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EuMW 2021
United in Microwaves

EUROPEAN MICROWAVE WEEK

EXCEL, LONDON
13-18 FEBRUARY 2022
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EUROPEAN MICROWAVE WEEK 2021

CONFERENCE PROGRAMME

EUROPE'S PREMIER MICROWAVE, RF, WIRELESS AND RADAR EVENT

UNITED IN MICROWAVES

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51st European Microwave Conference 2021
The 51st European Microwave Conference

EuMIC 2021
The 16th European Microwave Integrated Circuits Conference

EuRAD 2021
The 18th European Radar Conference

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The European Microwave Week 2021 organisers would like to thank the following companies for their help and valued support throughout this year's event.

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Welcome to the 24th European Microwave Week

It is with great pleasure that we welcome you to the 24th European Microwave Week (EuMW), which is taking place at ExCeL in London, UK. At the time of writing this message, the world is still in the grip of the coronavirus pandemic. The pandemic has greatly affected the way we live our lives for almost two years now. Many people around the world have lost their lives and many have had their lives changed permanently by the pandemic. One impact has been how we, the human race, interact with each other. The human instinct is usually to come together to help deal with problems, to form strategies and build partnerships, and, to celebrate successes.

EuMW is one such event that is motivated by these instincts. It is for this reason the organising team for this year's event has worked long and hard to ensure we have an event where we can come together and meet, face to face, as a community to continue to develop and celebrate our area of science, engineering and technology. We feel that it is vital to achieve this goal. This is the reason why EuMW 2021 is taking place during February 2022 – we have delayed hosting the event so that it is more feasible to hold a successful in-person event whilst still respecting any national and international restrictions on social interactions and travel.

This is the third time that EuMW has been hosted in London, following on from previous highly successful events in 2001 and 2016. London is a natural venue for prestigious scientific events, being the home of such long-standing scientific institutions as the Royal Society (founded in 1660), the University of London (founded in 1836) and the Institution of Electrical Engineers (founded in 1871), as well as the home to many famous scientists, including James Clerk Maxwell, Lord Rayleigh, Charles Wheatstone, Alan Turing, etc. Our moto for this year's EuMW is 'United in Microwaves'. This reflects the traditional feeling of unity in our community, and, demonstrates how we can use this conference to re-establish and further develop this feeling of unity within our community of colleagues and fellow professionals, despite the recent problems caused by the pandemic.

EuMW 2021 continues the annual series of highly successful microwave events that started back in 1998. EuMW 2021 comprises three co-located conferences: European Microwave Conference (EuMC); European Microwave Integrated Circuits Conference (EuMIC); European Radar Conference (EuRAD). There are also many workshops and short courses associated with each of these conferences, along with several Special and Focused Sessions. Two particular highlights are Special Sessions on the life and works of two prominent members for our community who sadly passed during 2020; Professor Peter Clarricoats and Professor Roberto Sorrentino. Peter Clarricoats was Chair of the first European Microwave Conference (EuMC), held in London in 1969, and Chair of the 9th EuMC in the UK in 1979; he received a EuMA Distinguished Service award in 2005. Roberto Sorrentino was a founder member of the European Microwave Association and President of EuMA from 1998 to 2009. They will both be sadly missed.

In addition, there are three Forums, covering: Defence, Security and Space; Automotive; and, Beyond 5G technologies. There is also a very large trade show – the largest RF and microwave trade show in Europe – where the leading companies from our industry exhibit their very latest technological developments. EuMW 2021 also has several activities aimed specifically at students. These include: the Tom Brazil Doctoral School of Microwaves; the European Microwave Training School; the Career Platform; and, IEEE Young Professionals. There is also the Women in Microwave event, in which both women, and men, are encouraged to participate.

We sincerely hope that you will enjoy a memorable experience in London at EuMW 2021.

NICK RIDLER
EuMW General Chair
National Physical Laboratory, UK

JOHN CUNNINGHAM
EuMW General Co-chair
University of Leeds, UK

Welcome from the President of the European Microwave Association

On behalf of the European Microwave Association (EuMA), I warmly welcome you to the 24th edition of the European Microwave Week in London! EuMA stands up for our microwave and RF community. We foster networking between scientists, engineers, decision makers and end-users. The European Microwave Week (EuMW) is our main asset and a real networking event. It's the place to get information you can't get anywhere else and to meet colleagues you don't see every day.

EuMA is continuously improving itself to support our microwave community. We recently released a 22 pages White Paper "For a Strong & Competitive European Wireless Technologies Ecosystem". A free download is available at our website www.eumwa.org. Soon EuMA will announce a new series of webinars with interesting and qualified speakers.

EuMA is very active on social media. Follow us @eumassociation on Facebook, LinkedIn, Twitter, YouTube and Instagram and discover our latest posts.

EuMA actively supports young researchers. Thereto our Innovation Team is launching the fourth edition of the *EuMA Internship Award*. Each year, up to seven prizes of 4.500 € each are awarded to selected master and PhD students to spend a period of at least 3 months abroad in one of the leading European microwave industries or institutes. Details are at our website. EuMA continues to provide grants and reduced registration fees to students and delegates from NIS countries to attend the EuMW.

EuMA offers a membership to all working in the field of microwaves. Members enjoy reduced fees for attending EuMW and EuMA-sponsored events as well as the IEEE IMS and the APMC. EuMA members have free access to our archive of publications and the on-line version of the International Journal on Microwave and Wireless Technologies.

EuMW is the premier microwave conference and exhibition event in Europe. We value the cooperation with IEEE Societies MTT, AP and ED and the GAAS® Association and our long-standing partner Horizon House / Microwave Journal as event organiser.

Preparing and hosting the EuMW is a major effort, from paper submission and review to on-site organisation. This is accomplished by a team of volunteers year by year. My special and sincere thanks go to Nick RIDLER and John CUNNINGHAM the 2021 General Chair and Co-chair; to Peter GARDNER, General TPC Chair; to Adrian CROSS, Treasurer; to Emma MCPHERSON and Yi WANG, EuMC Chair and TPC Chair; to Chris CLIFTON and Edward WASIGE, EuMIC Chair and TPC Chair; and to James WATTS and Matt RITCHIE, EuRAD Chair and TPC Chair – just to name a few on behalf of the entire team. Thank you!

The European Microwave Week is back again in UK after the successful events in 2001, 2006, 2011 and in 2016. All members of the team have been working hard to set up an outstanding technical and scientific programme and I am sure they will make your stay in London exciting, enjoyable, and a rewarding experience of Britain's hospitality. I would like to cordially invite you to EuMW 2021. Come to the wonderful city of London. Join us at EuMW2021 and discover information you won't get anywhere else. Take the opportunity to meet and talk to colleagues and friends from all over the world you don't see every day. I hope to see you in London! And most of all: Get involved in our community!

FRANK
VAN DEN BOGAART
President
European Microwave Association

EuMA is now very active on various social media. Follow us @eumassociation on Facebook, LinkedIn, Twitter and Instagram.

Welcome to the 16th European Microwave Integrated Circuits Conference

It is a great pleasure for us to welcome you to London for the 16th European Microwave Integrated Circuits (EuMIC) Conference which has been jointly organised by the GAAS® Association and EuMA since 2006. For the second year, the conference will not happen in Autumn but will be held in the Spring of 2022, on Monday the 14th and Tuesday 15th February 2022. EuMIC is the premier European technical conference for RF & microwave microelectronics as part of the European Microwave Week (EuMW).

The aim of the conference is to promote the discussion of recent developments and trends and to encourage the exchange of scientific and technical information covering a broad range of microwave, mm-wave, terahertz and related topics, from materials and technologies to integrated circuits and applications that will be addressed in all of their aspects: theory, simulation, design and measurement.

Monday is a busy day with a large offering: beyond the Opening Session, there will be twelve regular sessions as well as the traditional Foundry Session. This lively Foundry session brings together key representatives of the RF and microwave semiconductor foundries and will run together with the EuMIC Cocktail Reception, once again kindly sponsored by the GAAS® Association, to conclude the day. On Tuesday, there will be two regular sessions, two joint sessions with EuMC, two poster sessions, one jointly with EuMC, and the Closing Session. A number of the regular sessions will feature keynote industry talks on topical themes.

The EuMIC Opening Session will feature two keynote addresses by eminent speakers. Sir Christopher Snowden, Fellow of the Royal Society and Chair of the ERA Foundation, will speak on "III-V Nitride Semiconductors for Microwave Applications", while Zoya Popovic, Distinguished Professor, Department of Electrical, Computer and Energy Engineering at the University of Colorado, Boulder, USA, will speak on "High-Efficiency PAs for Broadband High-PAR Signals".

This year, the EuMIC Closing Session will start with the celebration of our best contributors. The EuMIC Prize for the best paper and the EuMIC Young Engineer Prize will be awarded by the EuMIC Prize Committee. For the next three years, the traditional GAAS® Association Fellowship Award will be replaced with the Tom Brazil Fellowship Award (by the GAAS® Association) in dedication to a friend and colleague who made such significant contributions to our microwave community. This award will focus on promoting and encouraging the achievements of research students and further announcements on the details will be made prior to the conference. This session will be concluded by two keynote presentations, one by Dr. Ebrahim Bushehri, CEO and Founder of Lime Microsystems (UK) on "Flexible and Open Source: The brave new world of Software Defined Radio and Open RAN", followed by Dr. Nadine Collaert, Program Director at IMEC on "6G – Known Technologies with a Twist or Maybe Not?"

We take this opportunity to show our appreciation to our authors for their technical contributions and for choosing to disseminate their work at EuMW and the dedication of the reviewers and TPC members who have spent their free time making the selections in order to provide the best possible programme. Workshops and Short Courses are a major offering of the EuMW and so we would also like to thank the organisers for gathering key experts to cover the latest developments. We also wish to acknowledge the support of the previous EuMIC teams, in particular Utrecht, who were always ready to advise. Finally, we would like to thank the 2021 EuMC and EuRAD teams for sharing experiences as well as to all our colleagues working in the background supporting EuMW as a whole.

We look forward to welcoming you personally in London for an exciting EuMIC!

CHRIS CLIFTON
EuMIC Chair
Sony Europe Ltd.

SHOKROLLAH KARIMIAN
EuMIC Co-Chair
University of Oxford, UK

EDWARD WASIGE
EuMIC TPC Chair
University of Glasgow, UK

Welcome to the 51st European Microwave Conference

Welcome to EuMC 2021! Never before has communications technology been so important for the world to retain functionality – last year we had the first virtual conference of this series and while the organisation meetings have largely been done remotely for this event, we are delighted to be able to hold this conference in-person, and, be "United in Microwaves".

This year is the 51st edition of the conference, returning to London, the city where EuMC was first hosted back in 1969. EuMC is the largest event in Europe dedicated to a broad range of high frequency topics ranging from novel semiconductor and packaging technologies, photonics, passive and active microwave/mmWave circuits and antenna (arrays), up to system level, with innovative solutions for many applications including for example, biomedical, mobile and IoT.

We have received over 440 submissions across 46 countries for EuMC 2021. Our conference programme provides you the perfect platform for you to meet colleagues and learn about the latest advances in your own and related research areas. We have an exciting line up of world leading speakers from academia and industry and there are opportunities for you to learn about new areas through our workshops.

In particular, on Sunday and Monday there are 23 EuMC workshops and short courses on hot topics including new developments in filters and amplifiers, materials, packaging and measurement technology for 5G/6G, terahertz devices and technologies, and many more. Tuesday morning features the EuMW/EuMC plenary Opening Session where Mike Geen, chief scientist at Filtronic will give the opening speech on "What's next for mmWave?"

Another exciting aspect of this event is the European Microwave Exhibition which has been the largest traditional microwave and RF tradeshow in Europe for many years. This year we expect it to be the biggest such tradeshow post pandemic and hope it assists and inspires many fruitful technology developments and collaborations.

The Women in Microwaves event is sponsored by IEEE MTT-S and will take place on Tuesday afternoon and involve a trip to the Cutty Sark (Greenwich) as well as a Panel Session "Inspiring Women in Engineering".

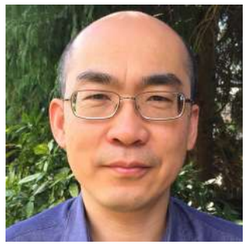
The conference sessions on Tuesday have tracks on power amplifiers, passive circuits and filters, integrated antennas, packaging, terahertz and metamaterials. Wednesday has a packed EuMC programme covering all areas including two poster sessions. Thursday features tracks on filters, antennas, characterisation techniques and applications. There is also the Asia-Pacific focused session when we will hear from several expert speakers.

In the EuMC Closing Session, also on Thursday, the EuMC microwave prize and two young engineer prizes will be awarded. The Closing Session features a keynote by Tadao Nagatsuma, Osaka University, entitled "Challenges and opportunities for terahertz communications – towards 6G and beyond", and a keynote on the "(R)Evolution of wireless communications", by Eric Hawthorn from Radio Design. Finally, on Friday there are four more short courses and workshops on advanced manufacturing/packaging, microwave superconductivity, terahertz and AI.

Enjoy London! Explore some of the many sights in this buzzing city. Perhaps visit the nearby Royal Observatory and stand on the historic prime meridian of the world at the home of Greenwich Mean Time (GMT), or switch to the arts and visit the gallery of your choice be it traditional or modern. Most of all, we hope that you will enjoy EuMC 2021 and we look forward to being "Re-united in Microwaves"!

EMMA MACPHERSON
EuMC Chair
University of Warwick , UK

DOMINIQUE SCHREURS
EuMC Co-chair
University of Leuven, Belgium



YI WANG
EuMC TPC Chair
Univeristy of Birmingham, UK

Welcome to the 18th European Radar Conference

It is our pleasure to welcome you to the 18th European Radar Conference (EuRAD 2021) which will be held from the 16th to 18th February 2022 in London, UK, as part of European Microwave Week 2021. This radar conference is the major European event for the present status and the future trends in the field of radar research, technology, system design and applications. The EuRAD conference will bring together a global network of researchers, practitioners and institutes working on topics related to the following four areas of focus: 1) Radar Sub-systems and Phenomenology, 2) Radar Signal and Data Processing, 3) Radar Architecture and Systems and finally 4) Radar Applications.

For many delegates this will be the first face-to-face large-scale event they attend in a long time, and we hope to put on an excellent conference by bringing world class radar researchers together. The ability to interact in person at conference is a brilliant opportunity that is difficult to replicate and as the first physical EuRAD conference for two years we hope attendees can enjoy this experience and get the most out of it. We are proud to put on the EuRAD 2021 conference at the London ExCeL centre. While at the conference our attendees can enjoy the sights and sounds of London.

In the Wednesday Opening Session, we will host an excellent speaker on the cutting-edge perspective of radar & EW research. Barry Trimmer will be speaking on Trends in Defence Electronics – Technological Convergence in Radar & EW. He is presently VP (technical) for Intelligence, Surveillance and Reconnaissance (ISR) within Thales UK, with particular responsibilities for Electronic Warfare, Radar, Airborne Mission Systems and Unmanned Air Systems. This will be followed by a talk by Eva Rajo Iglesias, Professor at the Department of Signal Theory and Communications, University Carlos III de Madrid. Eva will describe the state of the art in antenna technologies for millimetre and sub-millimetre wave radar.

The Closing Session plenary talk will be provided by Nigel Clarke. Nigel led on All-terrain and Autonomy Sensing Research at Jaguar Land Rover Research, and he will show the role that microwave radar must play in making a Level 5 fully autonomous car and how the use of higher frequency radar might make full autonomy more realisable.

The EuRAD conference stands out as the leading European event that puts on show the latest cutting-edge research, development, and new innovations from the field of radar. Strongly attended by academics, industry experts and government representatives we hope to inspire new and experienced radar researchers with our diverse programme. This year we had 179 submitted papers which went through a rigorous review process by our expert review panel. The end result is 129 papers being presented over 2 poster and 21 oral sessions at the conference. Leading industrial keynotes will be provided at a number of our focus oral sessions by leading experts within their fields. This year, the conference provides an array of expertly lead workshops in key focus areas of interest including strong links with both the Defence, Security & Space (DSS) and the Automotive Forums. These events have grown significantly since their inception and provide really important engagement of their respective interlinked communities. The DSS event will be held on Wednesday from 11:20 until the end of the day.

The EuRAD 2021 organisers would like to specially thank all the excellent reviewers and expert TPC members for their support. Despite the need for a fast turn around and high-quality reviews during the peak holiday period we still achieved a rigorous level of peer review. Without our volunteer reviewers it would not be possible to put on this event, many thanks. All that is left is to thank the EuRAD conference delegates for your attendance and contributions to EuRAD 2021.

JAMES WATTS
EuRAD Chair
Theta Technologies Ltd. UK

STEPHEN HARMAN
EuRAD Co-chair
Aveillant Ltd, UK

MATTHEW RITCHIE
EuRAD TPC Chair
University College London, UK

Welcome from the General TPC Chairs

I am delighted that we have been able to host the European Microwave Week in London again. Although much has changed since EuMW 2016, when we were last here, the UK capital city continues to be one of the great global centres for culture, the arts, sport, entertainment, shopping and tourism. I look forward to seeing you during EuMW 2021 as you enjoy our excellent conference programmes, and I hope you will be able to experience some of the other opportunities that this city offers while you are here.

As General Technical Programme Committee Chair, I would like to thank the many people who have worked through very difficult, challenging and frequently changing circumstances to generate what I am sure you agree is an excellent set of conference programmes.

First of all, of course, the paper authors and presenters. Excellent research and development work has continued in our widespread scientific and technical community despite the difficulties and complications caused by the pandemic lockdowns and other restrictions, and this has been reflected in a very high quality set of submitted papers. I must also thank the authors for their patience as circumstances forced us to change submission deadlines several times and postpone the conference. We now share a distinction with the 2020 Olympics and the European Soccer championships, in holding our event during the year after that which appears in the name!

I also owe huge thanks to the excellent group of over 500 expert reviewers who scrutinised and provided constructive critiques on over 700 submitted papers to enable the Technical Programme Committee to select the best of them for our conferences. The delayed timing of the review period made this task more challenging this year, and I am extremely grateful to all those who fitted in their review tasks during or around their well-earned vacation periods.

For the second time, the Technical Programme Committee meeting has been conducted as a distributed virtual event, because of pandemic related travel constraints. I owe huge gratitude to the EuMW 2020 team for establishing the processes that made it possible to do this efficiently and effectively, and to the EuMW 2021 Operations Team and the EuMA Software Officers who made it work so well again this time. Of course, I would also like to acknowledge the excellent work done by the TPC chairs of the three individual conferences and our Technical Programme Committee, over 100 highly experienced experts in their fields. In their 26 sub-committees, they considered all of the reviewed papers and selected the best, with an overall acceptance rate of approximately 65%, and they formed them into the coherent and attractive set of 84 sessions on key topics in our discipline that make up our three conferences. Several of the sessions also feature invited talks from industry experts, to highlight the industrial context of those key topics. The programmes for the week as usual feature a set of specialist workshop and short courses.

Ours is a dynamic and constantly evolving discipline. As always, the EuMW programmes cover the important and fast developing themes, including: new applications and new passive and active technologies for the high mm-wave and low THz bands; advanced manufacturing processes creating new possibilities in component design and system integration; artificial intelligence (AI), both as a tool in design and fabrication and as a new paradigm in signal processing; new applications for radar in many different aspects of our lives; and the many technologies and applications associated with communications systems, including 5G and beyond.

It has been a pleasure and a privilege to serve as General TPC Chair for EuMW 2021. I look forward to seeing you in London in February 2022.

PETER GARDNER
EuMW General TPC Chair
University of Birmingham, UK

DJURADJ BUDIMIR
EuMW General TPC Co-chair
University of Westminster, UK

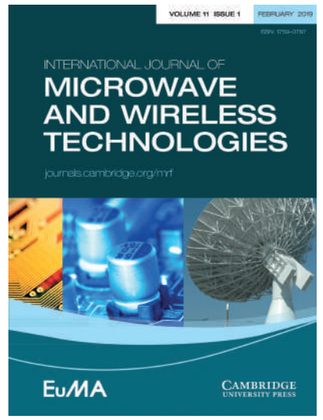
International Journal of Microwave and Wireless Technologies: EuMW 2021 Special Issue

The International Journal of Microwave and Wireless Technologies was created in 2009 by the European Microwave Association (EuMA) and Cambridge University Press for the benefit of the microwave research community in Europe and overseas.

The journal is published ten times a year. It allows academic and industrial researchers to promote their work and stay connected with the most recent developments in microwave and RF technology. The journal is referenced in databases such as Scopus and Google Scholar and is indexed in the Thomson Reuters Web of Science. Following the success of previous microwave weeks, the journal will again publish a special issue dedicated to European Microwave Week 2021.

The authors of several highly ranked papers presented at the conferences will be invited to submit an extended version for publication in the journal. The special issue will be guest edited by Yi Wang, TPC chair of EuMC 2021, Edward Wasige, TPC chair of EuMIC 2021, and Matthew Ritchie, TPC chair of EuRAD 2021.

Accepted papers will be published online at http://journals.cambridge.org/MRF and can be referenced using their DOI (Digital Object Identifier). Once all submissions are received, the articles will be collated into the Special Issue, which is expected to appear in June 2022.



YI WANG
EuMC 2021 TPC Chair

EDWARD WASIGE
EuMIC 2021 TPC Chair

MATTHEW RITCHIE
EuRAD 2021 TPC Chair

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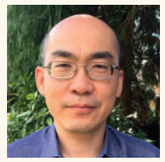

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National Physical Laboratory, UK

Manoj Stanley
Operational Officer & Video Chair
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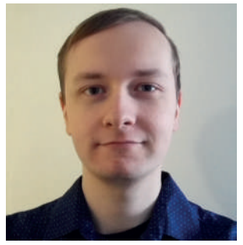
Connex Hotels and Events, UK

2020 European Microwave Week in Utrecht Best Paper Prizes: EuMC

EuMC Prize
Sponsored by Eindhoven University of Technology



Wim van Cappellen
EuMC Chair

Bart Smolders

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Mikko Hietanen[1], Jere Rusanen[1], Janne P. Aikio[1], Nuutti Tervo[1], Timo Rahkonen[1], Aarno Pärssinen[1]
[1]University of Oulu

Paper Title
Ka-Band TDD Front-End with Gate Shunt Switched Cascode LNA and Three-Stack PA on 22 nm FDSOI CMOS Technology

EuMC Young Engineer Prize
Sponsored by Eindhoven University of Technology

Wim van Cappellen
EuMC Chair

Bart Smolders

Authors
Anton Sieganschin[1] ,Thomas Jaschke[1], Arne F. Jacob[1]
[1] Hamburg University of Technology

Paper Title
A Compact Low-Noise Frontend for Rx/Tx-Integrated SatCom Arrays

EuMC Young Engineer Prize
Sponsored by Antenna Company

Wim van Cappellen
EuMC Chair

Diego Caratelli

Authors
J. Gabriel Buckmaster[1], Thomas H. Lee[1]
[1]Stanford University

Paper Title
An Electronically Steerable Millimeter-Wave Reflectarray for Wireless Power Delivery

2020 European Microwave Week in Utrecht Best Paper Prizes: EuRAD

EuRAD Prize
Sponsored by THALES

Mayazzurra Ruggiano
EuRAD Chair

Geert van der Molen

Authors
Hasan Iqbal[1], Andreas Löffler[1], Mohamed Nour Mejdoub[1], Frank Gruson[1]
[1]Continental AG

Paper Title
Realistic SAR Implementation for Automotive Applications

EuRAD Young Engineer Prize
Sponsored by HENSOLDT

Mayazzurra Ruggiano
EuRAD Chair

Guy Kouemou

Authors
Julius Tilly[1], Fabio Weishaupt[1], Ole Schumann[1], Jürgen Dickmann[1], Gerd Wanielik[2]
[1]Mercedes-Benz AG, [2]TU Chemnitz

Paper Title
Road User Classification with Polarimetric Radars

2020 European Microwave Week in Utrecht Best Paper Prizes: EuMIC

EuMIC Prize
Sponsored by Delft University of Technology

François Deborgies
EuMIC Chair

Kofi Makinwa

Authors
Eswara Rao Bammidi[1], Ingmar Kallfass[1]
[1]Institute of Robust Power Semiconductor Systems (ILH) - University of Stuttgart

Paper Title
An Analog Costas Loop MMIC in 130 nm SiGe BiCMOS Technology for Receiver Synchronization of QPSK and BPSK Modulated Signals

EuMIC Young Engineer Prize
Sponsored by GAAS® Association

François Deborgies
EuMIC Chair

Paolo Colantonio

Authors
Tejinder Singh[1], Raafat R. Manso[1]
[1]University of Waterloo

Paper Title
Reconfigurable PCM GeTe-Based Latching 6-bit Digital Switched Capacitor Bank

Roberto Sorrentino Prize

This is a new prize, named in remembrance of Roberto Sorrentino. The prize has been initiated by Linda Di Carlo Sorrentino in cooperation with RF Microtech, the Italian EM Society (SIEm) and EuMA. Awarded every year for at least ten years, it will recognize an outstanding young professional who has distinguished technical achievements (not on a single paper) within the microwave field. The technical achievements may include technical papers in journals and/or conferences/symposia sponsored or technically sponsored by EuMA. The technical achievements may also include services as a committee member for these Journals and/or conferences/symposia. This prize focuses on the individual rather than the achievements and would preferably be in yearly alternation between university and industry.

A nominee must be a member of the EuMA and no more than 38 years of age at the time of nomination deadline (i.e. not having reached their 39th birthday). To help bridge the gender gap in the microwave community however, this deadline is postponed by one year per child for women that have had children. A nomination must be made by a EuMA member (not a student member) who has known the nominee for more than 2 years. Self-nomination is not allowed. Two references in addition to the nominator are required. A selection panel, chaired by a member of the EuMA Board of Directors, selects every year a suitable number of panel members (from 5 to 7), whose names are not public. The Chair does not vote. Because of the large financial coverage, the Jury has one member designated by RF Microtech and one by SIEm, respectively.

The annual prize comprises a certificate, a medal and a financial award of 4.000 €, contributed by Mrs Linda Di Carlo Sorrentino, RF Microtech, SIEm, and EuMA. Collectively this might sustain the prize for a longer period as it is intended to keep the amount of the prize at 4.000 € therefore increasing the number of years of availability of the prize beyond 10 years. The prize will be presented at the Opening Session of the European Microwave Week. The first prize will be presented during EuMW 2021.

EuMA Outstanding Career Award

RICHARD V. SNYDER

Richard V. Snyder is the President of RS Microwave (Butler, NJ, USA, founded 1981). He is the author of 145 papers, three book chapters and holds 27 patents. Interests: E-M simulation, network synthesis, dielectric and suspended resonators, high power notch and bandpass filters and active filters. BS, MS and PhD degrees from Loyola-Marymount, USC and Polytechnic Institute of New York University. Served the IEEE North Jersey Section as Chairman, 14 year Chair of the MTT-AP chapter. Chaired the IEEE North Jersey EDS and CAS chapters for 10 years.

He twice received the Region 1 award. January 1997: named a Fellow of the IEEE and is now a Life Fellow. January 2000: received the IEEE Millennium Medal. General Chairman for IMS2003, in Philadelphia, and was Emeritus Chair for IMS2018 also in Philadelphia. He was elected to the MTT-S ADCOM in 2004. Within the ADCOM, he served as Chair of the TCC and Liaison to the EuMA. He served as an MTT-S Distinguished Lecturer: from 2007 – 2010, continuing as a member of the Speakers Bureau.

He served three years as Associate Editor for the IEEE Transactions on Microwave Theory and Techniques, responsible for most of the filter papers submitted. Member of the American Physical Society, the AAAS and the New York Academy of Science. MTT-S President for 2011. IMSEC Chair 2016 – 2019, N&A Chair at present. Reviewer for IEEE-MTT and EMC publications. Reviewer for the EuMA International Journal of Microwave and Wireless.

Teaches and advises at the New Jersey Institute of Technology. Visiting Professor at the University of Leeds, in the U.K. Serves on TPC committees, as reviewer and/or Chair, for IMS, EUMW and other global conferences. He served 7 years as Chair of MTT-8 (now MTT-5 on Filters) and continues in MTT-5/TPC work. He is the organizer of the annual IWS conference in China. He currently serves the EuMA General Assembly as the North American (Region 15) delegate.

EuMA Distinguished Service Award

STEPHEN (STEVE) NIGHTINGALE

Stephen (Steve) Nightingale received his Electrical Engineering degree from the CEI in 1974 and a PhD in Electronics from Kent University in 1980. He worked for Philips Research Laboratories, UK, designing microwave circuits and systems until 1982. He then joined General Electric, Syracuse, USA, as the EHF Technology Manager supervising and designing Gallium Arsenide MMICs up to 94 GHz with specific responsibility for the US Milstar and DSCS programmes. From 1986 to 1996, he worked for THORN EMI Electronics/Racal/Thales as a MMIC Technology Consultant, Department Manager and Technology Manager responsible for technology acquisitions for Radar and EW systems. This included technology acquisitions for the 4-nation military phased-array radar programme, COBRA.

In 1996, he joined ERA Technology/Cobham, UK, designing and manufacturing Mach-Zehnder optical modulator drivers operating at 2.5 and 10Gb/s. Production reached over 12,000 per annum and the developed designs became industry standards. From 2001, he became Chief Consultant for Electronic Design developing interference mitigation systems for civil and military platforms using direct RF cancellation and TDM. Notable deliveries were for the US Rescue 21 programme, various Australian Army equipment upgrade programmes and a number of UK MoD requirements.

Steve was appointed a Visiting Professor at Surrey University in 2002 sponsored by the Royal Academy of Engineering.

He was a Founder Member and Past Director of the EuMA. He has served the EuMA and the EuMC in various capacities for more than 30 years and was Chair of the EuMW and EuMC in 2001. Steve has also served on various boards in UK universities and industries, including Imperial College, London, and ECIT, Belfast.

Steve has published and lectured widely in the UK and abroad, has contributed to 4 books and been awarded 8 patents in the microwave field. He became a Fellow of the IEEE in 2002 with the citation ‘For Contributions to Planar Microwave and Millimeterwave Circuits’. He has also received several Sir Alan Cobham Awards for technical innovation, team leadership and sustainability.

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With two on-site Docklands Light Railway Stations (DLR), parking for 3,070 cars and London City Airport just under 10 minutes away, getting to ExCeL London couldn't be easier.

VENUE ADDRESS
Royal Victoria Dock, 1 Western Gateway, Royal Docks, London E16 1XL, UK.

The entrance for European Microwave Week is the East Entrance. By DLR alight at the Prince Regent station for the event.

LONDON UNDERGROUND & DLR
The Jubilee Line and the DLR are the quickest routes to ExCeL London. Alight at Canning Town on the Jubilee Line and change onto a Beckton-bound DLR train for the quick two-stop journey to ExCeL: Prince Regent for ExCeL (for the east entrance). DLR services: All trains towards Beckton/Gallions Reach will stop at Prince Regent.

BY RAIL
Your point of departure will determine the best service to take and at what station your train will arrive into London. London's main rail stations are:

- Charing Cross (27 mins from ExCeL)
- Euston (32 mins)
- Kings Cross/St Pancras International (32 mins)
- Liverpool Street (26 mins)
- London Bridge (16 mins)
- Marylebone (31 mins)
- Moorgate (26 mins)
- Paddington (32 mins)
- Victoria and Waterloo (38 mins)

BY AIR
London has 6 international airports. We recommend flying into London City Airport as it is only about a mile away from the venue and takes about 15 mins to get to the venue using the DLR.

BY CAR
You can download our parking map

which shows you the location of the car parks on campus.
If you're arriving via the M11, the North Circular (A406) or the A13, as you get closer to ExCeL you'll pick up signs for Royal Docks, City Airport and ExCeL London. If you're using satellite navigation, please enter the postcodes below.

E16 1XL – If you are travelling from the west to ExCeL from Blackwall Tunnel, Limehouse Link, A12 or central London.

E16 1FR – If you are travelling from the east to ExCeL from the M11, A13 or into London from the east.

E16 1AL – If you are using the Royal Victoria Car Park (MSCP). Approximately a 5 minute walk from the venue.

If you have any questions or require more information please email ParkingOnline@excel.london

For full details on how to reach ExCeL London by underground & DLR, rail, air and driving please visit: https://www.excel.london/visitor/getting-here

HOTEL RESERVATION

Horizon House has teamed up with Connex Hotels and Events, our official hotel booking supplier, to offer you the ability to book your accommodation for EuMW at the most competitive rates available. It is very easy to make an immediate hotel booking.

Simply visit their booking page:
http://www.connexhotelsandevents.com/eumw-london.html
and make your booking,

or email:
sally@connexhotelsandevents.com.

You will find a wide range of accommodation to suit every budget. Alternatively, see the hotel booking pages within this programme.

PERSONAL INVITATION (VISA)

A valid passport will be required for entry into the organising country, in this case the UK. A UK visa may also be required for the purpose of attending EuMW. You can check whether you will need a visa by visiting the following website: https://www.gov.uk/apply-to-come-to-the-uk. If you are registering as a speaker, a delegate or an exhibitor and you need a visa, we recommend that you contact the UK Consulate, in your own country at least 3 to 4 months prior to EuMW.

The organisers will be pleased to send a letter of invitation to any speaker, exhibitor or conference delegate requesting it to assist with their visa application.

In order to request a letter of invitation, please download and complete the request form https://www.eumw2021.com/docs/EUMW2021_VisaForm.zip and send it to the visa operational officer: visas@eumw2021.org.

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Hotel Booking Form
February 2022

Rooms are held on a guaranteed basis. For this reason, you are asked to supply a credit card number and full company details. If your travel plans change and you wish to cancel your accommodation, please contact Sally Garland on +44 (0)7775 744193 or email sally@connexhotelsandevents.com to avoid any non-arrival or cancellation charges, as each hotel has a different cancellation policy, full cancellation details will be clearly marked on every booking confirmation. Prepay rates are non-refundable and non-cancelable.

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Date of Arrival _____ Date of Departure _____

Number of rooms required

Single Room(s) _____ Twin Room(s) _____ Double Room(s) _____

First choice Hotel _____ Second choice Hotel _____

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In order to guarantee the accommodation, please provide us with your credit card details:

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ALOFT LONDON HOTEL – ★★★★ 1 Eastern Gateway, Royal Victoria Dock, London E16 1FR **Special Event Rate including Breakfast****	Located at the East Entrance of Excel	Prepay Flexible 	£263.00 £290.00 **£269.00**	B&B B&B **B&B**
MOXY LONDON EXCEL – ★★★ 1014 Dockside, London E16 2FQ **Special Event Rate including Breakfast****	7 minute walk to Excel East	Prepay Flexible 	£91.00 £124.00 **£119.00**	RO B&B **B&B**
HAMPTON BY HILTON LONDON DOCKLANDS – ★★★ Dockside Road, London E16 2FQ **Special Event Rate including Breakfast****	7 minute walk to Excel East	Prepay Flexible 	£93.00 £139.00 **£129.00**	B&B B&B **B&B**
HOLIDAY INN EXPRESS – LONDON EXCEL – ★★★ 1018 Dockside Road, London E16 2 FQ **Special Event Rate including Breakfast****	10 minute walk to Excel East	Prepay Flexible 	£113.00 £129.00 **£115.00**	B&B B&B **B&B**
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CROWNE PLAZA LONDON EXCEL – ★★★★ 7 Western Gateway, London E16 1AA **Special Event Rate including Breakfast****	5 minute walk to Excel West Entrance	Prepay Flexible 	£200.00 £280.00 **£259.00**	B&B B&B **B&B**
NOVOTEL LONDON EXCEL – ★★★★ 7 Western Gateway, London E16 1AA	3 minute walk to Excel West Entrance	Prepay Flexible	£131.00 £152.00	B&B B&B
GOOD HOTEL LONDON EXCEL – ★★★ Western Gateway, Royal Victoria Dock, London E16 1FA	6 minute walk to Excel West Entrance	Prepay	£149.00	B&B
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PRINCE REGENT HOTEL LONDON EXCEL – ★★★ 361-363 Prince Regent Lane, London E16 3JP	9 minute walk to Excel East	Prepay Flexible	£93.00 £98.00	B&B B&B
COURTYARD BY MARRIOTT LONDON CITY AIRPORT – ★★★★ 10 Connaught Road, London E16 2AE **Special Event Rate including Breakfast****	20 minute by walk 15 minute walk to Excel East	Prepay Flexible 	£192.00 £237.00 **£185.00**	B&B B&B **B&B**
HOLIDAY INN EXPRESS – ROYAL DOCKS – ★★★ 1 Silvertown Way, London **Special Event Rate including Breakfast****	12 minutes by DLR to Excel East	Flexible 	£232.00 **£75.00**	B&B **B&B**
IBIS LONDON EXCEL DOCKLANDS – ★★ 9 Western Gateway, London E16 1AB	4 minute walk to Excel West Entrance	Prepay Flexible	£107.00 £121.00	B&B B&B
IBIS STYLES LONDON EXCEL – ★★ 272 Victoria Dock Road, London E16 3BY	4 minute walk to Excel West Entrance	Prepay Flexible	£74.00 £80.00	B&B B&B
IBIS BUDGET LONDON CITY AIRPORT – ★ North Woolwich Road, London E16 2EE	16 minute walk to Excel East	Prepay Flexible	£37.00 £42.00	B&B B&B

*The above rates are based on single occupancy, during the main days of the event and the standard room type of the hotel. Other room types or pre and post event nights may have different prices. All rates quoted include VAT at the current rate.

****Special Event Rates are only bookable via this form or direct with** Sally@connexhotelsandevents.com

Prepay: Room rate will be charged at the time of booking, to the credit card used to guarantee the reservation, after this the room is non-refundable.

Flexible: Room can be cancelled or amended up until a few days before arrival, individual policy will be stated on the booking confirmation.

RO: Room rate does not include breakfast; however, breakfast is available at the hotel at an extra cost.

B&B: Room rate includes breakfast.

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Local Information and Insurance

WI-FI
Wi-Fi is available in the exhibition hall and conference area. Login details can be found within your delegate bag.

ELECTRICITY
Electricity is supplied at 240V, 50 Hz. UK 3-pin plug.

CREDIT CARDS
All major hotels and most restaurants and shops will accept credit cards. It is advisable to carry other identification as well. Visa and MasterCard are the most widely accepted cards.

HISTORY & SIGHTSEEING
London is the cultural, political and economic heart of the United Kingdom. It is the capital city of England and the United Kingdom – a 21st century city with history dating back to Roman times. At its centre stand the imposing Houses of Parliament, the iconic 'Big Ben' clock tower and Westminster Abbey, site of British monarch coronations. Across the River Thames, the London Eye observation wheel provides panoramic views of the South Bank cultural complex, and the entire city. London is famous for world-class museums, galleries, royal palaces, shopping destinations, West End theatre shows and award-winning restaurants. For more information, visit https://www.visitlondon.com/

INSURANCE
It is highly recommended that all participants carry the proper travel and health insurance, as the organiser cannot accept any liability for any accident, illness, or injury that occur during or when travelling to the event. Please also insure that personal items are covered for loss, damage or theft either through a personal policy or by a corporate policy. We cannot accept any liability for personal items that are lost, damaged or stolen during or travelling to and from European Microwave Week 2021.

Conference Information

BADGES AND REGISTRATION
The registration area will be located near the entrance to the Exhibition Hall as signposted. Online registrants will automatically be e-mailed their badge barcode and an order confirmation receipt immediately after they pay. All those who have pre-registered should bring their badge barcode and confirmation with them to the conference where they can print out their badge by scanning their barcode at the Fast Track desk onsite. Processing will be quick and easy but queues may form at busy times, so please arrange to collect your badge well in advance of your first conference session. Those who have not pre-registered can do so on site until 18th February 2022. There will be on-site registration terminals located within the registration area, where delegates can enter their details and pay immediately by swiping their credit or debit cards through the card readers attached to the terminals. Alternatively, you can pay at the Cashier desk if you require a printed receipt. If you have any questions regarding registration procedures and payment, please email: eumwreg@aventri.com.

CONFERENCE ROOMS
Conference rooms are located in ICC Capital Suite – Level 3 as signposted. The conferences will be held in different rooms over the conference dates. Please refer to the Conference Matrix at the back of this booklet for a detailed overview. Delegates can register for one, two or all three of the conferences. Registration at one conference does not allow any access to other conference sessions. Those who wish to register for two or more conferences will receive a discount on these registrations.

INTERACTIVE SESSIONS
The interactive poster papers will be presented on electronic screens, which are located in the exhibition area as signposted on Tuesday, Wednesday and Thursday.

EXHIBITION HOURS
The exhibition area will be located in Exhibition Halls N20 – N23 as shown on the Floor Plan in this booklet. As a registered delegate you will have full access to the exhibition area.

The exhibition opening hours are:
- Tuesday 15th February 2022, 9.30 – 18.00
- Wednesday 16th February 2022, 9.30 – 17.30
- Thursday 17th February 2022, 9.30 – 16.30

See the back cover for a full listing of the exhibitors (correct at the time of going to press).

CONFERENCE PROCEEDINGS
All papers published for presentation at your chosen conference will be available to download from an online repository. Four weeks prior to the event, downloading instructions will be communicated to conference registrants.

Partner Programme
Things to see and do in London!

London is the cultural, political, and economic heart of Britain, famous for world-class museums, galleries, royal palaces, shopping destinations, West End theatre shows and award-winning restaurants. With so much to do, it's hard to narrow down the long list of reasons to visit, but below you'll find our favourites.

HOP ON HOP OFF BUS TOUR




Explore London at your own pace with the Golden Tours hop-on hop-off Bus Tour. Choose between four routes and hop off at more than 60 stops, including Shakespeare's Globe and Westminster Abbey. As well as having your transport covered, you can enjoy added extras including free walking tours and a 24-hour Thames River pass.

	Adult	Child
1 Day Bus Tour	£28.00	£14.00
24 Hour Bus Ticket	£31.45	£14.45
24 Hour Ticket + St Paul's Cathedral	£41.00	£19.00
48 Hour Ticket	£35.00	£17.00

THE TOTAL LONDON EXPERIENCE – FULL DAY TOUR

Hop aboard a private, air-conditioned coach for a whistle-stop tour of central London.
First, explore one of the city's most magnificent buildings: St Paul's Cathedral. Step inside Sir Christopher Wren's architectural masterpiece and discover its striking interior, before climbing up to the Golden Gallery for sweeping views of the capital.
Then, head to Buckingham Palace for a quintessential display of British pomp and pageantry, as you watch the famous Changing the Guard ceremony. See the Queen's New Guard exchange duty with the Old Guard – all active British Army soldiers clad in traditional red tunics and bearskin hats. When the ceremony isn't available, the tour visits Horse Guards Parade instead.
Afterwards, make your way to the Tower of London, a royal fortress famous for being the prison (and execution place) of choice of one of Britain's most notorious monarchs: Henry VIII. There, you'll get the chance to go on a one-of-a-kind tour of the palace with a Yeoman Warder, or "Beefeater". Learn about the Tower's fascinating history, stand where famous heads have rolled, get to grips with swords and armour, and take a closer look at the priceless Crown Jewels.
Next, it's time to jump aboard a riverboat for a relaxing ride along the Thames to one of London's most charming and underrated neighbourhoods: Greenwich – The home of time, Greenwich is where eastern and western hemispheres meet. Discover its historic attractions, impressive buildings, and panoramic views on a guided walking tour. You'll take in iconic sights including the world's last surviving tea clipper, Cutty Sark, and another one of Sir Christopher Wren's architectural gems, the Old Royal Naval College.
As you head back into central London by boat, sit back and enjoy the city's skyline, before seeing it from above with a thrilling ride on the London Eye. At 135 metres, this feat of design and engineering is the world's tallest cantilevered observation wheel. The 360-degree views are incredible and the perfect way to round up the afternoon.

Adult £129.00
Child £119.00

If you would like to buy tickets for any of the attractions or tours, please contact Sally Garland on sally@connexhotelsand-events.com

TOP ATTRACTIONS

LONDON EYE

At 135 metres, the London Eye is the world's tallest cantilevered observation wheel; a feat of design and engineering, it has become the modern symbol representing the capital and a global icon. The experience showcases breath-taking 360-degree views of the capital and its famous landmarks and has been the number one visitor experience in the city for the past decade.

Adult ticket from £24.50
Child ticket from £22.00

WARNER BROS. STUDIO

Duration: Approx. 7 hours (with transportation)
Step on to authentic sets, discover the magic behind spellbinding special effects and explore the behind-the-scenes secrets of the Harry Potter film series.
Discover the iconic Hogwarts Great Hall and explore the Forbidden Forest, all before boarding the original Hogwarts Express at Platform 9¾ and wandering down Diagon Alley.
Located at the Studios where all eight films were produced, the Studio Tour showcases the British talent, imagination and artistry that went into making the impossible a reality on screen. Visitors will relive the magic through the eyes of the filmmakers who brought the Harry Potter film series to life.

Adult ticket from £89.00
Child ticket from £84.00

HM TOWER OF LONDON

Despite the Tower of London's grim reputation as a place of torture and death, within these walls you will also discover the history of a royal palace, an armoury and a powerful fortress. Don't miss Royal Beasts and learn about the wild and wonderous animals that have inhabited the Tower, making it the first London Zoo.
Discover the priceless Crown Jewels, join an iconic Beefeater on a tour and hear their bloody tales, stand where famous heads have rolled, learn the legend of the Tower's ravens, storm the battlements, get to grips with swords and armour, and much more!

Adult ticket from £28.90
Child ticket from £14.40

THE SHARD

The View from The Shard allows you to go inside The Shard building and look out over London from the viewing platforms on levels 68 and 69. You can also head up to the Skydeck on level 72 - an open-air platform offering spectacular views over London.

While you're enjoying the views, grab a drink or snack served by one of the bars. You can also book an all-inclusive experience in advance, which includes a glass of champagne and souvenir photos of your visit.

Adult ticket from £45.00
Children under 4 – Free

If you would like to buy tickets for any of the attractions or tours, please contact Sally Garland on sally@connexhotelsand-events.com

FREE LONDON ATTRACTIONS

From London's exquisite parks to world-class museums, historic houses and stunning art galleries, there are some amazing free experiences to be had in London.
You may need to book tickets in advance, even if entrance is free.

There are many more places to visit in London. For more ideas go to: www.visitlondon.com.

TATE MODERN

NATIONAL GALLERY

KENSINGTON GARDEN

NATURAL HISTORY MUSEUM

VICTORIA AND ALBERT MUSEUM

SKY GARDEN BRASSERY

BRITISH MUSEUM

SOMERSET HOUSE

SHOREDITCH

Social Events

EuMIC Cocktail Reception
Monday 14th February 2022
18:00 – 20:00

***Cost*: Free to all EuMIC delegates (Sponsor: GAAS® Association)**
(Please bring your badge to gain admission)
***Location*: Onsite in the Exhibition Hall N19 – N23**

This event will start at 18:00 to permit attendees to also join the Foundry Session which begins at 18:30. However, there will be plenty of food and drinks for attendees who will join the event after the final EuMIC papers finish at 18:20 - so please join us when you are free!

Automotive Forum Networking Dinner
Monday 14th February 2022
19:00 – 22:00

***Cost*: Free to registered Automotive delegates**
(please bring your badge to gain admission.)
***Location*: Off-site: The Fox Excel**
(Located just outside the West Entrance of Excel.)

Join us for drinks and a 3 course dinner to give you the chance to network and discuss the issues raised throughout the Conference in an informal setting.

EuMW Welcome Reception
Tuesday 15th February 2022
18:30 – 21:30

***Cost*: Free to conference delegates & invited exhibitors**
***Location*: The Platinum Suite (level 1)**

All registered conference delegates, as well as invited representatives from companies participating in the exhibition are invited to the EuMW 2021 Welcome Reception, sponsored by Keysight Technologies, Horizon House Publications and EuMA. Delegates will need to bring their badge and exhibitors their invite along with them to gain entrance. The evening will begin with drinks at 18:30 followed by the General Chairs' handover from EuMW 2021, London to EuMW 2022, Milan as well as an address from the Platinum Sponsor, Keysight Technologies. The open-buffet dinner will be served from 19:00.

The EuMW Cruise on the River Thames
Wednesday 16th February 2022
19:00 – 22:00

***Cost*: £ 39.00 for all guests**
***Location*: North Greenwich Pier (by the O2)**

Join us aboard City Alpha and City Gamma boats for a traditional three hour Thames sightseeing cruise leaving at 19:00. The cruise will take you along the Thames into Central London before turning and heading back down river to Greenwich. This unique sightseeing experience will be complimented with drinks and canapes.
Tickets are limited, so register today!

EuRAD Lunch
Friday 18th February 2022
13:00 – 14:00

***Cost*: Free to registered EuRAD delegates**
(please bring your badge to gain admission.)
***Location*: ICC Capital Suites 14 – 16**

A seated hot plated lunch for EuRAD delegates to catch up and round off a busy week.

Workshops and Short Courses List

Despite the organisers' best efforts to ensure the availability of all listed workshops and short courses, the list below and the numbering are subject to change. Please refer to www.eumw2021.com before registration for final availability and numbering.

Sunday 13th February 2022			
WS01	EuMC	Full Day	Advances of wireless sensing in harsh and severe environments
WS02	EuMC/EuMIC	Full Day	Terahertz device, circuit and system fundamentals and applications
WS03	EuMC	Full Day	mmWave Plastic Waveguide High Data Rate Communication
WS04	EuMC	Full Day	New trends in microwave and mmWave filters
WS05	EuMC	Full Day	On-chip and scalable RF packaging solutions with integrated antennas for 5G mmWave and 6G applications
WS06	EuMC/EuMIC	Full Day	Progress and status of Gallium Nitride monolithically microwave integrated circuits
WS07	EuMC	Half Day AM	RF reliability status and challenges for 5G mmWave and 6G applications
WS08	EuMC	Full Day	Technology for RF 5G and satcom: from material to packaged demonstrators
WS09	EuMC	Full Day	Research in power and S-parameters measurements at mmWave and terahertz frequencies
SS01	EuMC	Half Day PM	Advanced non-linear characterization and design of highly efficient power amplifiers using load pull data for sub 6GHz and mmWave applications
SS02	EuMIC	Full Day	Fundamentals of microwave PA Design
SS03	EuMC	Half Day PM	5G mmWave OTA measurements – best practices for fast and reliable results
SS04	EuMC	Half Day AM	Terahertz technology, instrumentation and applications
Monday 14th February 2022			
WM01	EuMC	Half Day PM	Optimizing modulation quality measurements on wide bandwidth signals – from conformance through R&D
WM02	EuMC/EuMIC	Full Day	Advances in circuits and systems for mmWave radar and communication in silicon technologies
WM03	EuMC	Full Day	Sensing, imaging and biological tissues characterization using microwaves and mmWaves
WM04	EuMC	Full Day	RF on-wafer calibration and measurement eco-system workshop
WM05	EuMC	Half Day AM	Novel technologies for emerging on-board microwave equipment based on surface mounted electromechanical relays
WM06	EuMC	Full Day	Recent developments in wireless power transfer and energy harvesting
WM07	EuMC	Half Day AM	Beyond 5G: mmWave and terahertz techniques of 6G research
SM01	EuMC	Half Day AM	R&D trends and challenges in RFPAs for medium/high-volume products
SM02	EuMC	Half Day PM	Intuitive microwave filter design with EM simulation
SM03	EuMC	Half Day PM	Phase-noise in next-generation aerospace/defense and commercial wireless communications
SM04	EuMC	Half Day PM	Solid-state microwaves applications in industrial, scientific and medical fields
Wednesday 16th February 2022			
WW01	EuMC/EuMIC	Full Day	Technologies for 6G FEMs
WW02	EuRAD	Full Day	Virtual validation of automotive sensors
SW01	EuRAD	Half Day AM	Joint range-angle superresolution MIMO radar
SW02	EuRAD	Half Day PM	Radar design from the ground up
Thursday 17th February 2022			
WTh01	EuRAD/EuMC	Half Day AM	Advances in drone antenna measurement techniques for Satcom and RADAR applications
Friday 18th February 2022			
WF01	EuMC	Half Day AM	Advanced manufacturing and packaging
WF02	EuRAD	Half Day PM	Paradigm change in automotive mm-Wave radar applications – from technology push to demand pull
WF03	EuMC	Full Day	Innovative THz technologies for imaging, radar and communication
WF04	EuRAD	Full Day	Advanced processing and deep learning approaches for indoor sensing using short-range radars
SF01	EuMC	Half Day AM	AI techniques for microwave antenna and filter design: from theory to practice
SF02	EuMC	Half Day AM	Microwave superconductivity: applications of SQUID and Josephson junctions in microwave circuits

Registration Information

CONFERENCE REGISTRATION DETAILS

See pricing table on the following page.

ONLINE REGISTRATION

- All online registrations should be made at www.eumw2021.com.
- Registrations completed up to and including 31st December 2021 will be charged at the 'Advance Discounted Rate' and those from 1st January 2022 will be charged at the 'Standard Rate'.
- Online registration is open from mid October 2021 up to and during the event until 18th February 2022.

ONSITE REGISTRATION

- Onsite registration is available:
- Saturday, 12th February 2022, 16:00 – 19:00
- Sunday, 13th February 2022, 08:00 – 17:00
- Monday, 14th February 2022, 08:00 – 17:00
- Tuesday, 15th February 2022, 08:00 – 17:00
- Wednesday, 16th February, 2022 08:00 – 17:00
- Thursday, 17th February 2022, 08:00 – 17:00
- Friday, 18th February 2022, 08:00 – 10:00

Onsite registration will be charged at the Standard Rates.

HOW TO REGISTER

If you have any questions regarding registration procedures and payment, please contact: eumwreg@aventri.com

ONLINE

- Delegates can register for one, two or all three of the conferences.
- Discounts will be given to those registering for two or more conferences.
- In addition to the conferences, delegates can register for forums, short courses or workshops.
- Discount is given when combining a forum, short course or workshop registration with a conference registration.
- Payment can be made online using Amex, Visa, Mastercard or Bank Transfer.
- Registrants paying by Credit Card will be sent an automatic email confirmation, with a receipt and badge barcode.
- Registrants choosing to pay by Bank Transfer will receive their confirmation, but their receipt and badge barcode will be sent only once payment has been received and cleared by Horizon House.
- Please note that fees are not subject to VAT.

ONSITE

- The registration area will be outside the Exhibition Halls as signposted
- There will be Self Service terminals in the registration area where delegates can enter their details and pay immediately by swiping their credit cards through the readers attached to the terminals.
- Delegates can also choose to 'Pay at Cashier' and then proceed to the Cashier Point and pay using credit cards or cash. Receipts will be given accordingly.

Registration Fees

Get the most out of this year's Microwave Week with a Full Week ticket. Combine all three conferences with access to all forums (the Defence, Security and Space forum and the 5G and Beyond forum) except the Automotive forum, as well as all Workshops and Short Courses.

Registration at one conference does not allow access to the sessions of the other conferences.

Subsidised lunchboxes are £7 each (one per day). They are available to all who attend EuMW, and should be ordered at the time of registration, either online or on-site.

Reduced rates are offered if you have society membership to any of the following: EuMA, GAAS, IET or IEEE. Reduced rates for the conferences are also offered if you are a Student/Senior (Full-time students 30 years or younger and Seniors 65 or older as of 13th February 2022). The fees shown below are invoiced in the name and on behalf of the European Microwave Association. All payments must be in £ (pound sterling) – cards will be debited in £ (pound sterling) .

CONFERENCES REGISTRATION	**ADVANCE DISCOUNTED RATE** (FROM 11th OCTOBER UP TO & INCLUDING 31st DECEMBER 2021)				**STANDARD RATE** (FROM 1st JANUARY 2022)			
	Society Member		**Non-Member**		**Society Member**		**Non-Member**	
1 Conference	Standard	Student/Sr.	Standard	Student/Sr.	Standard	Student/Sr.	Standard	Student/Sr.
EuMC	£430,–	£120,–	£600,–	£160,–	£600,–	£160,–	£830,–	£230,–
EuMIC	£330,–	£110,–	£460,–	£150,–	£460,–	£150,–	£640,–	£210,–
EuRAD	£290,–	£100,–	£410,–	£140,–	£410,–	£140,–	£570,–	£200,–
2 Conferences	Standard	Student/Sr.	Standard	Student/Sr.	Standard	Student/Sr.	Standard	Student/Sr.
EuMC + EuMIC	£600,–	£230,–	£840,–	£320,–	£840,–	£320,–	£1,180,–	£440,–
EuMC + EuRAD	£570,–	£220,–	£800,–	£300,–	£800,–	£300,–	£1,120,–	£430,–
EuMIC + EuRAD	£490,–	£210,–	£690,–	£290,–	£690,–	£290,–	£970,–	£410,–
3 Conferences	Standard	Student/Sr.	Standard	Student/Sr.	Standard	Student/Sr.	Standard	Student/Sr.
EuMC + EuMIC + EuRAD	£730,–	£330,–	£1,020,–	£460,–	£1,020,–	£460,–	£1,430,–	£640,–
Full Week Ticket	£1,140,–	£680,–	£1,490,–	£870,–	£1,450,–	£830,–	£1,920,–	£1,070,–

CONFERENCE TECHNICAL CO-SPONSORS

EuMIC 2021 – The 16th European Microwave Integrated Circuits Conference

51st European Microwave Conference 2021 – The 51st European Microwave Conference

EuRAD 2021 – The 18th European Radar Conference

GAAS · Electron Devices Society · APS · EurAAP · APMC 2021 · APS · EurAAP

BECOME A MEMBER – **NOW!**

EuMA membership fees: Professional £22,–/year, Student £13,–/year.

One can apply for EuMA membership by ticking the appropriate box during registration for EuMW. Membership is valid for one year, starting when the subscription is completed. The discount for the EuMW fees applies immediately.

Members have full e-access to the International Journal of Microwave and Wireless Technologies. The printed version of the journal is no longer available.

EUMA KNOWLEDGE CENTRE
The EuMA website has its Knowledge Centre which presently contains over 20,000 papers published under the EuMA umbrella. Full texts are available to EuMA members only, who can make as many copies as they wish, at no extra-cost.

SPECIAL FORUMS AND SESSIONS REGISTRATION		**ADVANCED DISCOUNTED RATE** (UP TO & INCLUDING 31st DECEMBER 2021)		**STANDARD RATE** (FROM 1st JANUARY 2022 & ONSITE)	
	Date	**Delegates***	**All Others****	**Delegates***	**All Others****
European Microwave Student School	14th February 2022	£40,–	£40,–	£80,–	£80,–
Tom Brazil Doctoral School of Microwaves	14th February 2022	£40,–	£40,–	£80,–	£80,–
Automotive Forum	14th February 2022	£240,–	£290,–	£330,–	£390,–
Defence, Security and Space Forum	16th February 2022	£20,–	£60,–	£20,–	£60,–
5G and Beyond Forum	17th February 2022	£60,–	£70,–	£80,–	£90,–

* Those registered for EuMC, EuMIC or EuRAD ** Those not registered for a conference

WORKSHOPS AND SHORT COURSES	**IN COMBINATION WITH CONFERENCE REGISTRATION**				**WITHOUT CONFERENCE REGISTRATION**			
	Society Member		**Non-Member**		**Society Member**		**Non-Member**	
	Standard	Student/Sr.	Standard	Student/Sr.	Standard	Student/Sr.	Standard	Student/Sr.
Half Day	£90,–	£60,–	£110,–	£90,–	£110,–	£90,–	£150,–	£110,–
Full Day	£120,–	£90,–	£160,–	£120,–	£160,–	£120,–	£220,–	£160,–

EUROPEAN MICROWAVE WEEK SPONSORS

Official Publication: Microwave Journal

Supported by: IET The Institution of Engineering and Technology

Co-Sponsored by: MTT-S

Co-Sponsored by: IEEE

EuMW 2021 Student School

Monday 14th February 2022
9:00 – 17:20, ROOM 3

Organiser: John Crute, The Technology Academy, UK
Co-organiser: Markus Funk and Jamie Lunn, Rohde & Schwarz

The registration fee for this event is £40 (up to & incl. 31st December 2021) or £80 (from 1st January 2022 & onsite) For further information please visit: https://www.eumw2021.com.

The aim of the EuMW 2021 Student School is to enable Undergraduate and Masters Degree Students to become familiar with a range of RF and microwave measurements using modern test and measurement (T&M) equipment. A series of technical presentations will introduce students to key RF and microwave measurements and best practice operation of T&M equipment.

Working in small teams, students will then use various T&M instruments, including vector network analysers, spectrum analysers and power meters, to perform a range of RF and microwave measurements. Students will also learn how to correctly care for and clean connectors and cables to improve measurement quality and reduce the risk of expensive damage to laboratory test equipment.

Leading test equipment manufacturer Rohde & Schwarz will provide a range of modern test equipment for the workshops, which will be supported by expert staff. Attendees will each receive a student pack containing various useful items. Teams will be assessed throughout the workshops and prizes will be awarded for the best overall team and runners-up.

Programme

SESSION 1: TECHNICAL PRESENTATIONS

09:00 – 09:05 **Introduction to the Student School**
John Crute, The Technology Academy

09:05 – 09:50 **Vector Network Analyzer (VNA) Measurements**
Jamie Lunn, Rohde & Schwarz

09:50 – 10:35 **Spectrum Analyzer Measurements**
Markus Funk, Rohde & Schwarz

10:35 – 11:00 **Coffee**

11:00 – 11:45 **Power Measurements**
Markus Funk, Rohde & Schwarz

11:45 – 12:30 **Connector and Cable Care**
Jamie Lunn, Rohde & Schwarz

12:30 – 13:30 **Lunch**

SESSION 2: HANDS-ON MEASUREMENTS WORKSHOPS

13:30 – 14:15 **Workshop 1**

14:15 – 15:00 **Workshop 2**

15:00 – 15:30 **Coffee Break**

15:30 – 16:15 **Workshop 3**

16:15 – 17:00 **Workshop 4**

17:00 – 17:20 **Closing Session and Awards**

11th Tom Brazil Doctoral School of Microwaves

Emerging Technologies and Techniques for Imaging and Computing

Monday 14th February 2022
9:00 – 18:30, ROOM 4

Organiser: Lai Bun Lok, University College London, UK
Co-organiser: Claudio Paoloni, Lancaster University, UK

M.Sc. and Ph.D. students can register for this event. The registration fee is £40 (up to & incl. 31st December 2021) or £80 (from 1st January 2022 & onsite). The number of registrants is limited to 50. Any questions please email: student.activities@eumw2021.org

The 2021 European Microwave Week features the 11th Tom Brazil Doctoral School of Microwaves, sponsored by the GAAS® Association. It offers postgraduate students and postdoctoral researchers a focused interactive hands-on workshop and technical lecture series in microwaves that go beyond the standard conference programme.

In the hands-on workshop, attendees will learn the system design of modern digital radios. After interactive demonstrations using a commercial software defined radio, the instructor will lead groups to design one key building block of the modern digital radio. You will learn to simulate and lay out a selected radio component, fabricate it on-site and measure its performance with a USB vector network analyzer (NanoVNA), which you keep after the workshop.
A technical lecture series devoted to emerging microwave topics is provided by four invited speakers in the afternoon. The Doctoral School concludes with an announcement of the Tom Brazil Fellowship Award (by the GAAS® Association) shortlist by representatives of the GAAS® Association.

Programme

09:00 – 10:40 **Hands-on workshop: Digital Radio Systems & interactive demonstrations**
David Ricketts, North Carolina State University, USA

10:40 – 11:20 **Break**

11:20 – 13:00 **Hands-on Workshop: design, build & measurement of radio components**
David Ricketts, North Carolina State University, USA

13:00 – 14:20 **Lunch**

14:20 – 15:10 **Microwave Near-Field Imaging of Human Tissue**
Natalia Nikolova, McMaster University, Canada

15:10 – 16:00 **New Frontiers in Terahertz Technology**
Mona Jarrahi, University of California Los Angeles, USA

16:00 – 16:40 **Break**

16:40 – 17:30 **Superconducting microwave circuits for quantum computing**
Peter Leek, University of Oxford, UK

17:30 – 18:20 **THz applications for artworks and cultural heritage**
Emilio Giovenale, ENEA, Italy

18:20 – 18:30 **Tom Brazil Fellowship Award (by the GAAS® Association) student essay competition shortlist announcement**

Tom Brazil Fellowship Award (by the GAAS® Association) Student Essay Competition

The Role of Microwaves in Contributing to the Realisation of a more Sustainable World

14th – 15th February
Exhibition Hall (MicroApps) + Other Locations

Programme

As part of the Tom Brazil Fellowship Award (by the GAAS® Association), we would like to announce the following essay competition which will be open to students pursuing a research degree in RF/Microwave/mmWave electronics. The first prize will be 1500 € with a runner-up prize of 750 €. You must register for one of the conferences to enter the essay competition.

The student should write a 4000 word essay or max of 12 pages including diagrams and tables, on the role of microwaves so far in reducing the carbon footprint and what kind of future activities will be important and why. In particular, what aspects of their own research work would be applicable.

Guidance: What we're looking for is a summary of the role so far of RF/Microwaves/mmWave in telecommunications and other fields which have contributed to remote working (especially during the COVID pandemic) and reducing travel/commuting. Also for enabling developing countries to build sustainable agricultural and other industries that require good communications infrastructire. The use of THz for forecasting of catastrophic weather events has also been an important and ongoing development. Microwave activity can help in reducing carbon footprint: for example high efficiency power amplifiers and other components for base station applications, high efficiency antenna beam steering architectures, use of THz for weather forecasting an warning of catastrophic weather/natural events.

We are looking for creative and original ideas and suggestions on how future microwave related research work can be best directed in fulfilling our contribution in reducing climate change and mitigating the effects that we already have to manage.

The shortlist of 4 selected essays will be announced at the end of the Tom Brazil Doctoral school on 14th February and these finalists will be asked to do a final pitch at 8:30am – 9:30am on Tuesday 15th February in the MicroApps area of the Exhibition Hall. The winner and runner-up will be announced during the awards session at the EuMIC closing event on 15th February afternoon.

Submissions: Please submit your essay by the deadline of 18th January 2022 (before midnight UK time) to grants@eumw2021.org.

IEEE Young Professionals Activities

Wednesday 16th February 2022
13:00 – 16:00 (Lunch from 13:00), ROOM 15

Programme

Following last years' initiative, EuMW 2021 will have a Young Professionals track devoted to students, young researchers and young industry professionals. The track comprises of a couple of technical and self-development sessions. The sessions are organised and co-sponsored by IEEE MTT-Society Young Professionals, IEEE Young Professionals and UK & Ireland Section, and in collaboration with IEEE Region 8 Young Professionals.

Guest speakers to be announced soon. Keep a close eye on this website and on our social media platforms to stay up to date.

For additional questions, please contact mtt-yp@ieee.org.

Women in Microwave Engineering
Stronger Together

Tuesday 15th February 2022
13:00 – 18:00, ROOM 15

Chair: Dr. Noushin Karimian, Manchester Metropolitan University, UK
Co-Chair: Dominique Scheurs, KU Leuven, Belgium

Register (free of charge) for this event via www.eumw2021.com – Register as a free EXHIBITION ONLY VISITOR. To attend, please pre-register by sending an email to women.microwaves@eumw2021.org subject: EuMW 2021 – Attend WiM Event

We continue the tradition of holding the Women in Microwave Engineering event, sponsored by IEEE MTT-S during the European Microwave Week. Both women and men are welcome.

This year's event will take place in London, a leading global city and a world cultural capital. The event will focus on inspiring women in engineering and will end with a guided tour of the Cutty Sark.

Two invited speakers will give presentations on their current research and success as a woman in Engineering. At the end of the panel session a guided tour to the Cutty Sark will take place.

Programme

SPECIAL PANEL SESSION ON "INSPIRING WOMEN IN ENGINEERING" – A WOMEN IN MICROWAVE ENGINEERING EVENT
Registration: Free

13:00 – 14:30 **Panel Session "Inspiring Women in Engineering"**

14:30 – 18:00 **Visit to Cutty Sark**
A luxury Coach will take you to Greenwich to board the Cutty Sark, the celebrated historic sailing ship and fastest of its time, for a self-guided tour with interactive audio guide.
The Cutty Sark is a tea clipper, a ship built for extreme speed and streamlined ocean wayfaring in order to transport tea across the seas. While it was depended on to bring tea from the East to drinkers in the West, the Cutty Sark actually served multiple purposes during its working. During its lifetime, the Cutty Sark was responsible for bearing and transporting more than 10 million pounds of brew.

18:00 **Return to ExCeL**

Career Platform

Tuesday 15th and Wednesday 16th of February 2022
Various locations, refer to programme

Organiser: Dr. Noushin Karimian, Manchester Metropolitan University, UK
Co-organiser: Helen Duncan, MWE Media Ltd., UK

WHAT IS IN IT FOR YOU?

Get ready to start your own company.
Meet your future employer.
Expand your network.

The Career Platform has been an integral part of EuMW since 2013. The aim is to foster the dynamic between young researchers, engineers and the job market in the RF and microwave field. It includes a dedicated meeting area for these young people to speak with human resources and recruitment specialists from the companies and organisations that sponsor the platform.

A special conference session will be held to explain more about the industrial market, and to share ideas on career development, which interested young people are invited to attend free of charge.

EuMW 2021 will also continue its e-Platform initiative, which provides a free-to-use job portal for the European RF and Microwave community at http://rf-and-microwave-jobs-in-europe.eu. For further information, contact the Career Platform Chairs:

Dr. Noushin Karimian
Manchester Metropolitan University
career.platform@eumw2021.org

Helen Duncan
MWE Media Ltd.
helen.duncan@mwemedia.com

Events

09:00 – 12:00 **Special Session: The European Microwave Industry Market**
Date: Tuesday 15th
Venue: Room 15
Registration fee: Free

09:00 – 17:00 **Career Platform Lounge**
Date: Tuesday 15th and Wednesday 16th
Venue: ICC Capital Suite located on Level 2
Registration fee: Free

This space will encourage networking between job seekers and recruiters. The platform lounge includes recruitment booths from sponsoring European companies and academic institutions.
Young people are invited to bring and share their CVs.

For sponsorship information, please contact the Career Platform Chairs (see above).

ONLINE **E-Career Platform**
Venue: Online
Registration fee: Free

The EuMW e-career platform aims to support and promote the RF and Microwave community by providing a job portal on a Europe-wide scale: http://rf-and-microwave-jobs-in-europe.eu

Also please connect with us via our LinkedIn group, ***RF and Microwave Jobs in Europe***

The Automotive Forum
Automotive Radar Sensors and Testing

Monday 14th February 2022
9:00 – 18:20, ROOM 14
+ Dinner on Monday evening

Chair: Thomas Zwick, Karlsruhe Institute of Technology, Germany
Co-Chairs: Martin Kunert, Robert Bosch GmbH & Frank Gruson, Continental AG, Germany
Local Arrangement Chair: Xiaobang Shang, National Physical Laboratory, UK

Following applications like keyless entry and tire pressure monitoring systems, mobile communications and recently automotive radar made microwave technologies a strong pillar inside the automotive world. The first 77 GHz automotive radar sensors entered the European market in 1999. In 2019, the European Microwave Association (EuMA) for the first time organized the Automotive Forum to provide an open platform for industrial experts to discuss technical aspects, concepts and radar architectures as well as market issues in the area of microwaves in the automotive industry.

The forum consists of a good mix of technical presentations, plenary and panel discussions as well as networking time. This year's event will focus on the following topics:

1. Radar testing technologies
2. Virtual radar testing
3. Imaging radar for autonomous driving
4. Radar market, technology and game changers

The forum is mainly devoted to technical experts from automotive industry throughout the whole supply chain. Keynote speakers will present their views on special technical solutions as well as regulatory or strategic issues. Early registration is recommended.

Registration and Programme Updates

Advanced Registration fee (up to & incl. 31st December 2021) is £240 for those who registered for a conference and £290 for those not registered for a conference. Standard Registration fee (from 1st January 2022 & onsite) is £330 for those who registered for a conference and £390 for those not registered for a conference. The Conference Special Events section of the EuMW website will give further details and updates.

Programme

SESSION 1: RADAR TESTING TECHNOLOGIES
(Chair: Thomas Zwick, Karlsruhe Institute of Technology, Germany)

09:00 – 09:20 **Practical Advice and Considerations for Radar Testing**
Vitali Anselm, National Instruments, Germany

09:20 – 09:40 **Road to Lab: Validation of ADAS/AD functions relying on sensor fusion**
Henrik Liebau, Seung Chul Shin, Keysight Technologies, Germany/USA

09:40 – 10:00 **Radar Target Simulation – Precise and Versatile Testing of Automotive Radars**
Andreas Himmler, dSpace, Germany

10:00 – 10:20 **Validation of Radar-Based ADAS and AD Functions on Vehicle-in-the-Loop Test Beds**
Holger Gryska, Rohde & Schwarz, Germany | Tobias Düser, AVL, Germany

10:20 – 10:40 **Open Discussions all Presentations of the Session**

10:40 – 11:20 **Coffee**

SESSION 2: VIRTUAL RADAR TESTING
(Chair: Xiaobang Shang, National Physical Laboratory, UK)

11:20 – 11:40 **Automotive Radar Simulation: a Use Case Example**
Rogier van Aken, Siemens Digital Industries Software, The Netherlands

11:40 – 12:00 **Multiple-Ray-Tracing (MRT) Tool with SystemVue**
Riccardo Giacometti, Christopher Groetsch and Mart van-Gijsel, Keysight Technologies, Italy

12:00 – 12:20 **Automated Driving and the Need for Virtual Validation – the VIVID Project**
Frank Gruson, Hasan Iqbal and Sandro Reith, Continental, Germany

12:20 – 12:40 **Over-the-Air Radar Target Simulator – Technology, Challenges and Outlook**
Prasanna Kannan, IPG Automotive GmbH, Germany

12:40 – 13:00 **Open Discussions all Presentations of the Session**

13:00 – 14:20 **Lunch**

SESSION 3: IMAGING RADAR FOR AUTONOMOUS DRIVING
(Chair: Frank Gruson, Continental AG, Germany)

14:20 – 14:40 **Regulatory Requirements of Automotive Imaging Radars for Advanced Driver Assistance Systems (ADAS)**
Oliver Kneip, KL-Certification GmbH, Germany | Daniel Lenhardt, IB-Lenhardt AG, Germany | Karsten Geraldy, Piotr Sardyko, IBL-Lab GmbH, Germany |Alois Ascher, Rohde & Schwarz GmbH, Germany

14:40 – 15:00 **Compact Imaging Radar**
Simón Tejero Alfageme, Huawei, Germany/China

15:00 – 15:20 **On a vision through Imaging radar**
Ankit Sharma & Apu Sivadas, Steradian Semiconductor Pvt Ltd, India

15:20 – 15:40 **Challenges in the Design of Radar Transceivers for ADAS/AD**
Marta Martinez Vazquez, Renesas Electronics Europe GmbH, Germany/Japan

15:40 – 16:00 **Open Discussions all Presentations of the Session**

16:00 – 16:40 **Coffee**

SESSION 4: RADAR MARKET, TECHNOLOGY AND GAME CHANGERS
(Chair: Martin Kunert, Robert Bosch GmbH, Germany)

16:40 – 17:00 **Paradigm change in automotive mm-wave radar applications - from technology push to demand pull**
Holger H. Meinel, Germany

17:00 – 17:20 **Radar Market Overview and Technology Trends**
Cédric Malaquin, Yole Développement, France

17:20 – 17:40 **22FDX technology node @ GlobalFoundries - Solutions for mmWave Radar Applications & 5/6G Communication**
Manfred Horstmann, Global Foundries, Germany

17:40 – 18:00 **Can sub-THz radar be a game changer?**
Marina Gashinova, University of Birmingham, United Kingdom

18:00 – 18:20 **Open Discussions all Presentations of the Session**

Defence, Security and Space Forum
RF Sensing from Space: Modern Trends and Challenges

Wednesday 16th February 2022
11:20 – 18:20, ROOM 8 – 11

Chair: Prof. Chris Baker, University of Birmingham, UK
Co-chair: Dr. Michail Antoniou, University of Birmingham, UK

RF sensing from spaceborne systems is undergoing a revolution. Leveraging the vast legacy of orbital RF sensors, and powered by the latest advances in RF and satellite technologies, next-generation missions, from radar satellites to spaceborne radiometers, are rapidly emerging.

Around the world, there are innovative and new systems in operation, development or concept design stages, some of which involve large-scale radar satellite constellations for the first time ever. Driven by current and future user demands in remote sensing, security and defence, they are pushing the limits of the possible in terms of the fidelity of their sensing outputs, the rate with which these outputs are provided, and their RF sensing instrumentation that enables it, all while the size of spaceborne platforms themselves is reducing.

The purpose of this year's Defence, Security and Space Forum is to encapsulate the current state of the art in spaceborne RF sensing, and to discuss its key technical enablers as well as the challenges it faces moving forward. World-renowned experts from aerospace primes, SMEs', space agencies and government across Europe will present their work on this exciting topic, from new concepts and RF technologies to established systems currently in operation, with an emphasis on technological aspects that impact civilian and military applications.

Registration and Programme Updates

Registration fee is £20 for those who registered for a conference and £60 for those not registered for a conference. The Conference Special Events section of the EuMW website will give further details and updates.

Programme

09:00 – 10:40 **EuRAD Opening**

10:40 – 11:20 **Coffee Break**

11:20 – 13:00 **RF Sensing from Space: Modern Trends and Challenges**
Moderators: Chris Baker and Michail Antoniou

Four renowned experts will discuss various topics on RF sensing from space.

- "The Future of Spaceborne SAR systems: NewSpace or Full-Fledged Systems?", Prof. Alberto Moreira, Director of the Microwaves and Radar Institute, German Aerospace Centre (DLR)
- "How Airbus tackles the new spaceborne RF sensing challenges", Sam Doody, HO Microwave Instruments, Airbus Defence and Space UK
- "Processing and exploitation challenges for future UK defence and security space-based radar missions", Prof. David Blacknell, Technical Fellow, Defence Science and Technology Laboratory (DSTL).
- "The ICEYE orbital SAR constellation", Dr. Darren Muff, Senior SAR Product Engineer, ICEYE

13:00 – 14:20 **Free Lunch Boxes Provided on-site by Microwave Journal**

14:20 – 16:00 **Microwave Journal Industry Panel Session**
The Microwave Journal Industry Session will feature technological innovations that industry is developing for RF Sensing from Space related topics.

- "Towards a Quantum Advantage in Radar," Fabian Kronowetter, Junior Development Engineer technology, Rohde & Schwarz
- "Technology Advancements Enable Next-Generation SATCOM and Space-Based RADAR," Mike Jones, System Platform Manager and Brad Hall, System Applications Manager, Aerospace and Defense, Analog Devices
- "How GaN Technology is Transforming SATCOM RF Architectures," Speaker-TBD, Qorvo

16:00 – 16:40 **Coffee Break**

16:40 – 18:20 **Round table discussion**
Moderators: Chris Baker and Michail Antoniou
Panelists: David Blacknell (DSTL), Sam Doody (Airbus Defence and Space UK), Alberto Moreira (DLR), Darren Muff (ICEYE)

World-wide experts are invited to this Table to discuss the trends, potential, and challenges for new spaceborne RF sensing concepts. Key discussion points include, but are not limited to:

- What are the end user needs (civilian and military) driving innovation in spaceborne RF sensing?
- What are the key technologies that enable it and what new capabilities do they introduce?
- What are the barriers in the adoption and integration of these technologies?
- How can these barriers be overcome?
- What is the role of research in helping to overcome them?

2010 Paris	2011 Manchester	2012 Amsterdam	2013 Nuremberg	2014 Rome	2015 Paris	2016 London	2017 Nuremberg	2018 Madrid	2019 Paris	2020 Utrecht	2021 London
The Defence, Security and Space Forum	mmWave Imaging Systems	Defence and Security including Space	Military Radar vs. Automotive Radar	Protection and Security of our Infrastructure and Home land	RF Payloads for Unmanned Aerial Vehicles	Challenges and Opportunities for Indoor/ Enclosed and Urban Communications and Sensing Technologies	The Internet of Space: Technologies and Applications	Integrating Unmanned Systems in Defence and Security Scenario's	New Radio Architectures: The Evolution for Satellite Constellations	Space Situational Awareness	RF Sensing from Space: Modern Trends and Challenges

5G and Beyond Forum
Trailblazing the Future

Thursday 17th February 2022
9:00 – 17:15, ROOM 14

Chair: Dr Lutfi Albasha, American University of Sharjah, UAE
Co-Chair: Dr Chris Clifton, Sony Semiconductors and Solutions, Basingstoke, UK

The forum focus is on technologies beyond 5G. State of the art developments in the fields of wireless technologies for 5G and beyond will be discussed. The forum is for one-day with invited speakers from academia and industry. The topics of the forum covers a wide range of subjects that pertain to next generation communications This includes 6G standardization, environment aware networks, advanced sensing and low power radars. The forum will include a panel session, coffee breaks and packed lunch.

Registration and Programme Updates

Advanced Registration fee (up to & incl. 31st December 2021) is £60 for those who registered for a conference and £70 for those not registered for a conference. Standard Registration fee (from 1st January 2022 & onsite) is £80 for those who registered for a conference and £90 for those not registered for a conference. The Conference Special Events section of the EuMW website will give further details and updates.

Programme

08:00 – 09:00 **Registration and Morning Coffee**

09:00 – 09:15 **Welcoming Notes**
Chair

09:15 – 10:00 **RoF Technology for Beyond 5G Radio's Design**
Fadhel M. Ghannouchi, IEEE Fellow
iRadio Lab, Department of Electrical and Computer Engineering, University of Calgary, Canada

10:00 – 10:45 **On the Verge of 6G?**
Andreas Roessler
Technology Manager Rohde&Schwarz USA, Inc.

10:45 – 11.30 **Towards Environment-Aware Wireless Networks**
Mohamed-Slim Alouini, Fellow IEEE
King Abdullah University of Science and Technology (KAUST), Saudi Arabia

11:30 – 12:15 **Integrating Communications, Sensing and Intelligence for 6G and Beyond**
Christos Masouros
Department of Electronic and Electrical Engineering University College London (UCL)

12:15 – 13:00 **On the Application and Performance of Intelligent Reflective Surfaces in 6G**
Emad Alsusa
Department of Electrical and Electronic Engineering, University of Manchester

13:00 – 14:00 **Lunch**

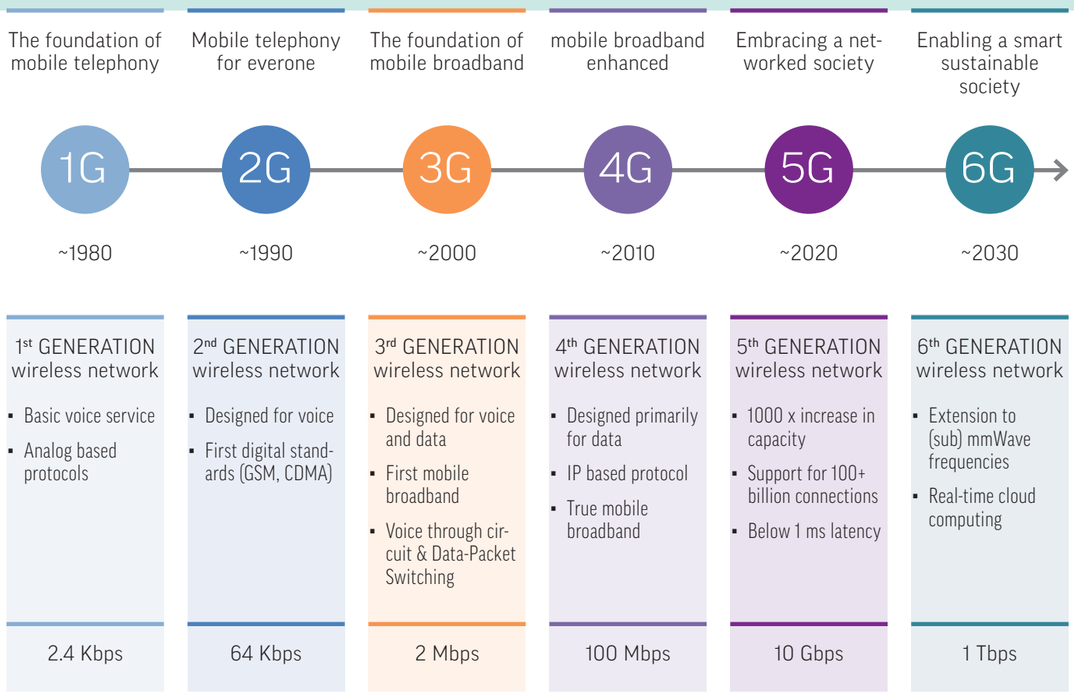
14:00 – 15:00 **Panel Session**
All speakers Moderator: Co-Chair

15:00 – 15:45 **What is the Role of Intelligent Reflecting Surfaces in 6G?**
Emil Björnson
KTH Royal Institute of Technology, Stockholm, Sweden

15:45 – 16:30 **High Frequency MMICs and Characterization Considerations**
Lyndon Pattison, IconicRF, Belfast, Ireland

16:30 – 17:15 **Low Power Stretched-Processed Miniaturized Receiver Radar Sensors**
Lutfi Albasha, American University of Sharjah, UAE

17:15 **Forum Closing Remark**



SUNDAY OVERVIEW

Room	09:00 – 13:00	14:20 – 18:20
1	**WS01** Advances of Wireless Sensing in Harsh and Severe Environments	
2		
3		
4	**WS02** Terahertz Device, Circuit and System Fundamentals and Applications	
5		
6		**SS01** Advanced Non-linear Characterization and Design of Highly Efficient Power Amplifiers Using Load-Pull Data for sub-6GHz and mmWave Applications
7	**WS04** New Trends in Microwave and mmWave Filters	
8	**SS02** Fundamentals of Microwave PA Design	
9	**WS05** New On-Chip and Scalable RF Packaging Solutions with Integrated Antennas for 5G mmWave and 6G Applications	
10	**WS06** Progress and Status of Gallium Nitride Monolithic Microwave Integrated Circuits	
11	**WS07** RF Reliability Status and Challenges for 5G mmWave and 6G Applications	**SS03** 5G mmWave OTA Measurements – Best Practices for Fast and Reliable Results
12	**WS08** Technology for RF 5G and Satcom: From Material to Packaged Demonstrators	
13	**SS04** Terahertz Technology, Instrumentation and Applications	
14	**WS09** Research in Power and S-parameters Measurements at mmWave and Terahertz Frequencies	
15		
16		
17	**WS03** mmWave Plastic Waveguide High Data Rate Communications	

EuMC EuMIC EuRAD Students EuMW Exhibitors

MONDAY OVERVIEW

Room	09:00 – 10:40	11:20 – 13:00	14:20 – 16:00	16:40 – 18:20	EVENING PROGRAMME
1	**SM01** R&D Trends & Challenges in RFPAs for Medium/High-Volume Products		**WM01** Optimizing Modulation Quality Measurements on Wide Bandwidth Signals - from Conformance Through R&D		
2	**WM02** Advances in Circuits and Systems for mmWave Radar and Communication in Silicon Technologies				
3	**Student School**				
4	**Tom Brazil Doctoral School of Microwaves**				
5			**EuMIC05** Integrated Circuit Modelling and Design Methodology		
6	**WM03** Microwave and mmWave Techniques for Sensing, Imaging and Characterisation of Biological Tissues				
7		**EuMIC04 Opening Session**			
8				**EuMIC08** Components and Subsystems for 100 GHz and Above	
9				**EuMIC09** High Performance LNAs	
10	**EuMIC01** Large Signal and Non-linear Charaterization Techniques		**EuMIC06** Integrated PAs for 5G, SATCOM and Vehicular Applications	**EuMIC10** Advances in Si and GaN Based Integrated PAs	
11	**EuMIC02** Silicon Based RF Solutions		**SM02** Intuitive Microwave Filter Design with EM Simulation		
12	**EuMIC03** Transceiver MMICs		**SM03** Phase-Noise in Next-Generation Aerospace/Defense and Commercial Wireless Communications		
13	**WM04** RF On-wafer Calibration and Measurement Eco-system Workshop				
14	**Automotive Forum**				
15	**WM05** Microwave Equipment Based on SM EM Relays		**SM04** Solid-State Microwaves Applications in Industrial, Scientific and Medical Fields		
16	**WM06** Recent Developments in Wireless Power Transfer and Energy Harvesting				
17	**WM07** Beyond 5G: mmWave and THz Techniques of 6G Research		**EuMIC07** Frequency-Converting Circuits	**EuMIC11** Boradband Integrated Circuits	**EuMIC Foundry Session** 18:30 – 20:00
Off-site					**Automotive Forum Networking Dinner** 19:00 – 22:00
Exhibition Area					**EuMIC Cocktail Reception** 18:00 – 20:00

EuMC EuMIC EuRAD Students EuMW Exhibitors

MONDAY 09:00 – 10:40

ROOM	Room 10	Room 11	Room 12
	EuMIC01 Large signal and Non-linear Characterization Techniques Chair: Teresa M. Martín-Guerrero[1] Co-Chair: Nuno Borges Carvalho[2] [1]Universidad de Málaga, [2]University of Aveiro / Instituto de Telecomunicações	**EuMIC02** Silicon Based RF Solutions Chair: Peter Magnee[1] Co-Chair: Rüdiger Quay[2] [1]NXP Semiconductors, [2]IAF-Fraunhofer: Fraunhofer Institute for Applied Solid-State Physics	**EuMIC03** Transceiver MMICs Chair: Mehmet Karaaslan[1] Co-Chair: Friedel Gerfers[2] [1]Teledyne E2V UK Ltd, [2]TU Berlin
09:00 – 09:20	**EuMIC01-1** Load-pull measurement of SiGe:C HBT in BiCMOS 55 nm featuring 11 dBm of output power at 185 GHz Caroline Maye[1] [1]University of Lille - IEMN	**EuMIC02-1** SiGe BiCMOS as enabling technology for next generation RF & THz Systems Gerhard Kahmen[1] **INDUSTRIAL KEYNOTE** [1]IHP - Leibniz-Institut fur innovative Mikroelektronik	**EuMIC03-1** mmW GaN/Si MMICs: The 3rd generation of III/V processes to complement Si RFIC solutions Marc Rocchi[1] **INDUSTRIAL KEYNOTE** [1]OMMIC
09:20 – 09:40	**EuMIC01-2** Nonlinear Characterization of Wideband Power Amplifiers with frequency dependent match load Sanket Chaudhary[1], Nuno Borges Carvalho[1], Marina Jordão[1], Marc Vanden Bossche[2], Adam Cooman[3], Sergio Pires[3] [1]Universidade de Aveiro / Instituto de Telecomunicações, [2]National Instruments, [3]Ampleon, The Netherlands BV	**EuMIC02-2** Analysis of the Relaxed Contacted-Poly-Pitch Effect on the RF Performance of Strained-SiGe-Channel p-FETs in 22nm FDSOI Technology Quang Huy Le[1], Dang Khoa Huynh[1], Steffen Lehmann[2], Zhixing Zhao[2], Thomas Kämpfe[1], Matthias Rudolph[3] [1]Fraunhofer Institute for Photonic Microsystems (IPMS), [2]Globalfoundries, Germany, [3]BTU, Germany	**EuMIC03-2** A Bidirectional 28 GHz RF Transceiver Front-End with Test and Calibration Interface for 5G Phased Arrays Katharina Kolb[1], Julian Potschka[1], Tim Maiwald[1], Klaus Aufinger[2], Amelie Hagelauer[1], Marco Dietz[1], Robert Weigel[1] [1]FAU Erlangen-Nuremberg, [2]Infineon Technologies AG, [3] University of Bayreuth
09:40 – 10:00	**EuMIC01-3** Intermodulation Products of a CMOS SP6T Antenna Switch: Results Comparison Between an Experimental Test-Bench and a Corresponding Simulated Virtual Test-Bench Marwen Ben Sassi[1], Hassan Saleh[1], Ousmane Sow[1], Imene Lahbib[1], Gregory D U'Ren[1], C. Hallépée[2], et al. [1]XFAB, [2]Xlim - UMR 7252 - CNRS- Limoges University	**EuMIC02-3** Design Methodology of Wide Tuning Range DGS-based VCO for K-band Applications in 0.18-µm CMOS Technology Baichuan Chen[1], Samundra Kumar Thapa[1], Adel Barakat[1], Ramesh Kumar Pokharel[1] [1]Kyushu University	**EuMIC03-3** A 2-channel TX and 4-channel RX in SiGe BiCMOS for X-band MIMO Radar Applications Maciej Kucharski[1] [1]SIRC Sp. z o.o.
10:00 – 10:20	**EuMIC01-4** A computationally-efficient self-consistent large signal model for GaN HEMTs based on ASM-HEMT Sourabh Khandelwal[1], Ken Kikuchi[2], Hiroshi Yamamoto[2] [1]Macquarie University, [2]Sumitomo Electric Industries Ltd Japan	**EuMIC02-4** Linearity Assessment of GaN HEMTs on Si using Nonlinear Characterisation Rana ElKashlan[1], Ahmad Khaled[1], Raul Rodriguez[1], Vamsi Putcha[1], Uthayasankaran Peralagu[1], AliReza Alian[1], Nadine Collaert[1], Piet Wambacq[1], Bertrand Parvais[1] [1]imec	**EuMIC03-4** Two-Element 81-86 GHz SiGe Transmitter Beamformer for Backhaul Applications Roee Ben-Yishay[1], Oded Katz[1], Danny Elad[1] [1]ON Semiconductor
10:20 – 10:40	**EuMIC01-5** Large-Signal Modeling for Nonlinear Analysis of Experimental Devices in 22nm FDSOI Technology Quang Huy Le[1], Dang Khoa Huynh[1], Anurag Nayak[1], Steffen Lehmann[2], Zhixing Zhao[2], Thomas Kämpfe[1], Matthias Rudolph[3] [1]Fraunhofer Institute for Photonic Microsystems (IPMS), [2]Globalfoundries, [3]Brandenburg University of Technology (BTU)	**EuMIC02-5** Reconfigurable and Scalable Monolithic Band Reject Circuit Utilizing Phase-Change Switch Matrices Tejinder Singh[1], Raafat R. Mansour[1] [1]University of Waterloo	**EuMIC03-5** A W-Band Single-Chip Receiver in a 60 nm GaN-on-Silicon Foundry Process Robert Malmqvist[1], Rolf Jonsson[1], Mingquan Bao[2], Rémy Leblanc[3], Koen Buisman[4], Christian Fager[4], Kristoffer Andersson[2] [1]Swedish Defence Research Agency (FOI), [2]Ericsson Research, Ericsson AB, [3]OMMIC S.A.S, [4]Chalmers University of Technology

MONDAY 11:20 – 13:00

ROOM	Room 7 – 9
	EuMIC04 EuMIC Opening Session Chair: Chris Clifton[1], EuMIC Chair Co-chair: Shokrollah Karimian[2], EuMIC Co-chair; Edward Wasige[3], EuMIC TPC Chair [1]Sony Europe B.V, [2]University of Oxford, UK, [3]University of Glasgow, UK
11:20 – 11:30	Welcome Address: Opening of the European Microwave Integrated Circuits Conference 2021 Chris Clifton[1] [1]EuMIC Chair
11:30 – 12:15	III-V Nitride Semiconductors for Microwave Applications Christopher Snowden[1] [1]Fellow of the Royal Society, Chair of the ERA Foundation The demand for high performance semiconductor devices for microwave applications to meet the exacting power, frequency, bandwidth and linearity requirements of 5G, radar and remote sensing has driven the development of wide-band gap semiconductors capable of delivering high powers, with high efficiencies at frequencies up to 100 GHz. This presentation will review the state-of-the-art, highlighting the development and introduction of GaN-based FETs for use in discrete and integrated circuits. A comparison with Si, SiGe and GaAs-based technologies will be made, discussing the relative merits and RF performance. Examples, of applications, and details of the technology for GaN-based devices will be given for operation in the frequency range 2 to 96 GHz. Particular emphasis will be placed on the use of GaN on Si substrate HEMTs in power amplifiers in both MIC and MMIC forms. The modelling and design of devices and circuits will be covered together with some insight into fabrication and production. Finally, future prospects for III-V nitride devices will be presented.
12:15 – 13:00	High-Efficiency PAs for Broadband High-PAR Signals Zoya Popovic[1] [1]University of Colorado, USA Achieving power amplifiers (PAs) with high efficiency and good linearity is challenging if the amplified signals have wide instantaneous bandwidths (> 100 MHz) and high peak-to-average power ratios (PAPR > 10 dB). Examples of such signals include multi-carrier concurrent signals, both closely and widely spaced, and band-limited noise-like signals, typical of 5G and other multi-carrier aggregated signal applications. This talk will overview techniques for supply modulation of broadband signals amplified by different GaN PAs, including a 2–4GHz single ended hybrid PA, an X-band MMIC PA, and a K-band MMIC PA. The signals that are considered include band-limited noise with bandwidths from 10 to 250 MHz, and widely spaced multi-carrier with up to 800 MHz spacing. Both continuous and discrete supply modulation of multiple amplifier stages is demonstrated, and linearization methods discussed.

MONDAY 14:20 – 16:00

ROOM	Room 5	Room 10	Room 17
	EuMIC05 Integrated Circuit Modelling and Design Methodology Chair: Vadim Issakov[1] Co-Chair: Matthew OKeefe[2] [1]Technische Universitaet Braunschweig, [2]INEX Microtechnoogy Ltd	**EuMIC06** Integrated PAs for 5G, SATCOM and Vehicular Applications Chair: Joseph Staudinger[1] Co-Chair: Alessandro Cidronali[2] [1]NXP Semiconductor Inc, [2]University of Florence	**EuMIC07** Frequency-Converting Circuits Chair: Ingmar Kallfass[1] Co-Chair: Lars-Erik Wernersson[2] [1]University of Stuttgart, [2]Lund Univeristy
14:20 – 14:40	**EuMIC05-1** A 30-to-38 GHz Active and Passive Combined Down-conversion Variable Gain Mixer with Low OP1dB Variation in 65-nm CMOS Mu Heng Li[1], Chun-Nien Chen[1], Yunshan Wang[1], Huei Wang[1] [1]National Taiwan University	**EuMIC06-1** Buffer-free GaN-on-SiC HEMT heterostructures for Sub-6GHz and mmWave RF devices Jr-tai Chen[1] **INDUSTRIAL KEYNOTE** [1]SweGaN	**EuMIC07-1** A Ka-Band MMIC Single-Chip Frequency Converter for Telecom Satellite Applications Francesco Scappaviva[1], Davide Resca[1], Andrea Biondi[1], Luca Cariani[1], Francesco Vitulli[2], François Deborgies[3] [1]MEC – Microwave Electronics for Communications, [2]Thales Alenia Space Italia, [3]ESA / ESTEC
14:40 – 15:00	**EuMIC05-2** Analog Linearization of a 10-W GaN Power Amplifier by Baseband Feedback Mathani Eltayeb[1], Morten Olavsbråten[2], Gian Piero Gibiino[1], Alberto Santarelli[1] [1]University of Bologna, [2]NTNU	**EuMIC06-2** A High GBW High Power Wideband Power Amplifier for Automotive Radar Application Kambiz Hadipour[1], Dominik Amschl[2], Daniel Knauder[2], Stefano Di Martino[2] [1]Infineon Technologies Linz GmbH & Co KG, [2]Infineon Technologies Austria	**EuMIC07-2** A V-band Low-Power and Compact Down-Conversion Mixer with Low LO Power in 130-nm SiGe BiCMOS Technology Batuhan Sütbas[1], Herman J. Ng[2], Jan Wessel[1], Alexander Koelpin[1], Gerhard Kahmen[1] [1]IHP - Leibniz-Institut fur innovative Mikroelektronik, [2]Karlsruhe University of Applied Sciences, [3]Hamburg University of Technology
15:00 – 15:20	**EuMIC05-3** Statistical Modeling of GaN HEMTs by Direct Transfer of Variations to Model Parameters Petros Beleniotis[1], Serguei Chevtchenko[2], Matthias Rudolph[1] [1]Brandenburg University of Technology (BTU) Cottbus-Senftenberg, [2]Ferdinand-Braun-Institut, Leibniz-Institut für Höchstfrequenztechnik	**EuMIC06-3** A highly rugged 39 GHz 19.3 dBm Power Amplifier for 5G Applications in 45nm SOI Technology Alice Bossuet[1], Baudouin Martineau[1], Cedric Dehos[1], Benjamin Blampey[1], Alexis Divay[1], Yvan Morandini[2] [1]CEA - LETI, [2]SOITEC Grenoble	**EuMIC07-3** A 60 GHz Frequency Doubler with 3.4-dBm Output Power and 4.4% DC-to-RF-Efficiency in 130-nm SiGe BiCMOS Yu Zhu[1], Vincent Rieß[1], Hatem Ghaleb[1], Niko Joram[1], Frank Ellinger[1] [1]TU Dresden
15:20 – 15:40	**EuMIC05-4** Design of Terahertz InP pHEMT Using Machine Learning Assisted Global Optimization Techniques Jing Wang[1], Li-Yuan Xue[1], Bo Liu[1], Chong Li[1] [1]University of Glasgow	**EuMIC06-4** 44 dBm Output Power and High Gain K-band GaN Power Amplifier for Satellite Communication Takuma Torii[1], Yoshifumi Kawamura[1], Eigo Kuwata[1], Masaomi Tsuru[1] [1]Mitsubishi Electric Corporation	**EuMIC07-4** A 14.6 GHz - 19.2 GHz Digitally Controlled Injection Locked Frequency Doubler in 45 nm SOI CMOS Olli Kursu[1], Timo Rahkonen[1], Aarno Pärssinen[1] [1]University of Oulu
15:40 – 16:00	**EuMIC05-5** Low-Power Ka- and V-Band Miller Compensated Amplifiers in 130-nm SiGe BiCMOS Technology Batuhan Sütbas[1], Herman J. Ng[2], Jan Wessel[1], Alexander Koelpin[1], Gerhard Kahmen[1] [1]IHP - Leibniz-Institut fur innovative Mikroelektronik, [2]Karlsruhe University of Applied Sciences, [3]Hamburg University of Technology	**EuMIC06-5** 125W Solid State Power Amplifier for 17.3-20.2GHz SatCom Applications Rocco Giofrè[1], Paolo Colantonio[1], Lorena Cabria[2], Mariano Lopez[2] [1]University of Roma Tor Vergata, [2]TTI Norte	**EuMIC07-5** A W-Band Up-Conversion Mixer with Integrated LO Frequency Doublers in a 60 nm GaN Technology Mingquan Bao[1], Robert Malmqvist[2], Rolf Jonsson[2], Jonas Hansryd[1], Kristoffer Andersson[1] [1]Ericsson AB, [2]Swedish Defence Research Agency (FOI)

MONDAY 16:40 – 18:20

ROOM	Room 8	Room 9	Room 10	Room 17
	EuMIC08 Components and Subsystems for 100 GHz and Above Chair: Ullrich Pfeiffer[1] Co-Chair: Herbert Zirath[2] [1]University of Wuppertal, [2]Chalmers University of Technology	**EuMIC09** High Performance LNAs Chair: Lars-Erik Wernersson[1] Co-Chair: Ingmar Kallfass[2] [1]Lund Univeristy, [2]University of Stuttgart	**EuMIC10** Advances in Si and GaN Based Integrated PAs Chair: Khaled Elgaid[1] Co-Chair: Rocco Giofrè[2] [1]Cardiff University, [2]Università di Roma Tor Vergata	**EuMIC11** Broadband Integrated Circuits Chair: Friedel Gerfers[1] Co-Chair: Mehmet Karaaslan[2] [1]TU Berlin, [2]Teledyne E2V UK Ltd
16:40 – 17:00	**EuMIC08-1** Highly-Integrated Multi-Channel D-Band Radar Transceivers in Silicon Technologies Vadim Issakov[1] **INDUSTRIAL KEYNOTE** [1]Infineon Technologies	**EuMIC09-1** 200 GHz Low Noise Amplifiers in 250nm InP HBT Technology Utku Soylu[1], Ahmed Samir Hamed Sayed Ahmed[1], Munkyo Seo[1], Ali Farid[1], Mark Rodwell[1] [1]University of California, Santa Barbara, [2]Sungkyunkwan University	**EuMIC10-1** Transient Field-Plate Thermometry Demonstrated on a 20-W X-Band GaN Power Amplifier Simon J. Mahon[1], Melissa Gorman[1], Michael Heimlich[1] [1]Macquarie University	**EuMIC11-1** Is SiGe BiCMOS an essential technology for 6G? Pascal Chevalier[1] **INDUSTRIAL KEYNOTE** [1]STMicroelectronics
17:00 – 17:20	**EuMIC08-2** SiGe BiCMOS Building Blocks for E- and D-Band Backhauling Front-Ends Giandomenico Amendola[1], Luigi Boccia[1], Francesco Centurelli[2], Pascal Chevalier[3], Alessandro Fonte[4], Saleh Karman[3], Salvatore Levantino[3], Andrea Mazzanti[3], Carmine Mustacchio[1], Andrea Pallotta[2], et al. [1]University of Calabria, [2]Sapienza University of Rome, [3]STMicroelectronics, France, [4]SIAE Microelettronica S.p.A., [5]Politecnico di Milano, [6]University of Pavia, [7]STMicroelectronics	**EuMIC09-2** Output Power Limited Rugged GaN LNA MMIC Evelyne Kaule[1], Cristina Andrei[1], Matthias Rudolph[1] [1]Brandenburg University of Technology Cottbus-Senftenberg	**EuMIC10-2** A 27 dBm Ku-band SiGe Power Amplifier Working up to 90°C with High Robustness to the 2:1 SWR Benjamin COQUILLAS[1], Eric Kerhervé[2], Samuel Redois[3], Anne-Charlotte AMIAUD[3], Laurent ROUSSEL[4], Bruno Louis[3], Eric ITCIA[3], Thomas Merlet[4] [1]THALES LAS, France / University of Bordeaux, France, [2]University of Bordeaux, France, [3]THALES DMS, France, [4]THALES LAS, France, [5]THALES DMS	**EuMIC11-2** 120 GBd SiGe-Based 2:1 Analog Multiplexer Module for Ultra-Broadband Transmission Systems Christian Schmidt[1], Tobias Tannert[2], Jung Han Choi[1], Christoph Caspar[1], Detlef Pech[1], Sebastian Wünsch[1], Greta Ropers[1], Jonathan Schostak[1], Volker Jungnickel[1], Ronald Freund[1], Markus Grözing[2], Manfred Berroth[2] [1]Fraunhofer Heinrich Hertz Institute, [2]Universität Stuttgart
17:20 – 17:40	**EuMIC08-3** A Superheterodyne 300 GHz Transmit Receive Chipset for Beyond 5G Network Integration Iulia Dan[1], Christopher Grötsch[2], Laurenz John[3], Sandrine Wagner[3], Axel Tessmann[4], Ingmar Kallfass[5] [1]Qorvo , [2]Keysight Technologies, [3]Fraunhofer IAF, Fraunhofer Institute for Applied Solid State Physics, [4]Fraunhofer IAF, Fraunhofer Institute for Applied Solid State Physics, [5]Institute of Robust Power Semiconductor Systems (ILH) - University of Stuttgart	**EuMIC09-3** A highly linear 79 GHz Low-Noise Amplifier for Civil-Automotive Radars in 22 nm FD-SOI CMOS with -6 dBm iP1dB and 5 dB NF Songhui Li[1], David Fritsche[1], Laszlo Szilagyi[1], Xin Xu[1], Quang Huy Le[1], Defu Wang[1], Thomas Kämpfe[2], Corrado Carta[1], Frank Ellinger[1] [1]TU Dresden, [2]Fraunhofer Institute for Photonic Microsystems (IPMS)	**EuMIC10-3** A 4 GBaud 5 Vpp Pre-Driver for GaN based Digital PAs in 22 nm FDSOI using LDMOS Frowin Buballa[1], Sebastian Linnhoff[1], Thomas Hoffmann[2], Andreas Wentzel[2], Wolfgang Heinrich[2], Friedel Gerfers[1] [1]Technische Universität Berlin, [2]Ferdinand-Braun-Institut gGmbH, Leibniz-Institut für Höchstfrequenztechnik	**EuMIC11-3** A 7-30 GHz, 80-dBΩ Noise-Optimized, Bandpass-Like TIA in 130 nm SiGe BiCMOS Technology for Quasi-Coherent Optical Receivers Tom Keinicke Johansen[1], Guillermo Silva Valdecasa[1], Monika Kupska[2], Jose Altabas[2], Omar Gallardo[2], Michele Squartecchia[2], Jesper Bevensee Jensen[2] [1]Technical University of Denmark, [2]Bifrost Communications Aps.
17:40 – 18:00	**EuMIC08-4** Implementation of Slow-Wave Thin-Film Microstrip Transmission Lines in a 35nm InGaAs Technology Athanasios Gatzastras[1], Hermann Massler[2], Arnulf Leuther[2], Sébastien Chartier[2], Ingmar Kallfass[1] [1]Institute of Robust Power Semiconductor Systems (ILH) - University of Stuttgart, [2]Fraunhofer IAF	**EuMIC09-4** Highly Linear D-Band Low-Noise Amplifier with 8.5dB Noise Figure in InP-DHBT Technology Maruf Hossain[1], Ralf Doerner[2], Hady Yacoub[2], Tom Keinicke Johansen[3], Wolfgang Heinrich[2], Viktor Krozer[2] [1]Ferdinand-Braun-Institut (FBH) Leibniz-Institut für Höchstfrequenztechnik, [2]Ferdinand-Braun-Institut (FBH), [3]Technical University of Denmark (DTU)	**EuMIC10-4** 400-Watt S-band Power Amplifier MMIC Peter de Hek[1], Gijs van der Bent[1], Frank E. van Vliet[1] [1]TNO	**EuMIC11-4** Multi-Phase Clock Path Circuit up to 57 GHz Including 5 bit Programmable Phase Interpolators for Time-Interleaved Broadband Data Converters in a 28 nm FD-SOI CMOS Technology Daniel Widmann[1], Tobias Tannert[1], Xuan-Quang Du[1], Markus Grözing[1], Manfred Berroth[1] [1]University of Stuttgart
18:00 – 18:20	**EuMIC08-5** A 140 GHz to 170 GHz Active Tunable Noise Source Development in SiGe BiCMOS 55 nm Technology Victor Fiorese[1], Joao Carlos Azevedo Goncalves[1], Simon Bouvot[1], Emmanuel Dubois[2], Christophe Gaquière[2], Guillaume Ducournau[2], François Danneville[2], Sylvie Lépilliet[2], Daniel Gloria[1] [1]STMicroelectronics, [2]University of Lille	**EuMIC09-5** C-Band Low-Noise Amplifier MMIC with an Average Noise Temperature of 44.5 K and 24.8 mW Power Consumption Felix Heinz[1], Fabian Thome[1], Arnulf Leuther[1], Oliver Ambacher[1] [1]Fraunhofer IAF, Fraunhofer Institute for Applied Solid State Physics	**EuMIC10-5** A 41.5 dBm Broadband AlGaN/GaN HEMT Balanced Power Amplifier at K-Band Stanislav Samis[1], Christian Friesicke[2], Thomas Maier[3], Rüdiger Quay[1], Arne F. Jacob[1] [1]Hamburg University of Technology, [2]Fraunhofer IAF, Fraunhofer Institute for Applied Solid State Physics, [3]Fraunhofer IAF, Fraunhofer Institute for Applied Solid State Physics	**EuMIC11-5** A DC to 20 GHz Variable Gain Amplifier with Tunable Input Matching in 22 nm FDSOI Technology Seyyedmohsen Seyyedrezaei[1], Manu Viswambharan Thayyil[1], Corrado Carta[1], Frank Ellinger[1] [1]Technische Universität Dresden, Germany

MONDAY 18:30 – 20:00

ROOM **Room 17**

EuMIC Foundry Session

Chair: Marc Rocchi, Ommic

Co-Chair: Sunday Expo, Manchester Metropolitan University

18:30 – 20:00 Panel Session.

Panel comprising leading III-V and Silicon foundries with a lively discussion on the merits of each cutting edge technology for the next generation of communication devices.

TUESDAY OVERVIEW

Room	08:30	09:00 – 10:40	11:20 – 13:00	14:20 – 16:00	16:40 – 18:20	EVENING PROGRAMME
1		**EuMIC/EuMC01** Novel Filtering Devices in Integrated Technologies		**EuMC02** Innovative Microwave Circulators and Phase Shifters	**EuMC05** Novel Structures for Power Combiners and Couplers	
2		**Exhibitor Workshops**		**Exhibitor Workshops**		
3		**Exhibitor Workshops**		**Exhibitor Workshops**		
4		**EuMIC/EuMC02** THz Components		**EuMIC16** Phased Array Components from S-band up to 300 GHz	**EuMC06** 3D to 2D Transitions and New Materials for mmWave System Integration	
5		**Exhibitor Workshops**		**Exhibitor Workshops**		
6		**EuMW01** Teaching Methods for Microwave Engineering		**EuMC03** Non-planar Filters I	**EuMC07** Non-planar Filters II	
7			**EuMW02 Opening Session**		**EuMC08** Digital Predistortion, PA Optimisation and MIMO Architectures	
8						
9					**EuMIC17 Closing Session**	
10						
11						
12					**EuMC09** Metasurfaces and Frequency Selective Surfaces	
13		**EuMIC12** Device Modelling and Simulation of Parasitic Phenomena		**EuMC04** Active Antennas and Architectures	**EuMC10** Innovative Antenna Methodology and Design	
14		**EuMIC13** Receiver Components		**EuMIC/EuMC03** MMIC Power Amplifiers and Supply Modulation	**EuMC11** Front-End and Transceiver Modules	
15		**Career Platform**		**Women in Microwaves** (Panel to 3 pm, Visit to 6:30 pm)		
16		**EuMC01** Advanced Packaging and Interconnect Technologies for Emerging Applications				
17		**EuMIC14** Advances in mmWave and High Power Integrated PA Technologies		**EuMW03** Special Session in Memoriam of Prof. Roberto Sorrentino	**EuMC12** THz Systems and Applications	
Exhibition Hall		**Tom Brazil Fellowship Award (by the GAAS® Association) Finalists Pitching** The Role of Microwaves in Contributing to a Sustainable World (Venue: MicroApps)	**EuMIC15** Posters	**EuMIC/EuMC04** Posters		
Conference Center: Platinum Suite						**EuMW Welcome Reception** 18:30 - 22:00

EuMC EuMIC EuRAD Students EuMW Exhibitors

TUESDAY 09:00 – 10:40

ROOM	Room 16	Room 1	Room 4	Room 13
	EuMC01 Advanced Packaging and Interconnect Technologies for Emerging Applications Chair: Mehmet Kaynak[1] Co-Chair: Joachim Oberhammer[2] [1]IHP Microelectronics GmbH, [2]KTH	**EuMIC/EuMC01** Novel Filtering Devices in Integrated Technologies Chair: Roberto Gomez-Garcia[1] Co-Chair: Michael Höft[2] [1]University of Alcala, [2]Christian-Albrechts-Universität zu Kiel	**EuMIC/EuMC02** THz components Chair: Marion K. Matters-Kammerer[1] Co-Chair: Oleksiy Sydoruk[2] [1]Eindhoven University of Technology, [2]Imperial College London	**EuMIC12** Device Modelling and Simulation of Parasitic Phenomena Chair: Raphaël Sommet[1] Co-Chair: Valeria Brunel[2] [1]University of Limoges XLIM, [2]United Monolithic Semiconductors
09:00 – 09:20	**EuMC01-1** Advanced Integration and Packaging of High-Power Components and Amplifiers for 5G/Beyond Industrial Applications Kamal K. Samanta[1] **INDUSTRIAL KEYNOTE** [1] AMWT Ltd, Edgware, UK	**EuMIC/EuMC01-1** A Millimeter-Wave Substrate Integrated Waveguide Filter in Si-BCB Technology Jordan Corsi[1], Giuseppe Acri[1], Maxime Moulin[1], Nicolas Zerounian[2], Anne-Sophie Grimault-Jacquin[2], Loïc Vincent[2], Guillaume Ducournau[4], Frédéric Aniel[2], Florence Podevin[1], Philippe Ferrari[1], Emmanuel Pistono[1] [1]Université Grenoble Alpes, [2]Université Paris-Saclay, CNRS, Centre de Nanosciences et de Nanotechnologies, [3]Grenoble INP, [4]IEMN UMR 8520	**EuMIC/EuMC02-1** A SiGe Based 0.48 THz Signal Source with 45 GHz Tuning Range Jonathan Wittemeier[1], Florian Vogelsang[1], David Starke[1], Holger Rücker[2], Nils Pohl[1] [1]Ruhr-Universität Bochum, [2]IHP - Leibniz Institut für innovative Mikroelektronik	**EuMIC12-1** Noise Modeling of GaN/AlN HEMT Sanaul Haque[1], Frank Schnieder[2], Oliver Hilt[2], Ralf Doerner[2], Frank Brunner[2], Matthias Rudolph[1] [1]Brandenburg University of Technology, [2]Ferdinand-Braun-Institut gGmbH, Leibniz-Institut für Höchstfrequenztechnik
09:20 – 09:40	**EuMC01-2** Design and Measurement of Interconnects in Fan-Out Wafer-Level Packaging (FOWLP) for mm-Wave Applications up to 100 GHz Sherko Zinal[1], Ivan Ndip[2], Marco Rossi[2] [1]Fraunhofer Institut Zuverlässigkeit & Mikrointegration - IZM, [2]Fraunhofer IZM, Berlin	**EuMIC/EuMC01-2** A 100GHz Bandpass Filter Employing Shielded Folded Ridged Quarter-Mode SIW Resonator in CMOS Technology Baichuan Chen[1], Samundra Kumar Thapa[1], Adel Barakat[1], Ramesh Kumar Pokharel[1] [1]Kyushu University	**EuMIC/EuMC02-2** The Effect of Surface Passivation for Sub-THz Silicon Gradient Refractive Index Lens Antti Lamminen[1], Aleksi Tamminen[2], Jaakko Saarilahti[1], Vladimir Ermolov[1], Pekka Pursula[1] [1]VTT Technical Research Centre of Finland, [2]Aalto University	**EuMIC12-2** Efficient TCAD temperature-dependent Large-Signal simulation of a FinFET power amplifier Eva Catoggio[1], Simona Donati Guerrieri[1], Fabrizio Bonani[1], Giovanni Ghione[1] [1]Politecnico di Torino
09:40 – 10:00	**EuMC01-3** Demonstration of Millimeter-wave SMT Chip Scale Package using Hot-via MMICs and plastic BGA Encapsulation Alexandre Bessemoulin[1] [1]United Monolithic Semiconductors	**EuMIC/EuMC01-3** SAW Resonator Band-Pass Filter on GaN/Si operating at 8 GHz Alina Cristina Bunea[1], Dan Neculoiu[1], Adrian Dinescu[1] [1]National Institute for Research and Development in Microtechnologies - IMT Bucharest	**EuMIC/EuMC02-3** Optoelectronic Millimeter-Wave Integrated Circuits Fabricated in Pure Silicon-Based Technologies Uroschanit Yodprasit[1], Wolfgang Winkler[1] [1]Silicon Radar GmbH	**EuMIC12-3** A TCAD simulation study on gated-anode diodes for microwave applications Arijit Bose[1], Debaleen Biswas[1], Qiang Ma[1], Yoichi Tsuchiya[1], Hidemasa Takahashi[2], Yuji Ando[2], Akio Wakejima[1] [1]Nagoya Institute of Technology, [2]Nagoya University
10:00 – 10:20	**EuMC01-4** Modeling and Measurement of Double Stacked Microvia in Antenna-in-Package Module for 5G mmWave Applications Kavin Senthil Murugesan[1], Stefan Kosmider[2], Oliver Schwanitz[2], Uwe Maaß[2], Ivan Ndip[2], Andreas Ostmann[2], Klaus Dieter Lang[2] [1]TU Berlin, [2]Fraunhofer IZM, Berlin	**EuMIC/EuMC01-4** Engineered High Resistivity Silicon Substrates in IPD Technology Used for Miniaturized sub-6 GHz Filters Atte Haapalinna[1], Heikki Holmberg[1], Arto Hujanen[2], Katja Parkkinen[1], Pekka Rantakari[1], Tauno Vähä-Heikkilä[2] [1]Okmetic Oy, [2]VTT Technical Research Centre of Finland	**EuMIC/EuMC02-4** 140 GHz Differential Antennas in Embedded Wafer Level Ball Grid Array Technology Akanksha Bhutani[1], Elizabeth Bekker[1], Teng Li[1], Lucas Giroto de Oliveira[1], Thomas Zwick[1] [1]Karlsruhe Institute of Technology (KIT)	**EuMIC12-4** Trap Characterization in InAlN/GaN and AlN/GaN based HEMTs with Fe- and C-doped Buffers Emmanuel Dupouy[1], Vigneshwara Raja Paramasivan[1], Florent Gaillard[1], Raphaël Sommet[1], Jean-Christophe Nallatamby[1] [1]XLIM UMR 7252, University of Limoges/CNRS
10:20 – 10:40	**EuMC01-5** Optimised Hot-Via Transition with 20 dB Return Loss for MMIC Packaging from DC to 110 GHz Leigh Milner[1], Shyam Mehta[1], Leanard Hall[2], Simon J. Mahon[3], Sudipta Chakraborty[3], Michael Heimlich[3] [1]DST Group, [2]Free Space Solutions, [3]Macquarie University	**EuMIC/EuMC01-5** Glass-Integrated Single- and Dual-Band Bandpass Filters Andrea Ashley[1], Dimitra Psychogiou[1] [1]University of Colorado Boulder	**EuMIC/EuMC02-5** Enhancing Mmwave on-Chip-Antennas Using in-Package Electromagnetic Bandgap Structures Dmitrii Kruglov[1], Oleg Iupikov[1], Marianna Ivashina[1], Rob Maaskant[1] [1]Chalmers University of Technology	**EuMIC12-5** Mechanisms of Buffer and Surface Traps in GaN HEMTs for Low Frequency Y21 and Y22 parameters Tomohiro Otsuka[1] [1]Mitsubishi Electric Corporation

TUESDAY 09:00 – 10:40

ROOM	Room 14	Room 17	Room 6
	EuMIC13 Receiver Components Chair: Friedel Gerfers[1] Co-Chair: Lars-Erik Wernersson[2] [1]TU Berlin, [2]Lund Univeristy	**EuMIC14** Advances in mmWave and High Power Integrated PA Technologies Chair: Franco Giannini[1] Co-Chair: Simon J. Mahon[2] [1]University of Rome 'Tor Vergata', [2]Macquarie University	**EuMW01** Teaching Methods for Microwave Engineering Chair: David S Ricketts[1] Co-Chair: Ulf Johannsen[2] [1]North Carolina State University, [2]Eindhoven University of Technology
09:00 – 09:20	**EuMIC13-1** A Low Phase Noise Phase-Locked Loop With Short Settling Times for Automotive Radar Tobias T. Braun[1], Marcel van Delden[1], Christian Bredendiek[2], Jan Schoepfel[1], Nils Pohl[1] [1]Ruhr-University Bochum, [2]Fraunhofer FHR	**EuMIC14-1** A 100 GHz Class-F-Like InP-DHBT PA with 25.4% PAE Amit Shrestha[1], Ralf Doerner[1], Hady Yacoub[1], Tom Keinicke Johansen[2], Wolfgang Heinrich[1], Viktor Krozer[1], Matthias Rudolph[3], Andreas Wentzel[1] [1]Ferdinand-Braun-Institut gGmbH, Berlin, Germany, [2]Technical University of Denmark (DTU), Kgs. Lyngby, Denmark, [3]Ulrich L. Rohde Chair of RF and Microwave Techniques, Brandenburg University of Technology (BTU), Cottbus, Germany	**EuMW01-1** Teaching 100 remote students hands-on microwave design: Building a 16 QAM radio at home by hand David Ricketts[1], Jordan Besnoff[1] [1]North Carolina State University
09:20 – 09:40	**EuMIC13-2** A Passively-Coupled 39.5GHz Colpitts Quadrature VCO in SiGe HBT Technology Janis Wörmann[1] [1]Institute of Robust Power Semiconductor Systems (ILH) - University of Stuttgart	**EuMIC14-2** A 117.5-130 GHz 22.1 dBm 11.5% PAE DAT Based Power Amplifier in InP 130 nm HBT Technology Linsheng Zhang[1], Vinay Iyer[1], Jay Sheth[1], Linli Xie[1], Robert M. Weikle[1], Steven Bowers[1] [1]University of Virginia	**EuMW01-2** Launching the First Massive Open Online Course (MOOC) on Microwave Engineering and Antennas A. Bart Smolders[1], Domine Leenaerts[2], Kevin Hasten-berg[2], Ellen den Boer[2], Ulf Johannsen[1] [1]Eindhoven University of Technology, [2]NXP Semiconductors
09:40 – 10:00	**EuMIC13-3** 30-46 GHz 1.5dB IL Negative Gate Control SPDT with 24.5dBm IP1 in 130nm CMOS Sumeet Londhe[1], Noam Bar-Helmer[2], Samuel Jameson[2], Eran Socher[1] [1]Tel Aviv University, [2]Rafael Advanced Teachnologies	**EuMIC14-3** A 47-50GHz 3W MMIC Power Amplifier Using 100nm GaN Technology Seifeddine Fakhfakh[1], Guillaume Callet[1], Estelle Byk[1], Laurent Favede[1], Aleksandra Malko[1], Sandra Riedmüller[2], Pierre Denis[2], Hervé Blanck[2], Marc Camiade[1] [1]United Monolithic Semiconcuctors SAS, [2]United Monolithic Semiconductors GmbH	**EuMW01-3** RF Circuits Laboratory for Remote Learning and Massive Open Online Courses Carlos Mendes da Costa, Jr.[1], Lino van Mulken[1], Rainier van Dommele[1], Peter Baltus[1] [1]Eindhoven University of Technology - TU/e
10:00 – 10:20	**EuMIC13-4** A Highly Linear SiGe BiCMOS Gilbert-Cell based Downconversion Mixer for 5G Applications Mir Hassan Mahmud[1], Abdurrahman Burak[1], Can Çalışkan[1], Tahsin Alper Ozkan[1], Ali Bahadir Ozdol[1], Melik Yazici[1], Yasar Gurbuz[1] [1]Sabanci University	**EuMIC14-4** A D-Band Power Amplifier with 12 dBm OP1dB, 10 % Power Added Efficiency in InP-DHBT Technology Maruf Hossain[1], Tanjil Shivan[2], Ralf Doerner[2], Sten Seifert[2], Hady Yacoub[2], Tom Keinicke Johansen[3], Wolfgang Heinrich[2], Viktor Krozer[2] [1]Ferdinand-Braun-Institut (FBH) Leibniz-Institut für Höchstfrequenztechnik, [2]Ferdinand-Braun-Institut (FBH), [3]Technical University of Denmark (DTU)	**EuMW01-4** A Radar Kit for Hands-On Distance-Learning Markus Gardill[1], Tushar Tandon[2] [1]Brandenburgische Technische Universität Cottbus - Senftenberg, [2]Julius-Maximilians-Universität Würzburg
10:20 – 10:40	**EuMIC13-5** 37.2-to-42.0 GHz VCO with -93.4 dBc/Hz Phase Noise for FMCW Radar in 22 nm FDSOI Laszlo Szilagyi[1], Songhui Li[1], Xin Xu[1], Paolo Valerio Testa[1], Andres Seidel[1], Corrado Carta[1], Frank Ellinger[1] [1]Technische Universität Dresden	**EuMIC14-5** A 28-GHz-Band GaN HEMT MMIC Doherty Power Amplifier Designed by Load Resistance Division Adjustment Ryo Ishikawa[1], Takuya Seshimo[1], Yoichiro Takayama[1], Kazuhiko Honjo[1] [1]The University of Electro-Communications, Chofu, Tokyo, Japan	**EuMW01-5** Microwave Engineering education during COVID-19 pandemic: challenges and solutions implemented in practical work Andrés Fontana[1], Olivier Tantot[1], Nicolas Delhote[1], Serge Verdeyme[1], Denis Barataud[1], Cyril Decroze[1], Guillaume Neveux[1], Thomas Fredon[1], Guillaume Andrieu[1] [1]XLIM - Université de Limoges

TUESDAY 10:40 – 13:30

Posters will be ready by 10:40. Presenters will be around their stands at 10:50 – 11:20 and 13:00 – 13:30.

Exhibition Hall

EuMIC15
EuMIC Posters

Chair: Mustafa Bakr[1]
[1]University of Oxford

EuMIC15-1
Field-Plate Mixer
Simon J. Mahon[1], Michael Heimlich[1]
[1]Macquarie University

EuMIC15-5
Benefits of AlGaN/GAN thermal ROM coupling with industrial non-linear transistor model
Christophe Chang[1], Laurent Brunel[1]
[1]United Monolithic Semiconcuctors SAS

EuMIC15-9
Full Octave Continuously Tunable SiGe Bipolar LC-VCO in Ku-Band
Christian Bredendiek[1], Klaus Aufinger[2], Nils Pohl[3]
[1]Fraunhofer FHR, [2]Infineon Technologies AG, [3]Ruhr-Universität Bochum

EuMIC15-2
17.6 dB Variable-Gain and Variable-Bandwidth Upconverter in 65 nm CMOS for 60 GHz Bands
Oner Hanay[1], David Bierbüsse[1], Renato Negra[1]
[1]Chair of High Frequency Electronics, RWTH Aachen University

EuMIC15-6
1-6 GHz 35W Balanced GaN-HEMT Power Amplifier with Innovative Quadrature Couplers
Alexey Radchenko[1], Sergey Garmash[1], Andrei Kishchinsky[1]
[1]Microwave Systems JSC

EuMIC15-10
An E-band Bidirectional PALNA in 0.13 µm SiGe BiCMOS Technology
Raju Ahamed[1], Mikko Varonen[2], Dristy Parveg[2], Md Najmussadat[1], Mikko Kantanen[2], Yehia Tawfik[1], Kari A. I. Halonen[1]
[1]Aalto University, [2]VTT Technical Research Centre of Finland

EuMIC15-3
A derating-rules compliant Ka-Band GaN-on-Si power amplifier designed for highly reliable satellite applications
Ferdinando Costanzo[1], Lorenzo Pace[1], Patrick Ettore Longhi[1], Walter Ciccognani[1], Sergio Colangeli[1], Rémy Leblanc[2], Ernesto Limiti[1]
[1]University of Rome "Tor Vergata", [2]OMMIC

EuMIC15-7
A 300 GHz Frequency Doubler in Transferred Substrate InP DHBT Technology
Arsen Turhaner[1], Maruf Hossain[2], Mohamed Brahem[2], Tom Keinicke Johansen[1]
[1]Technical University of Denmark, [2]Ferdinand Braun Institut (FBH)

EuMIC15-11
A Ka-Band 40 W Output Power and 30 % PAE GaN MMIC Power Amplifier for Satellite Communication
Keigo Nakatani[1]
[1]Mitsubishi Electric Corporation

EuMIC15-4
A 3.3 to 11.3 GHz Differential LNA with Slight Imbalance Active Balun in 0.15-µm GaAs pHEMT Process for Radio Astronomical Receiver
Ting-Hsuan Fan[1], Chau-Ching Chiong[2], Huei Wang[1]
[1]National Taiwan University, [2]Academia Sinica Institute of Astronomy and Astrophysics (ASIAA)

EuMIC15-8
55% Fractional-Bandwidth Doherty Power Amplifier in 130-nm SiGe for 5G mm-Wave Applications
Aniello Franzese[1], Nebojsa Maletic[1], Mohamed H. Eissa[1], Muh-Dey Wei[2], Renato Negra[2], Andrea Malignaggi[1]
[1] IHP - Leibniz-Institut für innovative Mikroelektronik, [2]HFE RWTH-Aachen

EuMIC15-12
Probabilistic Poly Harmonic Distortion Model
Anna Manjaly[1], Justin King[1]
[1]Trinity College Dublin

TUESDAY 11:20 – 13:00

Room 7 – 12

EuMW02
EuMW/EuMC Opening Session

Chair: Nick Ridler[1], General Chair
Co-Chair: Emma MacPherson[2], EuMC Chair
[1]National Physical Laboratory, UK, [2]University of Warwick, UK

11:20 – 11:25 Welcome Address: Opening of the European Microwave Week
Nick Ridler[1]
[1]General Chair

11:25 – 11:35 EuMA Welcome Address
Frank van den Bogaart[1]
[1]EuMA President

11:35 – 11:40 Greetings from the IEEE MTT-S
Gregory Lyons[1]
[1]IEEE MTT-S President

11:40 – 11:45 Greetings from the EuMW 2021 Platinum Sponsor
Keysight Technologies

11:45 – 12:30 What's Next for mmWave?
Mike Geen[1]
[1]Filtronic

mmWave technology has matured rapidly over the last decade allowing spectrum allocations up to about 100 GHz to be used to provide wireless links with fibre like performance. Demand is growing for even higher data rate links. This presentation will therefore explore the next set of challenges to exploit new spectrum allocations above 100 GHz.

12:30 – 12:50 Awards Ceremony
Nick Ridler[1]
[1]General Chair

EuMA Outstanding Career Award
EuMA Distinguished Service Award
Roberto Sorrentino Prize

12:50 – 13:00 Announcements and Notifications
Emma MacPherson[1]
[1]EuMC Chair

TUESDAY 13:50 – 16:40

Posters will be ready by 13:40. Presenters will be around their stands at 13:50 – 14:10 and 16:00 – 16:30.

Exhibition Hall

EuMIC/EuMC04
EuMIC/EuMC Posters

Chair: Mustafa Bakr[1]
[1]University of Oxford

EuMIC/EuMC04-1
Microwave sensing using metal-insulator-metal diodes based on 4-nm-thick hafnium oxide
Martino Aldrigo[1], Mircea Dragoman[1], Sergiu Iordanescu[1], Mazen Al Shanawani[2], George Deligeorgis[3]
[1]National Institute for Research and Development in Microtechnologies (IMT), [2]University of Bologna, [3]FORTH

EuMIC/EuMC04-2
Automatic Nonlinear Nonquasi-Static Diode Model Extraction from Large-Signal Measurements
Aarón García-Luque[1], Teresa M. Martín-Guerrero[1], Alberto Santarelli[2], Carlos Camacho-Peñalosa[1]
[1]Universidad de Málaga, Andalucía Tech, [2]Università di Bologna

EuMIC/EuMC04-3
Compact GaN RF-Switches for Power Applications
Samira Driad[1], Charles Teyssandier[1], Laurent Caillé[1], Christophe Chang[1], Laurent Brunel[1], Benoit Lambert[1], Hermann Stieglauer[2], Valeria Brunel[1]
[1]United Monolithic Semiconductors SAS, [2]United Monolithic Semiconductors GmbH

EuMIC/EuMC04-4
Analysis of RF Stress Influence on Large-Signal Performance of 22nm FDSOI CMOS Transistors utilizing Waveform Measurement
Dang Khoa Huynh[1], Quang Huy Le[1], Steffen Lehmann[2], Zhixing Zhao[2], Germain Bossu[2], Wafa Arfaoui[2], Defu Wang[1], Thomas Kämpfe[1], Matthias Rudolph[3]
[1]Fraunhofer Institute for Photonic Microsystems (IPMS), [2]Globalfoundries, Germany, [3]Brandenburg University of Technology (BTU)

EuMIC/EuMC04-5
Towards an Excitable Microwave Spike Generator for Future Neuromorphic Computing
Qusay Raghib Ali Al-taai[1], Razvan Morariu[1], Jue Wang[1], Abdullah Al-Khalidi[1], Ali Al-Moathin[1], Bruno Romeira[2], José Figueiredo[3], Edward Wasige[1]
[1]University of Glasgow, [2]International Iberian Nanotechnology Laboratory, [3]Universidade de Lisboa, Campo Grande

EuMIC/EuMC04-6
Numerical and Experimental Investigations of Selfmixing Effect of a Planar Gunn Diode Oscillator
Mingyan Zhong[1]
[1]University of Glasgow

EuMIC/EuMC04-7
An Ultra-Wideband Microstrip-to-WR15 Waveguide Transition for MMIC Applications
Bent Walther[1], Marcel van Delden[1], Thomas Musch[1]
[1]Ruhr-University Bochum

EuMIC/EuMC04-8
An Integrated Multiphysics Model for Phase-Change Material Switches
Pierre Blondy[1], Ines Bettoumi[2], Kateryna Kiryukhina[3], Olivier Puig[3]
[1]Xlim - UMR 7252 - CNRS- Universite De Limoges, [2]XLIM-UMR CNRS 7252 - Université de Limoges, [3]Centre National d'Études Spatiales (CNES)

EuMIC/EuMC04-9
Doherty Load Modulation Based on Non-Reciprocity
Paul Saad[1], Han Zhou[2], Jose-Ramon Perez-Cisneros[2], Rui Hou[1], Christian Fager[2], Bo Berglund[1]
[1]Ericsson AB, [2]Chalmers University of Technology

EuMIC/EuMC04-10
Adopting Supercapacitors in a Single-Stage Marx-Type Multi-level Supply Modulator
Lukas Hüssen[1], Renato Negra[1]
[1]HFE RWTH-Aachen

EuMIC/EuMC04-11
A 30-W GaN Quasi-MMIC Doherty Power Amplifier Based on All-Distributed Inductors Load Network
Rui-Jia Liu[1], Xiao-Wei Zhu[1], Jing Xia[2], Peng Chen[1], Chao Yu[1], Lv Zhang[3], Zhi-Yong Chen[3]
[1]Southeast University, [2]Jiangsu University, [3]Guobo Electronics Corporation

EuMIC/EuMC04-12
A Digital Power Amplifier for 32-QAM
Gavin Watkins[1]
[1]Toshiba Europe Limited

EuMIC/EuMC04-13
Effect of Switch Figure of Merit on Frequency-Reconfigurable Power Amplifier Performance
Adam Der[1], William Sear[1], Taylor Barton[1]
[1]University of Colorado, Boulder

EuMIC/EuMC04-14
Practical Work for Master2 Students: MMIC Distributed Amplifier Design for High Data Rate Receiver on GaAs-UMS Technology
Catherine Algani[1], Eric Leclerc[2]
[1]Le Cnam, [2]UMS

TUESDAY 14:20 – 16:00

ROOM	Room 1	Room 6	Room 13	Room 14
	EuMC02 Innovative Microwave Circulators and Phase Shifters Chair: Bart Nauwelaers[1] Co-Chair: Marco Pasian[2] [1]KU Leuven, [2]University of Pavia	**EuMC03** Non-planar Filters I Chair: Giuseppe Macchiarella[1] Co-Chair: Vicente E. Boria[2] [1]Politecnico di Milano, [2]Universitat Politecnica de Valencia	**EuMC04** Active Antennas and Architectures Chair: Nils Pohl[1] Co-Chair: Mark Beach[2] [1]Ruhr University Bochum, [2]University of Bristol	**EuMIC/EuMC03** MMIC Power Amplifiers and Supply Modulation Chair: Jeff Powell[1] Co-Chair: Markus Mayer[2] [1]Teratech Components, [2]Arelis
14:20 – 14:40	**EuMC02-1** TBA TBA[1] [1]TBA	**EuMC03-1** The extracted zero technique Simone Bastioli[1] **INDUSTRIAL KEYNOTE** [1]RS Microwave	**EuMC04-1** 7.5 GHz-Band Digital Beamforming Using 1-bit Direct Digital RF Transmitter with 10GbE Optical Module Ryo Tamura[1], Mizuki Motoyoshi[1], Suguru Kameda[1], Noriharu Suematsu[1] [1]Research Institute of Electrical Communication, Tohoku University	**EuMIC/EuMC03-1** A 6-18 GHz 13 W and 22% PAE GaN Power Chipset Mehdi DINARI[1], Benoit MALLET-GUY[1], Yves Mancuso[2] **INDUSTRIAL KEYNOTE** [1]Thales DMS France, [2]Thales Defence Mission Systems (TDMS)
14:40 – 15:00	**EuMC02-2** Broadband Ku- and Ka-Band Circulators in LTCC Using Sintered Bulk Ferrites Carsten Weil[1], Tim Hauck[1], Johannes Schur[2], Jens Müller[2] [1]AFT microwave GmbH, [2]TU Ilmenau	**EuMC03-2** Dielectric-loaded Ku-Band Filter for High-power Space Applications based on Barrel-shaped cavities Paolo Vallerotonda[1], Fabrizio Cacciamani[2], Luca Pelliccia[2], Francesco Aquino[2], Cristiano Tomassoni[2], Petronilo Martín-Iglesias[4], Vittorio Tornielli di Crestvolant[4] [1]RF Microtech s.r.l / University of Perugia, [2]RF Microtech s.r.l, [3]University of Perugia, [4]ESA / ESTEC	**EuMC04-2** Quadruple-fed Aperture-coupled Microstrip Patch Antenna for On-antenna Power Combining Timothée Le Gall[1], Anthony Ghiotto[2], Stefan Varault[1], Gwenaël Morvan[1], Bruno Louis[1], Grégoire Pillet[1] [1]Thales DMS France, [2]Bordeaux INP, IMS Laboratory	**EuMIC/EuMC03-2** On-chip Power Combining with 3-Stage75-110 GHz GaN MMIC Power Amplifiers Shane Verploegh[1], Timothy Sonnenberg[1], Mauricio Pinto[2], Akim Babenko[1], Zoya Popovic[2] [1]University of Colorado at Boulder, [2]Raytheon Company
15:00 – 15:20	**EuMC02-3** Quasi-Reflectionless Differential Phase Shifter with Arbitrary Prescribed Group Delay and Flat Phase Difference Girdhari Chaudhary[1], Daehan Lee[1], Muhammad A. Chaudary[2], Yongchae Jeong[1] [1]Jeonbuk National University, [2]Ajman University	**EuMC03-3** LTCC based Ka-Band Diplexer for Miniaturized Ground-Segment User Terminals Davide Tiradossi[1], Paolo Vallerotonda[2], Luca Pelliccia[1], Stefano Moscato[3], Antonio Traversa[3], Giandomenico Cannone[3], Petar Jankovic[4], Fabrizio De Paolis[4] [1]RF Microtech s.r.l, [2]RF Microtech s.r.l / University of Perugia, [3]SIAE Microelettronica S.p.A., [4]ESA / ESTEC	**EuMC04-3** Antenna Mutual-Coupling Mitigation With Analogue Compensation Network Roger Green[1], Tommaso Cappello[1], Geoffrey Hilton[1], Mark Beach[1] [1]University of Bristol	**EuMIC/EuMC03-3** Wideband Phase Modulator MMIC for K-Band Supply-Modulated Power Amplifier Linearization Gregor Lasser[1], Connor Nogales[1], Maxwell R. Duffy[2], Zoya Popovic[1] [1]University of Colorado, Boulder, [2]Northrop Grumman Corporation
15:20 – 15:40	**EuMC02-4** A Phase Shifter Composed of Reduced-Size Rat-Race Coupler with CRLH Transmission Lines and Resonating Reactance Circuits Masashi Nakatsugawa[1], Fusuke Kurotani[1], Yuya Chiba[1], Tamami Maruyama[1] [1]National Institute of Technology, Hakodate College	**EuMC03-4** Quadrature-Based Approach Used for Improved Fitting of Filter Measured S-parameters Jedrzej Michalczyk[1], Jerzy Michalski[1] [1]SpaceForest	**EuMC04-4** Conformal Antenna with Reconfigurability of Monopole-like and Broadside Patterns Realized with Polymer-Conductive Textile Composite Roy B. V. B. Simorangkir[1], Bahare Mohamadzade[2], Ali Lalbakhsh[2], Sanjeev Kumar[1], John L. Buckley[1], Toni Bjorninen[3], Brendan O'Flynn[1] [1]Tyndall National Institute, [2]Macquarie University, [3]Tampere University	**EuMIC/EuMC03-4** Compact Design of a L-Band 40W 40 MHz Envelope Tracking GaN Power Amplifier for Small Cells Olivier Nonet[1], Wilfried Demenitroux[1], Frederic Ploneis[1], Denis Barataud[2], Michel Campovecchio[2] [1]Thales Group, [2]Xlim - CNRS- Unversite De Limoges
15:40 – 16:00	**EuMC02-5** Simultaneous Electric and Magnetic Two-Dimensional Tuning in Nonlinear Magnetic Transmission Line MuhibUr Rahman[1], Ke Wu[1] [1]Polytechnique Montreal	**EuMC03-5** Narrowband Extracted Pole Filters With Mixed Dielectric and Waveguide Resonators in Ku-Band Patrick Boe[1], Daniel Miek[1], Fynn Kamrath[1], Kennet Braasch[1], Michael Höft[1] [1]Christian-Albrechts-Universität zu Kiel	**EuMC04-5** Design of a Multi-mode Transmission System Based on Vortex Electromagnetic Wave Jialin Zhang[1] [1]Beihang University (BUAA)	**EuMIC/EuMC03-5** A 600-W Enhancement-Mode GaN Multi-Level Dynamic Converter for Supply Modulated PAs Connor Nogales[1], Zoya Popovic[1], Gregor Lasser[1] [1]University of Colorado at Boulder

TUESDAY 14:20 – 16:00

ROOM	Room 4	Room 17
	EuMIC16 Phased Array Components from S-band up to 300 GHz Chair: Frank E. van Vliet[1] Co-Chair: Michael Schlechtweg[2] [1]TNO, [2]Fraunhofer Institute for Solid State Physics IAF	**EuMW03** Special Session in Memoriam of Prof. Roberto Sorrentino Chair: Cristiano Tomassoni[1] Co-Chair: Maurizio Bozzi[2] [1]University of Perugia, [2]University of Pavia
14:20 – 14:40	**EuMIC16-1** An S-band 34dBm Stacked-HBT Phase Driver in 0.25µm BiCMOS Technology for GaN-Based Phased-Array Radar Transmit Chain Jaap Essing[1], Alice Bossuet[1], Rob Knight[1], Peter de Hek[1], Frank E. van Vliet[1] [1]TNO	**EuMW03-1** How did EuMA start? André Vander Vorst[1] [1]European Microwave Association
14:40 – 15:00	**EuMIC16-2** A Phase Coherent DC-25 GHz 6-bit SiGe BiCMOS Step Attenuator with IP1dB >20 dBm Hamza Kandis[1], Abdurrahman Burak[1], Cengizhan Kana[1], Melik Yazici[1], Yasar Gurbuz[1] [1]Sabanci University	**EuMW03-2** Remembering Roberto Sorrentino- A man inspired by knowledge and culture Wolfgang Hoefer[1] [1]University of Victoria
15:00 – 15:20	**EuMIC16-3** A 26 GHz to 34 GHz Active Phase Shifter with Tunable Polyphase Filter for 5G Wireless Systems Alok Sethi, Rehman Akbar[1], Mikko Hietanen[1], Timo Rahkonen[2], Aarno Pärssinen[1] [1]Center for Wireless Communication, University of Oulu, [2]Circuits and systems Group, University of Oulu	**EuMW03-3** My time with Roberto Richard Snyder[1] [1]RS Microwave
15:20 – 15:40	**EuMIC16-4** A 25-50 GHz Digitally Controlled Phase-Shifter Steeven Voisin[1], Vincent Knopik[1], Eric Kerhervé[2] [1]STMicroelectronics, [2] University of Bordeaux, Bordeaux INP, UMR CNRS 5218, IMS Laboratory	**EuMW03-4** Roberto Sorrentino as EuMA President Wolfgang Heinrich[1] [1]Ferdinand-Braun-Institut gGmbH, Leibniz-Institut für Höchstfrequenztechnik
15:40 – 16:00	**EuMIC16-5** A 270 – 330 GHz Vector Modulator Phase Shifter in 130nm SiGe BiCMOS Mohammad Hassan Montaseri[1], Sumit Pratap Singh[1], Markku Jokinen[1], Timo Rahkonen[1], Marko E. Leinonen[1], Aarno Parssinen[1] [1]University of Oulu	**EuMW03-5** When academic excellence gets inspired by new challenges: the growth of RF Microtech Elisa Fratticcioli

TUESDAY 16:40 – 18:20

ROOM	Room 1	Room 4	Room 6	Room 7
	EuMC05 Novel Structures for Power Combiners and Couplers Chair: Maurizio Bozzi[1] Co-Chair: Marco Pasian[1] [1]University of Pavia	**EuMC06** 3D to 2D Transitions and New Materials for mmWave System Integration Chair: Joachim Oberhammer[1] Co-Chair: Ivan Ndip[2] [1]KTH, [2]Fraunhofer IZM	**EuMC07** Non-planar Filters II Chair: Richard Snyder[1] Co-Chair: Simone Bastioli[1] [1]RS Microwave	**EuMC08** Digital Predistortion, PA Optimisation and MIMO Architectures Chair: José Carlos Pedro[1] Co-Chair: Gavin Watkins[2] [1]Universidade de Aveiro - IT, [2]Toshiba Europe Limited
16:40 – 17:00	**EuMC05-1** Electrical Balance Duplexer as In-Band Full-Duplex Antenna Interface with Fast Orthogonal Searching Methodology Ting-Li Hsu[1], Muh-Dey Wei[1], Renato Negra[1] [1]Chair of High Frequency Electronics, RWTH Aachen University	**EuMC06-1** Low-Loss 140-175 GHz MMIC-to-Waveguide Transitions and MMIC-to-MMIC Interconnections Jian Ding[1], Xiaobang Shang[2], Chris Buck[1], Mike Geen[1], Nick Ridler[2] [1]Filtronic, [2]National Physical Laboratory (NPL)	**EuMC07-1** Miniaturized All-Reconfigurable Dual-Mode Dielectric Filter Using Piezomotors for Future Satellite Communications Abdulrahman Widaa[1], Chad Bartlett[2], Michael Höft[2] [1]Kiel University, [2]Kiel university	**EuMC08-1** A Hybrid Heuristic Search Control Assisted Optimization of Dual-Input Doherty Power Amplifier Chouaib Kantana[1], Rui Ma[1], Mouhacine Benosman[1], Yuji Komatsuzaki[2], Koji Yamanaka[2] [1]Mitsubishi Electric Research Laboratories, [2]Mitsubishi Electric Corporation
17:00 – 17:20	**EuMC05-2** A Miniaturized and Hybrid SIW Resonator Solution for Filtering Power Divider and Antenna Array Hossein Sarbandi Farahani[1], Behrooz Rezaee[1], Wolfgang Bösch[1] [1]Graz University of Technology/ IHF- TU Graz	**EuMC06-2** A Compact K-/Ka-Band Waveguide Transition with Integrated Diplexer and Power Divider Kevin Erkelenz[2], Lars Meyer[1], Noah Sielck[1], Björn Deutschmann[1], Arne F. Jacob[1] [1]Hamburg University of Technology	**EuMC07-2** 3-D Metal Printed High-Q Inline Filter With Helical Antenna Using Strong Mixed Coupling Resonator Jiayu Rao[1], Kenneth Nai[2], Povilas Vaitukaitis[1], Jiasheng Hong[1] [1]Heriot-Watt University, [2]Renishaw PLC	**EuMC08-2** Offline Method to Determine Optimal Complexity in Predistortion of RF Power Amplifiers Marc Vigneau[1], Adam Cooman[1], André Prata[1], Christophe Quindroit[1] [1]Ampleon
17:20 – 17:40	**EuMC05-3** A Novel Compact Four-Way Power Combiner with an Embedded Microstrip-to-Waveguide Transition for Ka-band Power Amplifiers Mouayd HOARI[1], Hind Bousbia[1], Hicham Boutayeb[1], Audrey Martin[2], Pierre Blondy[2] [1]Safran Data Systems, [2]Xlim - UMR 7252 - CNRS-Limoges University	**EuMC06-3** 220 GHz E-Plane Transition from Waveguide to Suspended Stripline Integrated on Industrial Organic Laminate Substrate Technology Victor Fiorese[1], Fanny Laporte[1], Jean-François Caillet[1], Didier Campos[1], Guendalina Catalano[1], Frederic Gianesello[1], Guillaume Ducournau[2], Emmanuel Dubois[2], C. Gaquière[2], B. Tricoteaux[3], M. Werquin[3], D. Gloria[1] [1]STMicroelectronics, [2]University of Lille, [3]MC2 Technologies	**EuMC07-3** Dielectric TM Mode Extracted Pole Filters with Large Spurious Free Range Kennet Braasch[1], Daniel Miek[1], Patrick Boe[1], Fynn Kamrath[1], Michael Höft[1] [1]Christian-Albrechts-Universität zu Kiel	**EuMC08-3** Simultaneous Measurement of Multiple Power Amplifiers for Phased Array Digital Predistortion Using a Shared Dual-Output Feedback Bilal Khan[1], Nuutti Tervo[1], Rehman Akbar[1], Marko E. Leinonen[1], Olli Kursu[1], Aarno Pärssinen[1], Markku Juntti[1] [1]University of Oulu
17:40 – 18:00	**EuMC05-4** Planar N-Way Power Combiner with High Isolation Between Input Ports Pouria Toofanzadeh[1], Sayyed-Hossein Javid-Hosseini[1], Vahid Nayyeri[1] [1]Iran University of Science and Technology	**EuMC06-4** Special glass for packaging of high frequency electronics Martin Letz[1], Harry Engelmann[1], Gerhard Lautenschläger[1], Nicolas Brune[1], Xiaofei Bai[1], Bartłomiej Salski[2], Tomasz Karpisz[2] [1]SCHOTT AG, [2]Warsaw University of Technology	**EuMC07-4** Compact Monolithic SLM 3D-Printed Filters using Pole-Generating Resonant Irises LU QIAN[1], Rafael Martinez[1], Milan Salek[1], Moataz Attallah[1], Yi Wang[1], Michael J. Lancaster[1] [1]University of Birmingham, UK	**EuMC08-4** Direct Input-to-Output Neural Network for Efficient Digital Predistortion of MIMO Transmitters Andrius Vaicaitis[1], Anqi Hu[1], John Dooley[1] [1]Maynooth University
18:00 – 18:20	**EuMC05-5** Wideband Compact-Size 3-dB Backward Directional Coupler Using Slotted-Microstrip Based Unit-Cells Mohamed Elsheikh[1], Amr Safwat[2] [1] Faculty of Engineering, Ain Shams University, [2]Faculty of Engineering, Ain Shams University		**EuMC07-5** Analysis and Design of Re-Configurable Combline Filters Using Dielectric Tuners Abhishek Sharma[1], Santiago Cogollos Borrás[1], Vicente Enrique Boria[1], Marco Guglielmi[1] [1]ITEAM, Universitat Polit`ecnica de Val`encia, Spain	**EuMC08-5** Averaged and Cluster DPDs for Beamforming Applications ahmadreza motaqi[2], Mohamed Helaoui[1], Abubaker Abdelhafiz[2], Wenhua Chen[1], Fadhel M. Ghannouchi[1] [1]University of Calgary, [2]Huawei , [1]Tsinghua University

TUESDAY 16:40 – 18:20

ROOM	Room 12	Room 13	Room 14	Room 17
	EuMC09 Metasurfaces and Frequency Selective Surfaces Chair: Francisco Medina[1] Co-Chair: Alexandros Feresidis[2] [1]Universidad de Sevilla, [2]University of Birmingham	**EuMC10** Innovative Antenna Methodology and Design Chair: Stefan Lindenmeier[1] Co-Chair: Hubregt Visser[2] [1]University of the Bundeswehr, [2]imec Netherlands	**EuMC11** Front-End and Transceiver Modules Chair: Lorenz-Peter Schmidt[1] Co-Chair: Ernesto Limiti[2] [1]Uni Erlangen, [2]University of Rome	**EuMC12** THz Systems and Applications Chair: Oleksiy Sydoruk[1] Co-Chair: Catherine Algani[2] [1]Imperial College London, [2]Le Cnam
16:40 – 17:00	**EuMC09-1** Transparent Metal Mesh Metasurfaces Themos Kallos[1] **INDUSTRIAL KEYNOTE** [1]Metamaterial Inc.	**EuMC10-1** RF and Antenna Design Methodology For Reliable Air-to-Ground Mobile Communications Adrian Payne[1], Mark Yetman[2], Marco Degiorgi[2], Javier Vazquez[2], Adrian Green[2], Mike Philippakis[2] **INDUSTRIAL KEYNOTE** [1]Chelton, [2]Chelton Ltd.	**EuMC11-1** How to package mmWave MMICs: Understanding the issues, avoiding the problems and optimising performance Liam Devlin[1] **INDUSTRIAL KEYNOTE** [1]PRFI Ltd	**EuMC12-1** Uses of terahertz pulse techniques in industry Phil Taday[1] **INDUSTRIAL KEYNOTE** [1]Teraview
17:00 – 17:20	**EuMC09-2** Multimode scattering matrix optimisation for the mitigation of harmonics in anomalous reflection metasurfaces Matthieu Elineau[1], Renaud Loison[1], Stéphane Méric[1], Raphaël Gillard[1], Geneviève Mazé-Merceur[2], Pascal Pagani[3], Philippe Pouliguen[3] [1]IETR, INSA Rennes, [2]CEA, [3]DGA (Direction Générale de l'Armement)	**EuMC10-2** A Squint Compensated Fully Differential Patch Antenna for Automotive MIMO Applications Jan Schoepfel[1], Stefan Grueter[1], Jonas Wagner[1], Nils Pohl[1] [1]Ruhr-University Bochum	**EuMC11-2** Multiple Transmitter Coexistence for 5G RF Front End Modules Florinel Balteanu[1] [1]Skyworks Solutions Inc.	**EuMC12-2** A 56.32 Gb/s 16-QAM link over dielectric fiber using a D-band channel bonding transceiver José-Luis Gonzalez Jimenez[1], Baudouin Martineau[1], Alexandre Siligaris[1], Abdelaziz Hamani[1], Francesco Foglia Manzillo[1], Frederic Hameau[1], Cedric Dehos[1] [1]Université Grenoble-Alpes/CEA-Leti
17:20 – 17:40	**EuMC09-3** Assessment of Compact Digital Metasurface with Beam Control for WBAN Applications Kassen Dautov[1], Galymzhan Nauryzbayev[1], Mohammad Hashmi[1], Nasimuddin Nasimuddin[2] [1]Nazarbayev University, Nur-Sultan, Kazakhstan, [2]Institute for Infocomm Research, Agency for Science, Technology and Research (A*STAR)	**EuMC10-3** A Circular Polarized Set of Ground Terminal Radiators Capable of Beamforming for the Reception of BGAN Services Zafer Toprak[1], Stefan Lindenmeier[1] [1]Bundeswehr University Munich	**EuMC11-3** A 9-Channel Phase Coherent Receive System for Direction of Arrival Estimation Andreas Depold[1], Christian Dorn[2], Stefan Erhardt[1], Robert Weigel[1], Fabian Lurz[3] [1]University of Erlangen-Nuremberg, [2] University of Bayreuth, [3] Hamburg University of Technology	**EuMC12-3** Wideband High-Gain Transmitarray Antenna for Point-to-Point Communications at 300 GHz Orestis Koutsos[1], Francesco Foglia Manzillo[1], Antonio Clemente[1], Ronan Sauleau[2] [1]CEA - LETI, [2]University of Rennes 1
17:40 – 18:00	**EuMC09-4** Design process of novel electromechanically tuneable reflectarray antennas Evangelos Vassos[1], James Churm[1], Alexandros Feresidis[1] [1]University of Birmingham	**EuMC10-4** Frequency-Scanning Multi-Yagi-Uda Array Antenna Hubregt Visser[1], Daan Daverveld[2], Ad Reniers[2] [1]imec, [2]Eindhoven University of Technology (TU/e)	**EuMC11-4** A Heterodyne Transceiver With Integrated Calibrator for K/Ka-Band Phased Arrays Anton Sieganschin[1], Nils C. Albrecht[2], Bartosz Tegowski[2], Thomas Jaschke[2], Jan Waldhelm[2], Nadja J. Lamann[2], Arne F. Jacob[2] [1]Hamburg University of Technology, [2]Technische Universität Hamburg	**EuMC12-4** Short Range Wireless Transmission Using a 295-315 GHz Superheterodyne Link Targeting IEEE802.15.3d Applications Dominik Wrana[1], Laurenz John[2], Benjamin Schoch[1], Sandrine Wagner[2], Ingmar Kallfass[1] [1]Institute of Robust Power Semiconductor Systems (ILH) - University of Stuttgart, [2]Fraunhofer IAF, Fraunhofer Institute for Applied Solid State Physics
18:00 – 18:20	**EuMC09-5** A broadband polarization-independent frequency selective surface with an inhomogeneous design Andreas Röhrner[1] [1]Munich University of Applied Sciences	**EuMC10-5** Wideband Dual-Polarized Antennas for Sub-6 GHz Applications Nikita Bulygin[1], Oleg Soykin[1], Sergey Churkin[1], Andrey Mozharovskiy[1], Maxim Muravyev[1], Alexey Artemenko[1], Roman Maslennikov[1] [1]Radio Gigabit LLC	**EuMC11-5** A K/Ka-Band Frontend for Dual-Beam, Dual-Polarized Tx/Rx Phased Arrays Anton Sieganschin[1], Thomas Jaschke[2], Jan Waldhelm[2], Nadja J. Lamann[2], Arne F. Jacob[2] [1]Hamburg University of Technology, [2]Technische Universität Hamburg	**EuMC12-5** 22Gbps/80cm Low-Cost THz Wireless System Jue Wang[1], Abdullah Al-Khalidi[1], Sean Ahearne[2], Edward Wasige[1] [1]University of Glasgow, [2]DELL EMC Technologies

TUESDAY 16:40 – 18:20

Room 8 – 11

EuMIC17
EuMIC Closing Session
Chair: Chris Clifton[1], EuMIC Chair
Co-chair: Shokrollah Karimian[2], EuMIC Co-chair; Edward Wasige[3], EuMIC TPC Chair
[1]Sony Europe B.V, [2]University of Oxford, UK, [3]University of Glasgow, UK

16:40 – 16:50 Awards Ceremony
Kamal K Samanta[1]
[1]EuMW 2021 Awards Chair

EuMIC Prize
EuMIC Young Engineer Prize
Tom Brazil Fellowship Award (by the GAAS® Association)

16:50 – 17:30 FLEXIBLE AND OPEN SOURCE: The brave new world of Software Defined Radio and Open RAN
Ebrahim Bushehri[1]
[1]CEO and Founder, Lime Microsystems

The fifth generation mobile networks radically changes the way components in the Radio Access Networks (RAN) are designed and implemented. This trend is likely to continue into the 6G era where software defined radios covering up to THz frequency bands could bring about some exciting and demanding opportunities for future front-end IC and module technologies. In parallel, there is a major effort inTelecommunication industry to virtualize the RAN, accelerated by the initiatives such as the O-RAN alliance. The overall objective is to allow for the adoption of web scale technologies and software into 5G and future 6G networks. Web scale technologies rely primarily on open source software and general availability of programmable hardware solutions for which adoption in RAN poses a number of challenges.

17:30 – 18:10 6G - Known Technologies with a Twist or Maybe Not?
Nadine Collaert[1]
[1]imec, Leuven

With 5G in full deployment, industry has kickstarted the research for the next generation of wireless communication 6G. While the vision for 6G still needs to take shape, and with CMOS scaling under pressure, more than ever System-Technology Co-optimization (STCO) will be needed to define the best blend of technologies to get benefits at the system level. In this talk, we will discuss how compound semiconductor devices and advanced packaging could play a key role in enabling ultra-fast, reliable and power-efficient connectivity

18:10 – 18:20 Closing remarks and invitation to EuMIC 2022
Chris Clifton[1], Paolo Colantonio[2]
[1]EuMIC 2021 Chair, [2]EuMIC 2022 Chair

WEDNESDAY OVERVIEW

Room	09:00 – 10:40	11:20 – 13:00	14:20 – 16:00	16:40 – 18:20	EVENING PROGRAMME
1		EuMC17 New Design Concepts for Microwave Filters in Planar and Hybrid Technologies	EuMC22 Advanced Implementations for Substrate-Integrated and Quasi-Planar Filters		
2	Exhibitor Workshops		Exhibitor Workshops		
3	Exhibitor Workshops		Exhibitor Workshops		
4	EuMC13 Non-planar Passive Components	EuMC18 Frequency Generation, Conversion and Nonlinear Modelling		EuMW04 Memorial Session for Professor Tatsuo Itoh	
5	Exhibitor Workshops		Exhibitor Workshops		
6	SW01 Joint Range-angle Super Resolution MIMO Radar		SW02 Radar Design from the Ground Up		
7	WW01 Technologies for 6G Front End Modules				
8	EuRAD01 Opening Session	Defence, Security and Space (DSS) Forum			
9					
10					
11					
12	WW02 Virtual Validation of Automotive Sensors				
13	EuMC14 Electromagnetic Scattering and Diffraction Effects	EuMC19 3D Printing: Processes and Reliability	EuMC23 5G Communication and Beyond“	EuMC26 Novel 3D Printing Approaches for mmWave Applications	
14	EuMC15 Metamaterial Based Devices and Applications	EuMC20 Advanced High Efficiency Power Amplifier Techniques	EuMC24 Advances in Electromagnetic Modeling and Numerical Techniques	EuMC27 Measurements for 5G and 6G Systems	
15		IEEE Young Professionals Lunch	IEEE Young Professionals Session		
16					
17	EuMC16 Integrated Components for Transceivers	EuRAD02 Radar Applications	EuRAD03 Emerging Radar Applications	EuMC28 5G and mmWave Arrays	
Exhibition Hall		EuMC21 Posters	EuMC25 Posters		
North Greenwich Pier (by the O2)					The EuMW Cruise on the River Thames 19:00 – 22:00

EuMC EuMIC EuRAD Students EuMW Exhibitors

WEDNESDAY 09:00 – 10:40

ROOM	Room 4	Room 13	Room 14	Room 17
	EuMC13 Non-planar Passive Components Chair: Cristiano Tomassoni[1] Co-Chair: Eric Rius[2] [1]University of Perugia, [2]Université de Brest	**EuMC14** Electromagnetic Scattering and Diffraction Effects Chair: Ke Wu[1] Co-Chair: Tan-Phu Vuong[2] [1]Polytechnique Montreal, [2]IMEP-LAHC Grenoble	**EuMC15** Metamaterial Based Devices and Applications Chair: Ferran Martín[1] Co-Chair: Pierre Blondy[2] [1]Universitat Autònoma de Barcelona, [2]Xlim - UMR 7252 - CNRS- Limoges University	**EuMC16** Integrated Components for Transceivers Chair: Almudena Suarez Rodriguez[1] Co-Chair: Arne F. Jacob[2] [1]University of Cantabria, [2]Hamburg University of Technology
09:00 – 09:20	**EuMC13-1** Hybrid Orthomode Transducer for E-band Point-to-Point Communication Systems Andrey Mozharovskiy[1], Alexey Klimov[1], Alexey Artemenko[1], Sergey Churkin[1], Oleg Soykin[1], Roman Maslennikov[1] [1]Radio Gigabit LLC	**EuMC14-1** Angle-Dependent Reflectivity of Microwave Absorbers at Oblique Wave Incidence Willi Hofmann[1], Andreas Schwind[1], Christian Bornkessel[1], Matthias A. Hein[1] [1]Technische Universität Ilmenau	**EuMC15-1** Metamaterial Lens for Monopulse Beamforming with a 77-GHz Long-Range Radar Christoph Kohlberger[1], Richard Hüttner[2], Andreas Stelzer[3] [1]Silicon Austria Labs, [2]Johannes Kepler University Linz, [3]JKU Linz	**EuMC16-1** Receive and Transmit Beamforming SiGe BiCMOS ICs for Scalable E-Band Phased Arrays Mikko Varonen[1], Antti Lamminen[1], Mikko Kantanen[1], Jan Holmberg[1], Arto Rantala[1], Manu Lahdes[1], Jussi Säily[1], Dristy Parveg[1], Mikko Kaunisto[1], Jouko Aurinsalo[1] [1]VTT Technical Research Centre of Finland
09:20 – 09:40	**EuMC13-2** Methods for Attenuating and Terminating Waves in Ridge Gap Waveguide at W-Band: Carbon-Loaded Foam, Carbonyl Iron Paint, and Nickel Plating Artem Vilenskiy[1], Yinggi Zhang[1], Marianna Ivashina[1] [1]Chalmers University of Technology	**EuMC14-2** Time and Frequency Analysis of Rough Surface Scattering in the THz Spectrum Toby Attwood[1], Emily Adams[1], Suzanna Freer[1], Alexander J. Vernon[2], Stephen M. Hanham[1], Costas Constantinou[1], Leyre Azpilicueta[3], Miguel Navarro-Cía[1] [1]University of Birmingham, [2]King's College London, [3]Tecnologico de Monterrey	**EuMC15-2** Stacked Metasurfaces for Misalignment Improvement of WPT System Using Spiral Resonators yutaro ikeda[1], Pokharel Ramesh[1] [1]Kyushu University	**EuMC16-2** A Q-Band Capable Sampler for Direct Microwave Sampling in Software Defined Radio Context Romain Pilard[1], Matthieu Martin[1], François Boré[1], Olivier Legendre[1], Jérémie Palmigiani[1], Salim Renane[1] [1]Teledyne e2v
09:40 – 10:00	**EuMC13-3** Design of Compact and High Q-factor W-Band Cavity in 0.18µm CMOS Technology Tomoki Fukuda[1], Ramesh Kumar Pokharel[1], Baichuan Chen[1], Samundra Kumar Thapa[1], Adel Barakat[1] [1]Kyushu University	**EuMC14-3** Uncertainty Quantification for the RCS of a Coated Target using an IBC-based Metamodel Pascal Pagani[1], Pierre Minvielle[1], Muriel Sesques[1] [1]CEA	**EuMC15-3** Beam-Scanning Leaky-Wave Antenna Based on Dielectric Image-Line for Millimetre-Wave Applications Solomon Mingle[1], Despoina Kampouridou[1] [1]University of Birmingham, UK	**EuMC16-3** Amplifier Bias for Minimum Noise Figure in Thermally Constrained Systems Anton Sieganschin[1], Nils C. Albrecht[1], Thomas Jaschke[1], Arne F. Jacob[1] [1]Hamburg University of Technology
10:00 – 10:20	**EuMC13-4** Compact C-band Wilkinson Power Divider in Empty Substrate Integrated Coaxial Line José Manuel Merello[1], Vicente Nova[1], Carmen Bachiller Martín[1], Vicente E. Boria[1] [1]Universitat Politècnica de València	**EuMC14-4** Scattering characterization of a blended wing body using numerical simulations Raffaele Scuderi[1] [1]Dassault Systèmes	**EuMC15-4** On the Capacitance of Slotted Metamaterial Resonators for Frequency-Variation Permittivity Sensing Jonathan Muñoz-Enano[1], Paris Vélez[1], Lijuan Su[1], Marta Gil[2], Pau Casacuberta[1], Ferran Martín[1] [1]Universitat Autònoma de Barcelona, [2]Universidad Politécnica de Madrid	**EuMC16-4** A Novel GaN/SiC MMIC Gain Switch Using a Resonant Bidirectional FET Amplifier Hiroshi Mizutani[1], Ryo Ishikawa[2], Kazuhiko Honjo[2] [1]Salesian Polytechnic, [2]The University of Electro-Communications, Chofu, Tokyo, Japan
10:20 – 10:40	**EuMC13-5** Full-Band Millimeter Wave Waveguide Magic Tees and Power Dividers for Manufacturing Ability Lingyun Ren[1], Cornelius Mayaka[1], dhanraj doshi[1], Fang Lu[1], Yonghui Shu[1] [1]ERAVANT Inc.	**EuMC14-5** Sensing the Charged-Particle Beam Position Using the Terahertz Range Diffraction Radiation from Two Dielectric Rods Covered with Graphene Dariia Herasymova[1] [1]Institute of Radio-Physics and Electronics NASU	**EuMC15-5** Ultra-Compact Ka-band Metamaterial Waveguide Filters, Fabricated by Lost-Wax Casting Maliheh Khatibi Moghaddam[1], Mostafa Khosrowne-jad[2], Romain Fleury[1] [1]EPFL, [2]MinWave Technologies SA	

WEDNESDAY 09:00 – 10:40

ROOM **Room 8 – 11**

EuRAD01
EuRAD Opening Session

Chair: James Watts[1], EuRAD Chair

Co-Chair: Stephen Harman[2], EuRAD Co-chair and Matthew Ritchie[3], EuRAD TPC Chair

[1]Theta Technologies Ltd., UK, [2]Aveillant Ltd, UK, [3]University College London, UK

09:00 – 09:10 Welcome Address: Opening of the European Radar Conference 2021.

James Watts[1]

[1]EuRAD Chair

09:10 – 09:55 The Evolution of RF Sensing (Convergence and Co-operation Revisited)

Barry Trimmer[1]

[1]Surveillance and Reconnaissance (ISR), Thales, UK

This presentation provides an updated perspective on 'Technological Convergence in Radar and EW'. The concept was first presented in 2011 in Microwave Journal, which focussed on two competing visions of the future: The potential to converge the front end function of RF sensor systems – given the increasing ability to digitise at credible bandwidths – to create very capable large scale sensor systems with multiple functions; The potential to combine larger numbers of relatively low cost sensor systems to create networks of sensing that could replace large monolithic systems.

The presentation provides an update of this perspective. It examines: Examples of convergence between RF sensing and communications technologies to illustrate the maturity of multiple functions served by a single technology (either as a converged system or as a source of technology), and evolution of systems capability in networked sensing – referencing in particular the advance of low cost unmanned systems and secure networks to enable truly cooperative sensing solutions.

None of the above happens in a vacuum (space examples notwithstanding). There are substantial influences that will make the deployment of converged or co-operative systems possible – or impossible. The presentation gives a sample of these influences for consideration – expanding on: The evolution of / need for network security and robustness; The increase in complexity of the environment (UAS proliferation, wind farms etc.); The evolving relationship between automation (leading to autonomy) and human control; The evolving maturity of low cost, complex technology for commercial communications – providing alternative development routes for complex sensing systems.

The presentation does not attempt to define a single route forward for sensing RF systems, but rather presents the challenges and opportunities presented by technological, industrial and human / AI trends.

09:55 – 10:40 Emerging Antenna Technologies for Millimetre and Sub-millimetre Wave Radar Systems

Eva Rajo Iglesias[1]

[1]Department of Signal Theory and Communications, University Carlos III de Madrid

The evolution of radar systems to the high band of the spectrum implies new challenges in all aspects including the design of the antenna systems.

An overview of the emerging antenna technologies with application in these frequency bands will be presented in this talk, with special emphasis on the use of gap waveguide technology and its application to radar systems.

WEDNESDAY 10:40 – 13:30

Posters will be ready by 10:40. Presenters will be around their stands at 10:50 – 11:20 and 13:00 – 13:30.

Exhibition Hall

EuMC21
EuMC Posters 1

Chair: Mustafa Bakr[1]

[1]University of Oxford

EuMC21-1
Compact Wideband Circularly Polarized Quarter-Mode Substrate Integrated Waveguide Antenna for Low-cost 2.4 GHz RFID Reader

Yongsheng Pan[1], Yuandan Dong[2]

[1]University of Electronic Science & Technology of China, [2]University of Electronic Science and Technology of China

EuMC21-2
Miniaturized and Process-Tolerant Ku-Band Power Dividers Using GaN on SiC

Volkan Erturk[1], Batuhan Sütbaş[2], Ekmel Özbay[1], Abdullah Atalar[1]

[1]Bilkent University, [2]Innovations for High Performance Microelectronics

EuMC21-3
Micromachined W-band Eight-way Power Divider Based on Micro-coaxial Lines

Ruihua Liang[1], Guanghua Shi[1], Minjie Shu[1], Zixian Wu[1], Cheng Guo[1], Anxue Zhang[1]

[1]Xi'an Jiaotong University

EuMC21-4
Bandpass Filter at 5 GHz with Reconfigurable Bandwidth Using Integrated ScDDAs

Rozenn Allanic[1], Denis Le Berre[2], Yves Quéré[2], Cédric Quendo[2], David Chouteau[1], Vriginie Grimal[1], Damien Valente[1], Jérôme Billoué[2]

[1]University of Brest, [2]Université de Bretagne Occidentale, [3]Université de Tours

EuMC21-5
Investigate LTCC technology for compact SIW resonators and filters with strong coupling for 5G applications

Efstratios Doumanis[1], Brian Laughlin[2], C. A. Lu[3], J. J. Yu[3], Kalyan Rapolu[4]

[1]Nokia Bell Labs, [2]DuPont Microcircuit Materials, Wilmington, DE USA, [3]Industrial Technology Research Institute, Taiwan, R.O.C., [4]DuPont Silicon Valley Technology Center, Sunnyvale, CA USA

EuMC21-6
A Novel Concept in Design of Microwave Planar Dual Band Filter having the Controllable Closed/Isolated Bands by Using the Simple Vias and the Slow Wave Effect for 5G/IoT Applications

Ceyhun Karpuz[1], Pınar Ozturk Ozdemir[2], Huriye Senol[1], Alperen Cengiz[1], Hasan Balik[2], Adnan Gorur[3]

[1]Pamukkale Uni., [2]Nat. Def. Univ., [3]N. O. Halis. Uni.

EuMC21-7
A Novel Chip to PCB-Half-Embedded Waveguide Transition

Thomas Lampersberger[1], Reinhard Feger[1], Markus Josef Lang[2], Jürgen Minichshofer[2], Sebastian Wolfgang Sattler[2], Andreas Stelzer[1]

[1]JKU University Linz, [2]Infineon Technologies Linz GmbH & Co KG, [3]AT&S Austria Technologie & Systemtechnik AG

EuMC21-8
Design and Test of Wearable Textile-based Transmission Lines

Rahil Joshi[1], Symon K. Podilchak[1], Constantin Constantinides[2], Bob Low[3]

[1]The University of Edinburgh, [2]Alba Orbital, [3]J&D Wilkie Ltd

EuMC21-9
Design of 130-290 GHz Rectangular COC Fibers for High-speed Data Links

Noman Siddique[1], Yinggang Li[2], Haisu Li[3], Qigejian Wang[1], Muhammad Talal Ali Khan[1], Jonas Hansryd[2], Shaghik Atakaramians[1]

[1]UNSW Sydney, [2]Ericsson AB, [3]Beijing Jiaotong University

EuMC21-10
Access Modelling-based De-embedding Method for High-frequency Characterization of Uni-traveling carrier Photodiodes

Djeber Guendouz[1], Marina Deng[1], Chhandak Mukherjee[1], Christophe Caillaud[2], Patrick Mounaix[1], Magali De Matos[1], Cristell Maneux[1]

[1]University of Bordeaux, [2]III-V Lab, Nokia Bell Labs, Thales, CEA Leti

EuMC21-11
Physical coupling background of In-line-connectors at system and vehicle level

Emanuel Panholzer[1], Stefan Lindenmeier[1]

[1]Universität der Bundeswehr München

EuMC21-12
Simulation of granular media by numerical characterization in the microwave range in coaxial line and in free space

Corentin Prigent[1], Patrick Lacoste[1], Geneviève Mazé-Merceur[1], Nicolas Malléjac[1]

[1]CEA

EuMC21-13
Microstrip Coupled-Line Directional Coupler for High Sensitivity Dielectric Constant Measurement

Zahra Rahimian Omam[1], Vahid Nayyeri[2], Omar M. Ramahi[2]

[1]University of Tabriz, [2]Iran University of Science and Technology, [3]University of Waterloo

EuMC21-14
Measurement Uncertainties for Mixed-Mode S-Parameters

Karsten Kuhlmann[1], Frauke Gellersen[1], Rainer Pöhmerer[2]

[1]Physikalisch Technische Bundesanstalt (PTB), [2]LEONI Kabel GmbH

EuMC21-15
Characterization of Microwave Substrates for High Accuracy and Long-Term Stability Using Full-Wave Microstrip Ring Resonator Method

Yuanyan Su[1], Anja Skrivervik[1], Matthieu Pellaton[2], Christoph Affolderbach[3], Gaetano Mileti[3], M. Veljovic[1]

[1]Ecole Polytechnique Fédérale de Lausanne, [2]University of Neuchâtel

EuMC21-16
Inter-Laboratory Comparison of On-Wafer Broadband 70kHz - 220 GHz Single-Sweep Measurements

Andrej Rumiantsev[1], Ralf Doerner[2], Jon Martens[3], Steve Reyes[3]

[1]MPI Corporation, [2]Ferdinand-Braun-Institut gGmbH (FBH), [3]Anritsu

WEDNESDAY 11:20 – 13:00

ROOM	Room 1	Room 4	Room 13	Room 14
	EuMC17 New Design Concepts for Microwave Filters in Planar and Hybrid Technologies Chair: Jiasheng Hong[1] Co-Chair: Dimitra Psychogiou[2] [1]Heriot-Watt University, [2]University College Cork & Tyndall National Institute	**EuMC18** Frequency Generation, Conversion and Nonlinear Modelling Chair: Nils Weimann[1] Co-Chair: Tom Keinicke Johansen[2] [1]University of Duisburg-Essen, [2]Technical University of Denmark	**EuMC19** 3D Printing: Processes and Reliability Chair: Adrian Porch[1] Co-Chair: Thomas Zwick[2] [1]Cardiff University, [2]Karlsruhe Institute of Technology (KIT)	**EuMC20** Advanced High Efficiency Power Amplifier Techniques Chair: Paul Tasker[1] Co-Chair: Francesc Purroy[2] [1]Cardiff Univeristy, [2]Huawei Technologies Sweden AB
11:20 – 11:40	**EuMC17-1** Spatiotemporal Modulated Three-Pole Non-Reciprocal Quasi-Elliptic Bandpass Filter David Chadzichristodoulou[1], Salman Arain[2], Charalambos Pavlou[3], Loukia Vassiliou[4], Dimitra Psychogiou[5], Symeon Nikolaou[6], Photos Vryonides[6] [1]RF and Microwave Solutions Ltd, Cyprus, [2]NFC-Institute of Engineering & Fertilizer Research, Pakistan, [3]University of Cyprus, Cyprus, [4]Agricultural Research Institute, Cyprus, [5]University College Cork, Ireland, [6]Frederick University Nicosia	**EuMC18-1** A Static Frequency Divider in GaN HEMT Technology Frida Strömbeck[1], Zhongxia Simon He[1], Herbert Zirath[1], Dan Kuylenstierna[1] [1]Chalmers University of Technology	**EuMC19-1** Space Qualified Additive Manufacturing for RF Components Esteban Menargues[1] **INDUSTRIAL KEYNOTE** [1]Swisstol2 SA	**EuMC20-1** Phase Compensated Sequential Load Modulated Balanced Amplifier Using Harmonically Tuned Control Amplifier CHENHAO CHU[1], Tushar Sharma[2], Sagar Kumar Dhar[3], Ramzi Darraji[4], Jingzhou Pang[5], Anding Zhu[1] [1]University College Dublin, [2]Renesas Electronics Corporation, San Diego, [3]University of Calgary, [4]Ericsson Canada, Inc., Ottawa, [5]Chongqing University
11:40 – 12:00	**EuMC17-2** Transversal-Coupled-Line Dual-Band Bandpass Planar Filters With Quasi-Elliptic-Type Response Li Yang[1], Mohamed Malki[1], Maoyu Fan[2], Roberto Gomez-Garcia[1] [1]University of Alcala, [2]University of Electronic Science and Technology of China	**EuMC18-2** Blind Receiver Distortion Compensation Dhecha Nopchinda[1], Thomas Eriksson[2], Koen Buisman[3] [1]University College London, [2]Chalmers University of Technology, [3]University of Surrey	**EuMC19-2** Reliability Investigations of Additive Manufactured RF-Structures on Low-Cost PCB Materials Based on Inkjet Technology Michael Schmalzbauer[1], Johannes Jakob[2], Franz-Xaver Röhrl[1], Felix Sepaintner[1], Andreas Scharf[1], Kai Löbbicke[1], Werner Bogner[2], Stefan Zorn[1] [1]Rohde & Schwarz GmbH & Co. KG Werk Teisnach, [2]DIT Deggendorf Institute of Technology	**EuMC20-2** A Wideband Highly-Efficient Linearizable 700W Doherty Power Amplifier Mitra Gilasgar[1], Sjoerd van Nederveen[1] [1]Ampleon
12:00 – 12:20	**EuMC17-3** ANN Model Development for Tunable Bandpass Filter Chandan Roy[1], Ping Zhao[2], Ke Wu[3] [1] École Polytechnique de Montréal, [2]Xidian University, [3]École Polytechnique de Montreal	**EuMC18-3** Analysis of inductively injection locked oscillators at an integer frequency ratio Franco Ramirez[1], Robert Melville[2], Almudena Suarez Rodriguez[1] [1]University of Cantabria, [2]EMECON, LLC	**EuMC19-3** Thermal Stability Analysis of 3D Printed Resonators Using Novel Materials LU QIAN[1], Sheng Li[1], Moataz Attallah[1], Talal Skaik[1], Paul Booth[2], Laurent Pambaguian[3], César España[3], Petronilo Martin-Iglesias[3], Yi Wang[1] [1]University of Birmingham, UK, [2]Airbus Defence and Space Ltd, [3]European Space Agency, The Netherlands	**EuMC20-3** An Enhanced Active Load-Pull Algorithm for Faster Convergence Cory Davies-Smith[1], Simon Woodington[1], Aamir Sheikh[1], Roberto Quaglia[2], Paul Tasker[2] [1]Mesuro, [2]Cardiff University
12:20 – 12:40	**EuMC17-4** Reconfigurable Transfer Function BST Acoustic Wave Lumped Element Resonator Filters Suhyun Nam[1], Dimitra Psychogiou[2], Amir Mortazawi[1] [1]University of Michigan, Ann Arbor, [2]University of Colorado at Boulder	**EuMC18-4** Analysis of Clock Signals Imperfections and Their Impact on an N-path Frequency Down-converter Pierre LABRUNÉE[1], Jacques Sombrin[2], Jacques DAVID[1], Jean-Louis Cazaux[1] [1]LAPLACE/Toulouse-INP, [2]TéSA laboratory	**EuMC19-4** Performance of SLA and DMLS 3D printed Ka-Band Resonators with Integrated Coaxial Launchers Jake Cazden[1], Dejan Filipovic[1], Ljubodrag Boskovic[1], Erik Lier[2], Thomas Hand[2], William Kefauver[2] [1]University of Colorado at Boulder, [2]Lockheed Martin Space Systems	**EuMC20-4** A 2-GHz 79%-PAE Power Amplifier with a Novel Harmonic Tuning Circuit Using Only CRLH TLs Shinichi Tanaka[1], Naoki Iisaka[1] [1]Shibaura Institute of Technology
12:40 – 13:00	**EuMC17-5** Quad-Band Bandpass Filter Using Modified Asymmetric Stepped Impedance Resonators Shi-Peng Chen[1], Yung-Wei Chen[2], Sung-Pu Wu[1], Hung-Wei Wu[1], Chow-Yen-Desmond Sim[1] [1]Department of Electrical Engineering, Feng Chia University, [2] Director, Innovation, Startup and Incubation Center, Kun Shan University	**EuMC18-5** A Real-Valued 4D Memory Polynomial Algorithm for Mixer Modeling Nima Hajiabdolrahim[1], Siqi Wang[1], Christian Fager[1], Halil Volkan Hüneri[1], Thomas Eriksson[1] [1]Chalmers University of Technology, [2]Ericsson	**EuMC19-5** Different Metallization Techniques Using a 3D Printed E-Band Orthomode Transducer Tim Freialdenhoven[1], Patrick Witte[1], Stephan Koß[2], Johannes Henrich Schleifenbaum[2], Thomas Dallmann[1] [1]Fraunhofer FHR, [2]RWTH Aachen University	**EuMC20-5** Bandwidth and Power Back-Off Performances of a Class-EM/F3 Power Amplifier Moise Safari Mugisho[1], Anna Piacibello[2], Vittorio Camarchia[2], Rüdiger Quay[1] [1]Fraunhofer IAF, [2]Politecnico di Torino

WEDNESDAY 11:20 – 13:00

ROOM	Room 17
	EuRAD02 Radar Applications Chair: Mayazzurra Ruggiano[1] Co-Chair: Willem A. Hol [1]Thales Nederland B.V.
11:20 – 11:40	**EuRAD02-1** A Human-Machine Distance Control System Using Incoherent Cooperative FMCW Radar Sensors Stefan Edstaller[1], Dominik Mueller[1] [1]Siemens Mobility GmbH
11:40 – 12:00	**EuRAD02-2** Polarimetric UAV-deployed FMCW Radar for Buried People Detection in Rescue Scenarios Carlos Sempere Chaves[1], Riana Helena Geschke[1], Maksim Shargorodskyy[1], Ralf Brauns[1], Reinhold Herschel[1], Christian Krebs[1] [1]Fraunhofer FHR
12:00 – 12:20	**EuRAD02-3** Ground penetrating capabilities of Airborne SAR System SETHI Remi Baque[1], SEBASTIEN ANGELLIAUME[1], PASCALE DUBOIS-FERNANDEZ[1], Olivier Ruault du Plessis[1] [1]ONERA
12:20 – 12:40	**EuRAD02-4** Improved RBFNN Based Rainfall Estimation: Initial Result Jie Yin[1], Hui Bi[1], Zhaoqi Wei[1], Yanjie Yin[1], Xingmeng Lu[1], Shuang Jin[1] [1]Nanjing University of Aeronautics & Astronautics
12:40 – 13:00	**EuRAD02-5** An Approach for Sleep Apnea Detection based on Radar Spectrogram Envelopes Yichuang Han[1], Alexander Yarovoy[1], Francesco Fioranelli[1] [1]TU Delft

WEDNESDAY 13:50 – 16:40

Posters will be ready by 13:40. Presenters will be around their stands at 13:50 – 14:10 and 16:00 – 16:30.

Exhibition Hall

EuMC25
EuMC Posters 2

Chair: Mustafa Bakr[1]
[1]University of Oxford

EuMC25-1
A Linear-to-Circular Polarization Converter with Wide Angular Stability and High Ellipticity for Ka-Band Applications
Mohammad Ayoub Sofi[1], Kushmanda Saurav[1], Shiban Kishen Koul[2]
[1]Indian Institute of Technology Jammu, [2]Indian Institute of Technology Delhi

EuMC25-2
Integrated Antenna Module for 5G Applications
Zunnurain Ahmad[1], Hans-Dieter Wohlmuth[1], Heinrich Heiss[2], Khai Yuan Chang[2]
[1]Infineon Technologies AG, [2]Infineon

EuMC25-3
A Wideband Circularly Polarized Horn Antenna using Transmission Type Linear to Circular Polarization converter for Ka-band Applications.
Javid Ahmad Ganie[1], Kushmanda Saurav[1]
[1]INDIAN INSTITUTE OF TECHNOLOGY JAMMU

EuMC25-4
Evaluations of the Vector Electric Field under a Wideband Transmitting Conical Antenna
Damien Gapillout[1], Alice Delsert[1], Jean-Christophe Diot[1], Bernard Crabos[1], Jean-Luc Lavergne[1]
[1]CEA Gramat - CEA DAM

EuMC25-5
Rational Fitting with Weighted Iteration (RFWI) with Application to Chassis Antenna
Yuming Bai[1], Peter Gardner[1]
[1]University of Birmingham

EuMC25-6
Reverberation-Chamber Performance of the Oscillating-Wall Stirrer for Estimating Antenna Efficiency
Anouk Hubrechsen[1], Ad Reniers[1], A. Bart Smolders[1], Sander Bronckers[1]
[1]Eindhoven University of Technology (TU/e)

EuMC25-7
A Local Hot-Cold Antenna Measurement System
Sean Manas[1], Elmine Meyer[2], Jacki Gilmore[1]
[1]Stellenbosch University, [2]Eindhoven University of Technology

EuMC25-8
Wide-Band, Dual Circularly-Polarized, Slot Antenna for 5G- and Beyond- Applications
Abdullah Haskou[1], Ali Louzir[1], Anthony Pesin[1]
[1]InterDigital, Inc.

EuMC25-9
Wideband Dual Polarized Shared Aperture Antenna for LTE Applications
Yang Cheng[1], Yuandan Dong[2]
[1]University of Electronic Science & Technology of China, [2]University of Electronic Science and Technology of China

EuMC25-10
A Dual-band Flexible Printed Graphene Antenna Array for 2.4 and 5 GHz WLAN IoE Applications
XINYAO ZHOU[1], Ting Leng[1], Kewen Pan[1], Zhirun Hu[1]
[1]University of Manchester

EuMC25-11
Miniaturized Supershaped Sinuous Antenna
Gianvito Mevoli[1], Claudio Maria Lamacchia[2], Pietro Bia[3], Antonio Manna[2], Diego Caratelli[4], Luciano Mescia[1]
[1]Politecnico di Bari, [2]IAMAtek srl, [3]Elettronica SpA, [4]The Antenna Company

EuMC25-12
High performance C/Ku band dual polarization feed system for large reflector antennas
Oleksandr Sushko[1], Stepan Piltyay[1], Serhii Martyniuk[1], Fedir Dubrovka[1]
[1]Igor Sikorsky Kyiv Politechnic Institute

EuMC25-13
Air-filled cavity-backed 28 GHz Antenna array implemented by 2.5D PCB process and Network Analysis
Hiroaki Takahashi[1], Sebastian Wolfgang Sattler[2], Helmut Paulitsch[1], Hossein Sarbandi Farahani[1], Wolfgang Bösch[1], Erich Schlaffer[2], Bernhard Reitmaier[2]
[1]Graz University of Technology, [2]AT&S Austria Technologie & Systemtechnik AG

EuMC25-14
20 GHz Dual-Polarized Array Antenna With Low Cross-Polarization and High Gain
Qingling Yang[1], Yi Wang[2], Steven Gao[3]
[1]University of Birmingham, [2]University of Birmingham, [3]University of Kent

EuMC25-15
The GAMMA Project: Development of a Galileo-Based Multi-Frequency Multi-Purpose Antenna
Mario Faliero[1], Gianluca Franzoni[2], Gaetano Pastore[2], Niccolò Pastori[2], Mirko Antonini[2], Roberto Muscinelli[4], Riccardo Poggi[4], Joaquin Reyes González[5]
[1]Amphenol SAA , [2]Thales Alenia Space Italia, [3]SpaceEXE, [4]Business Integration Partners, [5]EUSPA

WEDNESDAY 14:20 – 16:00

ROOM	Room 1	Room 13	Room 14	Room 17
	EuMC22 Advanced Implementations for Substrate-Integrated and Quasi-Planar Filters Chair: Michael Höft[1] Co-Chair: Anthony Ghiotto[2] [1]Christian-Albrechts-Universität zu Kiel, [2]Bordeaux INP, IMS Laboratory	**EuMC23** 5G Communication and Beyond Chair: Yinggang Li[1] Co-Chair: Holger Maune[2] [1]Ericsson AB, [2] Otto von Guericke University Magdeburg	**EuMC24** Advances in Electromagnetic Modeling and Numerical Techniques Chair: Alessandro Galli[1] Co-Chair: Walter Fuscaldo[2] [1]Sapienza University of Rome, [2]CNR-IMM, Consiglio Nazionale delle Ricerche, Rome, Italy	**EuRAD03** Emerging Radar Applications Chair: Pierfrancesco Lombardo[1] Co-Chair: Willem A. Hol [1]Sapienza University of Rome
14:20 – 14:40	**EuMC22-1** A Compact Filter With Dual-Mode Folded Circular SIW Cavities Anton Sieganschin[1], Bartosz Tegowski[2], Arne F. Jacob[2] [1]Hamburg University of Technology, [2]Technische Universität Hamburg	**EuMC23-1** Millimeter-wave and sub-THz technology and research trends for "beyond 5G" applications - an industry view Renato Lombardi[1] **INDUSTRIAL KEYNOTE** [1]Huawei IT	**EuMC24-1** Segmentation of a Complex Horn Antenna for Efficient Analysis and Optimization Lucas Polo-López[1], Juan Córcoles[2], Jorge A. Ruiz-Cruz[2], José R. Montejo-Garai[2], Jesús M. Rebollar[2] [1]IETR, INSA Rennes, [2]Escuela Politécnica Superior, Universidad Autónoma de Madrid, [3]Universidad Politécnica de Madrid	**EuRAD03-1** Heating, Ventilation, and Air Conditioning Control by Range-Doppler and Micro-Doppler Radar Sensor Emanuele Cardillo[1], Changzhi Li[2], Alina Caddemi[1] [1]University of Messina, [2]Texas Tech University, USA
14:40 – 15:00	**EuMC22-2** Ultra-broadband SIW Diplexer on low-cost Laminate Technology for Channel Bonding D-band Front Ends Abdelaziz Hamani[1], José-Luis Gonzalez Jimenez[1], Benjamin Blampey[1], Alexandre Siligaris[1], Cedric Dehos[1], Frederic Hameau[1], Francesco Foglia Manzillo[1] [1]University of Grenoble Alpes,CEA-Leti	**EuMC23-2** 28 GHz Over-the-Air Measurement using an OTFS Multi-User Distributed MIMO Noriaki Tawa, Toshihide Kuwabara[1], Yasushi Maruta[1], Tomoya Kaneko[1] [1]NEC Corporation	**EuMC24-2** A Cost-Effective Method for Extracting the Complex Permittivity of Inner Layer Dielectric PCB Materials Andreas Scharf[1], Felix Sepaintner[1], Johannes Jakob[1], Franz-Xaver Röhrl[2], Werner Bogner[1], Stefan Zorn[2] [1]DIT Deggendorf Institute of Technology, [2]Rohde & Schwarz GmbH & Co. KG	**EuRAD03-2** Plasma State Supervision Utilizing 140 GHz Radar Measurements Francesca Schenkel[1], Christian Schulz[1], Christoph Baer[1], Ilona Rolfes[1] [1]Ruhr-Universität Bochum
15:00 – 15:20	**EuMC22-3** Compact and Low-loss Stripline Bandpass Filter Made of Liquid Crystal Polymer for n257 and n258 Application Yuta Hasegawa[1], Masayuki Ota[1], Toshiya Iwamura[2], Yusuke Nakatani[1], Naoki Oyaizu[1], Koichiro Masuko[1], Ning Guan[1] [1]Fujikura Ltd., [2]Tohoku Fujikura Ltd.	**EuMC23-3** Modulated-Signal-Based EM/RF/DSP Co-Simulation Framework for Predictive Analysis of Fully Digital MIMO Transmitters Jin Gyu Lim[1], Hang Yu[1], Emile Traore[1], Mohammed Almoneer[1], Jingjing Xia[1], Slim Boumaiza[1] [1]University of Waterloo	**EuMC24-3** Preserving Causality in Time Domain Integral Equation-Based Methods Fabrizio Loreto[1], Daniele Romano[1], Giulio Antonini[1], Martin Stumpf[2], Ioan Lager[3], Guy Vandenbosch[4] [1]Università degli Studi dell'Aquila, [2]Brno University of Technology, [3]Delft University of Technology, [4]Katholieke Universiteit Leuven	**EuRAD03-3** Descending Staircase Detection for Service Robots based on M-Sequence UWB Radar Tim Erich Wegner[1], Jonas Gedschold[1], Gerrit Kropp[2], Johannes Trabert[2], Martin Kmec[3], Giovanni Del Galdo[1] [1]Technische Universität Ilmenau, [2]MetraLabs GmbH, [3]Ilmsens GmbH
15:20 – 15:40	**EuMC22-4** First Demonstration of Ultra-Miniaturized, High-Performance Filters on Alumina Ribbon Ceramic Substrates for 5G Applications Nahid Aslani Amoli[1], Fuhan Liu[1], Madhavan Swaminathan[1], Cheng-Gang Zhuang[2], Nikolay Z. Zhelev[2], Seong-Ho Seok[2], Cheolbok Kim[2] [1]Georgia Institute of Technology, [2]Corning Inc.	**EuMC23-4** E-Band Transmitter with 3W Complex Modulated Signal Output Power Performance Benjamin Schoch[1], Dominik Wrana[1], Ralf Hennebergerr[1], Sandrine Wagner[2], Erdin Ture[3], Axel Tessmann[3], Ingmar Kallfass[1] [1]Institute of Robust Power Semiconductor Systems, University of Stuttgart, [2]Radiometer Physics GmbH, [3]Fraunhofer Institute for Applied Solid State Physics (IAF)	**EuMC24-4** A Finite Element formulation for waveguides with first and second order symmetries Gines Garcia-Contreras[1], Juan Córcoles[1], Jorge A. Ruiz-Cruz[1] [1]Escuela Politécnica Superior, Universidad Autónoma de Madrid	**EuRAD03-4** Data Augmentation in Time and Doppler Frequency Domain for Radar-based Gesture Recognition Nicolai Kern[1], Christian Waldschmidt[1] [1]Ulm University
15:40 – 16:00	**EuMC22-5** Half-Mode Substrate Integrated Waveguide Filters with Arbitrarily Inserted Transmission Zeros Yilong Zhu[1], Yuandan Dong[1] [1]University of Electronic Science and Technology of China	**EuMC23-5** Delay-coded Communication for PHY Layer Security Luca Manica[1] [1]Collins Aerospace	**EuMC24-5** Efficient Modeling of Nonlinear Graphene as a Surface Boundary Condition in the Finite-Difference Time-Domain Method Fatemeh Moharrami[1], Vahid Nayyeri[2] [1]Telecommunication Company of Iran, [2]Iran University of Science and Technology	**EuRAD03-5** Multi-User Macro Gesture Recognition using mmWave Technology Alexandros Ninos[1], Jürgen Hasch[1], Thomas Zwick[2] [1]Robert Bosch GmbH, [2]Karlsruhe Institute of Technology (KIT)

WEDNESDAY 16:40 – 18:20

ROOM	Room 13	Room 14	Room 17	Room 4
	EuMC26 Novel 3D Printing Approaches for mmWave Applications Chair: Tudor Williams[1] Co-Chair: John Papapolymerou[2] [1]CSA Catapult, [2]Michigan State University	**EuMC27** Measurements for 5G and 6G Systems Chair: Jon Martens[1] Co-Chair: TBA [1]Anritsu	**EuMC28** 5G and mmWave Arrays Chair: Steven Gao[1] Co-Chair: Tomoya Kaneko[2] [1]University of Kent, [2]NEC Corporation	**EuMW04** Memorial Session for Professor Tatsuo Itoh Chair: Kamal K. Samanta[1] Co-Chair: Bumman Kim[2] [1]AMWT Ltd; Sony Europe, [2]Pohang University of Science and Technology
16:40 – 17:00	**EuMC26-1** Additively Manufactured Electronic (AME) Devices for mmWave Applications Jaim Nulman[1] **INDUSTRIAL KEYNOTE** [1]Nano Dimension	**EuMC27-1** Sub THz Bands for 6G: 10x the bandwidth with 10x the problems? Michael Dieudonne[1] **INDUSTRIAL KEYNOTE** [1]Keysight	**EuMC28-1** A 39 GHz MU-MIMO using 256 Element Hybrid AAS with Coherent Beam-Forming for 5G and Beyond IAB Applications Toshihide Kuwabara[1], Noriaki Tawa[1], Yasushi Maruta[1], Shinichi Hori[1], Tomoya Kaneko[1] [1]NEC Corporation	**EuMW04-1** A Golden Era of Seeking Solutions for Complex Propagation Constants: in memory of TATSUO ITOH Clive Tzuang[1] [1]National Taiwan University
17:00 – 17:20	**EuMC26-2** 3D-Printed Dielectric Dual Lens for a 140 GHz CMOS Radar Transceiver Juan Garcia[1] [1]KU Leuven & IMEC	**EuMC27-2** A Novel OTA Near-Field Measurement ApproachSuitable for 5G mmWave Validation and Test Martin Laabs[1], Dirk Plettemeier[1], Thomas Deckert[2], Vincent Kotzsch[2], Marc Vanden Bossche[2] [1]Technical University Dresden, [2]National Instruments Corporation, Austin, Texas, U.S.	**EuMC28-2** An Eight-Port Antenna Array for 5G MIMO Handset Long Qian[1], Xiaodong Chen[1], Wei Hu[2] [1]Queen Mary University of London, [2]Xidian University	**EuMW04-2** In memory of Professor Tatsuo Itoh Atsushi Sanada[1] [1]Osaka University
17:20 – 17:40	**EuMC26-3** Aerosol Jet Printed Microstrip Lines on Polyimide for D-Band Georg Gramlich[1], Joachim Hebeler[1], Christian Bohn[1], Uli Lemmer[1], Thomas Zwick[1] [1]Karlsruhe Institute of Technology (KIT)	**EuMC27-3** Benchmarking of GHz resonator techniques for the characterisation of 5G / mmWave materials Malgorzata Celuch[1], Michael Hill[2], Tomasz Karpisz[3], Marzena Olszewska-Placha[3], Say Phommakesone[4], Urmi Ray[5], Bartłomiej Salski[3] [1]QWED Sp. z o.o., [2]Intel Corp., [3]Institute of Radioelectronics and Multimedia Technology, Warsaw University of Technology, [4]Keysight Technolgies, [5]The International Electronics Manufacturing Initiative	**EuMC28-3** 26 GHz Band Beam-Steered Antenna for Mm-Wave 5G Systems Muhammad Rabbani[1], James Churm[1], Sohail Payami[2], Pei Xiao[2], Rahim Tafazolli[2], Tian Hong Loh[3], Alexandros Feresidis[1] [1]University of Birmingham, [2]University of Surrey, [3]Nation Physics Laboratory	**EuMW04-3** Professor Tatsuo Itoh and the Quasi-Yagi Antenna William Deal[1] [1]Northrop Grumman Corporation
17:40 – 18:00	**EuMC26-4** Three-Dimensional Printing of a Waveguide Termination for Millimeter Wave Applications Evan Roué[1], Vincent Laur[1], Alexis Chevalier[1], Gérard Tanné[1], Camille Patris[2], Olivier Vendier[2], Rose-Marie Sauvage[3] [1]Univ Brest, Lab-STICC, CNRS, UMR 6285, [2]Thales Alenia Space, [3]Agence de l'innovation de défense	**EuMC27-4** Transient phased array distortion measurements Jon Martens[1] [1]Anritsu	**EuMC28-4** Scalable Planar Phased Array Antenna with Dual Polarization and Metasurface Shield at 28 GHz Mohadig Rousstia[1], Junlei Zhao[1], Sandra Kits[1], Sergio Pires[1] [1]Ampleon Netherlands BV	**EuMW04-4** Professor Tatsuo Itoh's Spectral Domain Approach and Its Applications to Multilayered Electromagnetic Structures Ke Wu[1] [1]Polytechnique Montreal
18:00 – 18:20	**EuMC26-5** Comparison of E-band SLM and SLA printed waveguides and automotive radar antennas Aleksandar Dukanovic[1], Maximilian Eschbaumer[1] [1]Infineon Technologies AG	**EuMC27-5** Delay Spread Estimation in Presence of Obstructing Medium for 6G Channels Priyansha Kaurav[1], Shiban Kishen Koul[1], Ananjan Basu[1] [1]Indian Institute of Technology Delhi	**EuMC28-5** Low-Coupling and Dual-Polarized Horn-based Antenna Array aimed to Massive MIMO Applications Tiago Henrique Brandão[1], Hugo Rodrigues Dias Filgueiras[1], Arismar Cerqueira Sodré Junior[1] [1]National Institute of Telecommunications (Inatel)	**EuMW04-5** A Tribute to Professor Tatsuo Itoh as a Mentor, Teacher and Researcher Electromagnetic Structures Amir Mortazawi[1] [1]University of Michigan, Ann Arbor

THURSDAY OVERVIEW

Room	09:00 – 10:40	11:20 – 13:00	14:20 – 16:00	16:40 – 18:20	EVENING PROGRAMME
1		**EuMC35** Non-planar Filters and Passive Components	**EuMC/EuRAD04** Radar Architectures and Systems	**EuRAD13** Radar Imaging	
2	**Exhibitor Workshops**		**Exhibitor Workshops**		
3	**Exhibitor Workshops**		**Exhibitor Workshops**		
4	**EuRAD04** Distributed and Multistatic Radar	**EuRAD07** Drone Detection and Recognition	**EuRAD10** Signal Processing for Automotive Radar	**EuRAD14** Target and Clutter Classification in Automotive Radar	
5	**Exhibitor Workshops**		**Exhibitor Workshops**		
6	**EuMC29** On the Occasion of Nikola Tesla's 165th Anniversary	**EuMC36** Special Session: HEFPA – An International Project on Highly Efficient and Flexible Phased Arrays	**EuMC40** Advances in Biological and Medical Applications		
7	**EuRAD05** AI Methods in Automotive Signal Processing and Information Extraction	**EuMC/EuRAD01** High Resolution Methods in Range and Azimuth for Environmental Perception	**EuMC41** Material and On-wafer Measurements		
8	**EuRAD06** Radar Characteristics Measurement, Modelling and Simulation	**EuMW05** Special Session in Memory of Prof. Peter Clarricoats		**EuMC44** **EuMC** **Closing Session**	
9	**EuMC30** Asia Pacific Focused Session	**EuRAD08** Radar Antennas, Arrays and Calibration			
10	**EuMC31** Electromagnetic Interactions, Environmental and Biological Applications	**EuRAD09** Positioning and Localization Systems			
11	**EuMC32** Calibration Techniques and Nonlinear Measurements	**EuMC/EuRAD02** Channel and Radar Characterization			
12		**EuMC37** Radar and Communication Systems	**EuRAD11** Radar Processing Techniques for Automotive and Transportation		
13	**EuMC33** Sub-10GHz Antennas	**EuMC38** Advances in mmWave Antennas	**EuMC42** Antennas Using Advanced Manufacturing and Novel Substrate Materials		
14	**5G and Beyond Forum**				
15	**WTh01** Advances in Drone Antenna Measurement Techniques for Satcom and RADAR Applications				
16					
17	**EuMC34** RFID and WPT Technologies	**EuMC39** Novel IoT Technologies	**EuMC43** Sensing and Dynamic Technologies	**EuRAD15** Human Activity Sensing	
Exhibition Hall		**EuMC/EuRAD03** Posters	**EuRAD12** Posters		

EuMC EuMIC EuRAD Students EuMW Exhibitors

THURSDAY 09:00 – 10:40

ROOM	Room 6	Room 9	Room 10	Room 11
	EuMC29 On the Occasion of Nikola Tesla's 165th Anniversary Chair: Djuradj Budimir[1] Co-Chair: Zoya Popovic[2] [1]University of Westminster, [2]University of Colorado Boulder	**EuMC30** Asia Pacific Focused Session Chair: Yi Wang[1] Co-Chair: Kamran Ghorbani[2] [1]University of Birmingham, [2]RMIT University	**EuMC31** Electromagnetic Interactions, Environmental and Biological Applications Chair: Michal Mrozowski[1] Co-Chair: Oksana Shramkova[2] [1]Gdansk University of Technology, [2]Interdigital, R&D France	**EuMC32** Calibration Techniques and Nonlinear Measurements Chair: Nuno Borges Carvalho[1] Co-Chair: Anding Zhu[2] [1]University of Aveiro / Instituto de Telecomunicações, [2]University College Dublin, [3]Chalmers University of Technology
09:00 – 09:20	**EuMC29-1** No Bigger than a Pocketwatch:' Nikola Tesla's Early Vision of the Information Age Bernard Carlson[1] [1]University of Virginia	**09:00 – 09:25** **EuMC30-1** Millimeter-wave Digital Beam-forming Massive-MIMO and Distributed-MIMO Technologies and Their Verifications toward 5G-Beyond Further Capacity Enhancement Tomoya Kaneko[1] [1]NEC Corporation	**EuMC31-1** On the Potential for Viruses as Nano Microwave Transmitters Gabriel Goncalves Machado[1], Vincent Fusco[2] [1]Queen's University Belfast, ECIT, [2]Queen s University Belfast, ECIT	**EuMC32-1** Load-pull techniques with wideband modulated signals: state-of-the-art and future Gustavo Avolio[1] **INDUSTRIAL KEYNOTE** [1]Anteverta MW|Maury Microwave
09:20 – 09:40	**EuMC29-2** Advanced Retrodirective System for Beam WPT Naoki Shinohara[1] [1]Kyoto University	**09:25 – 09:50** **EuMC30-2** Material Characterization Using Power Measurements: Miracle of Machine Learning Tahoura Mosavirik[1], Mohammad Hashemi[2], Mohammad Soleimani[1], Vahid Nayyeri[1], Omar M. Ramahi[3] [1]Iran University of Science and Technology, [2]University of Tehran, [3]University of Waterloo	**EuMC31-2** Impact of Small-Cell Deployment on Combined Uplink and Downlink RF Exposure Compared to the Status Quo in Mobile Networks Lisa-Marie Schilling[1], Christian Bornkessel[1], Matthias A. Hein[1] [1]Technische Universität Ilmenau	**EuMC32-2** Increasing the accuracy of interpolated calibration with a local rational modelling technique Dries Peumans[1], Sander De Keersmaeker[1], Jeroen De Geeter[1], Yves Rolain[1] [1]Vrije Universiteit Brussel
09:40 – 10:00	**EuMC29-3** Tesla and Marconi: Wireless energy and information transfer Alessandra Costanzo[1], Zoya Popovic[2] [1]University of Bologna, [2]University of Colorado Boulder		**EuMC31-3** Microwave-assisted chemical recycling for polymeric waste valorisation Ignacio Julian[1], Carlos Gonzalez-Niño[1], Alberto Frisa-Rubio[1], Nelson Garcia-Polanco[1] [1]CIRCE Foundation	**EuMC32-3** Design of Microwave Calibration Standards for Characterising S-Parameters of Quantum Integrated Circuits at Millikelvin Temperatures Manoj Stanley[1], Sebastian de Graaf[1], Tobias Lindström[1], Martin Salter[1], James Skinner[1], Nick Ridler[1] [1]The National Physical Laboratory, Teddington
10:00 – 10:20	**EuMC29-4** On Smart Energy Systems Supported by Wireless Networks Vladimir Terzija[1], Sinisa Djurovic[2], Dragorad Milanovic[2], Dragan Cetenovic[2], Djuradj Budimir[2] [1]Skolkovo Institute of Science and Technology, Moscow, [2]University of Manchester, [3]University of Westminster	**09:50 – 10:15** **EuMC30-3** Metamaterial Inspired Geometries for Wireless Power Transfer to Biomedical Implants Pokharel Ramesh[1], Adel Barakat[1], Costas Sarris[2] [1]Kyushu University, [2]University of Toronto	**EuMC31-4** A microdosimetric study at the cellular and intracellular level using a 3D realistic cell model Laura Caramazza[1], Annalisa De Angelis[2], Zain Haider[3], Maxim Zhadobov[3], Franck André[4], Luis Mir[5], Francesca Apollonio[1], Micaela Liberti[1] [1]Sapienza University of Rome, [2]Fondazione Istituto Italiano di Tecnologia, Italy, [3]University of Rennes, [4] Univ. Paris-Sud, Université Paris-Saclay, France, [5]Univ. Paris-Sud, Université Paris-Saclay, France	**EuMC32-4** Mode Purity Evaluation for OAM Communication using Integrated Loop Antenna Array Haruki Kikuchi[1], Akira Saitou[1], Wataru Wada[1], Hiroshi Suzuki[1], Kazuhiko Honjo[1], Ryo Ishikawa[1] [1]The University of Electro-Communications
10:20 – 10:40	**EuMC29-5** Unlock the secrete key of Nikola Tesla to free energy Xiaoqiang Gu, Ke Wu[1] [1]Polytechnique Montreal	**10:15 – 10:40** **EuMC30-4** Plane Wave Generator Design for 5G Massive MIMO Base Stations OTA Testing Shiyao Zhu[1], Zhengpeng Wang[1], Yusheng Zhang[2], Jungang Miao[2] [1]Beijing University of Aeronautics and Astronautics, [2]Beihang University	**EuMC31-5** Analogous Maxwellian Algorithm for photon geodesic calculation in General Static Isotropic Metrics Enderson Falcón[1], Gabriel Santamaría-Botello[2], Vittorio De Falco[3], Adrián Amor[1], Valentín De la Rubia[4], Luis Enrique García-Muñoz[1] [1]Universidad Carlos III de Madrid, [2]University of Colorado Boulder, [3]University of Naples Federico II, [4]Universidad Politécnica de Madrid	**EuMC32-5** Emulation of Non-Reciprocity applied in Load-Modulated Power Amplifier Architectures using Single Amplifier Load-Pull Measurements Jose-Ramon Perez-Cisneros[1], Han Zhou[1], Christian Fager[1], Koen Buisman[2] [1]Chalmers University of Technology, [2]University of Surrey

THURSDAY 09:00 – 10:40

ROOM	Room 13	Room 17	Room 4	Room 7
	EuMC33 Sub-10GHz Antennas Chair: Wim van Cappellen[1] Co-Chair: Hendrik Rogier[2] [1]ASTRON, [2]Ghent University	**EuMC34** RFID and WPT technologies Chair: Alessandra Costanzo[1] Co-Chair: Jiafeng Zhou[2] [1]University of Bologna, [2]University of Liverpool	**EuRAD04** Distributed and Multistatic Radar Chair: Matthew Ritchie[1] Co-Chair: Stephen Harman[2] [1]University College London, [2]Aveillant Ltd.	**EuRAD05** AI Methods in Automotive Signal Processing and Information Extraction Chair: Francesco Fioranelli[1] Co-Chair: Fatih Sezgin[2] [1]TU Delft, [2]Technische Hochschule Ingolstadt
09:00 – 09:20	**EuMC33-1** Fifth Generation Sub-6GHz Antennas Design Challenges for Laptop and Tablet Applications – Need More Attention Sampson Hu[1] **INDUSTRIAL KEYNOTE** [1]Novocomms Limited	**EuMC34-1** Comparison between Cross-polarization and Circular Polarization Interrogation for Robust Chipless RFID Reading Olivier Rance[1], Nicolas Barbot[1], Etienne Perret[1] [1]Université Grenoble Alpes	**EuRAD04-1** Digital Radar: the data processing challenge Hannah Durnall[1] **INDUSTRIAL KEYNOTE** [1]Leonardo	**EuRAD05-1** Enhancing Angular Resolution Using Neural Networks in Automotive Radars Ignacio Roldan[1], Francesco Fioranelli[1], Alexander Yarovoy[1] [1]TU Delft
09:20 – 09:40	**EuMC33-2** Performance Analysis of Equivalent-Circuit Topologies for Periodic Leaky-Wave Antenna Asymmetric Radiators Alberto Hernández-Escobar[1], Elena Abdo-Sánchez[1], Pablo Mateos Ruiz[1], Jaime Esteban[1], Teresa M. Martín-Guerrero[1], Carlos Camacho-Peñalosa[1] [1]Universidad de Málaga, Andalucía Tech, [2]Information Processing and Telecommunications Center. Universidad Politécnica de Madrid	**EuMC34-2** A Dielectric Lens Rectenna for Wireless Power Transmission Abdel Hadi Hobballah[1], Romain Négrier[1], Michèle Lalande[1] [1]University of Limoges, Xlim	**EuRAD04-2** Matching Bistatic Target Responses in Radar Networks to Enable Vectorial Velocity Estimation Benedikt Meinecke[1], David Werbunat[1], Pirmin Schoeder[1], Christian Waldschmidt[1] [1]Ulm University	**EuRAD05-2** Drivable Free Space Detection on High-Resolution Radar Using Convolutional Neural Networks David Forino[1], Chetan Mara[1], Juan Pablo Steierl[1] [1]Automotive Safety Technologies
09:40 – 10:00	**EuMC33-3** Ultra-Wideband and Substrate-Independent AFSIW Cavity-Backed Slot Antenna for High-Performance Smart Surfaces Kamil Yavuz Kapusuz[1], Sam Lemey[1], Piet Demeester[1], Hendrik Rogier[1] [1]Ghent University	**EuMC34-3** Analog Frontend for a Passive 5.8-GHz RFID Transponder in 130-nm CMOS Technology Dominic Funke[1], Christian Bredendiek[2], Nils Pohl[1] [1]Ruhr-University Bochum, [2]Fraunhofer Institute for High Frequency Physics and Radar Techniques (FHR)	**EuRAD04-3** Compressive Sensing-Based Coherent Signal Integration for Multistatic Microwave Radars Paul Berry[1], Nabaraj Dahal[1] [1]DST Group	**EuRAD05-3** A Deep Learning Approach for Pedestrian Behavior Interpretation Based on Radar Point Clouds Fatih Sezgin[1], Daniel Vriesman[1], Patrick Held[1], Alessandro Zimmer[1], Thomas Brandmeier[1] [1]Technische Hochschule Ingolstadt
10:00 – 10:20	**EuMC33-4** Design of a high gain highsteering angle and wide band antenna for S band application Paul Karmann[1], Edson Martinod[2], Joël Andrieu[2], Mohamad Majed[2], Mohamad Rammal[1] [1]ITHPP, [2]XLIM - Université de Limoges	**EuMC34-4** Design of a Compact Harmonic Transponder Based on Quarter-Wavelength Impedance Transformers Jinyao Zhang[1], Sumin David Joseph[1], Yi Huang[1], Jiafeng Zhou[1] [1]University of Liverpool	**EuRAD04-4** A Dielectric Waveguide based Signal Distribution Network for Time Multiplexed Fixed Target Radar Measurements Christoph Baer[1], Juanita Fernández[1], Thomas Musch[1] [1]Ruhr University Bochum	**EuRAD05-4** Weakly Supervised Semantic Segmentation for Range-Doppler Maps Konstantinos Fatseas[1] [1]University of Twente
10:20 – 10:40	**EuMC33-5** A Triple-Mode Cylindrical Cavity-Backed Slot Filtering Antenna with High Selectivity Gen-Zhu Liang[1], Fu-Chang Chen[1], Kai-Ran Xiang[1] [1]South China University of Technology	**EuMC34-5** Design of a 24-GHz dual-polarized rectenna integrated on silicon Simone Trovarello[1], Diego Masotti[1], Martino Aldrigo[2], Mircea Modreanu[3], Alessandra Costanzo[1] [1]University of Bologna, [2]National Institute for Research and Development in Microtechnologies (IMT), [3]Tyndall National Institute	**EuRAD04-5** Ghost-Target Suppression in Coherent Radar Networks David Werbunat[1], Benedikt Schweizer[1], Benedikt Meinecke[1], Rossen Michev[2], Jürgen Hasch[2], Christian Waldschmidt[1] [1]Ulm University, [2]Robert Bosch GmbH	**EuRAD05-5** Signal Reconstruction Using Bi-LSTM for Automotive Radar Interference Mitigation Muhammad Rameez[1], Saleh Javadi[1], Mattias Dahl[1], Mats I. Pettersson[1] [1]Blekinge Institute of Technology

THURSDAY 09:00 – 10:40

ROOM **Room 8**

EuRAD06
Radar Characteristics Measurement, Modelling and Simulation

Chair: Andrew Stove[1]
Co-Chair: Stéphane Méric[2]
[1]University of Birmingham, [2]IETR, INSA Rennes

09:00 – 09:20 **EuRAD06-1**
Signal Reduction Due to Layer of Water at Low-THz Frequency for Automotive Radar Applications
Shahrzad Sabery[1], Fatemeh Norouzian[1], Aleksandr Bystrov[1], Emidio Marchetti[1], Peter Gardner[1], Marina Gashinova[1]
[1]University of Birmingham

09:20 – 09:40 **EuRAD06-2**
Synthetic Sea-Clutter Modelling for STAP
Sabrina Machhour[1], Stéphane Kemkemian[1]
[1]Thales Defence Mission Systems (TDMS)

09:40 – 10:00 **EuRAD06-3**
Numerical Analysis of Radar-Plasma-Signatures of a Sphere in a Mach 10 Hypersonic Wind Tunnel Flow
René Petervari[1]
[1]Fraunhofer Institute for High Frequency Physics and Radar Techniques FHR

10:00 – 10:20 **EuRAD06-4**
Scattering Properties of Antennas used For Stimulating Radar Sensors
Michael Ernst Gadringer[1], Michael Vorderderfler[1], Helmut Schreiber[1], Wolfgang Bösch[1]
[1]Graz University of Technology

10:20 – 10:40 **EuRAD06-5**
Quasi-monostatic Radar Cross-Section Measurement in Reverberation Chamber
Corentin Charlo[1], Philippe Besnier[1], Stéphane Méric[1]
[1]CNRS (UMR 6164 IETR)

THURSDAY 10:40 – 13:30

Posters will be ready by 10:40. Presenters will be around their stands at 10:50 – 11:20 and 13:00 – 13:30.

Exhibition Hall

EuMC/EuRAD03
EuRAD/EuMC Posters

Chair: Mustafa Bakr[1]
[1]University of Oxford

EuMC/EuRAD03-1
Design of narrow wall slotted waveguides planar array for 3D S-band radar with very low side lobelevel
Quoc Duy Nguyen[1]
[1]Viettel High Technology Industries Corporation

EuMC/EuRAD03-2
Transmission Line Based Frequency Modulated Continuous Wave Radar for Monitoring Airbag Deployment Processes
Björn Möhring[1], Uwe Siart[1], Sebastian Schweizer[2], Thomas F. Eibert[1]
[1]Technical University of Munich, [2]Audi AG

EuMC/EuRAD03-3
Compressed Sensing for MIMO Radar using SIW Antennas for High Resolution Detection
Cristian-Alexandru Alistarh[1], Laura Anitori[2], Wim van Rossum[2], Symon K. Podilchak[3], John Thompson[3], Mathini Sellathurai[1]
[1]Heriot-Watt University, [2]TNO Defense, Safety and Security, [3]The University of Edinburgh

EuMC/EuRAD03-4
Spectrum Estimation for Very High Frequency RF Systems
Mario LaManna[1], Pietro Monsurrò[2], Pasquale Tommasino[2], Alessandro Trifiletti[2]
[1]Evoelectronics, [2]Sapienza University of Rome

EuMC/EuRAD03-5
Enhancing Unambiguous Velocity in Doppler-Division Multiplexing MIMO Radar
Yuliang Sun[1], Marc Bauduin[1], André Bourdoux[1]
[1]Interuniversity Microelectronics Centre (Imec)

EuMC/EuRAD03-6
VBR: A S Band Tile of 16 T-R Modules for Fully Digital AESA Antennas (DAR Technology)
Francesco Macro[1], Marco Di BAttista[1], Bruno Buccinnà[1]
[1]Virtualabs

EuMC/EuRAD03-7
Wideband 6-Bit SiGe BiCMOS T/R ModuleCore-Chip for X-Band Phased-Arrays
Can Çalışkan[1], Abdurrahman Burak[1], Melik Yazici[1], Nihan Öznazlı[2], Yasar Gurbuz[1]
[1]Sabanci University, [2]ASELSAN Inc.

EuMC/EuRAD03-8
Enhanced Self-Interference Cancellation by Means of Adaptively Calibrated Filters
Johannes Steigert[1], Daniel Schwab[1]
[1]COMMSCOPE

EuMC/EuRAD03-9
Dosimetric Analysis of Plane Wave Propagation in Biological Tissues: Comparison Between Planar Multilayer vs Realistic Anatomical Models
Micol Colella[1], Simona Di Meo[2], Paolo Marracino[3], Micaela Liberti[1], Marco Pasian[2], Francesca Apollonio[1]
[1]Sapienza University of Rome, [2]University of Pavia, [3]Rise Technology S.r.l., Rome

EuMC/EuRAD03-10
Design of a Miniature Smart Pill Antenna
Hubregt Visser[1], Esmee Huismans[2], Minyoung Song[3], Yao-Hong Liu[3]
[1]imec Netherlands, [2]Eindhoven University of Technology, [3]imec

EuMC/EuRAD03-11
Status and Ongoing Development of a kW-level Broadband W-band Gyro-TWA
Liang Zhang[1], Craig Donaldson[1], Colin Whyte[1], Adrian Cross[1]
[1]University of Strathclyde

THURSDAY 11:20 – 13:00

ROOM	Room 7	Room 11	Room 1	Room 6
	EuMC/EuRAD01 High Resolution Methods in Range and Azimuth for Environmental Perception Chair: Thomas Dallmann[1] Co-Chair: Frank Gruson [1]Fraunhofer Institute for High Frequency Physics and Radar Techniques FHR	**EuMC/EuRAD02** Channel and Radar Characterization Chair: Dirk Plettemeier[1] Co-Chair: Kamran Ghorbani[2] [1]Technical University Dresden, [2]RMIT University	**EuMC35** Non-planar Filters and Passive Components Chair: Anthony Ghiotto[1] Co-Chair: Dimitra Psychogiou[2] [1]Bordeaux INP, IMS Laboratory, [2]University College Cork & Tyndall National Institute	**EuMC36** HEFPA – An International Project on Highly Efficient and Flexible Phased Arrays Chair: Ulf Johannsen[1] Co-Chair: Safieddin Safavi-Naeini[2] [1]Eindhoven University of Technology, [2]University of Waterloo
11:20 – 11:40	**EuMC/EuRAD01-1** Real-time DoA Estimation for Automotive Radar Yubo Wu[1], Chengzhang Li[1], Y. Thomas Hou[1], Wenjing Lou[1] [1]Virginia Tech	**EuMC/EuRAD02-1** Radio Wave Propagation Inside Buried Sewer Pipes for Infrastructure Robotics Viktor Doychinov[1], Ian D. Robertson[1] [1]University of Leeds, Leeds, United Kingdom	**EuMC35-1** Collective fabrication of LMST thermally-stable surface-mount ceramic devices for millimeter-wave bands Andrés Fontana[1], Aurélien Périgaud[1], Nicolas Delhote[1], David Carsenat[2], Guillaume Acikalin[2], Patrice Richard[2], Stéphane Bila[1] [1]XLIM - Université de Limoges, [2]Thales SIX GTS	**EuMC36-1** HEFPA – Highly Efficient and Flexible Phased Arrays Marcel Geurts
11:40 – 12:00	**EuMC/EuRAD01-2** Simultaneous Multi-Mode Automotive Imaging Radar Using Cascaded Transceivers Feike Jansen[1], Francesco Laghezza[1] [1]NXP Semiconductors	**EuMC/EuRAD02-2** Quantifying Modulation Quality at the Physical Layer using Equalized Channel Capacity Jan Verspecht[1] [1]Keysight Technologies Inc	**EuMC35-2** Design and Characterization of a compact 6-18GHz 200W Dual Directional Coupler for Power Amplification Applications James Belluot[1], Bertrand Gerfault[1] [1]THALES AVS / MIS	**EuMC36-2** 5G from Space: The path towards 3GPP-based non-terrestrial networks Sebastian Euler
12:00 – 12:20	**EuMC/EuRAD01-3** Auto-calibration of Automotive MIMO Radars Using Simultaneous Localisation and Mapping Nikita Petrov[1], Alexander Yarovoy[1] [1]Delft University of Technology	**EuMC/EuRAD02-3** Impairments of Atmospheric Attenuation on a Wideband E-Band Outdoor Communication Link Laura Manoliu[1], Ralf Henneberger[2], Axel Tessmann[3], Jochen Seidel[1], Michael Eppard[3], Ingmar Kallfass[1] [1]University of Stuttgart, [2]Radiometer Physics GmbH, [3]Fraunhofer Institute for Applied Solid State Physics (IAF), [4]Max Planck Institute for Solid State Research	**EuMC35-3** High-Yield Waveguide Diplexer for Low-Cost E-band 5G Point-to-Point Radio Links Fernando Teberio[1], Ibai Calero[1], Iván Arregui[2], Petronilo Martín-Iglesias[2], Jorge Teniente[2], Miguel A. G. Laso[2] [1]Anteral S.L., [2]Public University of Navarre (UPNA), [3]ESA / ESTEC	**EuMC36-3** Electronically Scanned Antenna (Flat Panel) Based Technologies for HTS Mobile SATCOM Applications Wael Abdel-Wahab
12:20 – 12:40	**EuMC/EuRAD01-4** An Approach for High-Angular Resolution Implementation in Moving Automotive MIMO Radar sen yuan[1], Francesco Fioranelli[1], Alexander Yarovoy[1] [1]TUdelft	**EuMC/EuRAD02-4** Effect of Microsphere Concentration and Size in Compacts on Terahertz Scattering Keir Murphy[1], Mira Naftaly[2], Alison Nordon[3], Daniel Markl[1] [1]University of Strathclyde, [2]National Physical Laboratory (NPL), Teddington, [3]The University of Strathclyde	**EuMC35-4** A Broadband Multilayer Vertical Transition at 79 GHz Employing FR4 as Core Material Dominik Schwarz[1], Nico Riese[1], André Dürr[1], Christian Waldschmidt[1] [1]Ulm University	**EuMC36-4** An Affordable Modular Phased-Array Architecture for Emerging Millimeter-Wave Communication Systems Safieddin Safavi-Naeini[1] [1]University of Waterloo
12:40 – 13:00	**EuMC/EuRAD01-5** Synthetic Aperture Radar Imaging of Moving Targets for Automotive Applications Masoud Farhadi[1], Reinhard Feger[1], Johannes Fink[2], Thomas Wagner[2], Andreas Stelzer[2] [1]Johannes Kepler University Linz, [2]Robert Bosch GmbH	**EuMC/EuRAD02-5** High Temporal Resolution Time-Gating for Wideband Radar Cross Section Measurements Rachel Jarvis[1], Justin Metcalf[1], Jessica Ruyle[1], Jay McDaniel[1] [1]University of Oklahoma	**EuMC35-5** 3D Metal Printed Deformed Elliptical Cavity Bandpass Filter with Wide Stopband Povilas Vaitukaitis[1], Kenneth Nai[2], Jiayu Rao[1], Jiasheng Hong[1] [1]Heriot-Watt University, [2]Renishaw PLC	**EuMC36-5** Antenna Arrays for 5G Millimetre-Wave Ulf Johannsen[1] [1]Eindhoven University of Technology

THURSDAY 11:20 – 13:00

ROOM	Room 12	Room 13	Room 17	Room 8
	EuMC37 Radar and Communication Systems Chair: Nils Pohl[1] Co-Chair: Ilona Rolfes[2] [1]Ruhr University Bochum, [2]Ruhr-Universität Bochum	**EuMC38** Advances in mmWave Antennas Chair: Tian Hong Loh[1] Co-Chair: Zhirun Hu[2] [1]National Physical Laboratory, [2]University of Manchester	**EuMC39** Novel IoT Technologies Chair: Dominique Schreurs[1] Co-Chair: John Batchelor[2] [1]KU Leuven, [2]University of Kent	**EuMW05** Special Session in Memory of Prof. Peter Clarricoats Chair: Rostyslav Dubrovka[1] Co-Chair: Robert Donnan[1] [1]Queen Mary University of London
11:20 – 11:40	**EuMC37-1** An automatic driving test for V2X-communication and application on a scan-phase-antenna diversity Anton Dobler[1], Stefan Lindenmeier[1] [1]University of the Bundeswehr Munich	**EuMC38-1** A Self-Diplexing Dual-Polarized K-/Ka-Band Patch Antenna Noah Sielck[1], Kevin Erkelenz[1], Arne F. Jacob[1] [1]Hamburg University of Technology	**EuMC39-1** FDD for Low Power Backscattering in Batteryless Sensor Nodes Yasser Qaragoez[1], Dominique Schreurs[1], Sofie Pollin[1] [1]KU Leuven	**11:20 – 11:35** **EuMW05-1** Shaped Beam Reflector Antennas Gerald Crone
11:40 – 12:00	**EuMC37-2** Experimental Evaluation of Filtering and Isolation in Highly Integrated mmWave Harmonic Radar Steffen Hansen[1], Nils Pohl[2] [1]Fraunhofer Institute for High Frequency Physics and Radar Techniques FHR, [2]Ruhr-University Bochum	**EuMC38-2** 5G mmWave Dual-Polarized Stacked Patch Antenna Mojtaba Sohrabi[1] [1]TU Dresden	**EuMC39-2** Wireless Power Transfer Procedure via Hybrid Frequency Diversity Enrico Fazzini[1], Alessandra Costanzo[2], Diego Masotti[2] [1]Alma Mater Studiorum - Universita di Bologna, [2]Università di Bologna	**11:35 – 11:50** **EuMW05-2** Modern research and achievements at UCLA inspired by Interaction with Peter Yahya Rahmat-Samii
12:00 – 12:20	**EuMC37-3** Car-to-car communication based on modulated active backscatter and automotive radar Antonio Ramon Lázaro Guillén[1], Marc Lázaro Martí[1], Ramón Maria Villarino Villarino[1], Pedro de Paco[2] [1]Rovira and Virgili University, [2]Universitat Autonoma de Barcelona	**EuMC38-3** Side Lobe Lowered Novel Axially Displaced Ellipse Antenna Design for Radio Link System Compliant with ETSI EN 302 217-4-2 Class 3 Mehmet Akif TULUM[1], AHMET SERDAR TURK[2] [1]Neta Elektronik A.Ş., [2]Yildız Technical University	**EuMC39-3** Meshed Microstrip Printed Antenna for Matching Network-Free RF Energy Harvesting Mahmoud Wagih[1], Alex S. Weddell[1], Steve Beeby[1] [1]University of Southampton	**11:50 – 12:05** **EuMW05-3** Peter Clarricoats - Scholar and Innovator David Olver
12:20 – 12:40	**EuMC37-4** Real-Time Wideband Spectrum Monitor Using Multiple Sampling Frequency Direct RF Undersampling for Wireless IoT Takashi Shiba[1], Tomoyuki Furuichi[1], Kohei Akimoto[1], Mizuki Motoyoshi[1], Suguru Kameda[1], Noriharu Suematsu[1] [1]Tohoku University	**EuMC38-4** Novel Bull's Eye Antenna at Ku Band With Enhanced Gain Bandwidth Despoina Kampouridou[1], Alexandros Feresidis[1] [1]University of Birmingham, UK	**EuMC39-4** A Temperature-Compensated BLE Beacon and 802.15.4-to-BLE Translator on a Crystal-Free Mote Titan Yuan[1], Filip Maksimovic[1], Brad Wheeler[1], David C. Burnett[1], Lydia Lee[1], Thomas Watteyne[2], Kristofer S.J. Pister[1] [1]University of California, Berkeley, [2]INRIA	**12:05 – 12:20** **EuMW05-4** My way: How I become an antenna man due to Professor Peter Clarricoats Fedir Dubrovka[1] [1]Igor Sikorsky Kyiv Politechnic Institute
12:40 – 13:00	**EuMC37-5** Cyclic Wiener Filtering of BPSK Signals for WLAN Adjacent Channel Interference Suppression Aleksandr Denisov[1], Yury Kuznetsov[1], Andrey Baev[1], Maxim Konovalyuk[1], Anastasia Gorbunova[1] [1]Moscow Aviation Institute (National Research University)	**EuMC38-5** Vertical and Horizontal SIW Horn Antennas at 60 GHz Thi-Hong-Le Dam[1], Thi-Them Truong[1], Minh-Thuy Le[2], Alejandro Niembro-Martin[3], Emmanuel Dreina[3], Tan-Phu Vuong[1] [1]Grenoble Alpes University , [2]Hanoi University of Science and Technology, [3]Schneider Electric	**EuMC39-5** RF Energy Extraction Using Wave Impedance Matching Sandhya Chandravanshi[1], Vincent Fusco[1], Neil Buchanan[1] [1]Queen's University Belfast	**12:20 – 12:35** **EuMW05-5** A tribute to Peter Clarricoats Graeme James **12:35 – 12:50** **EuMW05-6** My Friend and Great Contributor to Science and Academia Mohammed Sobhy

THURSDAY 11:20 – 13:00

ROOM	Room 4	Room 9	Room 10
	EuRAD07 Drone Detection and Recognition Chair: Francesco Fioranelli[1] Co-Chair: Duncan A. Robertson[2] [1]TU Delft, [2]University of St Andrews	**EuRAD08** Radar Antennas, Arrays and Calibration Chair: Claire Migliaccio[1] Co-Chair: Thomas Zwick[2] [1]Université Côte d'Azur, [2]Karlsruhe Institute of Technology (KIT)	**EuRAD09** Positioning and Localization Systems Chair: María-Pilar Jarabo-Amores[1] Co-Chair: Markus Steck[2] [1]University of Alcalá, [2]Hensoldt Sensors GmbH
11:20 – 11:40	**EuRAD07-1** bladeRAD: Development of an Active and Passive, Multistatic Enabled, Radar System Piers Beasley[1], Matthew Ritchie[1] [1]University College London	**EuRAD08-1** Design of Antennas with Capacitively Coupled Patches for Enlarged Bandwidth in the 80 GHz Band Jonathan Mayer[1], Jerzy Kowalewski[2], Akanksha Bhutani[1], Lucas Giroto de Oliveira[1], Thomas Zwick[1] [1]Karlsruhe Institute of Technology (KIT), [2]Huber+Suhner	**EuRAD09-1** Near Field DoA estimation utilizing a Large Aperture MIMO Array Radar with Tx Beamforming Kazuhiro Tsujimura[1], Hiroki Mori[1] [1]Toshiba Corporation
11:40 – 12:00	**EuRAD07-2** ARESTOR: A Multi-role RF Sensor based on the Xilinx RFSoC Nial Peters[1], Colin Horne[1], Matthew Ritchie[1] [1]University College London	**EuRAD08-2** Phase Distortion Correction of 79 GHz Frequency-Modulated Continuous Wave Radar Sungdo Choi[1], Seung-Tae Khang[1], Hyun-Woong Cho[1], Minsung Eo[1], Jongseok Kim[1] [1]Samsung Advanced Institute of Technology	**EuRAD09-2** Outlier Rejection Approach for Direction of Arrival Estimation in Low SNR Conditions Andrea Quirini[1], Francesca Filippini[1], Carlo Bongioanni[1], Fabiola Colone[1], Pierfrancesco Lombardo[1] [1]Sapienza University of Rome
12:00 – 12:20	**EuRAD07-3** Development of a Passive Dual Channel Receiver at L-Band for the Detection of Drones Benjamin Griffin[1], Alessio Balleri[1], Chris Baker[2], Mohammed Jahangir[2] [1]Cranfield University, [2]University of Birmingham	**EuRAD08-3** Compact, Broadband, and Highly Efficient Leaky-Wave Antenna in Air-Filled Substrate Integrated Waveguide Technology Kamil Yavuz Kapusuz[1], Andres Vanden Berghe[1], Sam Lemey[1], Hendrik Rogier[1] [1]Ghent University	**EuRAD09-3** Concept analysis of a frequency-sweeping delta/sigma beam-switching RADAR using machine learning Mohammad Reza Seidi Goldar[1], Jamshid Hassanpour[2], Joachim Oberhammer[1] [1]KTH, [2]School of Electrical and Computer Engineering, College of Engineering, University of Tehran
12:20 – 12:40	**EuRAD07-4** Receivers placement for UAV localization in a surveillance area Pierre LEBA[1], Jean-Yves Baudais[2], Stéphane Méric[2], Matthieu Crussière[2], Pierre-Yves Jezequel[1] [1]TDF, [2]IETR, INSA Rennes	**EuRAD08-4** Active Ka-band Open-Ended Waveguide Antenna with Built-in IC Cooling for use in Large Arrays Martijn de Kok[1], A. Bart Smolders[1], Niels Vertegaal[1], Ulf Johannsen[1] [1]Eindhoven University of Technology	**EuRAD09-4** Indoor Positioning with a Six-Beam Planar Antenna Suitable for 2.45 GHz Wireless Communications Alessandro Cidronali[1], Edoardo Ciervo[1], Giovanni Collodi[1], Stefano Maddio[1], Marco Passafiume[1], Giuseppe Pelosi[1] [1]Università di Firenze
12:40 – 13:00	**EuRAD07-5** Realistic Simulation of Drone Micro-Doppler Signatures Cameron Bennett[1], Stephen Harman[1], Ivan Petrunin[2] [1]Aveillant Ltd., [2]Cranfield University	**EuRAD08-5** Dual-Polarized Multilayer L-Band Asymmetric Subarray with Truncated Electric Walls Separation for Airborne SAR Applications Diego Lorente Catalan[1], Markus Limbach[1], Bernd Gabler[1], Héctor Esteban González[2], Vicente Enrique Boria-Esbert[2] [1]German Aerospace Center (DLR), [2]Universidad Politécnica de Valencia	**EuRAD09-5** experimental deep learning assisted super-resolution radar imaging Mostafa Alizadeh[1], Mohammad Chavoshi[1], Amr Samir[1], Ahmed Metwally Hegazy[1], Ali Bahri[2], Mohamed Basha[1], Safieddin Safavi-Naeini[1] [1]UNIVERSITY OF WATERLOO, [2]University of Calgary

THURSDAY 13:50 – 16:40

Posters will be ready by 13:40. Presenters will be around their stands at 13:50 – 14:10 and 16:00 – 16:30.

Exhibition Hall

EuRAD12
EuRAD Posters

Chair: Mustafa Bakr[1]
[1]University of Oxford

EuRAD12-1
Detection of Helicopters on a Single Range-Doppler Map Using LSTM Networks
Deniz Orkun Eren[1], Fatih Pektaş[1]
[1]Aselsan Inc.

EuRAD12-2
Efficient Velocity Disambiguation with Hypothetical Ambiguity Assessment
Sungdo Choi[1], Youngrae Cho[1], Hyun-Woong Cho[1], Minsung Eo[1], Jongseok Kim[1]
[1]Samsung Advanced Institute of Technology

EuRAD12-3
FPGA Implementation of Multiple Low-Rate Sampling Composite Detector
Canisio Barth[1], Ric Romero[1], Douglas Fouts[1]
[1]Naval Postgraduate School

EuRAD12-4
Fast 3D-CFAR for Drone Detection with MIMO Radars
Siying Wang[1], Reinhold Herschel[1]
[1]Fraunhofer Institute for High Frequency Physics and Radar Techniques FHR

EuRAD12-5
Least squares calibration of MIMO radars with collocated arrays
Nikita Petrov[1], Alexander Yarovoy[1]
[1]Delft University of Technology

EuRAD12-6
Joint Range-Angle Super-resolution Estimation for Frequency Division MIMO Radar
Hui Zhang[1], Sida Song[1], Sha Ma[1], Lei Wan[1]
[1]Huawei Technologies Co., Ltd., China

EuRAD12-7
Machine Learning using Support Vector Regression in Radar Remote Sensing for Oil-Spill Thickness Estimation
Charbel Bou Maroun[1], Georges Daou[1], Bassel Hammoud[2], Bilal Hammoud[1]
[1]Lebanese American University, [2]American University of Beirut (AUB), Beirut, Lebanon

EuRAD12-8
Quantum Enabled Staring Radar with Low Phase Noise
Mohammed Jahangir[1], Jonathan Jones[2], Jithin Kannanthara[1], Chris Baker[1], Kai Bongs[2], Michael Antoniou[2], Yeshpal Singh[2]
[1]University of Birmingham, UK, [2]University of Birmingham, UK

EuRAD12-9
Increased traffic safety by means of intelligent detection and localization technologies
Reinhard Kulke[1], Fabian de Ponte Müller[2]
[1]IMST GmbH, [2]DLR, German Aerospace Center

EuRAD12-10
Cognitive Radar Tracking with Adaptation of Update Interval and Integration Time
Svante Björklund[1], Thomas Sjögren[1]
[1]Swedish Defence Research Agency (FOI)

EuRAD12-11
Clutter characterization for robust detection of slow moving targets in Ka-band Noise Radar Images
Nerea del Rey-Maestre[1], Sergii Lukin[1], María-Pilar Jarabo-Amores[1], Konstantin Lukin[2], David Mata-Moya[1], Pedro José Gómez-del-Hoyo[1]
[1]University of Alcalá, [2]National Academy of Sciences of Ukraine

EuRAD12-12
Nonlinear Least Squares Estimation for Breathing Monitoring Using FMCW Radars
Gabriel Beltrão[1], Mohammad Alaee-Kerahroodi[1], Udo Schröder[2], Dimitri Tatarinov[2], Bhavani Shankar M.R.[1]
[1]SnT - Interdisciplinary Centre for Security, Reliability and Trust, University of Luxembourg, [2]IEE S.A., Luxembourg

EuRAD12-13
An Inexpensive SDR System for Emitter Localization
Simon Hüsges[1], Michael Meuleners[1], Christoph Degen[1]
[1]Hochschule Niederrhein

EuRAD12-14
2D Matched Filtering with Time-Stretching; Application to Orthogonal Matching Pursuit (OMP)
Remko Struiksma[1], Faruk Uysal[1], Wim van Rossum[1]
[1]TNO

EuRAD12-15
Radar calibration by corner reflectors with mass-production errors
Nikita Petrov[1], Erkut Yigit[1], Oleg Krasnov[1], Alexander Yarovoy[1]
[1]Delft University of Technology

THURSDAY 14:20 – 16:00

ROOM	Room 1	Room 6	Room 7	Room 13
	EuMC/EuRAD04 Radar Architectures Chair: David Greig[1] Co-Chair: Nils Pohl[2] [1]Leonardo UK, [2]Ruhr University Bochum	**EuMC40** Advances in Biological and Medical Applications Chair: Katia Grenier[1] Co-Chair: Panos Kosmas[2] [1]LAAS-CNRS, [2]Kings College London	**EuMC41** Material and On-wafer Measurements Chair: Xiaobang Shang[1] Co-Chair: Andrej Rumiantsev[2] [1]National Physical Laboratory (NPL), [2]MPI Corporation	**EuMC42** Antennas Using Advanced Manufacturing and Novel Substrate Materials Chair: Alexandros Feresidis[1] Co-Chair: Vincent Fusco[2] [1]University of Birmingham, [2]Queen's University Belfast
14:20 – 14:40	**EuMC/EuRAD04-1** Efficient Calibration of Very Large mm-Wave Radars by Virtual Phase Center Analysis André Dürr[1], Matthias Linder[1], Dominik Schwarz[1], Thomas Frey[1], Christian Waldschmidt[1] [1]Ulm University	**EuMC40-1** First-In-Human Clinical Investigation of the Wavelia Microwave Breast Imaging System Angie Fasoula[1] **INDUSTRIAL KEYNOTE** [1]MVG Industries	**EuMC41-1** In-situ automatic adjustment of probe positions and tilt angles for GSGSG probe Ryo Sakamaki[1], Masahiro Horibe[1] [1]National Metrology Institute of Japan (NMIJ) / National Institute of Advanced Industrial Science and Technology (AIST)	**EuMC42-1** Additive Manufactured Filtering Lens Antennas for Radar Measurements at 240 GHz Sven Thomas[1], Alex Shoykhetbrod[1], Nils Pohl[2] [1]Fraunhofer FHR, [2]Ruhr-University Bochum
14:40 – 15:00	**EuMC/EuRAD04-2** Impact of channel imbalances on beamforming performance in Automotive MIMO Radar Maximilian Eschbaumer[1] [1]Infineon Technologies AG	**EuMC40-2** Radar-based Detection of Hidden People at Different Frequency Bands Sandra Nowok[1], Patrick Wallrath[1], Reinhold Herschel[1] [1]Fraunhofer FHR	**EuMC41-2** Dielectric Measurement of Substrate Materials Using 3D Printed Re-Entrant Cavity Resonator Ali Musa Mohammed[1], Yi Wang[1], Milan Salek[1] [1]University of Birmingham	**EuMC42-2** A Compact 26 GHz Filtering Antenna with Cross Coupling Using LTCC Substrate Kaoru Sudo[1], Ryo Mikase[1], Yoshinori Taguchi[1], Koichi Takizawa[1], Natsumi Minamitani[1], Kengo Onaka[1], Saneaki Ariumi[1], Hisao Hayafuji[1], Masataka Ohira[2] [1]Murata Manufacturing Co., Ltd., [2]Saitama University
15:00 – 15:20	**EuMC/EuRAD04-3** A Low-Power 24-GHz Radar Transceiver for Automotive Hands-Free Trunk Opener Applications in a 0.13µm SiGe BiCMOS Technology Abhiram Chakraborty[1], Claus Lautenschlager[2], Markus Ortner[2], Andreas Wickmann[2], Daniel Englisch[1], Manfred Meindl[2], Muhammad Tayyab Qureshi[1], Martin Frank[1], Aizemaiti Yuemaier[1], Hans-Peter Forstner[1] [1]Infineon Technologies AG, [2]eesy-ic GmbH, [3]Infineon Technologies Linz GmbH & Co KG	**EuMC40-3** Long-Range LoRaWAN backscatter based sensors for medical and wearable applications Marc Lázaro Martí[1], Antonio Ramon Lázaro Guillén[1], Ramón Maria Villarino Villarino[1] [1]Rovira and Virgili University	**EuMC41-3** Complex Permittivity of 3D-Printing Filaments\ in the 20 - 50 GHz Frequency Band Mateusz Krysicki[1], Bartłomiej Salski[1], Tomasz Karpisz[1], Paweł Kopyt[1] [1]Warsaw University of Technology	**EuMC42-3** HIS design for an environment-robust UHF/UWB antenna with 3D-printed inclusions Shobit Agarwal[1], David Chadzichristodoulou[2], Abdul Quddious[3], Diego Masotti[1], Symeon Nikolaou[4], Alessandra Costanzo[3] [1]Alma Mater Studiorum - Universita di Bologna, [2]RF AND MICROWAVE SOLUTIONS LTD, CYPRUS, [3]KIOS Research and Innovation Center of Excellence, University of Cyprus, [4]Frederick University, 1036 Nicosia, [5]University of Bologna
15:20 – 15:40	**EuMC/EuRAD04-4** D-Band FMCW Radar with sub-cm Range Resolution based on a BiCMOS mmWave IC Wael A. Ahmad[1], Maciej Kucharski[2], Herman Jalli Ng[3], Dietmar Kissinger[4] [1]IHP, [2]Sensing and Imaging Research Center, [3]Karlsruhe University of Applied Sciences, [4]Ulm University	**EuMC40-4** Optimized Sensor for Broadband Dielectrometry of Biological Liquids of Small Volume Shilpi Pandey[1], Alexey I. Gubin[2], Soenke Schmidt[1], Martin Schüßler[1], Svetlana A. Vitusevich[3], Nickolay T. Cherpak[2], Rolf Jakoby[1], Carolin Hessinger[1] [1]Technical University of Darmstadt, Darmstadt, [2]O. Usikov Institute for Radiophysics and Electronics NAS of Ukraine, [3]Forschungszentrum Juelich, Peter Gruenberg Institute (PGI-8), Juelich, Germany	**EuMC41-4** Single and Differential Microstrip Lines Excitation Using a Contactless Dielectric Waveguide Probe for V-Band Amr Samir[1], Mohamed Basha[1], Ahmed Metwally Hegazy[1], Mohammad Chavoshi[1], Mostafa Alizadeh[1], Ardeshir Palizban[1], Safieddin Safavi-Naeini[1] [1]University of Waterloo	**EuMC42-4** Using Gypsum Material as the Substrate for Inside Wall Embedded Wireless IoT Sensors Zahra Badamchi[1], Tarek Djerafi[1] [1]INRS-EMT
15:40 – 16:00	**EuMC/EuRAD04-5** Surface pressure sensing radar using V-band Rohit Gawande[1], Ziad Haddad[1], Martin Michalik[1], Mark Taylor[1], Michael Tsai[1] [1]NASA Jet Propulsion Laboratory	**EuMC40-5** Controlled Drug Delivery Mediated by CW Electric fields: Experimental Setup and 3D Microdosimetry Modeling Laura Caramazza[1], Alessandra Paffi[1], Micaela Liberti[1], Francesca Apollonio[1] [1]Sapienza University of Rome, Italy	**EuMC41-5** Terahertz Non-destructive Testing of the Mica Insulation of Power Generator Bars in FMCW Measurements with a Dielectric Waveguide Antenna Maris Bauer[1], Carsten Matheis[1], Andrey Mashkin[2], Stefan Krane[2], Friedhelm Pohlmann[2], Fabian Friederich[1] [1]Fraunhofer ITWM, [2]Siemens Energy Global GmbHCo. KG	**EuMC42-5** Holographic Conical Beam Scanning Antenna for mm-Wave Radars Using Glass Technology Thomas Frey[1], André Dürr[1], Christian Waldschmidt[1], Tobias Chaloun[1] [1]Ulm University

THURSDAY 14:20 – 16:00

ROOM	Room 17	Room 4	Room 12
	EuMC43 Sensing and Dynamic Technologies Chair: Jasmin Grosinger[1] Co-Chair: TBA [1]Graz University of Technology	**EuRAD10** Signal Processing for Automotive Radar Chair: Mikhail Cherniakov[1] Co-Chair: Marc Bauduin[2] [1]University of Birmingham, [2]Interuniversity Microelectronics Centre (Imec)	**EuRAD11** Radar Processing Techniques for Automotive and Transportation Chair: Marina Gashinova[1] Co-Chair: Kevin Cinglant[2] [1]University of Birmingham, [2]ZF Autocruise
14:20 – 14:40	**EuMC43-1** Comparison between Hybrid- and TM-polarized Bessel-Beam Launchers for Wireless Power Transfer in the Radiative Near-field at Millimeter Waves Francesca Benassi[1], Walter Fuscaldo[2], Edoardo Negri[3], Giacomo Paolini[1], Diego Masotti[1], Paolo Burghignoli[3], Alessandro Galli[3], Alessandra Costanzo[1] [1]University of Bologna, [2]Consiglio Nazionale delle Ricerche, Rome, [3]Sapienza University of Rome	**EuRAD10-1** PMCW Radar Robust to Power Amplifier non-Linearity and IQ Imbalance with pi/K-BPSK Modulation Marc Bauduin[1], André Bourdoux[1] [1]imec	**EuRAD11-1** Extented Object Tracking with IMM Filter for Automotive Pre-Crash Safety Applications ANUSHA HANUMEGOWDA[1], Soumya Dewangan[1], Srihari Bhupala[1], Frank Gruson[2], Dagmar Steinhauser[3] [1]Continental Automotive Components(India) Pvt. Ltd, [2]Continental Automotive GmbH, [3]CARISSMA, Technische Hochschule Ingolstadt
14:40 – 15:00	**EuMC43-2** Optimal Operation of RF Energy Rectifiers by Adaptive Number of Frequency Selection using Multisine Excitation Lichen Yao[1], Guido Dolmans[1], Jac Romme[1] [1]Imec/ Holst Centre, Eindhoven	**EuRAD10-2** PreCFAR Gridmaps for Automotive Radar Fabio Weishaupt[1], Nils Appenrodt[1], Julius F. Tilly[1], Jürgen Dickmann[1], Dirk Heberling[2] [1]Mercedes-Benz AG, [2]Institute of High Frequency Technology - RWTH Aachen	**EuRAD11-2** A Real-Time, Frame-Level Platform Vibration Compensation Approach for mmWave Radar Systems Nikhil Poole[1], Soheil Hor[1], Amin Arbabian[1] [1]Stanford University
15:00 – 15:20	**EuMC43-3** Smart tire sensor design using numerical simulations Raffaele Scuderi[1] [1]Dassault Systèmes	**EuRAD10-3** A Radar-Oriented Approach to the Normal Distributions Transform Martijn Heller[1], Nikita Petrov[1], Alexander Yarovoy[1] [1]Delft University of Technology	**EuRAD11-3** Implementation and Assessment of a Radar Based True-Speed-Over-Ground Estimation Approach Utilizing Complex-Valued Correlation Torsten Reissland[1], Fabian Michler[1], Robert Weigel[1], Alexander Koelpin[2], Fabian Lurz[2] [1]Friedrich-Alexander University Erlangen-Nuremberg, [2]Technical University Hamburg (TUHH)
15:20 – 15:40	**EuMC43-4** Remote Microwave Sterilization Applicable Coronaviruses Using Van-Atta Retrodirective Antenna Array with 2-D Tracking Capability M. Kuznetcov[1], K. Kossenas[2], S. Podilchak[2], D. Comite[3], P. Hilario[1], G. Goussetis[1], S. Pavuluri[2], S. Griffiths[2], R. Chadwick[4], C. Guo[4], N. Bruns[4], C. Tait-Burkard[5], et al [1]Heriot-Watt University, [2]University of Edinburgh, [3]Sapienza University of Rome, [4]Univ. of Strathclyde	**EuRAD10-4** Reduction of Sidelobe Effects in Automotive Polarimetric Radar Measurements Julius F. Tilly[1], Ole Schumann[1], Fabio Weishaupt[1], Jürgen Dickmann[1], Gerd Wanielik[2] [1]Mercedes-Benz AG, [2]TU Chemnitz	**EuRAD11-4** Localization and Navigation of Service Robots by means of M-sequence UWB Radars Carsten Smeenk[1], Tim Erich Wegner[1], Gerrit Kropp[2], Johannes Trabert[2], Giovanni Del Galdo[1] [1]Technische Universität Ilmenau, [2]MetraLabs GmbH
15:40 – 16:00	**EuMC43-5** Differential Analysis in Microwave Dielectric Probing for Transcutaneous Biomedical Sensing Adrian Llop Recha[1], Dag Trygve Wisland[1], Tor Sverre Lande[1], Kristian G. Kjelgård[1] [1]University of Oslo	**EuRAD10-5** Comparing Non-Adaptive with Adaptive Windowing Using Multi-Dimensional Spatially Variant Apodization for Automotive Radar Minh Nguyen[1], Reinhard Feger[1], Jonathan Bechter[2], Andreas Stelzer[1], Markus Pichler-Scheder[3] [1]Johannes Kepler University Linz, [2]ZF Friedrichshafen AG, [3]Linz Center Of Mechatronics Gmbh	**EuRAD11-5** Comparison of ZF and MF filters through PSLR and ISLR assessment in automotive OFDM radar Bochra BENMEZIANE[1], Jean-Yves Baudais[2], Stéphane Méric[2], Kevin Cinglant[1] [1]ZF Autocruise, [2]IETR, INSA Rennes

THURSDAY 16:40 – 18:20

ROOM Room 8 – 11

EuMC44
EuMC Closing Session

Chair: Nick Ridler[1], General Chair
Co-Chair: Emma MacPherson[2], EuMC Chair
[1]National Physical Laboratory, UK, [2]University of Warwick, UK

16:40 – 16:50 Session Welcome
Nick Ridler[1]
[1]General Chair

16:50 – 17:20 The (R)Evolution of Wireless Communications
Eric Hawthorn[1]
[1]Radio design

James Clerk Maxwell died before his prediction of the existence of Radio Waves was proved experimentally. Since then, wireless communications have revolutionised the way we communicate and the way we live. Where did it come from, where are we now and where are we going? In this presentation I will briefly outline some of the key historical achievements that have contributed to the evolution of wireless communications, take a look at some of the technology advancements that have contributed to the success of today's systems and discuss how this revolutionary technology might continue.

17:20 – 17:40 Awards Ceremony
Kamal K Samanta[1]
[1]EuMW 2021 Awards Chair

EuMC Prize
EuMC Young Engineer Prizes

17:40 – 18:10 Challenges and Opportunities for Terahertz Communications Towards 6G and Beyond
Tadao Nagatsuma[1]
[1]Osaka University, Japan

Since the first utilization of radio waves for wireless communications by G. Marconi in early 20th century, we have been increasing a carrier frequency of radio waves to ensure a data rate and/or a channel capacity. Currently, the demand for much greater data rate of wireless technologies is growing in accordance with a rapid advancement of mobile networks and rich media contents handled by the networks and computers. For these reasons, researchers have been aggressively seeking a use of terahertz (THz) waves whose frequency is over 100 GHz for ultrahigh-speed wireless links. This talk will overview latest advances in THz communications research and testbeds, and will discuss the future perspective and directions with respect to technological challenges and applications towards 6G and beyond.

18:10 – 18:20 Closing Remarks
Chair: Nick Ridler, General Chair
Co-Chair: Emma MacPherson, EuMC Chair

THURSDAY 16:40 – 18:20

ROOM

Room 1	Room 4	Room 17
EuRAD13 Radar Imaging Chair: Laurent Ferro-Famil[1] Co-Chair: Debora Pastina[2] [1]University of Rennes 1, [2]University of Rome La Sapienza	**EuRAD14** Target and Clutter Classification in Automotive Radar Chair: Thomas Zwick[1] [1]Karlsruhe Institute of Technology (KIT), [2]TU Delft	**EuRAD15** Human Activity Sensing Chair: Michael Antoniou[1] Co-Chair: Francesco Fioranelli[2] [1]University of Birmingham, [2]TU Delft
16:40 – 17:00 **EuRAD13-1** Pulse-to-Pulse Radar-Aided Positioning using Multibeam Autofocus Keith T.J. Klein[1], Faruk Uysal[1], Miguel Caro-Cuenca[1], Matern Otten[1], Jacco de Wit[1] [1]TNO	**EuRAD14-1** Radar-Based Classification of Automotive-Related Scenarios using Temporal Info Karim Ishak[1], Christian Waldschmidt[1], Nils Appenrodt[2], Jürgen Dickmann[2] [1]Ulm University, [2]Daimler AG	**EuRAD15-1** Hand Gesture Recognition Using a Dual Axis Millimeter-Wave Interferometric-Doppler Radar and Convolutional Neural Networks Eric Klinefelter[1], Jeffrey Nanzer[1] [1]Michigan State University
17:00 – 17:20 **EuRAD13-2** Detection of Fiber Orientation with SAR Imaging via Amplitude and Phase Filtering André Froehly[1], Reinhold Herschel[2] [1]Fraunhofer FHR, [2]Fraunhofer Institute for High Frequency Physics and Radar Techniques (FHR)	**EuRAD14-2** Ray-Tracing-Based Micro-Doppler Simulation for 77 GHz Automotive Scenarios Stefan Wald[1], Thomas Dallmann[1], Frank Weinmann[1] [1]Fraunhofer FHR (Fraunhofer Institute for High Frequency Physics and Radar Techniques FHR)	**EuRAD15-2** Distributed Radar-based Human Activity Recognition using Vision Transformer and CNNs Yubin Zhao[1], Ronny G. Guendel[1], Alexander Yarovoy[1], Francesco Fioranelli[1] [1]TU Delft
17:20 – 17:40 **EuRAD13-3** The end-to-end segmentation on automotive radar imagery Yang Xiao[1], Liam Daniel[1], Marina Gashinova[1] [1]University of Birmingham	**EuRAD14-3** Dynamic Road Surface Signatures in Automotive Scenarios Wietse Bouwmeester[1], Francesco Fioranelli[1], Alexander Yarovoy[1] [1]TU Delft	**EuRAD15-3** A Novel Micro-Doppler Coherence Loss for Deep Learning Radar Applications Mikolaj Czerkawski[1], Christos Ilioudis[1], Carmine Clemente[1], Craig Michie[1], Ivan Andonovic[1], Christos Tachtatzis[1] [1]University of Strathclyde
17:40 – 18:00 **EuRAD13-4** A Comparison of Tomographic SAR Reconstruction Methods Using Spaceborne Data Prithvi Laguduvan Thyagarajan[1], Holger Nies[1], Florian Behner[1], Simon Reuter[1], Otmar Loffeld[1] [1]University of Siegen	**EuRAD14-4** Digital FIR filtering for static clutter suppression in low resolution MIMO radar Ram Kishore Arumugam[1], Reinhold Herschel[1], Ihssen Masri[2], Katharina Burger[2], Willibald Reitmeier[2] [1]Fraunhofer FHR, [2]Vitesco Technologies	**EuRAD15-4** High resolution human clustering based on complex signal correlation coefficients Manjunath Thindlu Rudrappa[1], Reinhold Herschel[1] [1]Fraunhofer Institute for High Frequency Physics and Radar Techniques (FHR)
18:00 – 18:20 **EuRAD13-5** Refraction Compensation via Ray Tracing Methods for Complex-Shaped Objects André Froehly[1], Reinhold Herschel[1] [1]Fraunhofer Institute for High Frequency Physics and Radar Techniques (FHR)	**EuRAD14-5** Classification of Vulnerable Road Users Based on Spectrogram Autocorrelation Features Patrick Rippl[1] [1]Hochschule Ulm	**EuRAD15-5** Car Occupancy Detection Using Ultra-Wideband Radar Jakob Möderl[1] [1]Technical University Graz

FRIDAY OVERVIEW

Room	09:00 – 10:40	11:20 – 13:00		14:20 – 16:00	16:40 – 18:20	EVENING PROGRAMME
1	**WF01** Advanced Manufacturing and Packaging					
2	**SF02** Microwave Superconductivity: Applications of SQUID and Josephson Junctions in Microwave Circuits					
3						
4	**EuRAD16** Waveforms	**EuRAD19** Short Range Radar				
5						
6						
7				**EuRAD22 Closing Session**		
8						
9						
10	**EuRAD17** Multistatic and Fusion Techniques	**EuRAD20** Phased Array and MIMO Systems				
11	**EuRAD18** Object Classification Techniques	**EuRAD21** Radar Signal Processing and Imaging		**WF02** Paradigm Change in Automotive mmWave Radar		
12	**WF03** Innovative THz Technologies for Imaging, Radar and Communication					
13	**WF04** Advanced Processing and Deep Learning Approaches for Indoor Sensing Using Short-Range Radars					
14			**EuRAD Lunch**			
15						
16						
17	**SF01** AI Techniques for Microwave Antenna and Filter Design: from Theory to Practice					

EuMC EuMIC EuRAD Students EuMW Exhibitors

FRIDAY 09:00 – 10:40

ROOM	Room 4	Room 10	Room 11
	EuRAD16 Waveforms Chair: Aled Catherall[1] Co-Chair: Tobias Chaloun[2] [1]PlexTek, [2]Ulm University	**EuRAD17** Multistatic and Fusion Techniques Chair: Krzysztof Kulpa Co-Chair: Reinhard Feger[1] [1]Johannes Kepler University Linz	**EuRAD18** Object Classification Techniques Chair: Chris Baker[1] Co-Chair: Jacco de Wit[2] [1]University of Birmingham, [2]TNO
09:00 – 09:20	**EuRAD16-1** Frequency Comb Generation for High Range Resolution OFDM Radar Alexander Quint[1], Benjamin Nuss[1], Axel Diewald[1], Thomas Zwick[1] [1]Karlsruhe Institute of Technology (KIT)	**EuRAD17-1** Multi-Radar Fusion for Failure-tolerant Vulnerable Road Users Classification Maxim Rykunov[1], Eddy De Greef[1], Habib-Ur-Rehman Khalid[2], André Bourdoux[1], Hichem Sahli[2], Kheireddine Aziz[3] [1]Imec, [2]VUB & IMEC, [3]VUB	**EuRAD18-1** Transfer Learning-Based Fully-Polarimetric Radar Image Classification with a Rejection Option Elisa Giusti[1], Selenia Ghio[1], Amir Hosein Oveis[1], Marco Martorella[2] [1]CNIT (National Inter-University Consortium for Telecommunications), [2]CNIT - University of Pisa
09:20 – 09:40	**EuRAD16-2** Effects and Countermeasures at High Velocities for the Frequency Comb OFDM Radar Scheme Benjamin Nuss[1], Lucas Giroto de Oliveira[1], Thomas Zwick[1] [1]Karlsruhe Institute of Technology (KIT)	**EuRAD17-2** On two approaches to radar band fusion Sanhita Guha[1], Andreas Bathelt[1], Joachim Ender[1] [1]Fraunhofer FHR	**EuRAD18-2** Convolutional Neural Networks for Drone Model Classification Holly Dale[1], Michael Antoniou[1], Chris Baker[1], Mohammed Jahangir[1], Aled Catherall[2] [1]University of Birmingham, [2]PlexTek
09:40 – 10:00	**EuRAD16-3** IQ-Transmitter Digital Predistortion for an OFDM Radar Rossen Michev[1], David Werbunat[2], Jürgen Hasch[1], Christian Waldschmidt[2] [1]Robert Bosch GmbH, [2]Universität Ulm	**EuRAD17-3** Modelling of Extended Targets with Dual-Band MIMO Radar Networks Malik Muhammad Haris Amir[1], Salvatore Maresca[1], Giovanni Serafino[1], Paolo Ghelfi[2], Antonella Bogoni[1] [1]TeCIP Institute, Scuola Superiore Sant'Anna , [2]PNTLab, Consorzio Nazionale Interuniversitario per le Telecomunicazioni (CNIT)	**EuRAD18-3** Classification of Unmanned Aerial Vehicles (UAVs) Carrying Payloads with Polarimetric Radar Harinee Visvanathan Sethuraman[1], Alexander Yarovoy[1], Francesco Fioranelli[1] [1]TU Delft
10:00 – 10:20	**EuRAD16-4** Doppler Effect in a 79-GHz Sequential Sampling Pulse Radar Alexander Leibetseder[1], Andreas Stelzer[2] [1]Infineon Technologies Linz GmbH & CoKG, [2]Institute for Communications Engineering and RF-Systems / Johannes Kepler University Linz	**EuRAD17-4** Contactless Inspection of Hand-written Documents with Terahertz Imaging Ingrid Ullmann[1], Konstantin Root[1], Jan Schür[1], Lorenz Scheuble[1], Martin Vossiek[1] [1]Friedrich-Alexander-Universität Erlangen-Nürnberg	**EuRAD18-4** Objects classification based on UWB scattered field and SEM data using machine learning algorithms Yasmina Zaky[1], Nicolas Fortino[1], Jean-Yves Dauvignac[1], Benoit Miramond[1] [1]Université Côte d'Azur, CNRS, LEAT, France
10:20 – 10:40	**EuRAD16-5** Cognitive FMCW-Radar Concept for Ultrafast Spatial Mapping using Frequency Coded Channels Nicholas Karsch[1], Christoph Baer[1], Thomas Musch[1] [1]Ruhr-Universität Bochum	**EuRAD17-5** Bistatic GB-SAR with moving transponder Lapo Miccinesi[1], Luca Bigazzi[1], Massimiliano Pieraccini[1], Michele Basso[1] [1]Florence university	**EuRAD18-5** Fruit Sorting with Amplitude-only Measurements Flora ZIDANE[1], Jérôme Lanteri[1], Julien Marot[2], Claire Migliaccio[1] [1]Université Côte d'Azur, [2]Aix Marseille Université

FRIDAY 11:20 – 13:00

ROOM	Room 4	Room 10	Room 11
	EuRAD19 Short Range Radar Chair: Marina Gashinova[1] Co-Chair: Reinhold Herschel[2] [1]University of Birmingham, [2]Fraunhofer Institute for High Frequency Physics and Radar Techniques FHR	**EuRAD20** Phased Array and MIMO Systems Chair: Alexander Charlish[1] Co-Chair: David Mata-Moya[2] [1]Fraunhofer Institute for Communication, Information Processing and Ergonomics, [2]University of Alcalá	**EuRAD21** Radar Signal Processing and Imaging Chair: Martin Vossiek[1] Co-Chair: Fatemeh Norouzian[2] [1]Friedrich-Alexander University Erlangen-Nuremberg, [2]University of Birmingham
11:20 – 11:40	**EuRAD19-1** Hand-Guided Mobile Terahertz 3D Imaging Platform with Aspherical Telecentric f-Theta Optics Shiva Mohammadzadeh[1], Andreas Keil[1], Sven Leuchs[2], Christian Krebs[2], Dirk Nüßler[2], Jörg Seewig[3], Fabian Friederich[1] [1]Fraunhofer ITWM, [2]Fraunhofer FHR, [3]Institute for Measurement and Sensor Technology, TU Kaiserslautern	**EuRAD20-1** Architecture considerations for AESA antennas providing maritime Air Defence Martin Widgery[1] [1]BAE Systems	**EuRAD21-1** Doppler Beam Sharpening for Enhanced MIMO Imagery in the Presence of Automotive Interference Anum Ahmed Pirkani[1], Scott Cassidy[1], Fatemeh Norouzian[1], Marina Gashinova[1], Mikhail Cherniakov[1] [1]The University of Birmingham
11:40 – 12:00	**EuRAD19-2** Real Time Ultra High Resolution Microwave Imaging Curtain Harun Cetinkaya[1], Remi Baque[2], Reinhold Herschel[1], Nils Pohl[3] [1]Fraunhofer FHR, [2]ONERA, [3]Ruhr-University Bochum	**EuRAD20-2** Compressive Sensing for Direction-of-Arrival Estimation Using an Electronically Steered Multiple-Input Multiple-Output Array Max Schurwanz[1], Jan Mietzner[1], Peter Adam Hoeher[2] [1]University of Applied Sciences (HAW), [2]Christian-Albrechts-University of Kiel	**EuRAD21-2** Finding Anomalies in Radar Sea Clutter Using Radon Transforms Andrew Stove[1], Liam Daniel[2], Marina Gashinova[1], Edward Hoare[1], Dillon Kumar[1] [1]University of Birmingham, [2]University of Birmingham
12:00 – 12:20	**EuRAD19-3** Analysis of a Physically-Embedded Radar Sensor System Thomas Kurin[1], Vadim Issakov[1], Stefan Erhardt[1], Robert Weigel[1], Fabian Lurz[3] [1]Friedrich-Alexander University Erlangen-Nuremberg, [2]Infineon Technologies AG, [3]Hamburg University of Technology	**EuRAD20-3** A Practical Concept for Precise Calibration of MIMO Radar Systems Johanna Geiss[1], Erik Sippel[1], Martin Vossiek[1] [1]Institute of Microwaves and Photonics, University of Erlangen-Nuremberg	**EuRAD21-3** Images of satellite elements with a Sub-THz ISAR system Emidio Marchetti[1], Andrew Stove[1], Edward Hoare[1], Mikhail Cherniakov[1], Marina Gashinova[1] [1]University of Birmingham
12:20 – 12:40	**EuRAD19-4** Towards a Field-Ready HF-VHF Ground-Based Ice Penetrating Synthetic Aperture Radar: Forward Modelling and Validation for SAR Imaging Jonathan Hawkins[1], Lai Bun Lok[1], Paul Brennan[1], Keith Nicholls[2] [1]University College London, [2]British Antarctic Survey	**EuRAD20-4** Combined ISAR and MIMO processing for near-field 3D radar imaging Seifallah Jardak[1], Daiki Yoda[2], Hiroki Mori[2] [1]Bristol Research & Innovation Laboratory, [2]Toshiba Corporation	**EuRAD21-4** Doppler Centroid Estimation for Ocean Surface Current Retrieval from Sentinel-1 SAR Data MUHAMMAD AMJAD IQBAL[1], Andrei Anghel[2], Mihai Datcu[1] [1]University Politehnica of Bucharest Romania, [2]University POLITEHNICA of Bucharest (UPB) Romania, [3]German Aerospace Center (DLR)
12:40 – 13:00	**EuRAD19-5** Comparison of Short-Range SAR Imaging Algorithms for the Detection of Landmines using Numerical Simulations Jonas Schorlemer[1], Jan Barowski[1], Ilona Rolfes[1], Jochen Jebramcik[1] [1]Ruhr University Bochum	**EuRAD20-5** Automotive Interference Suppression in MIMO and Phased Array Radar Anum Ahmed Pirkani[1], Fatemeh Norouzian[1], Edward Hoare[1], Mikhail Cherniakov[1], Marina Gashinova[1] [1]The University of Birmingham	**EuRAD21-5** Radar Travel Time Tomography for Subsurface Ice Exploration at Saturn's Moon Enceladus Christian Huber[1], Andreas Benedikter[2], Gerhard Krieger[2], Marc Rodriguez-Cassola[2] [1]Friedrich Alexander University of Erlangen-Nürnberg, [2]Microwaves and Radar Institute, German Aerospace Center (DLR)

FRIDAY 14:20 – 15:40

ROOM	Room 7 – 9
	EuRAD22 EuRAD Closing Session Chair: James Watts[1], EuRAD Chair Co-Chair: Stephen Harman[2], EuRAD Co-chair and Matthew Ritchie[3], EuRAD TPC Chair [1]Theta Technologies Ltd., UK, [2]Aveillant Ltd, UK, [3]University College London, UK
14:20 – 15:00	The Long and Winding Road that Leads to Autonomy? Nigel Clarke[1] [1]Consultant Autonomous vehicles continued to be a significant growth area for radar sensing. The most manufactured radars in the world will be for automotive sensing and hence it represents a key use case of RF sensors but sensing is only part of the full challenge. This talk focuses on the difficulties faced in trying to build a Level 5 fully autonomous car in terms of sensors and scenarios whilst highlighting the role that microwave radar must play in making a robust sensor system for it. Examples highlights will be reviewed of UK research into what higher frequencies than the standard automotive 76 GHz radars can bring to making full autonomy more realisable.
15:00 – 15:20	Award Ceremony Kamal K Samanta[1] [1]EuMW 2021 Awards Chair EuRAD Conference Prize EuRAD Young Engineer Prize
15:20 – 15:40	Closing Remarks and Invitation to EuRAD 2022 in Milan James Watts, EuRAD 2021 Chair; EuRAD 2022 Chair

Welcome from the Workshop and Short Courses Chairs

As the first physical event in the field of microwave engineering after the outbreak of COVID-19 pandemic, EuMW 2021 committee are uniting students, academics, and industrial experts again in a less formal format at our workshops and short courses sessions. After careful considerations, we are pleased to offer an extensive and diverse programme of workshops and short courses throughout the entire week.

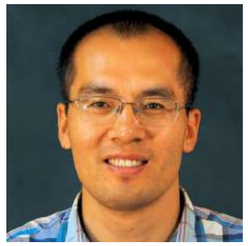
The wide-ranging programme of half-day and full-day workshops and short courses has been chosen to cover a range of important topics of interest to the whole EuMW community. The short courses will cover fundamental knowledge of specific areas or hands-on experience such as power amplifier designs, filter simulation, radar signal processing and AI technology for designing antennas and filters etc.; on the other hand, the workshops attracted world-leading scientists and engineers in the fields showcasing the latest developments of popular subjects such as 6G front-end developments, wireless power transfers, microwave in biomedical engineering, advanced manufacturing, and millimetre-wave and terahertz on-wafer/off-wafer S-parameters, power and load-pull measurements etc. Advances in semiconductor devices circuits based on GaN, SiC, CMOS and SiGe technologies and their applications will also be covered in a series of workshops.

We are very grateful to all the organisers, presenters and authors of workshops and short courses for their hard work and dedication before and during the conference. Each workshop and short course is individually endorsed by one or two of the conferences of EuMW. However, they are available and accessible to any scientist or engineer wishing to gain a broader perspective on microwave and RF systems and devices, or to learn about a new specialism within our broad field. Workshop organisers have been asked to provide panel sessions within their events for discussion and interaction, and we hope that you will benefit from participating in the international networking opportunity that this will present.

The workshops and short courses are mainly arranged on Sunday, Monday and Friday with few on Wednesday and Thursday. The EuMC endorsed sessions are distributed over the entire week and the EuRAD endorsed sessions are scheduled on Wednesday onwards, after the end of the main EuMIC conference sessions. We are confident that this structure will enable you to attend multiple workshops or short courses to incorporate into your schedule for the week, to enhance conference experience in London.

Slides for the workshops and short courses will be available to download from the conference's websites approximately two weeks before the conference. No hard copies of the slides will be provided. Instructions for the download process will be provided to the registered participants near the conference.

Finally, we would like to welcome you all in London in February 2022 and be United in Microwaves!



CHONG LI
Workshop, Short Courses Chair
University of Glasgow, UK

QAMMER ABBASI
Workshop, Short Courses Co-Chair
University of Glasgow, UK

SUNDAY 09:00 – 18:20

SS02
EuMIC

Fundamentals of Microwave PA Design

Chair: Paolo Colantonio[1]
Co-Chair: Franco Giannini[1]
[1]University of Roma Tor Vergata

Room 8

This short course aims to provide a comprehensive overview of all aspects related to the design of microwave power amplifier design. It is an introductory course, dedicated to graduate engineers who have moved into the field of RF design, as well as to microwave designers who aim to deeply understand the power amplifier basic concepts. This short course features a range of presentations and will provide a comprehensive overview and basic understanding on recent important progress and novel state-of-the-art achievements in semiconductor power amplifiers. Advances in semiconductor amplifiers and their applications will also be covered.
Starting from the fundamental concepts on semiconductor devices and their modelling development, the theoretical foundations of a power amplifier design are discussed. It will include fundamental concepts and state-of-the-art results on actual designs of a range of semiconductor power amplifiers using existing foundries. The load pull technique is also addressed and focused from the designer perspective.
The presentations will also cover a variety of advanced topics and will provide the attendees with a clear overview of the main streams of current and important research trends worldwide in this field, as the Doherty architecture and the load modulation power amplifier design concepts.
The short course will also focus on the major challenges, such as stability (small and large signal) and how to address these in amplifier design. Finally, accounting for the linearity issue, a basic overview on linearization techniques and their adoption to properly mitigate the amplifier distortion effects will conclude the short course.

PROGRAMME

Semiconductor devices and modelling for PAs
Iltcho Angelov[1]
[1]Chalmers University

PA basic concepts
Franco Giannini[1]
[1]University of Roma Tor Vergata

Design and model oriented load pull techniques
Marco Pirola[1]
[1]Politecnico di Torino

The Doherty power amplifier
Paolo Colantonio[1]
[1]University of Roma Tor Vergata

Load modulated PAs
Steve Cripps[1]
[1]Cardiff University

X-parameters high-power PAs modeling for system level analysis
Alessandro Cidronali[1]
[1]University of Florence

Linear and nonlinear stability analysis of power amplifiers
Giorgio Leuzzi[1]
[1]University of L'Aquila

Linearization techniques overview
Pere L. Gilabert[1]
[1]Universitat Politècnica de Catalunya UPC-Barcelona Tech.

Design of the power amplifier section of a X-band MMIC single chip front end
Davide Resca[1], Francesco Scappaviva[1]
[1]MEC srl

SUNDAY 09:00 – 13:00

SS04
EuMC

Terahertz Technology, Instrumentation and Applications

Chair: Miguel Navarro-Cía[1]
[1]University of Birmingham

Room 13

Wireless communications are irremediably moving into millimetre-waves and THz; evidence of this is the IEEE 802.15.3d-2017 standard. THz is also becoming key for security screening, quality control and medical imaging because of its excellent balance between spatial resolution and material penetration. Unquestionably, THz will play a major role in coming years. In this context, engineers need to be well aware of the current technology and the challenges related to THz in order to wangle the next generation of THz components and systems.
This Short Course aims to provide an opportunity for attendees to familiarize with THz technology (CW and pulsed). The storyline of the Short Course will build upon the organiser's research in THz devices and experience with: (CW) the commercial instruments ABmm VNA, Keysight N5247B PNA-X with VDI extenders and TeraSense imaging systems; (pulsed) the commercial instruments TeraView TPS Spectra 3000 and Menlo Systems TERA K15, and with an in-house (University College London) near-field time-domain-microscopy system. The Short Course will include the following sections:
o Why THz now? Historic introduction of THz science and technology. Current applications, trends and potential opportunities. Challenges from the material point of view. Considerations for modelling/simulations.
o THz technology: Passive components; sources (thermal, electrical and optical/laser based); detectors (thermal, coherent, others); commercial instruments, including cameras; my own experience: ABmm, TPS Spectra 3000, TERA K15 and non-commercial near-field TDS.
o TDS in detail: generation & detection.
o Applications

PROGRAMME

Terahertz technology, instrumentation and applications

Miguel Navarro-Cía[1]
[1]University of Birmingham

AGENDA

1. Why THz now? Historic introduction of THz science and technology.
2. Current applications, trends and potential opportunities.
3. Challenges from the material point of view.
4. Considerations for modelling/simulations.
5. THz technology: Passive components; sources (thermal, electrical and optical/laser based); detectors (thermal, coherent, others); commercial instruments, including cameras; user experience:
6. TDS in detail: generation & detection.
7. Applications

SUNDAY 09:00 – 18:20

WS01
EuMC

Advances of Wireless Sensing in Harsh and Severe Environments

Chair: Valentina Palazzi[1]
Co-Chair: Smaïl Tedjini[2]
[1]University of Perugia, [2]University Grenoble Alpes

Room 1

The research on wireless sensors and IoT devices is proceeding at full speed, and the potential of such technologies as game changers in different application scenarios is rapidly emerging. IoT devices can bring a significant support to industry, providing the correct tools to implement continuous condition monitoring of production processes, inventory, and supply chains (the so-called Industry 4.0 and Industrial IoT). In such a context, one of the main bottlenecks to achieve full deployability of the IoT devices is their reliability. Indeed, production facilities are characterized by harsh and severe environments (such as high temperature, humidity, and electromagnetic interferences) which can threaten the device integrity and deteriorate the quality of the wireless links. Additionally, due to the considerable extension of industrial buildings and farms, wireless sensor networks must be deployed over large and remote areas, which hinders the possibility to perform maintenance and to guarantee continuous power supply to the single sensor nodes. Similar challenges are faced by IoT devices utilized in different contexts, such as Smart Cities and Structural Health Monitoring, which makes the design of electronics for harsh environments a transversal topic. The present workshop aims at providing an extended overview of the current advances in wireless sensing for harsh and severe environments. The impact of adverse operating conditions on devices and signals will be analyzed, and this study will be used to derive models and design strategies for IoT devices. The most recent outcomes in such context will be described and discussed, and future directions will be outlined.

PROGRAMME

Additively manufactured wireless sensors for rugged IoT, structural health monitoring, smart agriculture and smart cities applications

Manos M. Tentzeris[1]
[1]Georgia Institute of Technology

Emerging design strategies and technologies for wireless sensing in harsh environments

Valentina Palazzi[1]
[1]University of Perugia

End-to-end characterization of wireless sensor links for the Industrial IoT (IIOT)

Alessandra Costanzo[1]
[1]University of Bologna

Accurate wireless sensor connectivity simulations in industrial environments with severe electromagnetic interference

Martin Vogel[1], C. J. Reddy[1]
[1]Altair

Reliability enhancements with frequency diverse RFID systems

Thomas Ußmüller[1]
[1]University of Innsbruck

Passive HF RFID repeater for communicating with tags in metal housings

Jasmin Grosinger[1]
[1]Graz University of Technology

Development and implementation of RFIDsensors for the monitoring of cheeseindustry

Smaïl Tedjini[1]
[1]University Grenoble Alpes

Autonomous sensors for environmental monitoring

Nuno Borges Carvalho[1]
[1]Universidade de Aveiro

Advancements on packaging additive manufacturing for harsh environment wireless sensors

Eduardo Rojas[1]
[1]Embry-Riddle Aeronautical University

RFID battery-less sensing in generators and transformers of hydroelectric power plants

Konstantinos Zannas[1]
[1]u-blox

Wireless, batteryless and packageless SAW sensors for harsh environments

Omar ELMAZRIA[1]
[1]Université de Lorraine

SUNDAY 09:00 – 18:20

WS02
EuMIC/
EuMC

Terahertz Device, Circuit and System Fundamentals and Applications

Chair: Dimitris Pavlidis[1]
Co-Chair: Imran Mehdi[2] and Javier Mateos[3]
[1]Florida International University, [2]Jet Propulsion Laboratory, [3]University of Salamanca

Room 4

THz technology has reached a certain degree of maturity but there are still important developments necessary for implementing it to systems. At the same time, there are still needs for device and circuit studies in order to improve, frequency, power, sensitivity performance and provide integrated solutions to system requirements. The workshop will provide the opportunity to new generations of scientists and engineers to learn about the unique features of Terahertz technologies, while at the same time addressing the latest achievements in the field. THz applications to be discussed extending among from sensing and spectroscopy to communications and imaging. The workshop will bring together experts from various academic, national labs and commercial enterprises to discuss the most recent advances in their respective fields and to provide insight into what the future might hold for exploration of this frequency range. It will focus on a variety of materials such as traditional III-Vs, III-Nitrides, Silicon, Graphene and Transition metal dichalcogenides (TMDs), as well as various device concepts for efficient THz generation and detection. The operation of the components to be discussed is based on plasmonics, photoconductors, plasma waves, photomixing, Resonant Tunneling, Negative Differential Resistance, CMOS and High-Electron Mobility Transistors. Devices such as Quantum Cascade Lasers, Self-switching Diodes and Uni-Traveling-Carrier Photodiodes and nanoscale Vacuum Transistors will also be addressed. Advanced Sensing, Imaging and Communications and terrestrial, space applications will be discussed. The Workshop is intended for young scientists and engineers who are interested in learning about this emerging field, as well as individuals with a more advanced understanding of related concepts. The topics addressed include fundamental and engineering considerations together with the latest results in Terahertz technology

PROGRAMME

THz applications: from devices to space systems
Imran Mehdi[1]
[1]Jet Propulsion Laboratory

Nitride-based two- and three-terminal devices for THz applications; from diodes to transistors and Nanoscale Vacuum transistors
Dimitris Pavlidis[1]
[1]Florida International University

Terahertz characterization and applications of III-Nitride and complex oxide heterostructures
Berardi Sensale-Rodriguez[1]
[1]The University of Utah

Gated planar nanodiodes for tHz detection
Javier Mateos[1]
[1]University of Salamanca

InP HBTs for THz microsystems
Miguel Urteaga[1]
[1]Teledyne Scientific Company

Low-power consumption THz metasurface quantum-cascade VECSELs.
Benjamin Williams[1]
[1]University of California Los Angeles

THz devices and systems: from technology to applications
Guillaume Ducournau[1], J. F. Lampin[1], E. Peytavit[1] and S. Barbieri[1]
[1]CNRS - University of Lille

Terahertz communications using resonant tunneling diodes
Masayuki Fujita[1]
[1]Osaka University

Resonant-tunneling-diode THz oscillators and applications
Safumi Suzuki[1] and Masahiro Asada[1]
[1]Tokyo Institute of Technology

High-speed terahertz wireless is hot, how about its contrary?
Ruonan Han[1]
[1]MIT

Challenges and advances in terahertz antennas
Maria Alonso del Pino[1]
[1]Delft University of Technology

THz spectroscopy of agricultural samples
Marion K. Matters-Kammerer[1]
[1]Eindhoven University of Technology

SUNDAY 09:00 – 18:20

WS03
EuMC

mmWave Plastic Waveguide High Data Rate Communication

Chair: Didier Belot[1]
Co-Chair: Eric Kerhervé[2]
[1]CEA, [2]IMS Bordeaux

Room 17

Driven by the requirements of emerging applications such as the autonomous driving, the mini-cell base stations, the e-health and the industry 4.0, the enablement of high-speed, low-latency, and low-power communication technologies is a key challenge to unlock the forthcoming sixth generation standard for wireless communications technologies (6G). Leveraging the availability of cost effective high performance silicon technologies, CMOS and BiCMOS sub-THz integrated circuits (IC) have demonstrated impressive performances (both in terms of achievable data rate and low power consumption) leading to innovative product introduction on the market. However, most of those developments have been focusing on wireless link and are consequently limited by the spectrum regulation (in terms of usable bandwidth). This limits the optimization that can be achieved at the system level in order to propose the best trade-off between power consumption and data rate. Europe is leading the thematic, with exploratory labs as KU Leuven, IMS Bordeaux and CEA-LETI Grenoble.
Maximum data-rate transmitted with this technique is 36Gbs over 1m, and maximum distance is 15m with 1.5Gbs transmitted. Three technologies are needed to transmit data:
-The RF-mmWave transceiver IC, generally using OOK, ASK, FSK modulation and targeting few pj/bit efficiency.
-The Electromagnetic coupling element, generally an antenna structure that must be as efficient as possible to limit the losses.
-The plastic fiber, where material specificities as Epsilon R and Tangent Delta are the main, but not the only one key factors.
Main challenges for this technique are:
-How to address 100Gbs over 1m for Data-center market.
-How to increase data rate at medium-long distance (5m-20m) reducing losses for other connectivity markets (vehicles, mini-cells, home, factories, ...)
-How to aim the pj/bit increasing as far as possible the efficiency to reduce the power consumption, thus the environmental impact.
-Which plastic material to reduce the environmental impact?
This Workshop will propose state of art presentations from research public and private organizations, and will give the opportunity to the audience to deeply discuss the potentiality of this technology. At the end of the Workshop, a Panel discussion will be organized with the speakers and Audience will be able to discuss with them to understand more this approach.

PROGRAMME

A 140GHz SFP28 PMF module achieving 25Gbps and 50Gbps with channel equalization
Patrick Reynaert[1]
[1]KU Leuven

Loss/sensitivity optimized X-shaped millimeter-wave plastic waveguide
Anthony Ghiotto[1]
[1]IMS Bordeaux (U.Bordeaux)

Plastic and hybrid communication links at 60GHz and 140GHz
José-Luis Gonzalez Jimenez[1]
[1]CEA-LETI (UGA)

High data-rate mmWave plastic fiber for evolved 5G and 6G base stations
Yinggang Li[1], Jonas Hansryd[1]
[1]Ericsson AB, Sweden

First mmWave transceiver IC product for plastic communications and contactless communications
Lionel Vogt[1]
[1]STM

Plastic wave guide: which connectivity market for this solution?
Laurent PETIT[1]
[1]Radiall

Demonstration
Didier Belot[1]
[1]CEA

SUNDAY 09:00 – 18:20

WS04
EuMC

New Trends in Microwave and mmWave Filters

Chair: Maurizio Bozzi[1]
Co-Chair: Cristiano Tomassoni[2]
[1]University of Pavia, [2]University of Perugia

Room 7

The aim of the workshop is to provide the attendees with a comprehensive overview of the most recent advances and the major research trends in area of microwave and millimetre-wave filters. Besides being a key component of any RF system, filters represent a major portion of the research activity on passive components, and attract special interest both in the academia and in the industry. Currently, all main applications (from 5G/6G to space) require filters with superior performance and specific fabrication properties.
The workshop includes 10 presentations (possibly one more will be subsequently added). The topics covered by the presentations will range from innovative design techniques to novel technological and manufacturing processes. The hot topic of tunable filters will be discussed, along with applications to space.
World-recognized authorities in the field will illustrate their recent achievements, and ample time will be devoted to the discussion, with the audience with a panel session that will cover approximately 25% of the total allotted time.

PROGRAMME

Wideband filtering circuits under multimode resonance
Yunpeng Lyu[1] and Lei Zhu[1]
[1]Nanjing University of Posts and Telecommunications

Advanced techniques for microwave planar filter realization
Roberto Gomez-Garcia[1], Li Yang[1] and José-María Muñoz-Ferreras[1]
[1]University of Alcala

Compact and multilayer substrate integrated waveguide (SIW) filters
Cristiano Tomassoni[1] and Maurizio Bozzi[2]
[1]University of Perugia, [2]University of Pavia

Multilayer and 3D filters
Cédric Quendo[1]
[1]Lab-STICC University of Brest

Recent researches and future trends of millimeter-wave on-chip bandpass filters
Wenquan Che[1] and Guangxu Shen[2]
[1]South China University of Technology, [2]Nanjing University of Posts and Communication, China

High Q tunable filters using a single tuning element
Raafat R. Mansour[1]
[1]University of Waterloo

Fully-directional RF co-designed bandpass filtering technologies
Dimitra Psychogiou[1]
[1]University College Cork and Tyndall National Institute

New high manufacturing yield filter design methods and topologies for high-capacity satellites
Fernando Teberio[1]
[1]Anteral/Public University of Navarre UPNA-MCG

Novel solutions of waveguide filters for microwave space applications
Vicente Enrique Boria-Esbert[1]
[1]Universitat Politècnica de Valencia

Shape optimization of microwave cavity filters
Stéphane Bila[1]
[1]XLIM CNRS Limoges

SUNDAY 09:00 – 18:20

WS05
EuMC

On-Chip and Scalable RF Packaging Solutions with Integrated Antennas for 5G mmWave and 6G Applications

Chair: Marcel Wieland[1]
Co-Chair: Ivan Ndip[2]
[1]Globalfoundries, [2]Fraunhofer IZM

Room 9

The on-going commercialization of 5G focuses on sub-6 GHz 5G-systems. Although some 5G mmWave devices are already in market, R&D of miniaturized, scalable, cost-effective and energy-efficient 5G mmWave systems which operate in the 24-29 GHz and 37-40 GHz bands is still underway. These systems are expected to enable peak data-rates up to 20 Gbps and latency of about 1ms. Unlike 5G, 6G is envisioned to operate above 100 GHz, e.g., in D-band, and would enable data-rates up to about 1 Tbps as well as latency of approximately 100 µs. Such extremely high data-rates and low latency, combined with novel artificial intelligence techniques, will enable new applications that would transform our lives, economy and society. However, the development of these 5G mmWave and 6G THz-systems is challenging, partly because of very high channel losses, which have severe impact on signal-to-noise ratio and throughput. To overcome these challenges, new mmWave/THz MIMO and beamforming-architectures as well as new on-chip, packaging, integrated-antenna and frontend-module (FEM)-integration solutions are required. In this workshop, experts from industry and academia will present novel system-architectures, on-chip and scalable Antenna-in-Package solutions for 5G mmWave and 6G. Key challenges and various RF system integration approaches (monolithic/heterogeneous-integration…) for the development of 5GmmWave/6G frontend-modules as well as chip-package co-optimization and multi-physics techniques will be presented. Recent results of some national/international 5GmmWave/6G projects such as SERENA (5G-mmWave EU Project), mmWave-IPCEI (Important Project of Common European Interest) and 6GKom (first 6G D-band-module project funded by German Federal Ministry of Education & Research) will also be discussed.

PROGRAMME

Workshop introduction
Marcel Wieland[1]
[1]Globalfoundries

Architectural challenges for 5G mmWave and 6G sub mmWave radio base stations
Kristoffer Andersson[1]
[1]Ericsson

Technology and chip-design considerations for 5G/B5G beamforming solutions
Franz Dielacher[1]
[1]Infineon Technologies

Transceiver frontends in BiCMOS technology for 6G communications
Dietmar Kissinger[1]
[1]University of Ulm

RF system-integration approaches and integrated antennas for 5G mmWave and 6G
Ivan Ndip[1]
[1]Fraunhofer IZM

Scalable AiP modules and chip-package-co-optimization for 5GmmWave/B5G
Selaka Bulumulla[1]
[1]Globalfoundries

Design Challenges of mm-wave Front-Ends and Antennas for 5G and beyond
Vadim Issakov[1]
[1]Braunschweig University of Technology

Package Design Trade-offs for 100Gbps 6G/THz Wireless Communication Links
Ullrich Pfeiffer[1]
[1]University of Wuppertal

Prediction of 5G/B5G transmitter characteristics using a comprehensive multi-physicalsimulation framework
Christian Fager[1]
[1]Chalmers University

SUNDAY 09:00 – 18:20

WS06
EuMIC/
EuMC

Progress and Status of Gallium Nitride Monolithic Microwave Integrated Circuits

Chair: Rüdiger Quay[1]
Co-Chair: Farid Medjdoub[2] and Ernesto Limiti[3]
[1]Fraunhofer IAF, [2]U. Lille/IEMN, [3]University of Rome

Room 10

This workshop gives an overview of the progress of important Gallium Nitride MMIC technologies available to the microwave and RF community for frequencies from 400 MHz to 200 GHz. Prominent industrial vendors of GaN MMICs have been invited and have agreed to participate. Several international speakers will give their view to the evolution of important applications such as sensing, data com, with emphasis on mm-wave IC technology. Several roadmaps will be provided to enable the audience to estimate the progress of MMIC on a global scale. Further, the research progress with respect to higher frequency scaling beyond commercial technologies is addressed. The workshop thus will provide an overview on the overall status of MMIC technology, device technology, circuit design, reliability, and integration.

PROGRAMME

Self-configuring, adapting and reconfigurable GaN MMICs
Charles Campbell[1]
[1]Qorvo (USA)

Recent development of GaN power Technology applied to RF sensors
Didier Floriot[1]
[1]UMS (France, Germany)

State of the art mmWave GaN/Si MMICs
Marc Rocchi[1]
[1]Ommic (France)

Design of high performance microwave and millimeter wave GaN HPAs
Bill Pribble[1]
[1]Wolfspeed (USA)

Design of GaN power amplifier MMICs operating beyond 100 GHz
Maciej Cwiklinski[1]
[1]Fraunhofer IAF (Germany)/Rohde und Schwarz

Mm-wave space applications using GaN at ESA
Piero Angeletti[1]
[1]European Space Agency/ESA

Reliability evaluation, failure modes and mechanisms of scaled RF GaN high electron mobility transistors
Enrico Zanoni[1], Matteo Buffolo[1], Carlo De Santi[1], Matteo Meneghini[1] and Gaudenzio Meneghesso[1]
[1]U. Padova

Technological development towards high performance mmWave GaN HEMTs and enhanced reliability
Farid Medjdoub[1]
[1]U. Lille/IEMN

Multifunctional front-end integration for radar/earth observation at mmWaves
Ernesto Limiti[1]
[1]U. Rome Tor Vergata

SUNDAY 09:00 – 13:00

WS07
EuMC

RF Reliability Status and Challenges for 5G mmWave and 6G Applications

Chair: Fernando Guarin[1]
Co-Chair: Mark Ingels[2]
[1]Global Foundries, [2]IMEC

Room 11

In this workshop, the current status of reliability methods as well as the challenges faced for the reliability assessment and qualification for 5G and 6G mmWave applications will be examined. Each of the material systems will be discussed for each of the major technology solutions being offered for 5G-6G; GaN, SiGe and Silicon CMOS RF(including SOI). While some of the underlying degradation mechanisms will be common, each material system will have its own; properties, unique failure mode and reliability risks, as well as limitations on operating temperature as they will have different self-heating profiles. A careful review and consideration for the performance / reliability balance will be given for each of the technology solutions (GaN,SiGe, Si CMOS-RF). One of the major goals will be to provide a practical overview of the key reliability mechanisms and methodologies for reliability characterization. We will also discuss the challenges faced by reliability engineers when assessing the reliability of 5G-6G/mmWave/RF applications.

PROGRAMME

System level reliability requirements
Mark Ingels[1]
[1]IMEC

GaN mmWave reliability status and challenges
Jesus del Alamo[1]
[1]MIT

GaN HEMTs reliability status and challenges for 5G applications
Jose Jimenez[1]
[1]QORVO

SiGe mmWave reliability status and challenges
John Cressler[1]
[1]Georgia Tech

SOI mmWave reliability status and challenges
Purushothaman Srinivasan[1]
[1]GlobalFoundries

SUNDAY 09:00 – 18:20

WS08
EuMC

Technology for RF 5G and SATCOM: From Material to Packaged Demonstrators

Chair: Jaroslav Kovac[1]
Co-Chair: Hermann Stieglauer[2]
[1]Slovak University of Technology, [2]United Monolithic Semiconductors GmbH

Room 12

This workshop is dedicated to GaN Front-End and Back-End technologies to fulfil microwave circuits and packaging solutions for 5G telecommunications and Satcom applications. In this workshop, an overview of GaN MMIC advanced epitaxial materials and processes on Si and SiC substrate working from Ka to E band is presented. Advanced materials are keys for achieving electrical performances nd high power at millimetre wave frequencies for 5G and more generally telecom applications. Wide band gap (WBG) semiconductor materials based on GaN are expected to enable superior electrical performances. The partners of the European Project 5G_GaN2 work on epitaxial layer designs on optimized substrate materials. The manufacturing of the epitaxial grown layers is carried out on MOCVD tools that are optimized to deposit this extreme hard to control materials. Low defect density at epitaxial growth and the control of impurities are a great challenge. Front-End and Back-End processes and especially Advanced Packaging were done on these materials to address the different demonstrators.
Microwave function designs using advanced GaN technologies are addressed. FEM (Front End Module) at 39GHz, high efficiency and linear HPA, E band HPA, Tx/Rx at 28GHz are the key functions to comply with 5G requirements. The circuit design phase is carried out including the effects of the package selected for the housing. In this scope, the integration of the circuits into low-cost package as SMD plastic or Fan Out Wafer Level Package (FOWLP) is presented. Main challenges for packaging are thermal dissipation, heterogeneous integration (Si and GaN), reliability and cost price. All these aspects covering the complete value chain from wafer suppliers, semiconductor fabrication and system integration are reviewed and trade-offs are proposed to fulfil the 5G telecommunication requirements.

PROGRAMME

GaN HEMT devices for V- to E-Band applications
Nicolas Michel[1]
[1]III-V Lab

Characterization and simulation of power devices electro-thermal properties
Jaroslav Kovac[1]
[1]Slovak University of Technology

GaN/SiC technology optimisation for 5G applications up to Ka-band
Jan Grünenpütt[1]
[1]UMS GmbH

Scaling of GaN channel thickness in buffer-free GaN-on-SiC HEMT heterostructures for microwave devices
Jr-tai Chen[1]
[1]SWEGAN

200mm CMOS compatible GaN/Si HEMT for Ka Band power amplifiers
Antoine Chanuel[1]
[1]CEA LETI

Advanced IAF 100 nm GaN HEMT Technology for 5G E-Band Backhaul Applications
Dirk Schwantuschke[1]
[1]Fraunhofer Institute

39GHz Front End Module on GaN for 5G applications
Mohammed Ayad[1]
[1]UMS SAS

High Efficiency HPA on GaN/SiC technology
Mingquan Bao[1]
[1]Ericsson

Fan Out Wafer Level Package for 5G telecommunications
Arnaud Garnier[1]
[1]CEA-LETI

SPDT and LNA on SOI for 5G applications
Vincent Puyal[1]
[1]CEA-LETI

30GHz HPA in SMD plastic package for Satcom applications
Jeremy Rabouin[1]
[1]Thales Six

20GHz 4W PA in SMD plastic package for SatCom applications
Jens Freese[1]
[1]Tesat

SUNDAY 09:00 – 18:20

WS09
EuMC

Research in Power and S-parameters Measurements at mmWave and Terahertz Frequencies

Chair: François Ziadé[1]
Co-Chair: Djamel Allal[1]
[1]Laboratoire National de Métrologie et d'Essais (LNE) France

Room 14

Power and S-parameters are two key measurement quantities in high frequency metrology. Driven by emerging applications such as 5G communications and terahertz security imaging, there is an increasing demand for establishing traceability in electrical measurements at millimetre-wave and terahertz frequenices. In this workshop, we will present the recent progress in power and S-parameter measurements at these high frequenices.
For power measurement, key players in metrology have been developing new waveguide power standards above 110 GHz, as well as on-chip power standards to establish the link between connectorized primary calibration standards and on chip measurements. In particular, the recent development of accurate on chip power sensors is expected to improve efficiency of power management for mobile devices. From a primary metrology point of view, new micro-calorimeters are developed to achieve the highest uncertainty level in the millimetre frequency range and free-space measurement techniques are explored to extend power measurement traceability to terahertz frequenices. On-wafer S-parameter measurements are of primary importance for industry to characterize integrated circuits. The increase in frequency to the terahertz frequency range requires improving the prober positioning accuracy as well as developing strategy to reduce probing pads effects. Extracting the electrical modelling of passive elements is also needed to support circuit simulations. The validation of these modelling can be obtained from S-parameters measurements. The most accurate calibration technique, such as Multiline TRL, can be used for measurements in industry environment.

PROGRAMME

Development of a thin-film bolometric power sensor for D-band
Yi Wang[1]
[1]University of Birmingham

Design of frequency compensated power detector in the G-band
Issa Alaji[1]
[1]University of Lille

Primary calibration method for RF power at 110 to 170 GHz
Gia Ngoc Phung[1]
[1]Physikalisch – Technische Bundesanstalt (PTB)

WR6 band micro-calorimeter
Murat Celep[1]
[1]National Physical Laboratory (NPL)

Comparison between Microcalorimeter power standard and waveguide dry calorimeter.
François Ziadé[1]
[1]Laboratoire National de Métrologie et d'Essais (LNE) France

Comparative measurements with commercial power meter
Przemysław Zagrajek[1], Marcin Wojciechowski[2]
[1]Wojskowa Akademia Techniczna im Jarosława Dabrowskiego (WAT), Poland, [2]Central Office of Measures (GUM)

Calibration of free-space THz detectors based on waveguidepower standard
Alireza Kazemipour[1]
[1]Eidgenössisches Institut für Metrologie (METAS)

Free space calibration method for VNA measurement
Karsten Kuhlmann[1]
[1]Physikalisch – Technische Bundesanstalt (PTB)

Transferring the accuracy of multiline TRL to industrial on-wafer calibrations
Uwe Arz[1]
[1]Physikalisch – Technische Bundesanstalt (PTB)

Measuring S-Parameters using millimetre-wave power measurements
Kamel Haddadi[1]
[1]University of Lille

Innovative on-wafer measurement solutions at THz frequency
Masahiro Horibe[1]
[1]National Institute of Advanced Industrial Science and Technology (AIST)

Modelling the Scattering parameters of passive MMIC elements
Thomas Flisgen[1]
[1]FBH Berlin

Results and advances in mmWave on-wafer S-parameters measurement accuracy
Robin Schmidt[1]
[1]Keysight Technologies BE

Measurement uncertainties of RF probes in traceable on-wafer measurements
Faisal Mubarak[1]
[1]VSL

SUNDAY 14:20 – 18:20

SS01
EuMC

Advanced Non-linear Characterization and Design of Highly Efficient Power Amplifiers Using Load Pull Data for Sub 6 GHz and mmWave Applications

Chair: Vince Mallette[1]
[1]Focus Microwaves

Room 6

This half day workshop will cover a broad range of topics which include 30GHz high efficiency power amplifier design using load pull data, the need and benefit of isolating trapping effect In GaN Charaterization and finally a technical analysis of wide bandwidth load pull systems and how they are helping both designers and test engineers better their designs and test times for modulated applications. As Satellite, 5G networks and mobile devices are being deployed worldwide, the need for efficient sub 6GHz and mmWave power amplifiers is in high demand and will continue to grow. The competitive market for such amplifiers leaves no room for average designs, and the design team needs to fully grasp all the key elements in characterization and modelling of transistors employed, as well as applying the models to design the amplifier. In this Workshop we will describe some of the key steps in designing a highly efficient 30 GHz GaN SiC HEMT power amplifier as well as lower frequency designs which follow a strict characterization and design process. The steps will include pulsed IV characterisation, pulsed s-parameters, mmWave load pull, behavioural and compact modeling, importing data to design tools and final design within the CAD tools. We will discuss the challenging task of mmWave load pull on high power GaN transistors that require high gamma loads to fully explore the maximum power and efficiency contours and compare the use of active and recent passive and hybrid active load pull techniques to produce the high Gamma loads required.

PROGRAMME

Using measurements to drive successful design – 30 GHz high efficiency PA example
Vince Mallette[1]
[1]Focus Microwaves

Isolating Trapping Effect In GaN Charaterization
Vince Mallette[1]
[1]Focus Microwaves

“Mind the gap” the value of high bandwidth loadpull systems?
Aamir Sheikh[1]
[1]Focus Microwaves

SUNDAY 14:20 – 18:20

SS03
EuMC

5G mmWave OTA Measurements – Best Practices for Fast and Reliable Results

Chair: Alejandro Buritica[1]
Co-Chair: Marie Weill[1]
[1]NI

Room 11

New 5G mmWave beamforming devices like Antenna-in-Module (AiM), mmWave-capable user equipment (UE) and customer premise equipment (CPE) designs require accurate Over-the-Air (OTA) validation and test to determine their beamforming performance. This short course introduces several real and practical challenges of mmWave OTA test, and presents considerations, trade-offs, and best practices for optimizing system calibration and measurement performance. This presentation also includes live demonstrations of the discussed OTA measurement techniques on an active antenna system, using mmWave signal generation and analysis within an RF anechoic chamber. Finally, it will introduce methodologies for speeding up the characterization of these new 5G mmWave devices.

PROGRAMME

Top challenges of 5G mmWave OTA testing
Alejandro Buritica[1]
[1]NI

Calculating overall Measurement Uncertainty (MU) budget
Gerardo Orozco[1]
[1]NI

How to overcome OTA measurement challenges
Alejandro Buritica[1]
[1]NI

Hands-on OTA test demonstration
Mher Minasyan[1]
[1]NI

MONDAY 09:00 – 13:00

SM01
EuMC

R&D Trends and Challenges in RF PAs for Medium/High-Volume Products

Chair: Souheil Ben Smida[1]
Co-Chair: Konstantinos Mimis[2]
[1]Herriot-Watt University, [2]Sony Europe

Room 1

With the advent of 5G and the need for ever increasing connectivity, new requirements and restrictions of the associated applications embed the adoption of research by the industry, and hence the translation of innovative ideas into products. One of the key components – if not the most important – for any wireless communications system is the power amplifier (PA). Although PAs have been the focus of research for many decades resulting in a vast number of architectures and implementations, it is still unclear why certain types of PAs have dominated particular applications and what are the key aspects that a new architecture must possess to outplace an established solution. This course will introduce the most prominent techniques for sub-6GHz and mmWave PAs and discuss them in the context of medium/high volume products i.e. for user-equipment, IoT and small-cells. The speakers, coming from both academia and industry, will discuss the theory and variations of the Doherty, Outphasing, Envelope Tracking and Digital Pre-Distortion. They will present implementations and highlight the aspects that have allowed each PA architecture to be widely accepted for a certain application or those that need to be improved to convince the industry. This course aims at helping students and researchers get familiar with PA efficiency/linearity enhancement techniques and inform them on the directions their research should focus in order to maximise their impact.

PROGRAMME

The need for high performance PAs and application requirements

Souheil Ben Smida[1] and K. Mimis[2]
[1]Herriot-Watt University, [2]Sony Europe

Outphasing transmitters in CMOS technology

Renato Negra[1]
[1]RWTH Aachen University

The Doherty PA in mmWave frequencies

David Williams[1]
[1]Iconic RF Ltd.

Envelope tracking flavours and implementation considerations

Jonathan Lees[1]
[1]Cardiff University

Enabling digital predistortion for today's power amplifiers

Oualid Hammi[1]
[1]American University of Sharjah

MONDAY 09:00 – 18:20

WM02
EuMIC/
EuMC

Advances in Circuits and Systems for mmWave Radar and Communication in Silicon Technologies

Chair: Vadim Issakov[1]
Co-Chair: Farzad Inanlou[2]
[1]TU Braunschweig, [2]Globalfoundries

Room 2

Recent developments in nano-scale CMOS, allow for MOS transistors to achieve fT and fmax in excess of several hundreds of gigahertz. This enables realization of highly integrated radar and communication systems operating at mmWave frequencies. Particularly, the frequency range around 140 GHz is an interesting candidate to become approved for licensed usage worldwide in the near future for radar and for 6G wireless communication applications. In this workshop, we discuss highly-integrated radar and communication systems operating at W-band and D-band realized in advanced nano-scale CMOS and BiCMOS technologies. The workshop offers a balanced distribution between both fields. We cover a wide range of topics starting from the technology choice for mmWave applications, a talk by Globalfoundries. Bosch will provide a vision on a fully integrated automotive radar system-on-chip in 22nm FDSOI technology. The team of Prof. Zwick (IEEE Fellow) presents packaging and antenna solutions for D-band FMCW radar. Next, mixed-signal part and RF part of a digitally modulated PMCW 140 GHz radar transceiver is discussed by TU Dresden and Infineon, respectively. Second half of the workshop focuses of communication transceivers towards 6G. It covers system considerations, mixed-signal part (ADCs and DACs) and novel system architectures. Finally, Prof. Mark Rodwell closes the workshop with a talk on 140 GHz MIMO arrays transceiver in CMOS and InP. In this workshop we have a good mixture of industry (Globalfoundries, Bosch, Infineon) and academia (FAU Erlangen, TU Dresden, TU Berlin, TU Braunschweig, Karlsruhe Institute of Technology). We have presentations from Europe and the USA. We will round up the workshop by a panel discussion in which we will address the challenges and future directions for circuit design for mm-wave frequency in radar and communication transceivers.

PROGRAMME

Enabling silicon technologies for mmWave radar trends and requirements

Farzad Inanlou[1]
[1]Globalfoundries

An automotive radar demonstrator with a 22nm CMOS FD-SOI transceiver

Philipp Ritter[1] and Juergen Hasch[1]
[1]Robert Bosch GmbH

Millimeter-wave antenna and packaging solutions for D-band FMCW radar Systems

Akanksha Bhutani[1] and Thomas Zwick[1]
[1]Karlsruhe Institute of Technology

High-speed ADCs for D-band radar in 22 nm FDSOI CMOS

Simon Buhr[1] and Frank Ellinger[1]
[1]Dresden University of Technology (TU Dresden)

Design of a D-band PMCW radar transceiver in 45 nm RFSOI technology

Vadim Issakov[1], Vincent Lammert[2] and Michael Leyrer[3]
[1]TU Braunschweig, [2]Infineon Technologies, [3]Infineon

mm-Wave advanced-sampling transceiver enabling 6G data transmission with 100 Gbit/s per mobile User

Patrick James Artz[1], Julius Edler[1] and Friedel Gerfers[1]
[1]Technische Universität Berlin

High-speed DACs in 22 nm FDSOI CMOS for D-band wireless communication towards 6G

Tobias Schirmer[1] and Frank Ellinger[1]
[1]Dresden University of Technology (TU Dresden)

High-speed ADC (>20 GS/s) with high resolution (≥10 bit) for Low-IF receiver in 22nm FDSOI

Julius Edler[1], P. Artz[1], E. Wittenhagen[1], N. Lotfi[1] and F. Gerfers[1]
[1]Technische Universität Berlin

Highly-integrated mmWave transceivers for communication systems in BiCMOS technologies

Marco Dietz[1] and Robert Weigel[1]
[1]Friedrich-Alexander University of Erlangen-Nuremberg

D-band CMOS+InP and CMOS-only MIMO communication transceiver technologies

Mark Rodwell[1], Ali Farid[1], Ahmed Ahmed[1], Utku Solyu[1] and Munkyo Seo[1]
[1]UC Santa Barbara

MONDAY 09:00 – 18:20

WM03
EuMC

Microwave and mmWave Techniques for Sensing, Imaging and Characterisation of Biological Tissues

Chair: Alessandra Costanzo[1]
Co-Chair: Marco Pasian[2]
[1]University of Bologna, [2]Università degli Studi di Pavia

Room 6

The use of electromagnetic fields for sensing, imaging, and characterization of biological tissues is a field where the research and development aspects represent an hot topic, and are fundamental to move toward real-life applications. Microwave frequencies are suited for several of these applications, and mm-waves are also investigated to provide new and/or alternative solutions.
In both cases, the promise is the possibility to provide new diagnostic tools, able to complement the existing ones, maintaining an high safety standard for the patient, due to the use of non-ionizing radiation, as well as easy-to-use operations and reasonable comfort. Maintaining at the same time reasonable costs, to contribute to the new healthcare paradigm, which foresees continuous and personalized medicine as one of the future pillar.
This workshop will present the state-of-the-art for some key elements, ranging from innovative applications, including invivo sensing and imaging, key considerations in measuring heterogeneous tissues, and sensing volume and tissue contributions, up to the characterization of tissues from the molecular point of view, fluctuations properties due to overorde-hydration and robust procedure to overcome these uncertainties will be discussed.
Two half-hour panel sessions will be organized within the full-day workshop during which speakers and attendees will have the opportunity to be engaged in discussions about potential applications and issues of the techniques presented during the workshop.

PROGRAMME

Energy-autonomous for detection of fluids
Francesca Benassi[1], Alessandra Costanzo[2]
[1]Università degli Studi di Bologna, [2]University of Bologna

Perspectives for mm-wave biomedical applications for in-vivo sensing and imaging
Simona Di Meo[1], Marco Pasian[2]
[1]Università degli Studi di Pavia, [2]University of Pavia

Skin phantoms for microwave and millimeter-wave applications: A comparative study
Milica Popović[1]
[1]McGill University

The significance and challenges of heterogeneities in dielectric measurements of Biological Tissues
Emily Porter[1]
[1]University of Texas at Austin

Characterization of exposure in emerging 5G/6G bands: effect of age and impact of textile
Giulia Sacco[1], Maxim Zhadobov[2]
[1]Univ Rennes, [2]University of Rennes 1, CNRS, IETR

Modeling dielectric response of biological structures at microscopic level
Micaela Liberti[1] and Francesca Apollonio[1]
[1]Università degli Studi di Roma "La Sapienza"

Improving measurement accuracy
Gertjan Maenhout[1] and Dominique Schreurs[1]
[1]KU Leuven

MONDAY 09:00 – 18:20

WM04
EuMC

RF On-wafer Calibration and Measurement Eco-system Workshop

Chair: Anthony Lord[1]
Co-Chair: David Viera[1]
[1]FormFactor Inc

Room 13

Up until recently, on-wafer measurements of semiconductor devices, either of narrow band Integrated Circuits or broadband transistors, was typically limited to 67GHz or in some cases 110GHz. However, with the growing demand of consumer devices working in the mm-wave range, including 5G or automotive radar for example, the requirements are growing for more measurements and data not only to 110GHz, but 220GHz and beyond. Even if the operating frequencies of these devices are sub 100GHz, the need to characterize the models of the transistors and other components used in these circuits typically is much higher than the working band they are eventually used in. In addition, it's helpful to have an understanding of the out of band performance and harmonics of the IC's, meaning it's becoming more common for engineers to measure all the way to 220GHz and beyond. And already emerging is research into 6G, that could potentially be working in the 200GHz frequency band. To compound this, the variety of applications and real world environments our devices are used in, data needs to be collected over a wide temperature range – putting even more demand on todays testing. As we progress up the frequency spectrum, new developments of RF probes, instrumentation, calibration standards and techniques need to be developed and integrated together to allow easy, accurate, repeatable and trustworthy data. This workshop brings together the on-wafer RF Eco-system providers and users of instrumentation, probes and calibration methods to share experiences and best practices.

PROGRAMME

Probing from home – Don't let Covid or bad weather stop you making on-wafer Measurements
Gavin Fisher[1]
[1]FormFactor

Broadband RF to mm-wave S-parameter measurements for semiconductor transistor and IC test
Anthony Lord[1]
[1]FormFactor Inc

The advancement of THz test & measurement equipment for 5G, 6G and beyond
Jeffrey Hesler[1]
[1]Virginia Diodes Inc

On-wafer load-pull measurements
Vince Mallette[1]
[1]Focus Microwaves

A micromachined dual-probe with for broadband single-sweep on-wafer Measurements to mm-wave frequencies
Matthew Bauwens[1]
[1]Dominion MicroProbes Inc

Extending the Keysight 125 GHz Solution to 220 GHz
Suren Singh[1]
[1]Keysight Technologies

Considerations for making planar S-parameter measurements at millimetre-wave frequencies
Xiaobang Shang[1]
[1]NPL

MONDAY 09:00 – 13:00

WM05
EuMC

Novel Technologies for Emerging On-board Microwave Equipment Based on Surface Mounted Electromechanical Relays

Chair: Vicente E. Boria[1]
Co-Chair: Jorge D. Martínez[1]
[1]UPV

Room 15

The development of highly miniaturized electromechanical relays is of primary importance for the implementation of reconfigurable microwave space subsystems in line with the evolution toward more digital satellites supporting higher data capacities. The increase on the architecture complexity imposes stronger constraints in terms of cost and mass, with no compromise on reliability. This workshop will present the latest advances on the development of miniature electromechanical relays (MEMRs), which are developed within the framework of SELECTOR H2020 project. Firstly, a broad perspective on how RF PCB technology can be employed for developing future on-board microwave equipment will be given. Then, the implementation of low-loss and broadband interconnections will be presented. Embedded waveguides are essential for taking advantage of the excellent performance of novel surface mounted compatible devices, while enabling full compatibility with standard multi-layer PCB technology with higher density of integration. Then, recent technological innovations on the implementation of MEMR devices at electrical, mechanical and thermal levels will be thoroughly discussed, showing the increased frequency of operation. Lastly, a thorough analysis of the reliability tests required for guaranteeing a spacequalified product will be presented and discussed.

PROGRAMME

Perspectives of RF on PCB technology to develop new microwave on-board equipment
Olivier Vendier[1]
[1]Thales Alenia Space

Embedded waveguides technologies for board-level interconnection of electromechanical relays at microwave and mmWave frequencies
José V.M. Sánchez de Rojas[1], Jorge D. Martínez[2]
[1]Universitat Politècnica de València, [2]UPV

SMT-compatible electromechanical relay for compact redundancy ring
Olivier Berenfeld[1]
[1]Radiall

Reliability evalution of SMT compatible electromechanical relay for compact redundancy ring applications
Ivan Marozau[1]
[1]CSEM

MONDAY 09:00 – 18:20

WM06
EuMC

Recent Developments in Wireless Power Transfer and Energy Harvesting

Chair: Jiafeng Zhou[1]
Co-Chair: Naoki Shinohara[2]
[1]University of Liverpool, [2]Kyoto University

Room 16

The workshop will include 12 talks in the area of wireless power transfer and energy harvesting. Leading experts with both from academia and industry backgrounds will introduce the latest progress in related areas. The speakers are from Japan, Korea, China, Singapore, Europe, UK, USA and Canada. The workshop will focus on low power electronics, including sensors, batteries and power management circuits, for the energy harvesting technology and its applications. It will also introduce the state-of-the-art developments of near-field, mid-field and far-field wireless power transfer techniques in recent years, including the exciting project of wireless charging on the Moon. The trendy topic of simultaneous wireless communication and wireless power transfer (SWIPT) will also be presented in this full-day workshop.

PROGRAMME

Wireless powered IoT sensor technology
Naoki Shinohara[1]
[1]Kyoto University

Novel semi-solid state lithium-ion rechargeable EnerCera(r) batteries
Makoto Iwai[1]
[1]NGK INSULATORS LTD

Low-power circuits for energy harvesters based on spiking-neuron delay elements
Takeaki Yajima[1]
[1]Kyushu University

Midfield wireless power transfer
Chulhun Seo[1]
[1]Soongsil University

Low power beat sensor
Koichiro Ishibashi[1]
[1]The University of Electro-Communications

Near-field wireless power transfer
Paul Mitcheson[1]
[1]Imperial College London

Simultaneous wireless information and power transfer
Nuno Borges Carvalho[1]
[1]the University of Aveiro

High performance wireless power transfer under misaligned conditions
Jiafeng Zhou[1]
[1]University of Liverpool

Harmonic based integrated rectifier-transmitter for wireless uplink
Yongxin Guo[1]
[1]University of Singapore

Progress in making a magnetically coupled resonant WPT system insensitive to misalignments and distances
Zhizhang David Chen[1]
[1]Dalhousie University

Waste to energy: beyond ambient microwave energy recycling
Xiaoqiang Gu[1] and Ke Wu[1]
[1]University of Montreal

Wireless charging on the moon
Joshua R Smith[1]
[1]University of Washington

MONDAY 09:00 – 13:00

WM07
EuMC

Beyond 5G: mmWave and Terahertz Techniques of 6G Research

Chair: Kevin Thompson[1]
Co-Chair: Allison Douglas[1]
[1]Keysight Technologies

Room 17

mmWave and sub-terahertz frequencies (100-300 GHz) with extreme modulation bandwidths are part of 6G research. This presents many unknowns given the novelty of these wavelengths for use in communications. One of those unknowns is exploring the level of system performance that is achievable and reasonable given new frequency bands, extreme modulation bandwidths, and new waveforms. This workshop will provide insight into several of these topics by discussing new sub-terahertz system-level design and test challenges presented by 6G. These include RF MIMO channel sounding techniques for these bands, broadband component scattering parameter and noise-figure evaluation using vector network analysis, EVM measurements at 140 GHz with varying waveforms and bandwidths up to an occupied bandwidth of 10 GHz, and time-synchronization in networks involving multiple RF links (access, radio & fiber fronthaul, GPS/PPS, 3GPP air-interface frames).

PROGRAMME

New sub-terahertz R&D testbed for 6G research

Greg Jue[1]
[1]Keysight Technologies

Channel sounding from mmWave to sub-THz

Wen Zhu[1]
[1]Keysight Technologies

Broadband VNA component characterization

Suren Singh[1]
[1]Keysight Technologies

Maintaining and measuring end-to-end timing integrity in networks with multiple RF links

Mike Beyers[1]
[1]Keysight Technologies

MONDAY 14:20 – 18:20

SM02
EuMC

Intuitive Microwave Filter Design with EM Simulation

Chair: Daniel Swanson[1]
[1]DGS Associates, LLC

Room 11

Microwave filters are one of the basic building blocks in RF systems along with amplifiers, mixers and oscillators. At some point, you may be called on to design or specify a filter, even though you are not a filter design expert. Fortunately, there is simple design method for narrow band filters that is easy to learn and quite universal. It can be applied to any lumped element or distributed topology and any manufacturing technology except SAW/BAW. And, the method is valid for bandwidths from a fraction of a percent up to 20 percent or more.
This short course is a "no math" approach to filter design that requires only simple algebra and no knowledge of complex filter synthesis techniques. It is suitable for industry non-experts, technical managers, students and educators. The root of the design flow is based on Dishal's method, with the addition of EM simulation for accuracy and port tuning for updates to the filter geometry. The basic design method can also be expanded to include cross-coupled filters and multiplexers.
Two design flow examples have been prepared for this short course. The first is a high Q cavity combline bandpass filter and the second is a microstrip combline bandpass filter. The design flow can be realized using software from many different vendors. Example project files will be made available to attendees.

PROGRAMME

Intuitive microwave filter design with EM simulation

Daniel Swanson[1]
[1]DGS Associates, LLC

AGENDA

1. Coupling coefficient concepts
2. Introduction to Dishal's method
3. Design flow for any narrow band filter
4. Example 1:
   - 4a. Microstrip combline filter design
   - 4b. EM simulation techniques for planar filters
   - 4c. Port tuning for planar filters
5. Example 2:
   - 5a. Cavity combline filter design
   - 5b. EM simulation techniques for cavity filters
   - 5c. Port tuning for cavity filters
6. More advanced commercial design tools
7. Summary

MONDAY 14:20 – 18:20

SM03
EuMC

Phase Noise in Next Generation Aerospace, Defense and Commercial Wireless Communications

Chair: Joanne Mistler[1]
Co-Chair: Brooks Hanley[1]
[1]Keysight Technologies

Room 12

The ability to manage the effects of noise in components and systems is critical to communications link performance. Noise can be added by power supplies, modulation, thermal and additive characteristics of devices. Phase-Noise, AM-Noise, Baseband Noise and Noise Figure must be fully characterized, as well as their effects on the dynamic range of communications links and on the performance of radar systems.
This course explains phase noise theory and its impact on performance in communication systems. We will describe multiple phase-noise measurement techniques, the role of the phase detector and the use of cross correlation in optimizing sensitivity, and we'll discuss the impact of reference sources, stimulus sources and AM on phase noise measurements.
We describe the origins of noise along with AM, residual and absolute noise and cross-correlation techniques for measurement from DC to mmWave frequencies. We also discuss Phase-Noise measurements across various instruments and the effects of external mixers on mmWave noise measurements.
This course describes the origins of noise and how the resultant components affect devices and are measured. We will also show how Phase-Noise relates to Noise Figure, view the accuracy and limitations of Noise Figure Y-Factor and Cold Source methods, and describe the differences in characterizing devices, particularly amplifiers, with each Figure of Merit.

PROGRAMME

mmWave phase noise impacts in wireless communications

Joanne Mistler[1]
[1]Keysight Technologies

Noise concepts for mmWave communications

Brooks Hanley[1]
[1]Keysight Technologies

MONDAY 14:20 – 18:20

SM04
EuMC

Solid State Microwaves Applications in Industrial, Scientific and Medical Fields

Chair: Marco Fiore[1]
[1]LEANFA Srl

Room 15

Solid-state microwave technology for Industrial, Scientific and Medical (ISM) applications is progressively gaining momentum although legacy magnetron technology still allows lower CAPEX burdens, especially for high-power applications. Apart from the hardware-linked advantages of solid-state technology (compactness, safety, parametric accuracy, life cycle extension, operating ease and flexibility), a huge boost towards extensive acknowledgement by the microwave community certainly comes from in-depth synergy with modern distributed software platforms. The short course will explore technology trends, design clues and business scenarios, especially trying to emphasize the real added value of software engineering to microwave-driven processes, obtainable through careful hardware-software co-design based on solid-state microwave power devices, digital microprocessors and accurate sensor networks. Innovative designs of solid-state microwave systems typically adopt a distributed intelligence approach, where each generator is equipped by real-time computational capability (e.g., linked to accurate control & monitoring of frequency, phase, power, dynamic impedance mismatch conditions, etc.) and a flexible real-time cooperative functionality that enables infinite modular combinations governed by a central – local or remote – brain. The main target of enabling efficient self-regulating workflows is accompanied by equally important achievements of allowing modern big data approach to industrial applications, high testability and manufacturability and perfectly tailored software-assisted maintenance and after-sales assistance. A description of significative achievements will be presented regarding medical hyperthermia, food materials processing, experimental nanomaterials development and other innovative ISM applications.

PROGRAMME

Solid-state microwave technology in ISM fields

Marco Fiore[1]
[1]LEANFA Srl

Hardware-software synergies in solid-state microwave applications

Marco Fiore[1]
[1]LEANFA Srl

Semiconductor technologies for solid-state microwaves

Nicola Di Modugno[1]
[1]LEANFA Srl

The advantage of solid-state microwave technology in medical applications

Fabio Lobascio[1]
[1]LEANFA Srl

Solid-state microwaves: the best is yet to come

Marco Fiore[1]
[1]LEANFA Srl

MONDAY 14:20 – 18:20

WM01
EuMC

Optimizing Modulation Quality Measurements on Wide Bandwidth Signals – From Conformance Through R&D

Chair: Kevin Thompson[1]
Co-Chair: Allison Douglas[1]
[1]Keysight Technologies

Room 1

Keysight inventors and lead experts are eager to meet you in this half-day workshop and share everything you need to know to optimize your modulation quality measurements on wide bandwidth signals, and be successful from conformance through R&D. For chipset and device makers, network equipment manufacturers, and operators, this workshop is a must – we made it for you!

We will begin with a look at industry movements and conformance requirements for today's and tomorrow's 5G base stations. Then, we will dive deep into measurement science and tackle EVM measurement optimization, and a new, novel method for digital pre-distortion. Finally, we will share exciting research and advancements in quantifying modulation quality using waveform-based modulation analysis, which does not require demodulation.

We can't wait for you to join us in this workshop, confronting real-world wireless engineering challenges with real-world measurements and expert insights.

PROGRAMME

Evaluating 5G Base Stations for Compliance to the 3GPP Specifications

Randy Becker[1]
[1]Keysight Technologies

Optimizing EVM measurements for wide bandwidth signals

Jennifer Stark[1]
[1]Keysight Technologies

Spectral DPD: A novel method of digital pre-distortion

Sam Kusano[1]
[1]Keysight Technologies

Quantifying modulation quality at the physical layer using equalized channel Capacity

Jan Verspecht[1]
[1]Keysight Technologies

WEDNESDAY 09:00 – 13:00

SW01
EuRAD

Joint Range-Angle Super Resolution MIMO Radar

Chair: Hui Zhang[1]
Co-Chair: Sha Ma[1]
[1]Huawei Technologies Co., Ltd

Room 6

Resolution is the most critical factor for radar to detect targets and portray the object details. On one hand, range resolution is proportional to signal bandwidth. However, signal bandwidth is limited by both hardware capability and spectrum regulation. On the other hand, angle resolution depends on antenna aperture. High angle resolution implies large antenna aperture, which is subject to installation limitation. Here we propose a novel distributed MIMO radar structure which employs each antenna with different frequency, to achieve both high range resolution and high angle resolution simultaneously. Several small bandwidth signals are processed together to form an equivalent large one, and at the same time, the aperture of the whole system is enlarged. We further analyse the factors influencing the performance, such as, the number of transmit antennas, the frequency offsets between different transmit antennas, and the ratio of the aggregated bandwidth to total spreading bandwidth, etc.

PROGRAMME

High range-angle resolution MIMO radar

Hui Zhang[1]
[1]Huawei Technologies Co., Ltd

AGENDA

1. High range-angle resolution MIMO radar
2. Sparse frequency allocation for wideband aggregation radar
3. Joint Range-Angle Super-resolution Estimation method for Frequency Division MIMO Radar

WEDNESDAY 09:00 – 18:20

WW01
EuMIC/
EuMC

Technologies for 6G Front End Modules

Chair: Ned Cahoon[1]
Co-Chair: Jack Pekarik[1]
[1]GlobalFoundries

Room 7

Carrier frequencies > 100GHz are attractive for next generation 6G cellular systems due to the large amount of available spectrum in the D- and G-bands that can be leveraged for high data rate communications. Operation at these high mmWave frequencies comes with many challenges, though, particularly in the demands placed on technology performance, integration and cost for the phased array front end. Losses on and off chip are very high. Transistor performance is significantly worse, with challenges in achieving acceptable gain, Pout, and PAE for the PA, acceptable gain and NF for the LNA and low insertion loss for the switch. Thermal management and antenna/FEM/transceiver integration will be particularly demanding due to the constraints of the lattice spacing at these frequencies. This workshop will delve into the candidate semiconductor and packaging technologies for the 6G beamformer FEM, and will explore the unique strengths and limitations of each for addressing these challenges.

PROGRAMME

View and trends in RF design towards 6G
Aarno Pärssinen[1]
[1]University of Oulu

SiGe BiCMOS technologies for 6G millimeter-wave
Pascal Chevalier[1]
[1]STMicroelectronics

State of the art SOI technology for mmWave FEM applications
Sameer Jain[1]
[1]GlobalFoundries

D-band circuits in 16nm FinFET: design and layout considerations
Patrick Reynaert[1] and Bart Philippe[1]
[1]KU Leuven ESAT-MICAS

InP and GaN devices for the next generation of wireless communication
Nadine Collaert[1]
[1]IMEC

Chip package co-optimization: circuit-level optimization with RDL passive components for mm-wave Power Amplifiers in 22nm FDSOI
Corrado Carta[1]
[1]TU Dresden

Circuits and technologies for applications above 100 GHz
Hua Wang[1]
[1]University of California - Santa Barbara

WEDNESDAY 09:00 – 18:20

WW02
EuRAD

Virtual Validation of Automotive Sensors

Chair: Hasan Iqbal[1]
Co-Chair: Sreehari Buddappagari Jayapal Gowdu[2]
[1]Continental, [2]TU Ilmenau

Room 12

Automotive environment perception sensors, predominantly radar, lidar, and camera enable driver assistance and highly automated driving functions. The exploding number of safety requirements necessitates reliable and efficient validation and homologation methods for these automotive sensors at highly automated driving at levels L3...L5. ? One approach is to conduct billions of miles of field-operational road tests in a variety of driving environments and challenging scenarios. However, this option is expensive and risky for both life and property. This method also makes it hard to ensure that every edge scenario is adequately tested. Hence, complementary approaches for testing in virtual environments become increasingly necessary. In the virtual validation methods, researchers are addressing the key question: "How can the safety of automated and connected driving functions be evaluated and assured?" To address this, the industry and academic partners are working on the design and implementation of a virtual validation tool chain, connecting software-based traffic and sensor simulations with propagation modelling and installed performance testing in virtual environment. In this workshop, state-of-the-art contributions on topics that implement virtual validation of automotive sensors will be presented. Among these, scenario-based testing using software-in-the-loop, hardware-in-the-loop and over-the-air vehicle-in-loop methods will be focused primarily on radar. Highly relevant topics of ray-tracing, sensor modelling and installed performance will be addressed along with measurement-based modelling and simulation of radar cross section and signatures of traffic objects.

PROGRAMME

Ray tracing for critical radar scenarios
Hasan Iqbal[1] and Frank Gruson[1]
[1]Continental

Installed performance testing of automotive radar in virtual environment
Sreehari Buddappagari Jayapal Gowdu[1] and P. Aust[1]
[1]TU Ilmenau

Simulation technology development for automated drive safety assurance
Satoshi Taniguchi[1]
[1]DIVP

Assessing the ADAS RADAR performance in harsh operating condition (e.g rain) using simulation.
Koen Delanghe[1]
[1]Siemens

Sensor modeling and integration with standardized interfaces
Kmeid Saad[1]
[1]Ansys

Sensor modelling and virtual validation using raytracing-based sensor simulation software
Christoph Brodehl[1]
[1]dSPACE

Ray tracing and radar channel simulation
Mario Pauli[1] and Anik Willner[1]
[1]Karlsruhe Institute of Technology

5 years of radar sensor modeling research: Current status and development trends within the PEGASUS-Family projects
Martin Holder[1], Lukas Elster[1]
[1]TU Darmstadt

Enabling analysis of perception phenomena for highly automated driving by using redundant sensor setups in automotive scenarios
Christian Gutenkunst[1], Kai Domhardt[2]
[1]IAVL, [2]TU Darmstadt

Testing of automotive radars in complex scenarios by measurement and simulation
Andrew Stove[1]
[1]University of Birmingham

Virtual testing of automotive lidar
Arsalan Haider[1], Wenjamin Rosenfeld[1]
[1]Blickfeld & Hochschule Kempten

Increasing Realism in Auto-Radar Drive Scenario Simulation with Multipath, Diffuse Scattering, and Micro-Doppler
Greg Skidmore[1]
[1]Remcom Inc.

WEDNESDAY 14:20 – 18:20

SW02
EuRAD

Radar Design From the Ground Up

Chair: Giorgia Zucchelli[1]
[1]The MathWorks B.V.

Room 6

This short course introduces an overarching strategy for designing radars from the ground up, covering theoretical and practical aspects. We will start with antenna design, optimization, pattern synthesis, and integration with the RF transceiver. We will introduce how to process beam characteristics such as steering angle, beamwidth, null locations, beam tapering, grating lobes, and beam squint. In addition, we will show how to design and analyze PCB-based antennas for integration in an active array including coupling, noise, and non-linear effects.
You will learn how to create end-to-end system-level models of radars and process detections generated from these models or from data collected from radar systems, and how to analyze cognitive radars that operate in crowded RF shared spectrum environments.
Step by step, we will simulate a complete multi-function radar system including scheduling and resource management with the ability to define tasks, jobs, priorities, time allowances, and the capability to efficiently handle large scenes. We will evaluate side-by-side the radar performance on realistic large-scale tracking scenarios, including bayesian state estimation, different multitarget tracking systems architectures, multi-sensor fusion engines, and track analytics. We will describe how to build a virtual platform for system-level development, facilitating debugging eventual problems before costly prototypes are available. Similar to the antenna and RF models, scenario fidelity must scale with the project phase, with increasing levels needed as the project matures.
During this short course will share with the participants different radar models based on MATLAB.

PROGRAMME

Modeling RF transceivers and antenna for radar applications

Giorgia Zucchelli[1]
[1]The MathWorks B.V.

Multisensor tracking radar design and analysis

Rick Gentile[1]
[1]The MathWorks Inc.

THURSDAY 09:00 – 13:00

WTh01
EuMC/
EuRAD

Advances in Drone Antenna Measurement Techniques for SATCOM and Radar Applications

Chair: Carlo Rizzo[1]
Co-Chair: Joakim Espeland[1]
[1]QuadSAT

Room 15

The aim of the workshop is to present the latest developments in drone-based antenna measurements through several presentations and a real live virtual demonstration where a drone will be engaged in the measurement of a ground VSAT antenna. QuadSAT will present a real demonstration of state-of-the-art drone-based antenna measurements in the context of SATCOM applications.
The global deployment of satellite terminals is well under way, in the context of Earth Observation and Satellite LEO constellations. The increasing demand for satellite-based services like inflight connectivity, maritime broadband services along with growth of telecommunication sector is anticipated to generate demand for new communication satellite launches during the forecast period and an increased demand for in-situ testing. A significant rise in ground satellite antennas and the advent of new multi beam antennas in the satellite and RADAR markets is forcing end users to consider mitigating radio interference.
To find out the latest news in this field, join QuadSAT in our 'Drone Workshop' where our CEO, Joakim Espeland, will take you through our journey and demonstrate how this technique can bring the measurement range to the customer by providing a real demonstration of measurements of an offset 1.3m antenna and comparing results with a traditional outdoor far-field system.

PROGRAMME

Drone based antenna measurements in the SATCOM market

Joakim Espeland[1]
[1]QuadSAT

Live Demonstration of Drone Based Antenna Measurement

Andrian Buchi[1]
[1]QuadSAT

A service perspective on drone-based field measurements

Markus Ridde[1]
[1]Cetecom GmbH

Customisation of RF Payload for drone applications

Jonas Lehmke[1]
[1]IMST GmbH

FRIDAY 09:00 – 13:00

SF01
EuMC

AI Techniques for Microwave Antenna and Filter Design: From Theory to Practice

Chair: Bo Liu[1]
Co-Chair: Yi Wang[2]
[1]University of Glasgow, [2]University of Birmingham

Room 17

Microwave antenna/array and filter/multiplexer design is becoming a tedious process. The success of existing design methods highly depends on designers' experience and has a low success rate when the structure is complex or the specifications are stringent. In recent years, machine learning and evolutionary computation have been introduced into microwave design, which shows promising results. For antennas, state-of-the-art AI-driven design techniques can successfully address several tens of stringent specifications without any initial design, while reducing the optimization time by more than 20 times and obtaining even better design quality compared to standard global optimization methods. For filters, state-of-the-art methods have realized increasing design automation while having a high success rate for complex structures and applied to designers of all levels.
However, many microwave and antenna designers are not familiar with AI-driven microwave design techniques or are not aware of how these techniques can be used to enhance their design ability and efficiency. Hence, the overarching goal of this short course is to not only provide a timely overview of how AI techniques can be used for antenna/array and filter design but also present recently developed methods with case studies. To achieve this goal the course is structured in six complementing parts:
1. Concepts and fundamentals of machine learning and evolutionary computation
2. AI-driven antenna/array design methods
3. Challenging antenna cases solved by AI-driven design methods
4. AI-driven filter/multiplexer design with case studies
5. Tutorial on using AI-driven microwave design tools
6. MATLAB Antenna Toolbox: an interactive AI-driven antenna design environment
7. AI techniques in microwave design and communication systems: new applications and challenges

PROGRAMME

Concepts and fundamentals of machine learning and evolutionary computation; AI-driven antenna/array design methods

Bo Liu[1]
[1]University of Glasgow

Challenging antenna cases solved by AI-driven design methods

Akram Alomainy[1]
[1]Queen Mary University of London

AI-driven filter/multiplexer design with case studies

Yi Wang[1]
[1]University of Birmingham

Tutorial on using AI-driven microwave design tools

Mobayode O. Akinsolu[1]
[1]Wrexham Glyndwr University

MATLAB Antenna Toolbox: an interactive AI-driven antenna design environment

Giorgia Zucchelli[1]
[1]MathWorks

AI techniques in microwave design and communication systems: new applications and open challenges

Muhammad Imran[1]
[1]University of Glasgow

FRIDAY 09:00 – 13:00

SF02
EuMC

Microwave Superconductivity: Applications of SQUID and Josephson Junctions in Microwave Circuits

Chair: Daryoush Shiri[1]
Co-Chair: Jonas Bylander[1]
[1]Chalmers University of Technology

Room 2

With the advent of modern and efficient cryogenic techniques and availability of high temperature superconductors (HTS), applications of these materials in microwave circuits and systems are on the rise. Examples are HTS filters and antennas in mobile base stations and satellite systems, Rapid Single Flux Quantum (RSFQ) logic in multi-GHz digital circuits and quantum bits (qubits) based on Josephson junctions (JJ), among others. On the other hand, young microwave engineers and students cannot afford spending their time reading hefty tomes to master the physics of superconductivity and low temperature physics. This pedagogical short course aims at filling this gap.
In the first part of this short course, the microwave properties of bulk and nanoscale superconductors are presented based on macroscopic quantum model. The circuit models of Josephson junction and superconducting quantum interference device (SQUID) are presented and their nonlinear behaviour in microwave frequencies are explained.
In the second part, the applications of JJ and SQUID in microwave circuits and systems are introduced including: parametric amplifiers, mixers, and oscillators. Hands on simulation examples based on Spice® and Simulink® are presented.

PROGRAMME

Microwave superconductivity: applications of SQUID and Josephson junctions in microwave circuits

Daryoush Shiri[1]
[1]Chalmers University of Technology

AGENDA

1. Bulk Superconductors
2. Josephson junctions and SQUID basics
3. Parametric Amplifiers
4. Mixers and Oscillators

FRIDAY 09:00 – 13:00

WF01
EuMC

Advanced Manufacturing and Packaging

Chair: Cristiano Tomassoni[1]
Co-Chair: Vicente E. Boria[2]
[1]University of Perugia, [2]Technical University of Valencia
Room 1

Communication systems become even more pervasive in our life. 5G systems will dramatically increase the telecommunication capabilities allowing the implementation of the so called Internet of Things (IoT) where an incredible number of objects will communicate through the internet. Part of the 5G communications will be supported by satellite infrastructures made of very large constellations of low orbit mini/nano satellites. In such a scenario a wide variety of new RF/microwave/millimiter wave components will be required. Indeed, they will be used in a lot of different situations, from sensors to satellites. Aspects like miniaturization, packaging and advanced manufacturing became essentials. In this workshop some compact components (especially filters) will be presented together with the advanced manufacturing technique used for their realization. Presented materials also include space applications. Ample time will be devoted to the discussion with the audience.

PROGRAMME

Additive manufacturing of non-conventional miniaturized filters
Cristiano Tomassoni[1], Enrique Lopez[1] and Abdul Rehman[1]
[1]University of Perugia

Compact Realizations of Advanced Filter Responses in Planar and 3D Waveguide Technologies
Vicente E. Boria[1], El Mehdi Messaoudi[1], Abhishek Sharma[2], Jorge D. Martínez[3]
[1]Technical University of Valencia, [2]ITeam - Universitat Politècnica de València, [3]UPV

Additive manufacturing approaches for the Implementation of a K-band Mushroom meta-material filter
Reinhard Teschl[1], Arash Arsanjani[1], Luke Robins[1]
[1]Graz University of Technology

Advanced Bandpass Filter Structures for W-Band Applications
Michael Höft[1], Chad Bartlett[1] and Daniel Miek[1]
[1]Kiel University

FRIDAY 09:00 – 18:20

WF03
EuMC

Innovative THz Technologies for Imaging, Radar and Communication

Chair: Werner Prost[1]
Co-Chair: Daniel Erni[1]
[1]University Duisburg-Essen
Room 12

The European Doctoral Training Network in Terahertz Technologies for Imaging, Radar and Communication Applications (TeraApps) was a multi-site network comprising 10 internationally reputed research teams and 14 associated partners all internationally leading academic groups. The network has finalized a unique research training programme for the cohort of 15 young researchers in the novel and multidisciplinary field of semiconductor terahertz technologies with exceptional prospects for career development and a potential of dramatic impact on the imaging, radar, communications and sensing application areas for our increasingly connected and smart world. Thereby it has strengthened Europe's human resources and industry competitiveness in the ever-growing field of terahertz electronics and opto-electronics. The mission of this workshop is to bring together this pool of young THz researchers with world-leading experts to present and to discuss their key complementary skills in a multidisciplinary scientific consortium.
The workshop will present the design, fabrication, characterization and systems utilization of terahertz sources and detectors mainly based on RTD semiconductor technology but also using emerging novel technologies such as 2D materials.

PROGRAMME

Micro-PL analysis of high current density resonant tunnelling diodes for THz applications
Michele Cito[1]
[1]University of Glasgow

Design of calibration structures for On Wafer S-parameters measurements up to 500GHz
Robin Schmidt[1], Thomas Nowack[2]
[1]Keysight Technologies Belgium BVBA, [2]University of Glasgow

Coherent receivers based on TB-RTD/On wafer TB-RTD measurements up to 500 GHz
Simone Clochiatti[1]
[1]University of Duisburg-Essen

Antimony and indium arsenide based resonant tunnelling devices for high-Speed and mid-infrared applications
Yaksh D. Rawal[1]
[1]Julius Maximilians Universität Würzburg

InGaAs based resonant tunnelling diode photo detector
Beguem Yavas[1]
[1]Julius Maximilians Universität Würzburg

Models for fully-quantum treatment of scattering in the THz and Optical domains
Matteo Villani[1]
[1]Universitat Autònoma de Barcelona

Accurate quantum transport modeling and epitaxial structure design optimisation of InGaAs/AlAs double-barrier resonant tunneling diodes for high-power terahertz oscillators
Davide Cimbri[1]
[1]University of Glasgow

Feasibility of Travelling-Wave Microstrip RTD Oscillators
Zoltan Jehn[1]
[1]Technische Universität Wien

Wireless subharmonic injection-locked, resonant tunneling diode array with beam steering capability at 720 GHz.
Meng Zhang[1]
[1]University of Duisburg-Essen

Semiconducting quantum dot single electron transistor as high sensitive cooled photodetector in THz bandwidth
Mahadi Asgari[1]
[1]CNR- Nanoscience Institute

Advanced Terahertz imaging systems based on tailored metasurface optic
Thomas Nowack[1]
[1]University of Glasgow

CNR- Nanoscience Institute
Mahadi Asgari[1]
[1]CNR- Nanoscience Institute

Panel Session
Robin Schmidt[1]
[1]Keysight Technologies Belgium BVBA

FRIDAY 09:00 – 18:20

WF04
EuRAD

Advanced Processing and Deep Learning Approaches for Indoor Sensing Using Short Range Radars

Chair: Avik Santra[1]
Co-Chair: Robert Weigel[2]
[1]infineon, [2]FAU

Room 13

Radars are non-intrusive sensors and finds applications in medical care, surveillance, human-machine interface, industrial water-level monitoring to name a few. Short range radar systems, featuring light weight and low cost, offer perfect solution for indoor human sensing however they need to be offer optimal performance requiring advanced receiver processing techniques. Radar can wirelessly detect and estimate the tiny physiological movements due to heartbeat and respiration activities. Furthermore, the micro-Doppler components from the humans can be sensed and utilized by radar processing to discern meaningful insights related to their activities, gestures or people density.
This workshop outlines some of the most important topics related to radar processing for indoor sensing. We present the talk on security and techniques to mitigate malicious attacks on radar sensors for their reliable operation. We present the talk on processing techniques for sequential human activity classification in the context of assisted living and gesture sensing for a practical real-time solution. We present the talk on remote vital sign monitoring for day-to-day remote patient monitoring using radars from the hybrid viewpoint of a practicing cardiologist and an electrical engineering professor. We present the talk on assisted living using radars, the advanced processing techniques including deep learning to address some of open challenges. We further present a talk on indoor people counting using radars addressing challenges of different environments and indoor artifacts. We then present a talk on kinematic and linguistic considerations that one needs for design of reliable deep neural network models for human classification tasks.

PROGRAMME

Parametric deep neural networks for learning from raw radar ADC data
Thomas Stadelmayer[1], Anand Dubey[2]
[1]University of Erlangen-Nuremberg, [2]FAU Erlangen

Security for modern radar sensors: potential attacks and risk mitigation
Changzhi Li[1]
[1]Texas Tech University

Kinematic and linguistic considerations in DNN design for radar-based biological signal classification
Sevgi Zubeyde Gurbuz[1]
[1]The University of Alabama

Remote vital sign monitoring, and the use of radars towards a viable solution: A hybrid engineering/medical viewpoint.
George Shaker[1], Jonathan Toma[2]
[1]University of Waterloo & NP Life Sciences, [2]NP Life Sciences

Radar sensing in assisted living
Julien Le Kernec[1]
[1]University of Glasgow

Radar indoor People Counting using Cross-modal Learning
Souvik Hazra[1]
[1]Infineon Technologies

Radar approaches for sequential human activity classification
Francesco Fioranelli[1]
[1]TU Delft

Waveform design for interference mitigation in indoor radar sensing
Bhavani Shankar M.R.[1], Mohammad Alaee-Kerahroodi[2]
[1]the University of Luxembourg, [2]Interdisciplinary Centre for Security, Reliability and Trust

Simulation of dynamic radar targets in complex indoor propagation Environments
Shobha Sundar Ram[1]
[1]IIIT, Delhi

Deep reinforcement learning applied to short-range radars
Lorenzo Servadei[1], Michael Stephan[2]
[1]Infineon Technologies, [2]FAU Erlangen

FRIDAY 14:20 – 18:20

WF02
EuRAD

Paradigm Change in Automotive mmWave Radar Applications - From Technology Push to Demand Pull

Chair: Marlene Harter[1]
Co-Chair: Andreas Himmler[2]
[1]Offenburg University of Applied Sciences, [2]dSpace

Room 11

Not too long ago the use of mm-Wave Radar sensors for automotive applications had a straight forward and well understood way to go into the future. The subsequent development of L4 and L5 sensors were beyond any questioning
==> technology push
Today, these quite ambitious development directions have been re-focused: main interests are L2+ or L2++, i.e. near term results. The needs of the final user, the driver itself - i.e. all of us - have become the most important aim. What really is an easy to use and easy to understand driver assistance system?
==> demand pull/ customer orientation.
Car insurance fee reduction based on radar (or Lidar!) for secure AEB (Automotive Emergency Breaking) functions and as a 2nd step AES (Automotive Emergency Steering) are helping the customer to pay for these (not yet cheap) high-tech systems;
==> changed financial/ industrial circumstances.
The direct customer orientation: How do these systems help the driver to take driving easier and make it more enjoyable, while letting him know how safe the systems are in use, is in focus today.
What does all of this mean for us - the mm-Wave community?
1) Easy to handle and to understand - as well as to maintain - sensor measurement and test systems, that will make it easy to convince the customer - the driver - that he has an advantageous tool for his own safety.
2) Based on new regulations - the forced employment of mm-Wave Radar sensors for in-cabin monitoring - as a new application area.
The later – in-cabin monitoring - e.g. by radar at 24, 60, 120 and 160 GHz – is becoming mandatory in new to be delivered cars from 2022 on - in Europe and the US, respectively.

PROGRAMME

From technology push to demand pull - ongoing developments in the automotive mm-Wave radar area
Holger H. Meinel[1]
[1]self-employed

Validation of 77 GHz FMCW radar transceivers: current approaches and future challenges
Andreas Och[1]
[1]Infineon Technologies Linz GmbH & Co KG

Facing the challenges of integration and operation of automotive radars
Marlene Harter[1]
[1]Offenburg University of Applied Sciences

Validation of radar integration in a bumper of a car
Andrea Sanna[1]
[1]Loccioni SpA

Radar target simulation – efficient testing
Andreas Himmler[1]
[1]dSpace

Customer trust by safety – increasing demand for future technologies by making radars more reliable
Thomas Dallmann[1]
[1]FhG – FHR

4D imaging radar: enhancing automotive safety with less complexity and costs
Ian Podkamien[1]
[1]Vayyar

Rohde & Schwarz Workshop
Tutorial Seminars and Technical Workshops

Date: Tuesday 15th and Wednesday 16th February 2022
Location: ICC Capital Suite - Level 3 - Room 3

TUTORIAL SEMINARS – RF BASICS IN TEST AND MEASUREMENT

The advances of 5G and mmWave communications – one of its key driving factors – are considerably changing the world of cellular and non-cellular communications. The automotive industry and Industry 4.0 are further technology drivers that have significantly impacted mmWave engineering development and the design of new products. Modern communications technologies, telemetry applications, radar technologies and industrial assembly of mmWave circuits increase the amount of cross-disciplinary collaboration.
Nowadays, mmWave engineers are also being confronted with the challenge of how to master the field of RF signal and digital communications. Therefore, a sound understanding of RF and mmWave testing methods is key for every mmWave engineer, since it helps them implement solutions and designs in RF and mmWave circuits.
The Rohde & Schwarz seminars covering RF basics in test and measurement will familiarise you with the fundamental aspects of signal generators, spectrum analysers and network analysers. You will learn how to benefit from the high flexibility of our T&M equipment when designing RF and mmWave circuits.
The seminar on real-time spectrum analysis will introduce the methods for debugging RF and mmWave circuits in the time and the frequency domain and demonstrate the excellent benefits for analysing complex mmWave circuitries.
Using vector network analysers for component testing and applying various calibration techniques allows highly precise characterisation of RF and mmWave components, which are necessary for mmWave designs and digital communications systems.

TUESDAY, 15TH FEBRUARY, 2022

09:30 – 11:00	Fundamentals of signal generators and oscillators (YIG versus VCO)
11:15 – 12:45	Fundamentals of spectrum analysis

WEDNESDAY, 16TH FEBRUARY, 2022

09:30 – 11:30	Introduction to digital signals and digital modulation
11:45 – 13:15	Real-time spectrum analysis embedded in advanced spectrum analysers

THURSDAY, 17TH FEBRUARY, 2022

09:30 – 10:30	Fundamentals of vector network analysis
10:45 – 12:15	Calibration in vector network analysis

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– Free to attend –

For more information, details and registration, visit
http://www.rohde-schwarz.com/eumw

TECHNICAL WORKSHOPS

TUESDAY, 15 FEBRUARY, 2022, 13:30 – 16:15
Modern RF frontend design and testing
Workshop chair: Markus Lörner, Market Segment Manager RF and Microwave Components, Rohde & Schwarz

5G is here. The focus is now on improving systems and enhancing them with mmWave. This drives the growing integration of components and creation of more efficient designs to minimise the form factor, improve energy efficiency and thereby drive overall costs down. Multifunction RF components such as beamformers are used in 5G mmWave as well as in satellite communications and defence applications. The high density of RF frontends for massive MIMO systems requires unprecedented energy efficiency to minimise the physical size while ensuring stable temperature conditions.
The workshop will provide an overview of the latest technologies and requirements of RF frontends, focusing on the topics of improved efficiency and enhanced integration. Experts from the test and measurement field and industry partners will provide solutions that meet demanding requirements.

WEDNESDAY, 16 FEBRUARY, 2022, 13:30 – 16:15
Millimeterwave and THz technology for beyond 5G
Workshop chair: Dr Taro Eichler, Market Segment Manager Wireless Communications, Rohde & Schwarz

Millimeterwave and THz technology are seen as key components for beyond 5G and 6G systems. The radio spectrum between 30 GHz and 300 GHz is used with the intention of resolving the spectrum crunch and enabling ultrabroadband mobile communications up to the terabit range. The research and development of such systems gives rise to new challenges in the area of frontend, mixed signal and baseband technology and new requirements for the test and measurement industry. Since highly integrated frontends including array antennas will be implemented, advanced over-the-air testing methods with an extremely extended frequency range up to 500 GHz will become mandatory. Furthermore, the use of extremely wideband channels up to several GHz will become a challenge in terms of broadband signal generation and signal analysers. These tasks require an interdisciplinary approach with close collaboration between semiconductor, assembly and signal processing experts.
This workshop gives an overview of recent developments in the area of broadband mmWave and THz communications systems with a special focus on radio channel and OTA measurements as well as on hardware implementation issues.

The schedule is subject to change. The latest version can be downloaded at
www.rohde-schwarz.com/eumw

SUNDAY OVERVIEW

Room	09:00 – 13:00	14:20 – 18:20
1	**WS01** Advances of Wireless Sensing in Harsh and Severe Environments	
2		
3		
4	**WS02** Terahertz Device, Circuit and System Fundamentals and Applications	
5		
6		**SS01** Advanced Non-linear Characterization and Design of Highly Efficient Power Amplifiers Using Load-Pull Data for sub-6GHz and mmWave Applications
7	**WS04** New Trends in Microwave and mmWave Filters	
8	**SS02** Fundamentals of Microwave PA Design	
9	**WS05** New On-Chip and Scalable RF Packaging Solutions with Integrated Antennas for 5G mmWave and 6G Applications	
10	**WS06** Progress and Status of Gallium Nitride Monolithic Microwave Integrated Circuits	
11	**WS07** RF Reliability Status and Challenges for 5G mmWave and 6G Applications	**SS03** 5G mmWave OTA Measurements – Best Practices for Fast and Reliable Results
12	**WS08** Technology for RF 5G and Satcom: From Material to Packaged Demonstrators	
13	**SS04** Terahertz Technology, Instrumentation and Applications	
14	**WS09** Research in Power and S-parameters Measurements at mmWave and Terahertz Frequencies	
15		
16		
17	**WS03** mmWave Plastic Waveguide High Data Rate Communications	

EuMC EuMIC EuRAD Students EuMW Exhibitors

MONDAY OVERVIEW

Room	09:00 – 10:40	11:20 – 13:00	14:20 – 16:00	16:40 – 18:20	EVENING PROGRAMME
1	**SM01** R&D Trends & Challenges in RFPAs for Medium/High-Volume Products		**WM01** Optimizing Modulation Quality Measurements on Wide Bandwidth Signals - from Conformance Through R&D		
2	**WM02** Advances in Circuits and Systems for mmWave Radar and Communication in Silicon Technologies				
3	**Student School**				
4	**Tom Brazil Doctoral School of Microwaves**				
5			**EuMIC05** Integrated Circuit Modelling and Design Methodology		
6	**WM03** Microwave and mmWave Techniques for Sensing, Imaging and Characterisation of Biological Tissues				
7		**EuMIC04 Opening Session**			
8				**EuMIC08** Components and Subsystems for 100 GHz and Above	
9				**EuMIC09** High Performance LNAs	
10	**EuMIC01** Large Signal and Non-linear Charaterization Techniques		**EuMIC06** Integrated PAs for 5G, SATCOM and Vehicular Applications	**EuMIC10** Advances in Si and GaN Based Integrated PAs	
11	**EuMIC02** Silicon Based RF Solutions		**SM02** Intuitive Microwave Filter Design with EM Simulation		
12	**EuMIC03** Transceiver MMICs		**SM03** Phase-Noise in Next-Generation Aerospace/Defense and Commercial Wireless Communications		
13	**WM04** RF On-wafer Calibration and Measurement Eco-system Workshop				
14	**Automotive Forum**				
15	**WM05** Microwave Equipment Based on SM EM Relays		**SM04** Solid-State Microwaves Applications in Industrial, Scientific and Medical Fields		
16	**WM06** Recent Developments in Wireless Power Transfer and Energy Harvesting				
17	**WM07** Beyond 5G: mmWave and THz Techniques of 6G Research		**EuMIC07** Frequency-Converting Circuits	**EuMIC11** Boradband Integrated Circuits	**EuMIC Foundry Session** 18:30 – 20:00
Off-site					**Automotive Forum Networking Dinner** 19:00 – 22:00
Exhibition Area					**EuMIC Cocktail Reception** 18:00 – 20:00

EuMC EuMIC EuRAD Students EuMW Exhibitors

TUESDAY OVERVIEW

Room	08:30	09:00 – 10:40	11:20 – 13:00	14:20 – 16:00	16:40 – 18:20	EVENING PROGRAMME
1		**EuMIC/EuMC01** Novel Filtering Devices in Integrated Technologies		**EuMC02** Innovative Microwave Circulators and Phase Shifters	**EuMC05** Novel Structures for Power Combiners and Couplers	
2		Exhibitor Workshops		Exhibitor Workshops		
3		Exhibitor Workshops		Exhibitor Workshops		
4		**EuMIC/EuMC02** THz Components		**EuMIC16** Phased Array Components from S-band up to 300 GHz	**EuMC06** 3D to 2D Transitions and New Materials for mmWave System Integration	
5		Exhibitor Workshops		Exhibitor Workshops		
6		**EuMW01** Teaching Methods for Microwave Engineering		**EuMC03** Non-planar Filters I	**EuMC07** Non-planar Filters II	
7			**EuMW02 Opening Session**		**EuMC08** Digital Predistortion, PA Optimisation and MIMO Architectures	
8						
9					**EuMIC17 Closing Session**	
10						
11						
12					**EuMC09** Metasurfaces and Frequency Selective Surfaces	
13		**EuMIC12** Device Modelling and Simulation of Parasitic Phenomena		**EuMC04** Active Antennas and Architectures	**EuMC10** Innovative Antenna Methodology and Design	
14		**EuMIC13** Receiver Components		**EuMIC/EuMC03** MMIC Power Amplifiers and Supply Modulation	**EuMC11** Front-End and Transceiver Modules	
15		**Career Platform**		**Women in Microwaves** (Panel to 3 pm, Visit to 6:30 pm)		
16		**EuMC01** Advanced Packaging and Interconnect Technologies for Emerging Applications				
17		**EuMIC14** Advances in mmWave and High Power Integrated PA Technologies		**EuMW03** Special Session in Memoriam of Prof. Roberto Sorrentino	**EuMC12** THz Systems and Applications	
Exhibition Hall		**Tom Brazil Fellowship Award (by the GAAS® Association) Finalists Pitching** The Role of Microwaves in Contributing to a Sustainable World (Venue: MicroApps)	**EuMIC15** Posters	**EuMIC/EuMC04** Posters		
Conference Center: Platinum Suite						**EuMW Welcome Reception** 18:30 – 22:00

EuMC EuMIC EuRAD Students EuMW Exhibitors

WEDNESDAY OVERVIEW

Room	09:00 – 10:40	11:20 – 13:00	14:20 – 16:00	16:40 – 18:20	EVENING PROGRAMME
1		**EuMC17** New Design Concepts for Microwave Filters in Planar and Hybrid Technologies	**EuMC22** Advanced Implementations for Substrate-Integrated and Quasi-Planar Filters		
2	Exhibitor Workshops		Exhibitor Workshops		
3	Exhibitor Workshops		Exhibitor Workshops		
4	**EuMC13** Non-planar Passive Components	**EuMC18** Frequency Generation, Conversion and Nonlinear Modelling		**EuMW04** Memorial Session for Professor Tatsuo Itoh	
5	Exhibitor Workshops		Exhibitor Workshops		
6	**SW01** Joint Range-angle Super Resolution MIMO Radar		**SW02** Radar Design from the Ground Up		
7	**WW01** Technologies for 6G Front End Modules				
8	**EuRAD01 Opening Session**	**Defence, Security and Space (DSS) Forum**			
9					
10					
11					
12	**WW02** Virtual Validation of Automotive Sensors				
13	**EuMC14** Electromagnetic Scattering and Diffraction Effects	**EuMC19** 3D Printing: Processes and Reliability	**EuMC23** 5G Communication and Beyond*	**EuMC26** Novel 3D Printing Approaches for mmWave Applications	
14	**EuMC15** Metamaterial Based Devices and Applications	**EuMC20** Advanced High Efficiency Power Amplifier Techniques	**EuMC24** Advances in Electromagnetic Modeling and Numerical Techniques	**EuMC27** Measurements for 5G and 6G Systems	
15		**IEEE Young Professionals Lunch**	**IEEE Young Professionals Session**		
16					
17	**EuMC16** Integrated Components for Transceivers	**EuRAD02** Radar Applications	**EuRAD03** Emerging Radar Applications	**EuMC28** 5G and mmWave Arrays	
Exhibition Hall		**EuMC21** Posters	**EuMC25** Posters		
North Greenwich Pier (by the O2)					**The EuMW Cruise on the River Thames** 19:00 – 22:00

EuMC EuMIC EuRAD Students EuMW Exhibitors

THURSDAY OVERVIEW

Room	09:00 – 10:40	11:20 – 13:00	14:20 – 16:00	16:40 – 18:20	EVENING PROGRAMME
1		**EuMC35** Non-planar Filters and Passive Components	**EuMC/EuRAD04** Radar Architectures and Systems	**EuRAD13** Radar Imaging	
2	**Exhibitor Workshops**		**Exhibitor Workshops**		
3	**Exhibitor Workshops**		**Exhibitor Workshops**		
4	**EuRAD04** Distributed and Multistatic Radar	**EuRAD07** Drone Detection and Recognition	**EuRAD10** Signal Processing for Automotive Radar	**EuRAD14** Target and Clutter Classification in Automotive Radar	
5	**Exhibitor Workshops**		**Exhibitor Workshops**		
6	**EuMC29** On the Occasion of Nikola Tesla's 165th Anniversary	**EuMC36** Special Session: HEFPA - An International Project on Highly Efficient and Flexible Phased Arrays	**EuMC40** Advances in Biological and Medical Applications		
7	**EuRAD05** AI Methods in Automotive Signal Processing and Information Extraction	**EuMC/EuRAD01** High Resolution Methods in Range and Azimuth for Environmental Perception	**EuMC41** Material and On-wafer Measurements		
8	**EuRAD06** Radar Characteristics Measurement, Modelling and Simulation	**EuMW05** Special Session in Memory of Prof. Peter Clarricoats		**EuMC44 EuMC Closing Session**	
9	**EuMC30** Asia Pacific Focused Session	**EuRAD08** Radar Antennas, Arrays and Calibration			
10	**EuMC31** Electromagnetic Interactions, Environmental and Biological Applications	**EuRAD09** Positioning and Localization Systems			
11	**EuMC32** Calibration Techniques and Nonlinear Measurements	**EuMC/EuRAD02** Channel and Radar Characterization			
12		**EuMC37** Radar and Communication Systems	**EuRAD11** Radar Processing Techniques for Automotive and Transportation		
13	**EuMC33** Sub-10GHz Antennas	**EuMC38** Advances in mmWave Antennas	**EuMC42** Antennas Using Advanced Manufacturing and Novel Substrate Materials		
14	**5G and Beyond Forum**				
15	**WTh01** Advances in Drone Antenna Measurement Techniques for Satcom and RADAR Applications				
16					
17	**EuMC34** RFID and WPT Technologies	**EuMC39** Novel IoT Technologies	**EuMC43** Sensing and Dynamic Technologies	**EuRAD15** Human Activity Sensing	
Exhibition Hall		**EuMC/EuRAD03** Posters	**EuRAD12** Posters		

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FRIDAY OVERVIEW

Room	09:00 – 10:40	11:20 – 13:00	14:20 – 16:00	16:40 – 18:20	EVENING PROGRAMME
1	**WF01** Advanced Manufacturing and Packaging				
2	**SF02** Microwave Superconductivity: Applications of SQUID and Josephson Junctions in Microwave Circuits				
3					
4	**EuRAD16** Waveforms	**EuRAD19** Short Range Radar			
5					
6					
7			**EuRAD22 Closing Session**		
8					
9					
10	**EuRAD17** Multistatic and Fusion Techniques	**EuRAD20** Phased Array and MIMO Systems			
11	**EuRAD18** Object Classification Techniques	**EuRAD21** Radar Signal Processing and Imaging	**WF02** Paradigm Change in Automotive mmWave Radar		
12	**WF03** Innovative THz Technologies for Imaging, Radar and Communication				
13	**WF04** Advanced Processing and Deep Learning Approaches for Indoor Sensing Using Short-Range Radars				
14		**EuRAD Lunch**			
15					
16					
17	**SF01** AI Techniques for Microwave Antenna and Filter Design: from Theory to Practice				

EuMC EuMIC EuRAD Students EuMW Exhibitors

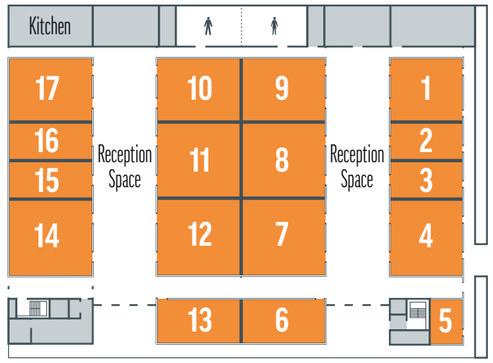
Venue Overview

An ADNEC Group Company

EXCEL LONDON

ICC Capital Suite - Level 3

Rooms 1 – 17
Exhibitor Workshops: Rooms 2, 3 & 6
EuMC Plenary: Rooms 7–12
Coffee breaks (Sunday, Monday and Friday)



Prince Regent for ICC London

DLR

East Entrance

Registration
Exhibition Entrance
Delegate Bags

Exhibition Halls N20 – N23
Entrance N 11

Poster Panels (Tuesday – Thursday)
Coffee Breaks (Tuesday – Thursday)
MicroApps

DLR

Custom House for ExCeL London

West Entrance

Platinum Suite

Welcome Reception (Tuesday)

Exhibitor List

A: AFT Microwave GmbH · ALPHA - RLH · American Standard Circuits, Inc. · Analog Devices GmbH · APC Technology Group plc · API Tech · AR Europe Ltd · Artech House Books
B: BAE Systems · Bits & Chips
C: Castle Microwave Ltd · CEA · Cobham Electrical and Electronic Equipment · Copper Mountain Technologies
D: dSPACE GmbH
E: E&T · Electronic Specifier Ltd · ESTER Technopole · ETL Systems Ltd · EuMA · European Microwave Week 2022 · everythingRF
F: Farran Technology Ltd · Filtronic · Focus Microwaves Group · FormFactor · Fraunhofer FHR · Fraunhofer IAF · Fraunhofer Institute for Applied Solid State Physics IAF · Fraunhofer Institute for High Frequency Physics and Radar Techniques FHR
H: Hermetic Solutions Group · hf-Praxis
I: IEEE Microwave Theory and Techniques Society (MTT-S) · IEEE Microwaves Magazine · IEEE MTT-s International Microwave Symposium · IET · IHP GmbH · IMST GmbH · Institut d'Electronique, de Microeléctronique et de Nanotechnologies (IEMN) · Intelliconnect Europe Ltd · Isola GmbH · Junkosha Inc.
K: Keysight Technologies UK Limited · Knowles Precision Devices · KOSTECSYS Co., Ltd
L: L3Harris · Link Microtek Ltd · LPKF Laser & Electronics AG
M: Maury Microwave · MCS Test Equipment · Melcom Electronics Ltd · Mician GmbH · Microwave Applications Group · Microwave Journal · Microwave Product Digest · Microwave Products Group · Microwave Systems JSC · Microwaves & RF · Milexia · Morion, Inc · MPI Corporation · MTR S.R.L.
N: Narda MITEQ · NSI-MI Technologies
O: OKTAL Synthetic Environment · OMMIC · OPHIR RF Inc · Optiprint AG · Optomec
P: Pendulum Instruments S.P. 200 · Planar Monolithics Industries Inc
R: RF MORECOM COREO Co., Ltd · RF-Lambda USA LLC · RFMW UK Ltd · Rogers BV · Rogers Corporation · Rohde & Schwarz GmbH & Co KG · Rosenberger Hochfrequenztechnik GmbH & Co. KG
S: Samtec Europe Ltd · Sensorview Co., Ltd · Serma Group · SIAE MICROELETTRONICA S.p.A. · Siglent Technologies Germany GmbH · Signal Integrity Journal · Silicon Radar GmbH · Smiths Interconnect - Smith Industries Industrial Group · Sonnet Software · Sumitomo Electric Europe Ltd · Synopsis Corporation Group · Synopsis Technologies · Syntony
T: Tech Comm · TNO Defence, Safety and Security · Triasys
V: Varioprint AG · Virginia Diodes Inc. · Vishay Electronic GmbH · VTT · VTT Technical Research Centre of Finland Ltd
W: WAVEPIA Co., Ltd · Wireless Telecom Group
X: XLIM

Latest Update

The information on this Programme Book is subject to change. Please check the latest news and download the final version of the Programme Book at: https://www.eumw2021.com

Attendees should check the latest requirement and updated advice concerning access to ExCeL from this website: https://www.excel.london

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