

Lund Circuit Design Workshop

TAKING PLACE IN LUND, SWEDEN, AT GRAND HOTEL
AND FACULTY OF ENGINEERING, LUND UNIVERSITY
SEPTEMBER 24-25 2018

INVITED SPEAKERS

Marcus Binning, Cadence, UK
Lorenzo Ciampolini, CEA LETI – LISAN, FR
Frédéric Hasbani, GN Hearing, DK
Michael Løngaa, GN Hearing, DK
Nafiseh Mazloum, Sony Mobile, SE
Jan Rabaey, UC Berkeley, US



The workshop is hosted by the Lund University Excellence Center in System Design on Silicon (SoS)

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Lund Circuit Design Workshop *will offer an overview of the research activities in IC design at Lund University. Additionally, invited presentations will be given by outstanding experts from academia and industry*



Close to the Edge – How Neural Network inferencing is migrating to specialised DSPs in State of the Art SoCs

MARCUS BINNING, CADENCE, UK

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Advanced memory solutions for emerging circuits and systems

LORENZO CIAMPOLINI, CEA LETI – LISAN, FR

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Technology and design considerations for Ultra-Low Power audio DSP

FRÉDÉRIC HASBANI & MICHAEL LØNGAA, GN HEARING, DK

6-7



Cellular IoT Devices

NAFISEH MAZLOUM, SONY MOBILE COMMUNICATIONS, LUND

7



Adventures in High Dimensions

JAN RABAEY, UC BERKELEY, US

8

PROGRAM

September 24 – Grand Hotel

9.30-10.00 *Registration and Coffee*

10.00-10.30 **Welcome**
OVE EDFORS, EIT, LUND UNIVERSITY

SESSION 1
EMERGING CIRCUITS
AND SYSTEMS

10.30-11.15 **Invited Presentation: Advanced memory solutions for emerging circuits and systems**

LORENZO CIAMPOLINI, CEA LETI – LISAN, FR

11.15-11.45 **3D stackable circuits and memory**

KARL-MAGNUS PERSSON, EIT, LUND UNIVERSITY

11:45-12:00 **A 26GHz 22.2dBm Variable Gain Power Amplifier in 28nm FD-SOI CMOS for 5G Antenna Arrays**

CHRISTIAN ELGAARD, ERICSSON + EIT, LUND UNIVERSITY

12.00-13.15 *Lunch*

SESSION 2
APPLICATION SPECIFIC
PROCESSORS

13.15-14.00 **Invited Presentation: Close to the Edge – How Neural Network inferencing is migrating to specialised DSPs in State of the Art SoCs**

MARCUS BINNING, CADENCE, UK

14.00-14.15 **An ASIP for massive MIMO with full compiler support**

STEFFEN MALKOWSKY, EIT, LUND UNIVERSITY

14.15-14.30 **SoC implementation in ST 28nm FD-SOI for distributed MIMO systems**

HEMANTH PRABHU, EIT, LUND UNIVERSITY (XENERGIC)

14.30-14.45 **Tuesday-poster pitches**

POSTER PRESENTERS, EIT, LUND UNIVERSITY

14.45-15.15 *Coffee*

SESSION 3
LOW-ENERGY CIRCUITS

15.15-16.00 **Invited Presentation: Technology and design considerations for Ultra-Low Power audio DSP**

FREDÉRIC HASBANI & MICHAEL LØNGAA, GN HEARING, DK

16.00-16.15 **Energy efficient analog front ends: Scaling laws and applications**

MURIS SARAJLIC, EIT, LUND UNIVERSITY

16.15-16.30 **Human Body IoT- Connected as needed**

ALI ZAHER, EIT, LUND UNIVERSITY

16.30-17.00 **Invited Presentation: Cellular IoT Devices**

NAFISEH MAZLOUM, SONY MOBILE COMMUNICATIONS, LUND

19.00- *Dinner at Hypoteket*

PROGRAM

September 25 – Faculty of Engineering, Lund University

SESSION 4 COMPUTING AND COMMUNICATION

- 09.00-09.30 *Coffee with Poster Session*
- 09.30-10.15 **Invited Presentation: Adventures in High Dimensions**
JAN RABAEY, UC BERKELEY, US
- 10.15-10.30 **Multi-antenna terminals in Massive MIMO**
ERIK BENGTSOON, SONY MOBILE COMMUNICATIONS + EIT, LUND UNIVERSITY
- 10.30-10.45 **Mission Critical Control at the Edge and over 5G**
PER SKARIN, ERICSSON + AUTOMATIC CONTROL, LUND UNIVERSITY
- 10.45-11.15 *Coffee with Poster Session*
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NEW DIRECTIONS AND CLOSING

- 11.15-11.45 **New Competence Center for Connected Systems**
OVE EDFORS, EIT, LUND UNIVERSITY
- 11.45-12.00 **Closing Remarks**
SVEN MATTISSON, ERICSSON, CHAIRMAN OF THE SOS BOARD
- 12.00-13.30 *Lunch and continued poster session*

COORDINATOR

PIA BRUHN Administrative Coordinator at EIT. Pia has worked in different research administrative constellations at LTH and Lund University since 1976 and has supported within all stages from basic research to industrial applications.



INVITED SPEAKERS

MARCUS BINNING received his BSc. in Electrical and Electronic Engineering from the University of Bristol in 1985, working on the (then brand new) CAD systems to create and simulate a digital design during his final year project. For the next 6 years he was involved in ASIC and embedded HW/SW design before spending 8 years working in advanced EDA verification tooling deployment across Europe (Zycad HW accelerators and emulation tools, and formal verification tools from Chrysalis Symbolic Design). Since 2000 he has headed up the Application Engineering effort in Europe for the Tensilica® Xtensa® configurable processor technology (now owned by Cadence Design Systems, Inc.). As an acknowledged expert in the ASIP (Application Specific Instruction set Processor) field, he has been involved with (and directly contributed to) a number of successful, complex customer designs in companies both small and multi-national.



LORENZO CIAMPOLINI is a senior designer in the advanced memory team of CEA Grenoble, France, dealing with methodology and design-for-yield for both volatile and non-volatile memories. After graduating with a MS in Solid-State Physics from Università di Firenze, Italy, he received a Ph.D. in Microelectronics at ETH Zürich, Switzerland. He joined STMicroelectronics in 2004, where he worked some years calibrating Solid-State diffusion physics manufacturing models, and then acted nearly ten years as interface between SRAM designers and technologists.



FREDERIC HASBANI Analog IC Lead at GN Hearing, Denmark joined in 2014. He's mainly focusing on hearing-aids Ultra-Low-Power DSP, power-management and radio IC design and architecture. After receiving an M.Sc E.E from ENSERG, France in 2000 he joined ST Microelectronics R&D, where he managed from 2008 a design team delivering power-management solutions for RF, MCU, and application processors in CMOS bulk and FD-SOI nodes. He also hosted 3 industrial PhDs in collaboration with AMPERE-INSA and IMEP-INPG labs on integrated DC-DC conversion.



MICHAEL LØNGAA began his career as an electronics mechanic and thereafter received his M.Sc.E in electronics engineering from Aalborg University. Michael started his engineering career as a DSP core designer and advanced to chip architect within wireless and DSP systems. It is especially the cooperation between HW and SW, which Michael finds interesting and challenging.



NAFISEH MAZLOUM received the M.Sc. degree in Digital Communication Systems and Technology from Chalmers University in 2008 and the Ph.D. degree in Radio Systems from Lund University in 2016. From 2007 to 2008 she was with the Distributed Sensor Systems Department at Philips Research Eindhoven, the Netherlands. Since 2017, she works as a researcher at the Radio Access Lab., Research and Incubation, Sony Mobile Communications, Lund, Sweden. Her main research focus is on low-power wireless communication systems.



INTERNATIONAL ADVISORS

MICHAEL FAULKNER received a B.Sc.(Eng) from London University, UK, and a Ph.D. from the University of Technology, Sydney, Australia. He is Professor in Telecommunications at Victoria University, Melbourne, Australia. He founded and led the Mobile Communications and Signal Processing Research (MCSP) group in 1988 which morphed into Centre for Telecommunications and Micro-Electronics (CTME) in 1992. Prof. Faulkner has successfully obtained and managed numerous industry research contracts and has won journal and conference best paper awards in the areas of amplifier linearization, signal compatibility, and low power receiver filtering. He has been involved in standardization and commercialization activities in the IEEE802.11 (WLAN) space. His research interests include signal processing, circuits, radio wave propagation and all aspects of wireless systems.



QIUTING HUANG received the Ph.D. degree in applied sciences from the Katholieke Universiteit Leuven, Belgium, in 1987. Between 1987 and 1992 he was a lecturer at the University of East Anglia, Norwich, U.K. Since January 1993, he has been with the Integrated Systems Laboratory, Swiss Federal Institute of Technology (ETH), (<http://www.iis.ee.ethz.ch>), Zurich, Switzerland, where he is Professor of Electronics. In 2007 he was also appointed as a part-time Cheung Kong Seminar Professor by the Chinese Ministry of Education and the Cheung Kong Foundation. His research interests span RF, analog, mixed analog-digital as well as digital application specific integrated circuits and systems, with an emphasis on wireless communications applications in recent years. He has published widely on those topics in leading solid-state circuits conferences and journals.



JAN RABAEY received his Ph.D degree in applied sciences from the Katholieke Universiteit Leuven, Belgium. He now holds the Donald O. Pederson Distinguished Professorship at the University of California at Berkeley. He is a founding director of the Berkeley Wireless Research Center (BWRC) and the Berkeley Ubiquitous SwarmLab, and has served as the Electrical Engineering Division Chair at Berkeley twice. Prof. Rabaey has made high-impact contributions to a number of fields, including advanced wireless systems, low power integrated circuits, sensor networks, and ubiquitous computing. His current interests include the conception of the next-generation integrated wireless systems, as well as the exploration of the interaction between the cyber and the biological world. He is the recipient of major awards, amongst which the IEEE Mac Van Valkenburg Award, the European Design Automation Association (EDAA) Lifetime Achievement award, and the Semiconductor Industry Association (SIA) University Researcher Award. He is an IEEE Fellow, a member of the Royal Flemish Academy of Sciences and Arts of Belgium, and has received honorary doctorates from Lund (Sweden), Antwerp (Belgium) and Tampere (Finland). He has been involved in a broad variety of start-up ventures.



SENIOR RESEARCHERS

PIETRO ANDREANI received the M.S.E.E. degree from the University of Pisa, Italy, in 1988, and the Ph.D. degree from Lund University, Sweden, in 1999. Between 2001 and 2007, he was Chair Professor with the Center for Physical Electronics, Technical University of Denmark, Kgs. Lyngby, Denmark. He was also a part-time IC designer at Ericsson Modems in Lund (2005-2014). Since 2007, he has been an Associate Professor in IC design at EIT. He was a TPC member of the ISSCC (2007-2012) and is a TPC member of ESSCIRC (chair of the Frequency Generation track since 2012, TPC chair in 2014) and RFIC. He has been an Associate Editor of JSSC since 2016, and an IEEE SCS Distinguished Lecturer since 2017. He was the Director of SoS in 2015-2016.



OVE EDFORS received the M.Sc. degree in computer science and electrical engineering in 1990 and the Ph.D. degree in signal processing in 1996, both from Luleå University of Technology, Sweden. In the spring of 1997 he worked as a researcher at the Division of Signal Processing at the same university and in July 1997 he joined the staff at the Department of Electrical and Information Technology, Lund University, Sweden, where he is a professor of Radio Systems since 2002. His research interests include radio systems, statistical signal processing and low-complexity algorithms with applications in telecommunication. His main research focus is design and implementation of massive MIMO systems. Since 2017 he is Director of SoS.



MARIA KIHLE received her her PhD in Communication Systems in 1999 at Lund University. During 2005-2006 she was a visiting researcher at NC State University. Currently, she is a Full Professor in Internetworked systems at the Department of Electrical and Information Technology, Lund University. Her main research area is performance optimization of distributed telecommunication applications and networked system, and several of her research projects have been industry driven. She has worked on service oriented architectures, web server systems, vehicular networks and media distribution architectures. Currently, her research mostly focuses on optimization and control of edge cloud infrastructures in 5G environments.



ERIK LARSSON is Professor in Computer Architecture. He received his Ph.D. from Linköping University in 2000 and did a post doc at Nara Institute of Science and Technology in Japan 2001-2002. He joined Linköping University as Assistant Professor 2003 and became Associate Professor in 2006. He did a sabbatical visit at NXP Semiconductors in Eindhoven 2008-2010 and joined Lund University in 2012. His research interest includes design for test and fault tolerance and he has authored/co-authored more than 150 scientific papers. He received the Institution of Engineering and Technology Premium Award 2009 and best paper awards at Asian Test Symposium 2002 and European Test Symposium 2016.



SENIOR RESEARCHERS

BUON KIONG LAU received his Ph.D. in 2003 from Curtin University of Technology, Australia. He has been with the Department of Electrical and Information Technology at Lund University since 2004, where he is now professor in the field of applied electromagnetics, particularly in antenna systems. His research interests encompass both theoretical and applied aspects of antenna systems. He has derived new antenna system design concepts and performance evaluation methods, and he has successfully demonstrated their applications in wireless communications. He is a Swedish Research Council Senior Researcher (rådsforskare) and a Distinguished Lecturer of IEEE Antennas and Propagation Society. He was a Track Editor, Senior Associate Editor, and Associate Editor with IEEE Transactions on Antennas and Propagation between 2010 and 2016.



LIANG LIU is an Associate Professor at EIT, Lund University. He received his B.S. and Ph.D. degree in the Department of Electronics Engineering (2005) and Micro-electronics (2010) from Fudan University (Shanghai, China). From Jan. 2010 to April 2010, he was with Rensselaer Polytechnic Institute (New York, USA) as a visiting researcher. He joined Lund University as a Post-doc in 2010 and was Assistant Professor 2014-2015. In 2015, He received Docent. His research interest includes wireless communication system and digital integrated circuits design. Liang is active in several EU and Sweden projects, including FP7 MAMMOET, VINNOVA SoS, SSF HiPEC, and SSF DARE.



JOACHIM RODRIGUES currently holds an Associate Professorship at the Department of Electrical and Information Technology at Lund University, Lund, Sweden. He received his degree in electrical engineering and computer science from the University of Applied Sciences, Kaiserslautern, Germany, and the Ph.D. degree from the Department of Electroscience, Lund University, in 2000 and 2005, respectively. From 2005 to 2008 he acted as ASIC process lead in the digital ASIC department at Ericsson Mobile Platforms (now ST-Ericsson), Lund, Sweden, and he re-joined his current department in 2008. His main research interest is modeling and implementation of digital and mixed-mode microelectronics, architectures for high performance ultra-low power design, which can be operated with an aggressively scaled supply voltage. Focus is on biomedical circuits and systems, and ultra-low voltage memories. He is currently the vice-director for SoS, head of IES, and co-founder of Xeneric AB.



FREDRIK RUSEK received the M.Sc. degree in Electrical Engineering in 2003 and the PhD degree in 2007 from Lund University, Sweden. He has been an associate professor and Docent at Lund University since 2012. He is author/co-author of more than 100 papers and patents. His main research interests include modulation theory, equalization, statistical signal processing, and applied information theory.



HENRIK SJÖLAND received the M.Sc. degree in Electrical Engineering in 1994 and the PhD degree in 1997 from Lund University, Sweden. In 1999 he was a postdoc at UCLA on a Fulbright scholarship. He has been an associate professor at Lund University since year 2000, and a full professor since 2008. He is heading the research group in Radio Frequency Integrated Circuit Design at Lund University. Since 2002 he is also part time employed at Ericsson Research. He has authored or co-authored more than 170 international peer reviewed journal and conference papers and holds 25 patents. His research interests include design of radio frequency, microwave, and mm wave integrated circuits, primarily in CMOS technology.



FREDRIK TUFVESSON received his Ph.D. in 2000 from Lund University in Sweden. After two years at a startup company, he joined the department of Electrical and Information Technology at Lund University, where he is now professor of radio systems. His main research interest is the interplay between the radio channel and the rest of the communication system with various applications in 5G systems such as massive MIMO, mm wave communication, vehicular communication and radio based positioning. Fredrik has authored around 80 journal papers and 140 conference papers and is deeply involved in the massive MIMO activities at the department. Besides this, he is deputy head of the department and leading the Lund part of the strategic research area ELLIIT.



MARKUS TÖRMÄNEN received the PhD degree in Circuit Design in 2010 from Lund University, Sweden. He was an assistant professor at Lund University 2010-2013, and since 2014 he has been associate professor and Docent at Lund University. He has authored/co-authored more than 60 international peer reviewed journal and conference papers. He is assistant program director for Electrical Engineering (M.Sc. Eng) at Lund University and he has been awarded the IEEE Senior Member grade. His research interests include design of analog, RF, microwave, and mm-wave circuits.



LIESBET VAN DER PERRE received the M.Sc. in 1992 and the Ph.D in 1997 from KU Leuven, Belgium, in 1992 and 1997. She was appointed honorary doctor at Lund University, Sweden, in 2015. She is Professor at the department of Electrical Engineering at KU Leuven and guest Professor at the EIT at Lund University. Dr. Van der Perre was with the nano-electronics research institute imec in Belgium from 1997 till 2015. She is a member of the Board of Directors of the company Zenitel since 2015. Prof. L. Van der Perre's main research interests are in wireless communication and embedded system, with a focus on energy efficiency.



JOHAN WERNEHAG received the M.Sc. degree in electrical Engineering and the Ph.D. in circuit design from Lund University, Lund, Sweden, in 2002 and 2008, respectively. In 2009 he joined Nokia where he was working as a Senior RF Design Engineer, integrating and verifying specification and regulatory compliance of wireless chip-set in mobile devices. In 2010 he joined Ericsson Research as a Researcher in the Modem Hardware group in Lund, Sweden. Since 2013 he is an associate professor at Lund University. His research interests are in the area of RF, mm-wave, and mixed-signal circuits for wireless communication. He is the recipient of the 2008 IEEE Asian Pacific Conference on Circuit and System 'Outstanding Student Paper Award'. Since 2017 he is working part time at Arm Sweden, as TX lead and Team Leader RFIC Design.

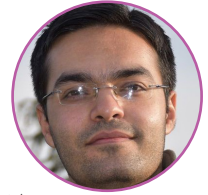


VIKTOR ÖWALL is Dean of the Faculty of Engineering, Lund University, and is Professor in Circuit Design specialized in the design of digital architectures. He received the Ph.D. degree from Lund University in 1994 and during 1995 to 1996 he was a postdoc at UCLA. His main research interest is in the field of combining theoretical research with hardware implementation aspects and reconfigurable computing platforms. Main application areas are wireless communication he has and is working on architectures for Faster-than-Nyquist signaling and Massive MIMO. Viktor has supervised 13 PhD students to their successful examination. He is a member of the VLSI Systems and Applications Technical Committee of IEEE CAS and a TPC member of ESSCIRC. Viktor is one of the founders of the start-up company Phase Holographic Imaging AB within the field of digital holographic imaging. The company was emerging from research projects within the VINNOVA Competence Centre CCCD.



POSTDOCS

BAKTASH BEHMANESH received his B.Sc., M.Sc. and Ph.D. degrees in Electrical and Electronics Engineering from Sharif University of Technology (SUT), Tehran, Iran, in 2006, 2008 and 2017, respectively. From 2008 to 2018, he has been an analog/mixed-signal integrated circuit designer with Integrated Circuits and Systems Group, EE Department, SUT, with focus on design of RFICs for low-noise applications and reconfigurable integrated RF filter design. In May 2018, he joined Electrical and Information Technology Department of Lund University as a postdoctoral researcher involved in the design of power amplifiers for next-generation wireless communication systems.



MIN KEUN CHUNG received the B.S. and Ph.D degrees from the school of electrical and electronic engineering, Yonsei University, Seoul, South Korea, in 2010 and 2016, respectively. In 2013 and 2015, He was with the National Instruments at Austin, TX, USA, as a Research Intern, where he participated in the design and implementation of signal intelligence and next generation wireless systems. He was a Postdoctoral Research Fellow with the Yonsei Institute of Convergence Technology, South Korea, where he was involved in the design and implementation of the physical layer of full duplex communication systems from 2016 to 2017. He is currently a Postdoctoral Research Fellow with the Wireless Communications Research Group at the Department of Electrical and Information Technology, Lund University, Sweden. His primal research interests are the design and implementation of the mmWave massive MIMO system.



BABAK MOHAMMADI received his Ph.D. degree in 2017 from the Electrical and Information Technology Department, Lund University. His research interests include power optimization, energy recycling, charge pump design, memories and assist techniques. His work has been published in solid state conferences and journals. He is currently a part-time postdoc at EIT, and he is CEO co-founder of Xenergetic AB, a company that offers low-power memory IP solutions.

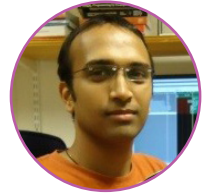


KARL-MAGNUS PERSSON received his PhD for research in nanoelectronic circuits at Lund University in 2014. Between 2015-2017 he was a postdoctoral fellow at Stanford University conducting research in stackable 3D electronics and he is now back i Lund pursuing a similar research topic.



POSTDOCS

HEMANTH PRABHU received his Bachelor's degree in electronics and communication in 2006 from Bangalore, India. He has worked in Texas Instruments for 3 years as digital design engineer. He received his MS in System On Chip and PhD in Electrical Engineering from Lund University in 2011 and 2017, respectively. His doctoral studies focused on algorithms for baseband signal processing for massive MIMO, and hardware implementation using HLS and reconfigurable platforms. He has been pursuing his post-doc in EIT, with focus on co-operative distributed processing in collaboration with Intel, and is now with the start-up company Xenergetic.



ALI ZAHER received his Bachelor degree in Computer and Communication Engineering from American University of Beirut in 2003. In 2006 he received his Masters degree in Digital Communication and Information Technology from Chalmers. The same year, Ali joined Ericsson Mobile Platform, Lund as ASIC designer for 3G and 4G modems. In October 2011, Ali decided to leave industry and joined Oslo University as PhD student in the Nano-electronics group. His research focused on developing miniaturized electronics to support medical sensors. In March 2016, Ali defended his thesis titled: Introducing NFC for in-body and on-body medical sensors. Ali worked for one year at U-blox Malmö with V2V communication ASICs, to take a leave and work as PostDoc at Oslo University as part of the project: Novel health service using implantable sensors connected to wireless applications. Currently, Ali is a guest researcher at EIT at LTH Lund.



PHD STUDENTS

HANIEH ALIAKBARI was born in Tehran, Iran in October 1988. She is a PhD researcher at EIT since January 2018. Before joining the Communication group at the department of Electrical and Information Technology (EIT), Lund University, she received her MSc (2012) and PhD degree (2017) in Telecommunication Engineering at Amirkabir University of Technology, Tehran (Tehran Polytechnic), Iran, both with a first class honors degree. She joined the Department of Electrical, Electronic and Information Engineering “G. Marconi” of the University of Bologna, Italy, as a Visiting PhD Student in September 2015 for 9 months. She has been involved in researches regarding electromagnetic modeling of (non)linear active devices, active and passive RF/microwave and millimeter-wave circuits for wireless communication, microwave/millimeter-wave active integrated antenna, and numerical electromagnetics. Her current interests are antenna design using Theory of Characteristic Modes (TCM) and massive MIMO antenna design for 5G.



ERIK BENGTSOON received M.Sc. in Electrical Engineering from Lund University 1997. He joined Ericsson Mobile Communication AB in Lund the same year and worked with RF ASIC design until 2005. He then joined Nokia A/S in Copenhagen and worked with antenna concept development with focus on reconfigurable antennas. In 2011, he joined Sony Mobile in Lund and belongs to the Radio Access lab. From 2015 he is an industry PhD student at the Department of Electrical and Information Technology, Lund University, partly founded by Swedish Foundation for Strategic Research (SSF). His current research focus is terminal diversity aspects from a massive MIMO perspective.



CHRISTIAN ELGAARD completed his M.Sc. degree in Engineering Physics from Lund University in 2002. Between 2003 and 2014 Christian held different positions at Ericsson, Nokia, and CSR and since 2015 he is working as a Senior Researcher in the RF ASIC systems group at Ericsson Research in Lund. Over the years, Christian has worked on many different analog blocks aimed for 2G - 5G radio systems, including LNAs, Mixers, VCOs, XO BB-filters, and PAs stretching from low frequencies to the mm-wave domain. Since Christian Elgaard joined Ericsson Research in 2015 he has completed 9 patent applications and authored 2 international peer reviewed conference papers. Christian is currently pursuing an industrial Ph.D. at the department of Electrical and Information Technology, Lund University.



JOSE FLORELIS was born in Spain in July, 1977. He received his M.Sc. degree in Telecommunications from Universitat Politècnica de València, Spain, in 2000 and his M.Sc. degree in Electronics with Emphasis in Microwave Technology from Högskolan i Gävle, Sweden, in 2001. He has been with Ericsson since 2002 working in the design and implementation of mobile platform solutions for GSM/WCDMA/LTE. In 2012 he joined the Radio Systems group at the department of Electrical and Information Technology, Lund University, Sweden, where he is currently pursuing his Ph.D. degree. His research interests are estimation and modeling of radio channels and distributed MIMO systems.



THERESE FORSBERG received a M.Sc. in Electrical Design engineering from Linköping University in 2007, with focus on electronics design and organic electronics. Her Master's thesis was carried out at Sony Ericsson and addressed RF coexistence issues in cellphones when integrating A-GPS receivers. In the summer of 2013, after 6 years of working with design and verification of integrated radio circuits at Ericsson/ST-Ericsson in Lund, she started her PhD studies in the Analog RF group at the department of Electrical and Information Technology at Lund University. Her field of interest is mm-wave transmitters in CMOS.



RIKARD GANNEDAH was born in Stockholm, Sweden in 1993. He received his M.Sc. degree in Engineering Nanoscience from Lund University in 2018. His Master's thesis focused on Digitally Controlled Oscillators for mm-Wave frequencies and was carried out at Ericsson AB, Lund. Rikard is currently pursuing a PhD in Circuit Design at the Department of Electrical and Information Technology at Lund University. His main research interest is analog CMOS circuit design for Massive MIMO systems.



SARA GUNNARSSON was born in Alvesta, Sweden in 1991. She received the M.Sc. degree in Electrical Engineering from Lund University in 2017. Sara is now working towards a dual Ph.D. degree at the department of Electrical and Information Technology, Lund University in cooperation with the department of Electrical Engineering, KU Leuven. Research interests include channel characterization and modelling in order to improve reliability and efficiency in massive MIMO systems.



XUHONG LI received her BSc degree in Telecommunication Engineering in 2010 from Jilin University, China, and the MSc degree in Wireless Communications from Lund University in 2014, Sweden. She is now working towards her Ph.D. degree at the department of Electrical and Information Technology, Lund University. Her main research interests include high resolution radio channel parameter estimation and radio-based positioning using massive MIMO system.



JONAS LINDSTRAND was born March 24, 1982, in Trelleborg, Sweden. He received a M.Sc. degree in electrical engineering from Lund University, Sweden, in 2010, on the subject of Mixed-Class RF Power Amplifiers for Envelope Tracking Systems in CMOS Technology. His Master Thesis was funded by Ericsson Research, Lund, Sweden and carried out at Bram Nauta's Integrated Circuit Design (ICD) group at the University of Twente, The Netherlands. Jonas is currently pursuing a PhD in Circuit Design at the Department of Electrical and Information Technology (EIT), Lund University, Sweden. The main research area is Radio Frequency Integrated Circuits (RFICs) with a focus on radio transmitters and antenna interfaces.



MOJTABA MAHDAVI received his M.Sc. degree in electrical engineering from Sharif University of Technology, Tehran, Iran in 2010. From 2010 to 2012 he was with Advanced Integrated Circuit Design Laboratory (AICD Lab) at Sharif University of Technology. He is currently working toward the Ph.D. degree in Digital ASIC group at Department of Electrical and Information Technology (EIT), Lund University. His research interest includes wireless communication systems, digital circuit design (ASIC/FPGA), and base-band processing for Massive MIMO systems.



STEFFEN MALKOWSKY was born in Mühlacker, Germany, in 1984. He received his B.Eng. degree in Electrical Engineering and Information Technology from Pforzheim University, Germany in 2011 and his M.Sc. degree in Electronic Design from Lund University in 2013. His master thesis was on the subject of Desynchronization of Synchronous Circuits. He is currently a PhD student at the department of Electrical and Information Technology, Lund University. He was one of the main developers behind the LuMaMi testbed and is currently focussing on ASIP design for massive MIMO.



MASOUD NOURIPAYAM received his M.Sc. in System-on-Chip (Electronic Design) from Lund University (LTH) in 2017. Since March 2018, He is working as a PhD student in the Digital ASIC group at the department of Electrical and Information Technology (EIT), Lund University. His main area of research is Ultra Low Voltage memory Architectures- Assist circuitry and Logic in Memory with the application in IoT, biomedical and machine learning.



CHRISTIAN NELSON received his M.Sc. degree in Engineering Physics from Lund University 2016. From 2013 through 2015 he was employed by the Swedish Defense Research Agency (FOI) where he worked with electronic warfare simulations and evaluation. Since 2016 he holds a position at Lund University as a Ph.D. student at the department for Electronic and Information Technology (EIT). His research interests are vehicular communication, electromagnetic wave propagation, and signal processing.



JESÚS RODRÍGUEZ was born in Madrid (Spain), in 1981. He received his Master's Degree in Telecommunication Engineering from University of Málaga, Spain, in 2007. His master thesis was on the subject of "Wavelets video compression for mobile communications". Afterwards he pursued a Postgraduate Master in Communication Technologies in the same University, finishing in 2009 with the thesis project: "Mobile channels estimation for LTE". He has worked for more than 10 years in the industry as a Physical Layer engineer and RTL Designer focused on diverse communication standards. His research interests are communication systems, digital circuit design, and efficient implementation of DSP algorithms. Jesús is currently a Ph. D. student in the department of Electrical and Information Technology (EIT) at Lund University, Sweden.



MURIS SARAJLIC received the B.Eng. degree in Electrical Engineering from University of Tuzla, Bosnia and Herzegovina in 2010 and the M.Sc. degree in Wireless Communications from Lund University in 2013. He is currently working towards a PhD degree at the Department of Electrical and Information Technology, Lund University. His research interests include energy efficiency and complexity aspects of hardware-constrained wireless communication systems.



PER SKARIN received M. Sc. in Computer Science and Engineering from Lund University 2004. He's first job was to work with multimedia processing on mobile phones at Ericsson Mobile Platforms in Lund. In 2008 he briefly turned his attention to Blu-ray systems at AudioDev in Malmö. In 2009 Per returned to ST Ericsson to work on baseband software for 3G. At ST Ericsson he's worked as a software developer, systems architect, and scrum master. He's been part of developing new core architectures, teaching software development and introducing new ways of working. Per joined Ericsson Research in 2014 to work on Cloud. Since 2016 he is part of Sweden's largest ever individual research program, the Wallenberg AI, Autonomous Systems and Software Program (WASP), as an Ericsson employee doing a PhD at the department of Automatic Control at Lund University. His current research goes into cloud technology and automation for time sensitive, critical cyber-physical systems.



SIYU TAN accomplished his bachelor study and received the B.Sc. In 2012 in Beijing University of Post and Telecommunications (BUPT), Beijing, China. He received the M.Sc. degree in LUND University In 2014 with a master thesis focused on analog-digital converter with digital calibration. His is currently pursuing his PhD study at the department of Electrical and Information Technology (EIT), Lund university, in the mixed signal group. His main research interest includes high-speed high-bandwidth mixed signal circuit design.



GUODA TIAN finished his bachelor study and received the B.Sc. in 2016 in Northeastern University (NEU), Shenyang, China. He joined the Wireless Communication Programme and received the M.Sc. degree in Lund University in 2018 with a master thesis focused on positioning of narrowband Internet of Things. His is currently pursuing his PhD study at the department of Electrical and Information Technology (EIT), Lund university. His main research interest includes machine learning for Massive MIMO systems.



MEMBERS OF THE SOS BOARD

SVEN MATTISSON chairman, received his PhD in Applied Micro Electronics from Lund University in 1986. From 1987 through 1994 he was an associate professor in Applied Micro Electronics in Lund where his research was focused on circuit simulation and analog ASIC design. 1995 he joined Ericsson in Lund to work on cellular hand-set development. Presently he is with Ericsson in Lund, where he holds a position as senior expert in analog system design. Since 1996 he is also an adjunct professor at Lund University. Dr. Mattisson is one of the principal developers of the Bluetooth concept.



ANDREIA CATHELIN started her electronic studies at the Polytechnic Institute of Bucarest, Romania and graduated from the Institut Supérieur d'Electronique du Nord (ISEN), Lille, France in 1994. In 1998 and 2013 respectively, she received PhD and “habilitation à diriger des recherches” (French highest academic degree) from the Université de Lille 1, France. Since 1998, she has been with STMicroelectronics, Crolles, France, now in Digital Front-End Manufacturing & Technology, Technology & Design Platforms, as Fellow. Her major fields of interest are in the area of RF/mmW/THz systems for communications and imaging. Andreia is serving in several IEEE conferences and committees, such as ISSCC and ESSCIRC, and is member of IEEE SSCS Adcom.



FRANZ DIELACHER received his M.S. and Ph.D. degrees in electrical engineering from the Graz University of Technology, Austria. From 1981 until 1999 he worked for Siemens Semiconductor Group. Since 1999 Dr. Dielacher is with Infineon Technologies in various positions in circuits and systems for communications like DSL, high-speed transceivers, and wireless infrastructure. Currently he is a Senior Principal Engineer in the Radio-Frequency and Sensors Group. His international involvement includes ISSCC TPC member and wireline subcommittee chair, ESSCIRC TPC member and TPC chair in 2001 and 2015, ESSCIRC steering board member, IEEE SSCS AdCOM member and Distinguished-Lecturer, member of the EuMIC, COMCAS and VLSI-TSA technical program committees and member of the IEEE Beyond 5G Technology Roadmap Working Group.



PETER KARLSSON received his Ph.D. in applied Electronics at Lund Institute of Technology in 1995 with a thesis on indoor radio wave propagation. He joined Telia Research and had different research and management positions in the wireless and mobile communications systems area. In 2000 Peter had a one year post-doc and research fellow position in the Center for Communications Research at the University of Bristol. Peter joined Sony Ericsson corporate technology office 2007 and was leading the network Technology Lab in the new Sony Mobile organisation from 2012. He is now head of the Research and Standardisation department at Sony Mobile in Lund, focusing on 5G radio access, system architecture and AI research. Peter has written and co-authored some 75 conference and journal papers in the mobile and wireless communications area.



ANTON KLOTZ studied Technical Computer Science at Mannheim University in Germany and joined Cadence Design Systems in 2004 as Application Engineer, where he was responsible for physical verification and DFM for large digital designs. In 2015 he became University Program Manager for the EMEA region.”



PETER OLANDERS took his PhD in Mathematical Physis in Lund 1984, started with radar design at Ericsson in 1985, moved to Televerket Radio/Telia Research in 1988 and then mobile systems at Ericsson in 1996. He has held various management positions at Telia and Ericsson, now being Research Leader. Many positions in standardization, industrial collaboration as well as university collaborations. Chaired Competence Centre for Circuit Design (CCCD) at Lund University board 1999 – 2007, currently chairing GHz competence centre at Chalmers (since 2007) as well as recently joined the SOS Board.



KARL-ERIK ÅRZÉN received his PhD in Automatic Control from Lund University in 1987. Since 2000 he is Professor in Automatic Control at Lund University. Since 2015 he is co-director for the Wallenberg Autonomous Systems and Software Program (WASP). He is also a member of the board for the ELLIIT strategic research area on IT and mobile communication, and member of the research board of the Faculty of Engineering (LTH) at Lund University. His research interests are control of computer systems, cloud computing, cyber-physical systems, and embedded and real-time control. He has written and co-authored more than 180 conference and journal papers.



ADJUNCT MEMBER OF THE SOS BOARD

PER RUNESON Professor of software engineering at Lund University, Sweden. Head of the Computer Science department. Research director for the industrial Excellence Center on Embedded Applications Software Engineering (EASE) and leader for the software engineering research group (SERG) at Lund University. His research interests include empirical research on software testing and quality, and methods for such research. He has a Ph.D. from Lund University and has worked as a consulting expert in industry. He is member of the editorial boards of Empirical Software Engineering (Springer) and Software Testing, Verification and Reliability (Wiley).



MAP



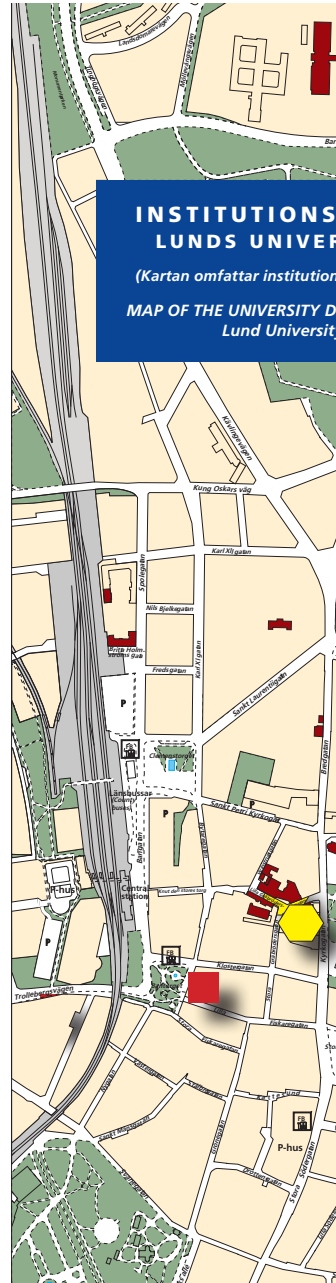
Grand Hotel

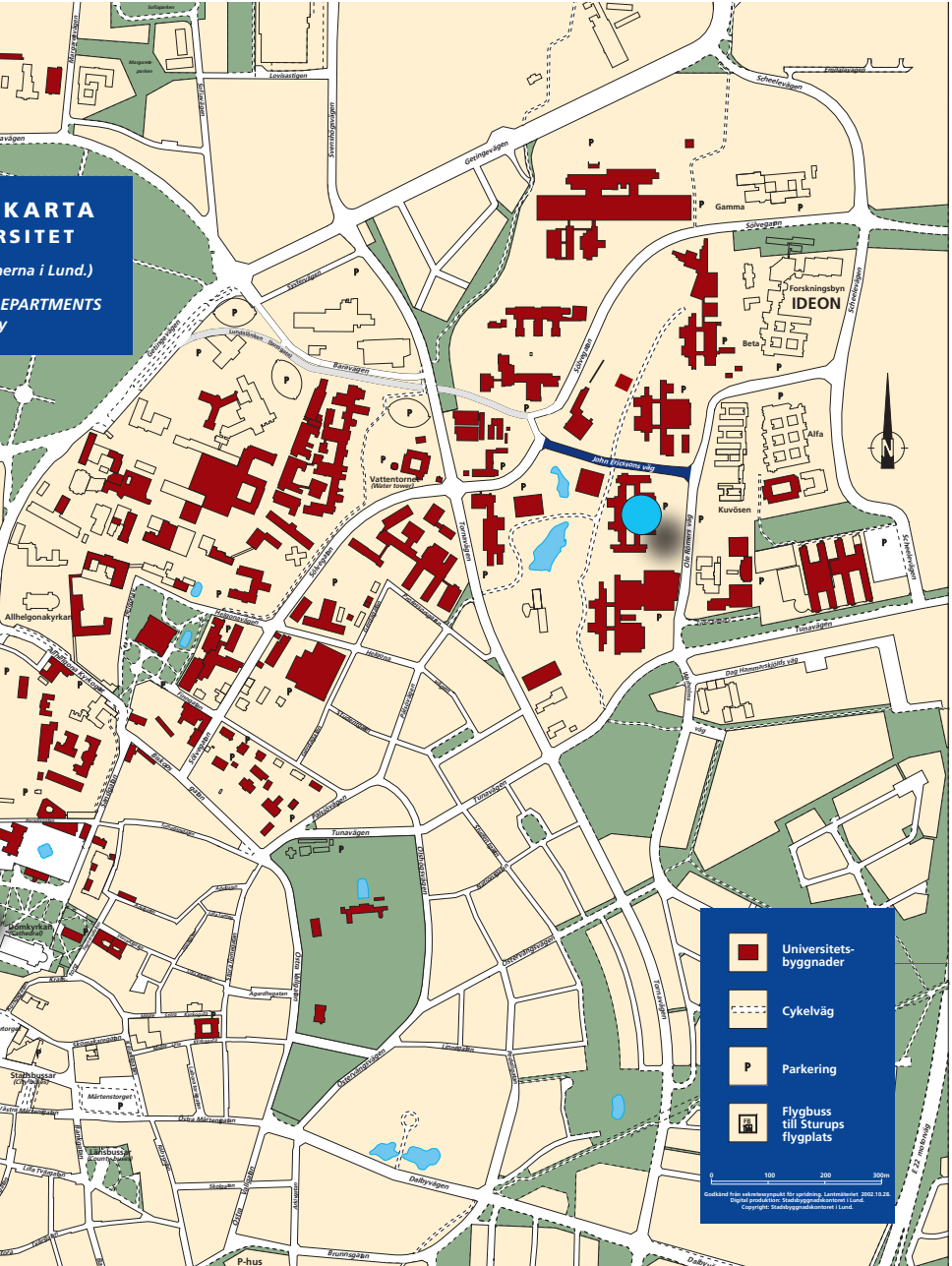


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