in scaled CMOS technologies
- **Dejan Markovic** - for contributions to low-power VLSI signal processing and neurotechnology

A full list of SSCS members who are IEEE fellows are listed [here](#).

Stay up-to-date with Learning with the SSCS Education Program

The [SSCS Education Program](#) provides Society members with free access to a wide range of quality educational content related to integrated circuits including tutorials, short courses, webinars, and eBooks.

- **Tutorials and Short Courses:** SSCS members have access to free tutorials and short courses from past years of ISSCC. Renowned experts in the field talk about new and ongoing developments in integrated circuits. [Click here to access.](#)
- **Webinars:** Monthly webinars are held for free for SSCS members on topics ranging



from Analog/RF and future microprocessors to new biomedical applications.

[Register for an upcoming webinar](#) or view [past webinars](#)

- **eBooks:** SSCS has two books available for download - [IC Design Insights](#) - a selection of tutorial and invited presentations given at CICC 2017 and [Low Power Circuit Design Using Advanced CMOS Technology](#) - part of the Tutorials in Circuits and Systems series.
- **CONFedu Series:** The CONFedu series features short 10-minute talks from SSCS sponsored conferences including ISSCC, CICC, ESSCIRC, and VLSI. [Click here to access.](#)
- **SSCSx Lecture Series:** The first series of lectures is five parts and is presented by Prof. Behzad Razavi on Noise. [Click here to access.](#)

Educational credits (PDH's and CEU's) are available at a low cost for select products. SSCS Educational content can be accessed via the [SSCS Resource Center](#) and the [SSCS YouTube Channel](#). The material is free for Society members.

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Upcoming SSCS Distinguished Lecture Events January 2021

The IEEE SSCS Austria Chapter Presents - RF Noise Coupling -- Understanding, Mitigation and Impacts on Wireless Communication Performance, Presented by Prof. Makoto Nagata, Virtual, January 15th, 2021, 12:00. [Click here for more information.](#)

Conferences

Upcoming SSCS Conferences

[2021 IEEE International Solid-State Circuits Conference \(ISSCC\)](#)

Feb 13 - 22, 2021

Virtual

[2021 International Symposium on VLSI Technology, Systems and Applications \(VLSI-TSA\)](#)

Hsinchu, Taiwan

Apr 19 - 22, 2021

[2021 International Symposium on VLSI Design, Automation and Test \(VLSI-DAT\)](#)

Hsinchu, Taiwan

Apr 19 - 22, 2021

[2021 IEEE Custom Integrated Circuits Conference \(CICC\)](#)

Virtual

Apr 25 - 28, 2021

[2021 IEEE Radio Frequency Integrated Circuit Symposium \(RFIC\)](#)

Atlanta, GA USA & Virtual

Jun 6 - 8, 2021

[2021 Symposia on VLSI Technology and Circuits](#)

Virtual

Jun 14 - 17, 2021

Call for Papers The 7th IEEE World Forum on the Internet of Things - WFIoT2021

Paper Submission Deadline: January 15, 2021

The [IEEE World Forum on the Internet of Things \(WFIoT2021\)](#) seeks submissions and proposals for original technical papers that address the Internet of Things (IoT), its theoretical and technological building blocks, the applications that drive the growth and evolution of IoT, operational considerations, experimentation, experiences from deployments, and the impacts of IoT on consumers, the public sector, and industrial verticals. The theme for the World Forum is “The Impact of Artificial Intelligence on IoT”. In recognition of the rapid growth of IoT across the world and adoption across almost all verticals we encourage the submission of multi-disciplinary content.

Papers should address, but are not limited to, the high-level topics below and a more detailed list found on the WFIoT2021 website that can be downloaded as a PDF document:

- Applications, Processes, and Services
- Artificial Intelligence, Machine Learning, and Analytics
- Basic and Enabling Technologies
- Communication, Connectivity, and Networking
- Computing – from Edge to Cloud
- Cybersecurity, Security, and Privacy
- Infrastructure, Devices, and Components
- Information Processing from Multimedia and Heterogenous Sources
- Results from Experiments, Demonstrations and Trials, and Deployment Experiences
- Social and Societal Impacts
- Systems Engineering, Integration Methods, and Operation Technologies
- Theoretical foundations, design methods, and architectural considerations

In addition, the World Forum is also seeking proposals for: (1) Special Sessions consisting of peer reviewed papers focused on research topics of importance to IoT; (2) Workshops consisting of peer reviewed papers, discussions, and summary results about advanced topics relevant to IoT. The summary results will be edited and published as part of the WFIoT2021 Proceedings; and (3) Industry Panels aimed at research topics important to industrial IoT issues. Each, Special Session, Workshop, and Industry Panel, once selected will issue an individual call for papers.

For more information, visit wfiot2021.iot.ieee.org

Call for Papers 2021 Symposia on VLSI Technology and Circuits June 13th - 19th, 2021 Virtual

Paper Submission Deadline: 23:59 JST Monday, February 8, 2021

The VLSI Technology symposium calls for papers in the following areas:

- Technologies for IOT including ultra-low power technologies; wearable devices/sensors, display, connectivity, power management; micro-controllers and application processors.
- Technologies for AI including CPU, GPU, in-memory computing, neuromorphic devices, and stochastic computing.
- Stand-Alone and Embedded Memories technology and reliability for SRAM, DRAM, 3D NAND and NOR Flash, MRAM, PCRAM, ReRAM, FeRAM and other new memories.
- CMOS Technology, Microprocessors and SoCs including scaling, VLSI manufacturing concepts, and yield optimization.
- RF / Analog / Digital Technologies and Sensors for mixed-signal SoC; RF front-end; analog, mixed-signal, I/O, high-voltage, MEMS, integrated sensors; power electronics.
- Process and Material Technologies including advanced transistor, modeling and reliability; high mobility channels; wide bandgap semiconductors and 2D devices; lithography; heterogeneous integration; interconnects scaling.
- Packaging Technologies and System-in-Package (SiP) including through-silicon-vias (TSVs) and 3D-system integration.
- Photonics Technology and Imaging Technology
- Beyond CMOS Devices, including Quantum Computing and Cryo-CMOS Technology

The Symposium on VLSI Circuits calls for papers in the following areas:

- Processors, SoCs, quantum computing, and machine learning
- Digital circuits, signal integrity, and IOs
- Hardware security
- Memory circuits, architectures, and interfaces
- Biomedical circuits and systems
- Sensors, imagers, and display circuits
- Power conversion circuits
- Analog building blocks
- Wireless receivers and transmitters
- Data converters
- Frequency generation and clock circuits
- Wireline and optical transceiver

Prospective authors must submit two-page papers and abstracts using the Symposia's website, www.vlssymposium.org

Call for Papers

2021 European Solid-State Device Research Conference

2021 European Solid-State Circuits Conference

Grenoble, France

September 6-9, 2021

Paper Submission Deadline: April 19th, 2021

The aim of **ESSCIRC** and **ESSDERC** is to provide an annual European forum for the presentation and discussion of recent advances in solid-state devices and circuits. The level of integration for system-on-chip design is rapidly increasing. Therefore, more than ever before, a deeper interaction among technologists, device experts, IC designers and system designers is necessary. While keeping separate Technical Program Committees, **ESSDERC** and **ESSCIRC** are governed by a common Steering Committee and share Plenary Keynote Presentations and Joint Sessions bridging both communities. Attendees registered for either conference are encouraged to attend any of the scheduled parallel sessions, regardless to which conference they belong.

Although not limited, papers are solicited for the following main topics:

- [Advanced Technology, Process and Materials](#)
- [Analog, Power and RF Devices](#)
- [Compact modeling and process/device simulation](#)
- [Joint TRACK: Memory devices and circuits towards non Von Neumann](#)
- [Joint TRACK: Emerging Computing Devices and Circuits](#)
- [Joint TRACK: Devices and circuits for Sensors, Optoelectronics and Display](#)
- [Analog Circuits](#)
- [Data Converters Circuits](#)
- [RF & mmW Circuits](#)
- [Frequency Generation Circuits](#)
- [Wireless & Wireline Circuits & Systems](#)
- [Digital Circuits & Systems](#)
- [Power Management Circuits](#)

Submission information and more details can be found here: <https://www.esscirc-essderc2021.org/>

SSCS Sponsored Conference Proceedings

Click the links below to access the latest SSCS-Sponsored conference proceedings.

2020

[2020 IEEE International Solid-State Circuits Conference \(ISSCC\)](#)

[2020 IEEE Custom Integrated Circuits Conference \(CICC\)](#)

[2020 IEEE Symposium on VLSI Circuits](#)

The Latest in SSCS Flagship Publications

IEEE Journal of Solid-State Circuits - January 2021 Issue is Now Available

Introduction to the Special Issue on the 2020 IEEE International Solid-State Circuits Conference (ISSCC), Issue 1, January 2021

This Special Issue of the IEEE Journal of Solid-State Circuits is dedicated to a collection of the best articles selected from the 2020 IEEE International Solid-State Circuits Conference (ISSCC) that took place on February 16–20, 2020, in San Francisco, CA, USA. This Special Issue covers articles from the Wireline, Digital Circuits, Digital Architectures and Systems (DASs), Machine Learning and AI, and Memory Committees.

[Click here to view the articles in this issue.](#)

IEEE Solid-State Circuits Letters - Volume 3 (2020) is Now Available

[Click here](#) to view the articles from this issue

[Click here](#) to view early access articles

IEEE Journal on Exploratory Solid-State

Computational Devices and Circuits - Volume 6- June 2020 is Now Available

Click [here](#) to view the articles in this issue

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For Society news and happenings, [check out](#) the Fall 2020 issue of the
IEEE Solid-State Circuits Magazine.

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