

YP events include start-ups presentation, poster and demo sessions, aiming to provide a thrilling environment for early career researchers to present their work.

A “2nd Runner-Up Paper Award” was assigned to Ms. Eve McGlynn, a PhD Student at the University of Glasgow (United Kingdom), for the paper titled “Encapsulated Magnetolectric Composites for Wirelessly Powered Brain Implantable Devices.” A “Best Paper Award” was eventually assigned to Dr. Fanny Spagnolo, a Postdoctoral Researcher at the University of Calabria (Italy), for the paper titled “A High-Performance and Power-Efficient SIMD Convolution Engine for FPGAs.”

Twelve papers and four demo presentations were accepted for the YP competition, and three YP awards were eventually assigned. A “Best Demo Award” was assigned to Dr. Jason Eshraghian, a Post-Doctoral Fellow at the University of Michigan (U.S.A.), for the live demonstration titled “Prosthesis Control Using a Real-Time Retina Cell Network Simulator.” A “Best Presentation Award” was assigned to Ms. Elena-Diana Șandru, a PhD student at the University Polytechnic of Bucharest (Romania), for the poster titled “Machine Learning-Based Local Sensitivity Analysis of Integrated Circuits to Process Variations.” Finally, a “Best Paper Award” was assigned to Mr. Kosuke Uchiyama, a PhD student at the Nagoya University (Japan),

for the poster titled “Design of Fully-Integrated Self-Powered FM Transmitter Using On-Chip Photodiodes in 65-nm CMOS.”

The WiCAS and YP winners received a one-year IEEE plus IEEE CASS membership, thanks to the generous support provided by the IEEE CASS. Moreover, as a sign of appreciation to all 2020 WiCAS and YP participants, the WiCAS co-chairs and the YP co-Chairs were pleased to grant a 25 USD voucher for CAS-related technical books to all speakers who gave live presentations during the conference days.

The WiCAS and YP co-chairs express their gratitude to the ICECS 2020 general co-chairs, Prof. Hadi Heidari and Prof. Elena Blockina, and to the conference organizing committee, for the technical support received in the definition of the WiCAS and YP sessions. The WiCAS and YP co-chairs would also like to thank the IEEE Circuits and Systems Society for the financial support that helped making these events a great moment of professional and personal enrichment.

Many thanks to Giulia Di Capua, Melika Payvand, Erika Covi and Nazila Fough who contributed to this report.

Ricardo Reis, *Senior Member, IEEE*

2021 IEEE CASS Rio Grande do Sul Webinars

Last year, the IEEE CASS Rio Grande do Sul Chapter and the Graduate Program on Microelectronics (PGMICRO) of the Universidade Federal do Rio Grande do Sul (UFRGS) transformed Local Face-to-Face Seminars into Global Webinars. A report about this action was published in the IEEE CASS Magazine, 4th quarter, 2020 [1]. All 2020 webinars were recorded and they are available at the IEEE CASS Rio Grande do Sul YouTube channel (www.youtube.com/cassriograndedosul)

In February 5th, it was started the season 2021 of the IEEE CASS Rio Grande do Sul webinars, with a talk by prof. **Subhasish Mitra** (Stanford University, USA), with the title **21st-Century NanoSystems for Abundant-Data Computing: The N3XT 1,000X** [Fig. 1].

Then, the following invited talks were organized in 2021 or are scheduled:

Prof. Hai “Helen” Li (Duke University, USA), Efficient Deep Learning at Scale, February 12

Prof. Ricardo Reis (UFRGS, Brazil), Challenges in the Design of Integrated Systems for IoT, Feb. 19

Prof. Rajesh K. Gupta (UC San Diego, USA), Programming Human Spaces, February 26

IEEE CASS RS Talks 2021
UFRGS, Porto Alegre, Brazil

YouTube Live @ IEEE CASS Rio Grande do Sul Chapter
<https://www.youtube.com/cassriograndedosul>



1:30 PM (Brasilia Time, GMT-3), February 5, 2021

Prof. Subhasish Mitra, Dept. of EE and Dept. of CS, Stanford University, USA 21st-Century NanoSystems for Abundant-Data Computing: The N3XT 1,000X



Abstract:

The world's needs for analyzing massive amounts of data is growing dramatically. The computation demands of these abundant-data applications, such as AI machine learning, far exceed the capabilities of today's computing systems. For example, a Dream AI Chip would co-locate all memory on a single chip together with computing elements, quickly accessible at low energy. Such Dream Chips aren't realizable today. Computing systems instead use large off-chip memory and spend enormous time and energy shuttling data back-and-forth. This memory wall gets worse with growing problem sizes, especially as conventional transistor miniaturization gets increasingly difficult.

This talk will present the N3XT (Nano-Engineered Computing Systems Technology) approach to build transformative NanoSystems by exploiting unique properties of underlying nanotechnologies. N3XT creates new chip architectures for computation immersed in memory through ultra-dense (monolithic) 3D integration of new logic devices (such as carbon nanotube transistors for high-speed and low-energy circuits) and new non-volatile memory (such as dense resistive RAM that can store multiple bits inside each memory cell). To scale with growing problem sizes, new Illusion systems orchestrate multiple N3XT chips to create an illusion of a Dream Chip with near-Dream energy and throughput.

A wide variety of N3XT hardware prototypes, built in commercial US foundry as part of DARPA's 3DSoc program as well as research facilities, represent leading examples of transforming scientifically-interesting nanomaterials and nanodevices into actual 21st-century NanoSystems. N3XT NanoSystems target 1,000X system-level energy-delay-product benefits especially for abundant-data applications. Such massive benefits enable coming generations of applications that push new frontiers, from deeply-embedded computing systems all the way to the cloud.

Short CV:

Subhasish Mitra is Professor of EE and of CS at Stanford University. He directs the Stanford Robust Systems Group, leads the Computation Focus Area of the Stanford SystemX Alliance, and is a member of the Wu Tsai Neurosciences Institute. Prof. Mitra also holds the Carnot Chair of Excellence in NanoSystems at CEA LETI in France. His research ranges across Robust Computing, NanoSystems, Electronic Design Automation (EDA), and Neurosciences. Results from his research group have influenced almost every contemporary electronic system, and have inspired significant government and research initiatives in multiple countries. Prof. Mitra also has consulted for major technology companies including Cisco, Google, Intel, Samsung, and Xilinx. Prof. Mitra's honors include the Newton Technical Impact Award in EDA (test of time honor by ACM SIGDA and IEEE CEDA), the Semiconductor Research Corporation's Technical Excellence Award, the Intel Achievement Award (Intel's highest honor), and the US Presidential Early Career Award. He has published award-winning papers at major venues. He is an ACM Fellow and an IEEE Fellow.



Figure 1. Flyer of the first 2021 Webinar.

Dr. Rodrigo Calderón Rico (Apple, Cupertino, USA), Missing Hardware Functions to Apply Intelligence in Communication Systems, March 5

Prof. Yuanqing Cheng (Beihang University, China), Reliable and Low Power Design for STT-MRAM, March 12

Dr. Gustavo Wilke (Synopsys, USA), Analysis and Optimization of Mesh-based Clock Distribution Architectures, March 19

Dr. Luciano Ost (Loughborough University, England), Early Soft Error Assessment of Embedded Deep Inference Networks, March 26.

Dr. Rob Aitken (Arm Research, San Jose, USA), The Challenges of Software-Defined Hardware, April 9

Prof. Ricardo Jacobi (Universidade de Brasilia, Brazil), Algorithms and Architectures for Morphological Image Processing, April 16

Prof. Eby G. Friedman (University of Rochester, USA), Single Flux Quantum Circuits, Algorithms, and Design Methodologies, April 23

Prof. Sachin S. Sapatnekar (University of Minnesota, USA), Automating Analog Layout: Why This Time is Different, May 7

Prof. Bruno Zatt (UFPEL, Brazil), Immersive Media Technology: Challenges, Solutions and Trends, May 14

Krishnakumar Nair (Facebook, USA), Accelerators for Deep Learning, May 21

Prof. Michael Hubner (Brandenburg University of Technology, Germany), Going New Ways in Embedded System Design, June 4

Prof. Ibrahim Elfadel (Khalifa University, UAE), Machine Learning Methods in VLSI CAD, June 11

Dr. Lou Scheffer (Howard Hughes Medical Institute, USA), The Electrical Design of Biological Systems—What can we Learn from the Brain of a Fly?, June 18

Please, go to the CASS Rio Grande do Sul YouTube channel to see the titles and abstracts of next talks, and to subscribe to the YouTube channel. It is also possible to find, in the YouTube channel, the recorded versions of past 2021 Talks, as well other talks related to other events organized by the CASS Chapter. CASS Talks keep reaching a broad set of countries, all around the world. Please, don't miss next talks.

Reference

[1] R. Reis, R. Brum, and J. R. Azambuja, "How CASS-RS transformed local face-to-face seminars into global webinars [CAS Society News]," *IEEE Circuits Syst. Mag.*, vol. 20, no. 4, pp. 78–87, 2020, doi: 10.1109/MCAS.2020.3027224.