

SIX DAYS

THREE CONFERENCES

THREE FORUMS

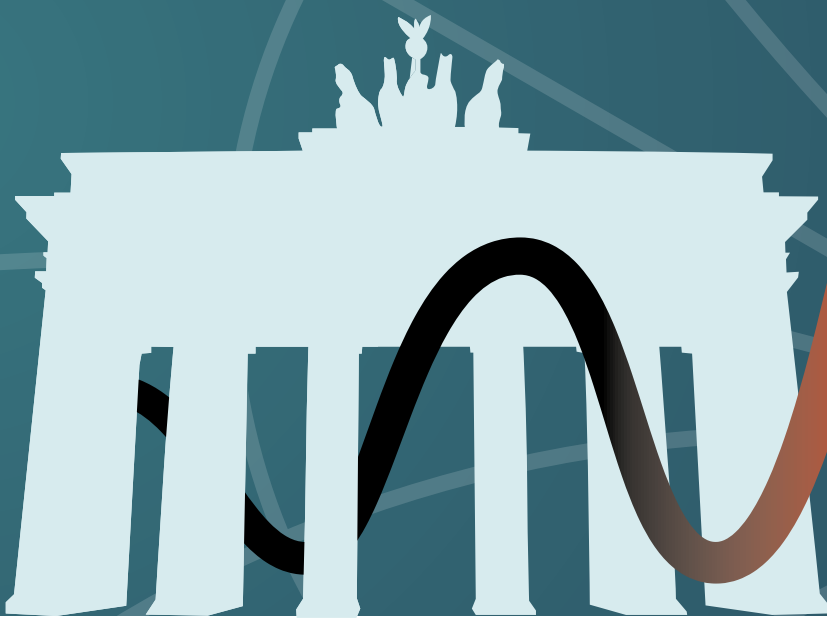
ONE EXHIBITION

EuMW 2023
EUROPEAN MICROWAVE WEEK
Messe Berlin hub27
BERLIN, GERMANY
17th-22nd SEPTEMBER 2023
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IN PERSON EVENT

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CONFERENCE PROGRAMME
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Welcome to the 26th European Microwave Week

Dear friends of the microwaves! It is our great pleasure to welcome you to the European Microwave Week (EuMW) 2023 in Berlin. After 25 very successful EuMWs in different cities in Europe, it's time for us to go to Berlin!

Berlin - the capital and the largest city of Germany, is a fascinating European city that is renowned not only for its landmarks and museums, but also a rich cultural life, vibrant party scene, and urban art. Evolving and progressing from a past of division into east and west, it has a distinctive charm of multi-layered uniqueness and a multi-cultural atmosphere. This is the reason we chose the Brandenburg Gate and the torn-down wall as our logo to celebrate the unification. Our slogan "Waves beyond walls" for EuMW 2023 shall emphasize that microwaves can unite and bring people closer. We are convinced that science can help tear down "walls".

European Microwave Week 2023 is held in hub27, which is part of the Berlin Expo-Center City (Messe Berlin). Hub27 is a recently opened modern conference centre with a large exhibition hall, which can be conveniently reached by public transportation (S-Bahn stop "Messe Süd"). Berlin can be easily reached by train and plane. The Berlin Brandenburg Airport Willy Brandt (BER) opened for international flights in 2020 and has excellent train connections to downtown Berlin. The city of Berlin has exceptionally good public transportation, which allows one to get

to any point of the city very efficiently and much more conveniently than by car. We want to make your visit to Berlin as convenient as possible. Therefore, we will include full usage of Berlin's public transportation in your conference badge, including the trip to and from the airport. For more details, please see the registration information.

EuMW 2023 includes the European Microwave Conference (EuMC), the European Microwave Integrated Circuits Conference (EuMIC), the European Radar Conference (EuRAD), the Defence, Security and Space Forum, the Automotive Forum, the 5G to 6G Forum, a large number of Workshops covering a wide range of topics, Focused and Special Session and special events, such as Women in Microwave Engineering and two Inter-Society Technology Panels by IEEE MTT-S. The opening and closing plenary sessions of each of the three conferences feature keynote lectures by internationally renowned leaders in their fields. In addition to the conferences, the annual European Microwave Exhibition, which is by far the largest RF and microwave trade show in Europe, will offer attendees the chance to explore the latest technological advances in the industry. Since meeting and networking are vital for our community to exchange ideas, make connections, mentor younger colleagues, meet old friends and make new ones, we organized many social activities, such as the EuMIC dinner, Automotive Forum Dinner, Welcome Reception, Gala Dinner, TPC lunch, and EuRAD lunch.

Participation of students and young professionals is strongly encouraged. We organized many activities specifically for students, namely Student and Doctoral Schools with a get-together for students and Young Professionals, prizes and grants, an extended student volunteers program, and most importantly the Student Career Event, which is going to be a great opportunity for students to meet and network with potential employers and have a great party in a club in Berlin.

We extend our sincere gratitude to the EuMW 2023 organization team for their tireless effort in putting together an excellent technical and social program. We also thank EuMA and Horizon House for their continued support and help.

Come and join us in Berlin and enjoy both the European Microwave Week - Europe's premier microwave, RF, wireless, and radar event - and the city of Berlin! In Berlin, you will experience the exciting history of divided and reunified Germany and realize how important international exchange is for peace and prosperity. We look forward to welcoming all of you to our capital!



THOMAS ZWICK
EuMW General Chair
Karlsruhe Institute of Technology,
Germany



VADIM ISSAKOV
EuMW General Co-Chair
TU Braunschweig, Germany

Welcome from the President of the European Microwave Association

On behalf of the European Microwave Association (EuMA), I would like to welcome you to the 26th edition of the European Microwave Week in Berlin! I am excited to go to Berlin, a city I learnt to appreciate when I did my first international internship when I was still at university, that internship was at Siemens in Berlin, Berlin by the way was then still split into a western and an eastern part. EuMW 2023 will be a great opportunity for the microwave community to come together again and for our exhibitors to showcase your technology to existing and new customers. EuMA stands up for our microwave and RF community. EuMA actively promotes networking between scientists, engineers, decision-makers, and end-users. European Microwave Week (EuMW) is our most important asset and a true networking event. It is the place to get information you can't get anywhere else and to meet colleagues you don't see every day.



EuMA actively supports young researchers. This is why our Innovation Team is launching the 6th edition of the EuMA Internship Award. Every year, up to 10 awards of € 4,500 each are granted to selected master's and PhD students to spend a period of at least 3 months abroad in one of Europe's leading microwave industries

or institutes. The number of host institutions is growing year on year. As is the number of applicants. Details to submit an application can be found on our [website](#). The deadline to submit your application this year is in November 2023.

EuMA continues also providing grants and reduced registration fees to students and delegates from NIS countries to attend the EuMW. In particular, we support our Ukrainian colleagues.

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.



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

EuMW is the premier microwave conference and exhibition event in Europe. We value the cooperation with IEEE Societies MTT, AP, AESS and ED; the GAAS Association; The MIKON Foundation; EuRAAP; APMC; 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 Thomas Zwick the 2023 General Chair, his Co-Chair Vadim Issakov and Operational Officer Akanksha Bhutani; to the Treasurer Martin Vossiek; to the General TPC Chair Ingmar Kallfass; to Ilona Rolfes, Jan Barowski, and Amelie Hagelauer the EuMC Chair, Co-Chair and TPC Chair resp.; to Friedel Gerfers, Corrado Carta, and Ulrich Lewark the EuMIC Chair, Co-Chair and TPC Chair resp.; to Christian Waldschmidt, Christina Bonfert, and Marlene Harter the EuRAD Chair, Co-Chair and TPC Chair resp.. Just to name a few on behalf of the entire team. Thank you!

European Microwave Week is back in Germany after successful events in 1999, 2003, 2007, 2013 and 2017. All members of the team have worked hard to put together an excellent technical and scientific programme and I am sure they will make your stay in Berlin very exciting and enjoyable, and a rewarding experience of German hospitality. I warmly invite you to EuMW 2023. Come to the beautiful and vibrant city of Berlin. Come to EuMW 2023 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 that you don't see every day. Hope to see you in Berlin! And above all: Get involved in our community!

EuMA is now very active on various social media. Follow us @eumassociation on [Facebook](#), [LinkedIn](#), [Twitter](#), [YouTube](#) and [Instagram](#).



FRANK VAN DEN BOGAART
President
European Microwave Association

Welcome to the 18th European Microwave Integrated Circuits Conference

It is a great pleasure for us to welcome you to Berlin for the 18th European Microwave Integrated Circuits (EuMIC) Conference, which has been jointly organized by the GAAS[®] Association and EuMA since 2006.

We are glad, after the Corona Pandemic, to hold the conference at its traditional period, fully in person on Monday 18th and Tuesday 19th of September 2023. The conference venue is the congress and event hall hub27 Berlin, located in the heart of Germany's capital. The city of Berlin is very pleased to host the gathering of microwave experts and IC designers from all over the world.

Within the frame of the European Microwave Week (EuMW), the EuMIC is the premier European technical conference for RF & microwave microelectronics. The aim of the conference is to promote 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. These will be addressed in all of their aspects: theory, simulation, design, and measurement.

If you arrive already on Sunday, we encourage you to register for one or more of the excellent Workshops and Short Courses. Monday is a busy day with a large offering: beyond the Opening Session, there will be 12 regular technical sessions and the traditional EuMIC Dinner at the Meistersaal, at Potsdamer Platz, kindly sponsored by

Infineon and the GAAS Association, which concludes the first day. Please note, the dinner location has limited seating, so consider early registration.

The EuMIC Opening Session will feature two keynote addresses by eminent speakers. Dr. Ludger Verweyen of Infineon, Germany, will propose new RF, Power, and Sensor Solutions for greener ICT networks while Christian Zelger from Bosch, Germany, will provide the latest trends of transceivers for automotive radar sensors.

On Tuesday, which also hosts the Opening of the EuMW 2023, the EuMIC offers 5 regular sessions, 1 joint session with EuMC, the Foundry Session, two interactive Poster Sessions (one of them joined), and the EuMIC Closing Session. Several of the regular sessions will feature keynote industry talks on topical themes. The joined Foundry Session will be organized as a Panel Session which will not only address the EU Chip Act but will also deliver the latest updates from the RF and microwave semiconductor foundries.

This year, the EuMIC Closing Session will start with two keynote presentations, the first by distinguished Professor Gabriel Rebeiz, University of California, San Diego, USA on "Leaving the Marconi Era and Entering the Directive Communications and Sensors Era for 5G/6G and SATCOM", followed by Dr. Julio C. Costa, Global Foundries, USA on "RFSOI Technology for the RF Front-End: Then, Now and Tomorrow". This is followed by 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.

In addition to these, the GAAS[®] Association Tom Brazil Fellowship Award will be presented in dedication to a friend and colleague who made such significant contribution to our microwave community. This award will focus on promoting and encouraging the achievements of research students. It is an essay competition in which the student should provide her/his idea on the role of microwaves addressing global challenges.

We would like to take the opportunity to express our appreciation to our authors for their excellent technical contributions and for choosing to disseminate their work at EuMIC. Furthermore, we highly appreciate the dedication of the reviewers and TPC members who have spent their free time making the selections to provide the best possible conference program. Workshops and Short Courses are a major offering of the EuMIC, and so we would also like to thank the organizers for gathering key experts to cover the latest developments. We also wish to acknowledge the support of the previous EuMIC teams, in particular Milan, who were always ready to advise.

Finally, we would like to thank the 2022 EuMC and EuRAD teams for sharing their experiences as well as all our colleagues working behind the scenes to support EuMW as a whole.

We are very much looking forward to welcoming you personally in Berlin for an exciting EuMIC conference.



FRIEDEL GERFERS
EuMIC Chair
Technical University of Berlin,
Germany



CORRADO CARTA
EuMIC Co-Chair
IHP & TU Berlin, Germany



ULRICH LEWARK
EuMIC TPC Chair
IMST, Germany

Welcome to the 53rd European Microwave Conference

With great pleasure and honour, the EuMC 2023 team warmly welcomes you to the 53rd edition of the European Microwave Conference! For the first time in its longstanding history the European Microwave Conference will take place in Berlin, the main capital of Germany, being famous as a vivid, inspiring world city of culture, politics, media and sciences. And as exciting as the city itself, an equally exciting program awaits you during your stay at the conference.

Representing the main event in the European Microwave Week, a broad range of high frequency related topics, from materials and technologies to integrated circuits, systems and applications will be addressed in all their aspects: theory, simulation, design, and measurement. We have done our very best to offer you an attractive conference where you can present and discuss the results of your research and learn about the latest trends, be inspired by world-leading keynote speakers from academia and industry, be exposed to the latest products in the exhibition as well as meet colleagues and make new friends.

We have received over 375 submissions across 40 countries for EuMC 2023. A rich program awaits you throughout the entire week. Along with peer-reviewed scientific works, which will be presented in more than 40 sessions, the program is enriched by contributions from keynote speakers, together with workshops, short courses, forums as well as the Doctoral and Student school.

Furthermore, focussed sessions will offer the latest highlights on technological advancements giving insights in the field of THz antennas and systems as well as addressing new developments of 6G technologies reaching from THz communications to aspects of joint communication and radar sensing. There is also the Asia-Pacific focused session when we will hear from several expert speakers.

Another exciting part of this event is the European Microwave Exhibition offering you a large platform for direct interaction with partners from industry and research institutes. This year we expect it to be one of the biggest microwave and RF tradeshow in Europe and hope that it assists and inspires many fruitful technology developments and collaborations.

Furthermore, we want to draw your attention to the plenary talks of three renowned speakers. On Tuesday morning during the EuMW/EuMC Plenary Opening Session, Daniel Mittleman of Brown University, USA, will present his plenary talk on "Security in Terahertz Wireless Links".

Thursday afternoon, during our EuMC Closing Session Heike Riel of IBM Research, Switzerland, will give her plenary talk on "Quantum Computing - Building a New Computing Technology", followed by Jean-Dominique Coste from Airbus, Germany, with his talk "Beams from

Space: The Future of Energy?". Don't miss to be there as the EuMC microwave prize and two young engineer prizes will as well be awarded.

In continuation of a tradition, Tuesday afternoon will serve for networking. This year, we will host a joint Women in Microwaves (WiM) and Young Professionals (YP) event comprising of an exciting panel discussion with female industry representatives and a unique sightseeing tour of Berlin's Unterwelten (underground world) afterwards.

On Tuesday evening, the EuMW Welcome Reception will take place, which is free to all conference delegates and invited exhibitors, and on Wednesday evening the EuMW Gala Dinner will lead us to the Tipi of Berlin. Please mind that an additional fee applies for participation and that the number of places is limited.

Finally, we want to thank all authors, reviewers, and TPC members for their valuable contributions and efforts paving the way for an exciting event!

We hope that you will enjoy EuMC 2023 and we look forward to meeting you in Berlin!



ILONA ROLFES
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Ruhr University Bochum, Germany



JAN BAROWSKI
EuMC Co-Chair
Ruhr University Bochum, Germany



AMELIE HAGELAUER
EuMC TPC Chair
Fraunhofer EMFT, Germany

Welcome to the 20th European Radar Conference

Welcome to EuRAD 2023 - the first European Radar Conference taking place in the vibrant city of Berlin! The 20th European Radar Conference (EuRAD 2023) will be held from 20th to 22nd September 2023 in Berlin, Germany, as part of the European Microwave Week 2023. At its 20th anniversary, the EuRAD 2023 will present you stimulating trends and new developments in all aspects of radar systems for a large variety of civil, security, automotive, defense, and medical applications.

We are pleased to bring together international experts, engineers and scientists to discuss, exchange and network. EuRAD is an outstanding and leading international platform to gather and discuss the latest technical developments and trends. Come to Berlin and make new contacts and expand your network. For the first time, EuRAD will take you to the beautiful metropolis of Berlin, a place rich in history and at the same time multicultural and modern, attracting millions of visitors from all over the world every year. No other major city offers such a density of sights, the city is full of life, buzzing and trendy. The conference will take place in Messe Berlin hub27, easily accessible by public transport from all over the city.

On Wednesday in the Opening Session, we present an exciting talk on Antenna Systems for Radar - revealing the contradictions between MIMO and Phased Array approaches. Tom Driscoll, CTO and

Founder of Echodyne will present this topic and give us insights into modern antenna concepts. Furthermore, we will report on the latest developments in the field of body scanners, which you all know from security checks at the airport. Matthias Gareis and Andreas Schießl from Rohde & Schwarz will report on walk-through scanners and the innovative concepts of UWB and sequential sampling behind them. In our closing session on Friday, Christoph Reising from the Fraunhofer Institute for High Frequency Physics and Radar Techniques will report on the latest developments in radar sensor technology for space surveillance. We will see new, digital concepts for high performance radars that offer completely new possibilities for remote sensing. During the Closing Session we invite all EuRAD visitors to our traditional EuRAD lunch. We look forward to seeing you there.

With an impressive number of over two hundred paper submissions this year, we are pleased to see a continuously growing interest in the European Radar Conference. Over recent years, EuRAD has become one of the leading radar events, enjoying wide recognition not only in Europe but also globally. The conference covers all relevant aspects and innovations in radar technology, including components, architectures, signal processing and applications. All 204 submitted papers went through a rigorous selection process by our expert review panel, resulting in 122 papers being accepted.

They have been organized into 18 oral sessions and one interactive poster session at the EuRAD conference, in addition with 9 joint sessions including one poster session shared with EuMC. Among these, focus sessions may be of special interest to you. These include besides a session on UAV-based Radar, two focus sessions on Automotive PCW Radars as well as two sessions on Joint Communication and Radar Sensing. New trends and recent advances in radar will be addressed by 9 industrial keynotes, distributed over the oral sessions.

Furthermore, several workshops will enhance the EuRAD program, including strong links with both the Defence, Security & Space (DSS) and the Automotive Forums.

This ambitious program could not have been set up without the excellent paper submissions and the tremendous effort of the reviewers and technical program chairs. The EuRAD organizers would like to thank all the authors for their contributions, the reviewers and the members of the TPC for undertaking their tasks in a professional and timely manner. Further, we would like to thank the plenary speakers and the invited keynote speakers for providing invaluable insights.

We look forward to meeting you in Berlin. Enjoy the conference and let yourself be inspired by the motto "Waves beyond Walls".



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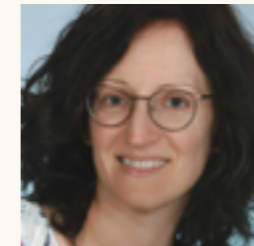
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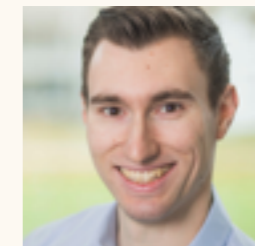
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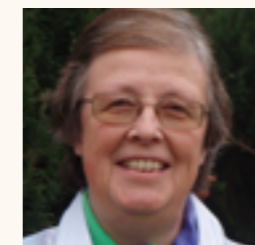
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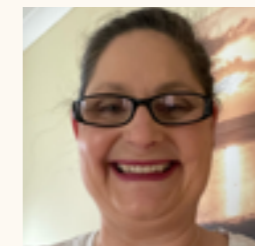
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Michel Zoghob
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Horizon House, United Kingdom



Julie Mills
Event Manager
Horizon House, United Kingdom



Sally Garland
Hotels and Partner Programme
Connex Hotels and Events, United Kingdom

2022 European Microwave Week in Milan Best Paper Prizes: EuMC

MICROWAVE PRIZE

Authors

Elizabeth Bekker, Akanksha Bhutani, Lucas Giroto de Oliveira, Theresa Antes, Thomas Zwick
Karlsruhe Institute of Technology

Title

Differential Split-Ring Resonator-Based Antenna at 140 GHz in Embedded Wafer Level Ball Grid Array Technology

Sponsors - JMA



EUMC YOUNG ENGINEER PRIZE

Authors

Elliott Williams
Caltech

Title

Meta-Gaps for Mechanically Reconfigurable Phased Arrays

Sponsors - Thales Nederland



EUMC YOUNG ENGINEER PRIZE

Authors

Han Zhou
Chalmers University of Technology

Title

Wideband Sequential Circulator Load Modulated Amplifier with Back-off Efficiency Enhancement



2022 European Microwave Week in Milan Best Paper Prizes: EuRAD

EURAD PRIZE

Authors

Marius Brinkmann, Frank Gumbmann, Gerhard F. Hamberger, Benedikt Simper
Rohde & Schwarz

Title

Material Characterization using High-Resolution Multiple-Input Multiple-Output Imaging Radars

Sponsors - Thales Nederland



EURAD YOUNG ENGINEER PRIZE

Authors

Pirmin Schoeder
University of Ulm

Title

A Modulation-Based Radar Target Simulator and Its Hardware Nonidealities

Sponsors - Hensoldt Sensors GmbH



2022 European Microwave Week in Milan Best Paper Prizes: EuMIC

EUMIC PRIZE

Authors

Luís C. Nunes, João L. Gomes, Filipe M. Barradas, José C. Pedro
Universidade de Aveiro

Title

A Simple Thermally Activated Trapping Model for AlGaIn/GaN HEMTs



EUMIC YOUNG ENGINEER PRIZE

Authors

Andre Engelmann
Friedrich-Alexander-Universität Erlangen-Nürnberg

Title

Design of two Low DC-Power High-Efficiency D-Band Power Amplifiers in 22 nm FD-SOI



EUMA Roberto Sorrentino Prize

THIS ANNUAL AWARD RECOGNIZES AN OUTSTANDING YOUNG PROFESSIONAL WHO IS A EUMA MEMBER WHO HAS DISTINGUISHED TECHNICAL ACHIEVEMENTS WITHIN THE MICROWAVE FIELDS OF INTEREST.

This is the second edition of the 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.

Recipients of the Roberto Sorrentino Prize:
2021: Prof. Dimitra Psychogiou
2022: Dr. Xiaobang Shang

EuMA Outstanding Career Award

THE OUTSTANDING CAREER AWARD WAS ESTABLISHED IN 2008, TO RECOGNIZE AN INDIVIDUAL “WHOSE CAREER HAS EXEMPLIFIED OUTSTANDING ACHIEVEMENTS IN THE FIELD OF MICROWAVES”.



2023 RECIPIENT: WERNER WIESBECK

Werner Wiesbeck received the Dipl.-Ing. (M.S.E.E.) and the Dr.-Ing. (Ph.D.E.E.) degrees from the Technical University Munich in 1969 and 1972, respectively. From 1972 to 1983 he was with AEG-Telefunken in various positions including that of Head of R&D of the Microwave Division in Flensburg and Marketing Director Receiver and Direction Finder Division, Ulm. During this period, he had product responsibility for mm-wave radars, receivers, direction finders and electronic warfare systems.

From 1983 to 2007 he was the Director of the Institut für Höchstfrequenztechnik und Elektronik (IHE) at the University of Karlsruhe (TH) and he is now Distinguished Senior Fellow at the Karlsruhe Institute of Technology (KIT). Research topics include antennas, wave propagation, Radar, remote sensing, wireless communication, ultra wideband technologies and drone (UAV) security. He is author and co-author of several books and of more than 850 publications, supervisor of more than 90 PhDs, and responsible supervisor of over 600 Diploma-/Master theses and he holds over 60 patents.

In 1989 and 1994, respectively, he spent a six-month sabbatical at the Jet Propulsion Laboratory, Pasadena. He is a member of the IEEE GRS-S AdCom (1992 - 2003), Chairman of the GRS-S Awards Committee (1994 - 1998, 2002 - 2017), Executive Vice President IEEE GRS-S (1998 - 1999), President IEEE GRS-S (2000 - 2001), Associate Editor IEEE-AP Transactions (1996 - 1999), past Treasurer of the IEEE German Section (1987 - 1996, 2003 - 2007). He has been General Chairman of the '88 Heinrich Hertz Centennial Symposium, the '93 Conference on Microwaves and Optics (MIOP '93), the Technical Chairman of International mm-Wave and Infrared Conference 2004, Chairman of the German Microwave Conference GeMIC 2006 and he has been a member of the scientific committees and TPCs of many conferences. He was a member of an Advisory Committee of the EU Joint Research Centre (Ispra/Italy), and he is an advisor to the German Research Council (DFG), to the German Federal Ministry of Education and Research (BMBF) and to industry in Germany.

He is the recipient of a number of awards, lately the IEEE Millennium Award, the IEEE GRS Distinguished Achievement Award, the Honorary Doctorate (Dr. h.c.) from the University Budapest/Hungary, the Honorary Doctorate (Dr.-Ing. E.h.) from the University Duisburg/Germany, the Honorary Doctorate (Dr.-Ing. E.h.) from the Technische Universität Ilmenau and the IEEE Electromagnetics Award 2008. He is a Life Fellow of IEEE, an Honorary Life Member of IEEE GRS-S, a Member of the Heidelberger Academy of Sciences and Humanities and a Member of the German Academy of Engineering and Technology (acatech). He is a member of the German VDE since 1972 and Fellow VDE-ITG. He is chair of a number of national and international Awards Committees.

EuMA Distinguished Service Award



2023 RECIPIENT: LORENZ-PETER SCHMIDT

Lorenz-Peter Schmidt received the Dipl.-Ing. and the Dr.-Ing. degrees in electrical engineering from the Technical University of Aachen, Germany, in 1974 and 1979. In 1979 he joined Prof. Tatsuo Itoh at the University of Texas at Austin as a Post Doc., focusing on the full-wave analysis of quasi-planar transmission lines, especially fin-lines.

From 1980 to 1998, he was with AEG-Telefunken, Ulm, Germany (now HENSOLDT), where he later became the Head of the Corporate Advanced Millimeter-Wave Technologies Department. His R&D activities included GaAs MMIC design up to 100 GHz, millimeter-wave interconnect and packaging technologies, radar sensors, transceiver front-end technology, and antennas in the range 10 - 140 GHz.

From 1998 until his retirement in 2015, he has been a Full Professor and the Head of the Institute of Microwaves and Photonics at the University of Erlangen-Nuremberg, Germany. His main research interests have been in the field of millimeter-wave and terahertz components, antennas, and measurement technologies as well as active and passive high resolution imaging systems.

Dr. Schmidt is a Member of VDE and Past-Chairman of the VDE/ITG Expert Group on Microwave Techniques. He is a Life Fellow of the IEEE and a member of the German IEEE MTT/AP Chapter Commission since many years. In 2013 he received the Microwave Prize of the MTT Society.

From 2001 to 2010 he was the German Representative in the EuMA General Assembly. In 2003, he served as the General Chair of the European Microwave Week, in 2007 as the Treasurer, and in 2013 as the EuMC Chairman. From 2015 until 2017, he was a member of the EuMA Board of Directors (BoD). Since 2015 he supports European Microwave Week Teams and organizes the know-how transfer, acting as EuMA's "European Microwave Week Officer" in close coordination with the EuMA BoD.

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

The role of Microwaves for global challenges

The Tom Brazil Fellowship Award by the GAAS® Association is granted to the best essays provided by students pursuing a research degree in RF/Microwave/mmWave electronics. A two-stage approach was taken to select the winners. As a first step, the participating authors submitted a four-page abstract on their view on "Microwaves in supporting global challenges," using one of the EuMIC conference topics, thus describing what kind of future microwave activities would be important and why. During the paper reviewing process, a shortlist of authors is determined. These authors were requested to provide an extended version of their contribution with a maximum of 4000 words or up to 12 pages.

In a second reviewing step, the best three essays are selected. The shortlist candidates will be presented at the end of the Tom Brazil Doctoral School. To promote their ideas, the finalists will be asked to perform a pitch in the MicroApps area of the Exhibition Hall. The winners of the money prizes will be announced during the awards session at the EuMIC closing event. The best essay will be awarded prizes ranging from € 1,000 to € 2,500.

In this essay competition, we were looking for a summary of the role 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 infrastructure. The use of THz for forecasting catastrophic weather events has also been an essential 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. We requested creative and original ideas and suggestions on how future microwave-related research work can be best directed in fulfilling actual and forthcoming global challenges.

'As humans, we have limited time and energy; do something useful' - Prof. Tom Brazil

International Journal of Microwave and Wireless Technologies: Former Best Paper Prizes

The International Journal of Microwave and Wireless Technologies selects one paper per year for the Best Paper Award of the Journal and announces it in the next year. EuMA grants an amount of € 1,000 for this award. In the following, the list of the former recipients of the prizes:

1. Muhammad Furqan, Faisal Ahmed, Reinhard Feger, Klaus Aufinger, Walter Hartner, Andreas Stelzer, "A SiGe-based fully-integrated 122-GHz FMCW radar sensor in an eWLB package," International Journal of Microwave and Wireless Technologies, 2017, 9 (6), 1219-1230.
2. Marco Dietz, Andreas Bauch, Klaus Aufinger, Robert Weigel, and Amelie Hagelauer, "A 1 to 32 GHz broadband multi-octave receiver for monolithic integrated vector network analyzers in SiGe technology," International Journal of Microwave and Wireless Technologies, 2018, 10 (5/6), 717-728.

3. Golzar Alavi, Sefa Özbek, Mahsa Rasteh, Markus Grözling, Manfred Berroth, Jan Hesselbarth, and Joachim N. Burghartz, "Toward a flexible and adaptive wireless hub by embedding power amplifier thinned silicon chip and antenna in a polymer foil," International Journal of Microwave and Wireless Technologies, 2019, 11 (5/6), 864-871.
4. Iulia Dan, Guillaume Ducournau, Shintaro Hisatake, Pascal Szriftgiser, Ralf-Peter Braun, and Ingmar Kallfass, "A superheterodyne 300 GHz wireless link for ultra-fast terahertz communication systems," International Journal of Microwave and Wireless Technologies, 2020, 12 (7), 578-587.
5. Philipp Ritter, "Toward a fully integrated automotive radar system-on-chip in 22 nm FD-SOI CMOS," International Journal of Microwave and Wireless Technologies, 2021, 13 (6), 523-531

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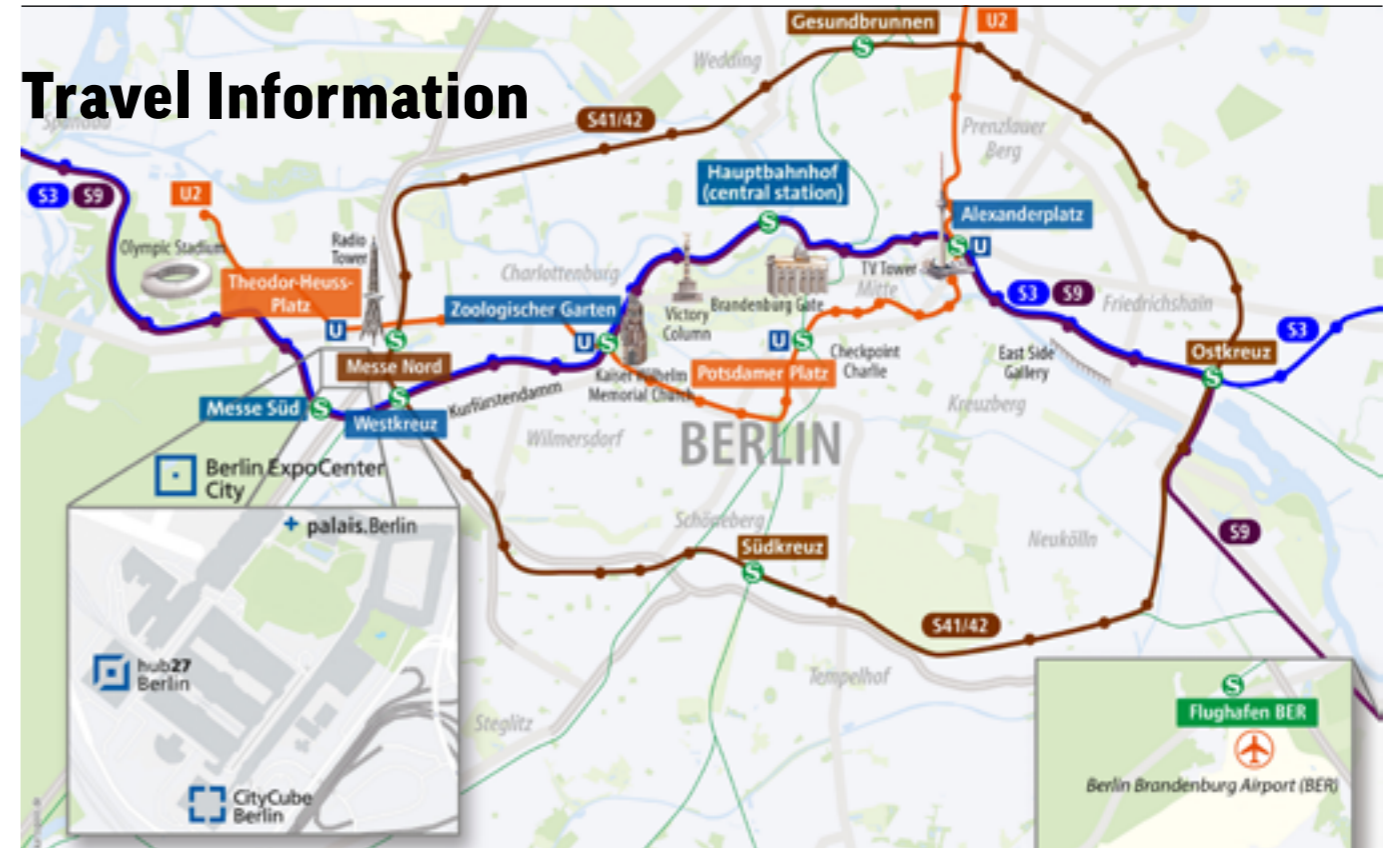
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Travel Information



HOW TO GET TO MESSE BERLIN

Venue Address

Messe Berlin
hub27
Jaffestraße 2, Tor 25
14055 Berlin
GPS: 52°30'11.2"N / 13°16'03.9"E

By Public Transport

Berlin public transport is provided by the BVG (<https://www.bvg.de/en>). A standard ticket is valid for S-Bahn, U-Bahn, Bus and Tram, also most regional trains are included.

S-Bahn station: Messe Süd (S3, S9)

U-Bahn station: Theodor-Heuss-Platz (U2)

Bus stop: Messegelände/ICC (143, 349 and N43)

The S-Bahn station is closest to hub27.

Important Information

The delegate badges and registration

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.connexhotelsand-events.com/eumw.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.

confirmation e-mails also include a ticket for the public transport in Berlin which is valid from September 16-22. The ticket is valid for the fare zones A, B, and C (<https://sbahn.berlin/en/tickets/the-vbb-fare-explained/fare-zones/>) which cover the complete city of Berlin including the connection to the airport BER. For details on how to use the ticket see the EuMW website.

By Train

Trains are run by Deutsche Bahn (<https://www.bahn.com/en>). All trains stop at central station (Hauptbahnhof). Some trains have additional stops like Gesundbrunnen, Südkreuz or Charlottenburg. When you book your ticket, you can give the nearest S-Bahn station to your hotel/venue as arrival point without extra fee. Messe Berlin offers special deals on

train tickets (<https://www.messe-berlin.de/en/visitors/arrival-departure/arrival/>).

From the Airport

The BER Airport is located in the south east of Berlin. The nearest other options are to fly to Leipzig/Halle, Dresden, Braunschweig, Hannover or Hamburg Airports and continue by train.

When arriving at BER:

Option 1, by train: regional train (RE7 to Dessau, RB14 to Nauen) or Airport Express Train (FEX to Hauptbahnhof)
Option 2, by S-Bahn: S9 to Spandau or S45 to/via Südkreuz
Option 3, by car: Taxi and car rental are available at the airport.

By Car

The parking lots P17 and P18 can be used for € 20/day/car.

PERSONAL INVITATION (VISA)

A valid passport will be required for entry into the organising country, in this case Germany. A German visa may also be required for the purpose of attending EuMW and we suggest you check with your local embassy. If you are registering as a speaker, a delegate or an exhibitor and you need a visa, we recommend that you contact the German Embassy, in your own country at least 3 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 found here: [EUMW2023 VISA REQUEST FORM](https://www.eumw2023.org/visas) and send it to the visa operational officer: visa.chair.eumw2023@eumwa.org

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.

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

Once divided in East and West Berlin during the Cold War, the German capital Berlin has become a major player in the European start-up scene offering young entrepreneurs a unique inventive spirit, international ambiance, and an active venture capital scene. Berlin accommodates an unforgettable variety of culture to experience and history

to touch such as the East Side Gallery, being the longest open-air art gallery in the world, the Brandenburg Gate, the Reichstag, seat of the German parliament, Checkpoint Charlie, or the Museumsinsel. With public transport stops within a radius of 500 metres throughout Berlin, exploring the city has never been easier. Famous for its Currywurst, Berlin offers a unique culinary experience with restaurants for every budget, a craft beer scene and is one of the most vegan-friendly cities in the world. Berlins exciting nightlife with countless bars, pubs, and clubs invites everyone to have an unforgettable experience. For more information, visit <https://www.visitberlin.de/en>.

Conference Information

BADGES AND REGISTRATION

The registration area will be located directly at the hub27 entrance. 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 22nd September 2023. 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:

- Conf. Registration: registration.eumw2023@eumwa.org
- Exhibition Registration: exhibitionreg@eumweek.com

CONFERENCE ROOMS

Conference rooms are located on levels Alpha (0), Beta (1) and Gamma (2) of the venue as signposted. The conferences will be held in different rooms over the conference dates. Please refer to the Conference Matrix in 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.

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 2023.

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 the hub27 hall at ground level alpha 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 19th September 2023, 9:00 - 18:00
- Wednesday 20th September 2023, 9:00 - 17:30
- Thursday 21st September 2023, 9:00 - 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. Please check the web site www.eumweek.com.

Hotel Booking Form September 2023

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.

FOR MORE HOTEL OPTIONS AND TO RESERVE YOUR ROOM ONLINE VISIT

<http://www.connexhotelsandevents.com/eumw.html>

Or complete the booking form below and email to sally@connexhotelsandevents.com

Contact Name _____ Company _____

Address _____

City _____ Post Code _____

Telephone _____ Fax _____

Email _____

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 _____

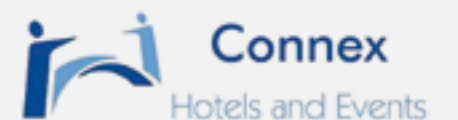
Guest Names _____

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

Credit Card Number _____ Name on Card _____ Expiry Date _____

I authorise that any no show or late cancellation charges, as stipulated in the Connex booking confirmation will be charged to this credit card.

Signed _____ Date _____



Tel: +44 (0)7775 744193
Email: sally@connexhotelsandevents.com

HOTEL	TO HUB27	RATES FROM*	
MELIA BERLIN HOTEL Friedrichstraße 103, 10117 Berlin	30 minutes by Rail 20 minutes by Car/Taxi	EuMW ** € 195.00 Flexible € 377.00	B&B B&B
B&B HOTEL BERLIN-CHARLOTTENBURG Kaiserdamm 117, 14057 Berlin	25 minutes by Rail 7 minutes by Car/Taxi	EuMW ** € 210.50 Flexible € 244.00	B&B RO
NUMA NOVELA HOTEL & APARTMENTS Konstanzer Str. 1, 10707 Berlin	30 minutes by Rail 10 minutes by Car/Taxi	EuMW ** € 165.00 Flexible € 170.00	B&B RO
INTERCITYHOTEL BERLIN CENTRAL STATION Katharina-Paulus-Straße 5, 10557 Berlin	30 minutes by Rail	EuMW ** € 159.00 Flexible € 238.00	B&B B&B
GOODMAN'S LIVING APARTMENTS Wilmsdorfer Str. 36, 10585 Berlin	25 minutes by Rail 7 minutes by Car/Taxi	EuMW ** € 129.50 Flexible € 145.00	RO RO
LEONARDO HOTEL BERLIN Wilmsdorfer Str. 32, 10585 Berlin	30 minutes by Rail 10 minutes by Car/Taxi	Prepay € 167.00 Flexible € 186.00	B&B B&B
CITADINES BERLIN OLIVAER PLATZ Olivaer Pl. 1, 10707 Berlin	30 minutes by Rail 9 minutes by Car/Taxi	Prepay € 171.00 Flexible € 189.00	RO B&B
ASPRIA BERLIN KU'DAMM Karlsruher Str. 20, 10711 Berlin	27 minutes by Rail 7 minutes by Car/Taxi	Prepay € 192.00 Flexible € 202.00	RO RO
NOVUM HOTEL KRONPRINZ Kronprinzendamm 1, 10711 Berlin,	23 minutes by Rail 5 minutes by Car/Taxi	Prepay € 198.00 Flexible € 202.00	B&B B&B
HOTEL VILLA KASTANIA Kastanienallee 20, 14052 Berlin	18 minute Walk 3 minutes by Car/Taxi	Flexible € 186.00	RO
HOTEL MARGRIT Brandenburgische Str. 24, 10707 Berlin	29 minutes by Rail 8 minutes by Car/Taxi	Prepay € 90.00	B&B
HOTEL KU' DAMM 101 Kurfürstendamm 101, 10711 Berlin	29 minutes by Rail 6 minutes by Car/Taxi	Prepay € 179.00 Flexible € 200.00	B&B B&B
COME INN HOTEL Kurfürstendamm 180, 10707 Berlin	30 minutes by Rail 9 minutes by Car/Taxi	Prepay € 165.00 Flexible € 183.00	B&B B&B
HOTEL-PENSION BERNSTEIN Nürnberger Str. 46, 10789 Berlin	33 minutes by Rail 11 minutes by Car/Taxi	Prepay € 109.00	B&B
PREMIER INN BERLIN CITY WILMERSDORF HOTEL Bundesallee 14, 10719 Berlin	37 minutes by Rail 9 minutes by Car/Taxi	Flexible € 133.00	RO

*All rates quoted include VAT at the current rate. **City Tax is extra and will be charged directly by the hotel per night**

**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.

INTERNSHIP AWARD

EARN

4.500 €

RESEARCH + INDUSTRY

This November 2023, the EuMA Innovation Team is launching the sixth edition of the **EuMA Internship Award**. Every year up to **seven awards of 4500€** each will be given to selected **Master and PhD students** to spend a period of at least **3 months abroad** in one of the **leading European Microwave Industries, Universities, and Research Institutes** supporting this initiative.

In addition to promote the mobility of students that would like to work in the microwave field across European Institutions, the award will also attract new talents to the hosting organizations and will help creating a larger and stronger community of microwave young professionals.

Master and Doctoral students with a background in Engineering, Computer Science, Mathematics or Physics can apply using the **QR Code**. The deadline for application is set to November 28, 2023.

WHO

PhD and Master students with a background in Engineering, Computer Science, Mathematics or Physics

WHERE

In leading **European Microwave Industries, Universities and Research Institutes**

WHAT

Internship abroad of at least 3 Months within 1 year from acceptance notification

WHEN

Submission deadline **28.11.2023**



APPLICATION PROCEDURE

- I. Select a host** and log in into the EuMA website to fill out the application form
- II. EuMA** will notify of a **preacceptance** by 13.1.2024
- III. Set-up the interview** with the host institution before 13.4.2024
- IV. Final notification** acceptance by 30.4.2024

INFOS & CONTACT



Web:
www.eumwa.org

Email:
internships@eumwa.org

EuMA | European Microwave Association

innovation TEAM

PROMOTING EUROPEAN MICROWAVES

Welcome to Berlin!

With almost four million people calling the city home, Berlin's position as a global melting pot of art, culture, politics, and technology is constantly evolving. You can easily immerse yourself in it all and make the most of your time in the German capital, from going inside some of history's most storied landmarks to fitting in with modern-day Berliners.

If you would like more details and costs of the attractions or tours that are not linked directly, please contact Sally Garland at sally@connexhotelsandevents.com.

For more information and many more ideas visit the Berlin website <https://www.getyourguide.co.uk/berlin-117/>

HOP-ON HOP-OFF BUS TOUR WITH LIVE COMMENTARY



Experience a Berlin city tour with live commentary.

Explore Berlin at your own pace from the roof of a double-decker bus, hop on and hop off as much as you like, stop at all the must-see attractions such as Checkpoint Charlie, Brandenburg Gate, the New Church (Deutscher Dom) and many more including a Cruise on the river Spree. Free WiFi on the bus.

With departures every 10-15 minutes you can hop on and off as you please at any of the 18 stops and discover the city at your own pace. The first bus stop is located at Kurfürstendamm 238.

Cost from € 20.00 per person (Boat Tour Option extra)

GUIDED CRAFT BEER & CULTURAL TOUR WITH SNACKS



Discover the former East Berlin district of Friedrichshain on a guided craft beer tour. Visit microbreweries and brewpubs to sample handcrafted beers and savour a selection of snacks chosen to complement the beer.

Cost from € 89.00 per person

3.25-HOUR SPREE & LANDWEHR-KANAL BOAT TOUR



Discover the Berlin skyline on a city cruise and see more than 40 bridges over the Landwehr Canal and river Spree. Admire the diverse architecture of the city, including Museum Island.

Cost from € 27.50 per person

PERGAMON & NEW MUSEUM TOUR AND MUSEUM ISLAND PASS



Discover Berlin's world-famous Museum Island. Explore the wonders of ancient Egypt, Babylon, Greece and Rome on this exclusive tour through two remarkable museums: The Pergamon and the New Museum.

Cost from € 59.00 per person

BERLIN WALL MUSEUM AT CHECK-POINT CHARLIE



Visit the Berlin Wall Museum at Checkpoint Charlie. Founded shortly after the construction of the Berlin Wall, this museum had a vital role in history and the objects on display in the museum provide evidence of this.

Cost from € 17.50 per person

THE BERLIN CARD



Explore Berlin with a 2, 3, 4, 5, or 6-day Berlin Welcome Card. Ride public transport in the ABC zones, including Berlin Brandenburg Airport, receive discounts of up to 50 % with many partners, and benefit from the pocket travel guide.

Cost from € 30.00 per person

75-MINUTE TRABI SAFARI



Drive through Berlin in the official car of the DDR. Squeeze yourself behind the wheel of a Trabant of your choice and putter around the capital. See the most interesting sights and get your very own souvenir Trabant-driver's license!

Cost from € 69.00 per person

DISCOVER BERLIN WALKING TOUR



Explore Berlin on a comprehensive walking tour. See all the major sights, from the Brandenburg Gate to Museum Island. Hear stories of residents from enthusiastic guides.

Cost from € 20.00 per person

BERLIN UNDERGROUND



Take an exciting discovery tour beneath the streets of the metropolis with a visit to the Berliner Unterwelten-Museum. Learn more about the secret history of the city. Descend into bunkers as well as tunnel systems. <https://www.berliner-unterwelten.de/en/index.html>

GERMAN SPY MUSEUM BERLIN



The German Spy Museum Berlin offers a distinctive opportunity to delve into the shadowy world of espionage, situated in the very location where the Wall once separated the city.

<https://www.deutsches-spionagemuseum.de/en>

VISIT THE DOME OF THE REICHSTAG BUILDING



The roof terrace and dome of the Reichstag Building can be visited, and offer spectacular views of the parliamentary and government district and Berlin's sights. Admission is free; advance registration required at <https://www.bundestag.de/en/visittheBundestag/dome/registration-245686>

Social Events

EuMW Welcome Reception

Tuesday 19th September 2023
18:45 - 21:45

Cost: Free to conference delegates & invited exhibitors

Location: Palais, Messe Berlin

Sponsors: Keysight, Horizon House, EuMA
(Please bring your badge to gain admission.)

All registered conference delegates, as well as invited representatives from companies participating in the exhibition are invited to the Welcome Reception, sponsored by Keysight Technologies, Horizon House Publications and EuMA. Delegates will need to bring their badge, while exhibitors will need to bring their invitation, in order to gain entrance. The evening will commence with drinks at 18:45, followed by the General Chairs' handover from EuMW 2023 in Berlin to EuMW 2024 in Paris along with an address from the Platinum Sponsor, Keysight Technologies.

The open-buffet dinner will be served from 19:15.

Automotive Forum Networking Dinner

Monday 18th September 2023
19:30 - 23:30

Cost: Free to registered Automotive Forum delegates
(Please bring your badge to gain admission.)

Location off-site: SAGE Restaurant

(Shuttle service from hub27 will be provided including a guided city tour of Berlin. Meeting point at 18:30. The buses will depart no later than 18:45.)

Join us for this unique event, which includes a 3-course dinner. This will provide you with the opportunity to network and discuss the issues raised throughout the Forum in an informal setting.

EuRAD Lunch & Closing Session

Friday 22nd September 2023
13:00 - 15:40

Cost: Free to registered EuRAD delegates
Sponsor: Hensoldt
(Please bring your badge to gain admission.)

Location: Alpha 5/6

An open-buffet lunch for EuRAD delegates to catch up and round off a busy week, followed by the EuRAD Closing Session.

Young Professionals Get-Together

Sunday 17th September 2023
20:00 - 24:00

Cost: Free for young professionals and school participants

Sponsors: Bosch, Dassault Systemes, Fraunhofer IAF, Hensoldt, IEEE MTT-S, Keysight, NI, Nokia, Rohde & Schwarz, Rosenberger, Saab, Siemens, Vega, Virginia Diodes
(Tickets required. These will be distributed in schools and Sunday lunch break in registration area. Only a limited number of tickets are available.)

Location off-site: Hofbräu Wirtshaus Berlin

Come and enjoy networking in a very informal venue!

Student Career Party

Wednesday 20th September
20:00 - 01:00

Cost: Free for microwave students

Sponsors: Bosch, Fraunhofer IAF, Hensoldt, Keysight, Nokia, Rohde & Schwarz, Rosenberger, Saab, Siemens, Vega

(Tickets required. These will be distributed during the Student Career Event at the entrance of hub27 on Wednesday, 12:00 - 15:00. Please note that only a limited number of tickets are available.)

Location off-site: Palais Kulturbrauerei

Students, come party with representatives of leading RF companies. Expect a free buffet, open bar, DJ, and the chance to meet your future employer.

EuMIC Dinner

Monday 18th September 2023
19:30 - 22:30

Cost: Free to all EuMIC delegates

Sponsor: Infineon

(EuMIC Dinner admission tickets required. These will be distributed to EuMIC delegates on site. Please note that only a limited number of tickets are available.)

Location off-site: Meistersaal am Potsdamer Platz

(Shuttle service will be provided from hub27. Meeting point at 18:30. The buses depart no later than 18:45.)

All registered EuMIC delegates are invited to our traditional and convivial "get-together". A good occasion to unwind at the end of the first conference day, and enjoy a dinner with speakers and colleagues.

EuMW 2023 TPC Lunch

Wednesday 20th September 2023
13:00 - 14:20

Special event for the EuMW 2023 Technical Program Committee members (by invitation).

Location: Funkturm Berlin

A special event to recognize the service of the TPC members.

EuMW Gala Dinner

Wednesday 20th September
19:30 - 23:30

Thanks to the generous sponsorship offered by Rohde & Schwarz, the cost is € 60 per person. Limited number of seats: "first come first serve"

Location off-site: Tipi am Kanzleramt

Sponsor: Rohde & Schwarz

(Shuttle service will be provided from hub27. Meeting point at 18:30. The buses will depart no later than 18:45.)

Experience the unique blend of culture, nature, and politics at TIPI AM KANZLERAMT in Berlin's iconic Tiergarten, offering a cozy tent venue, captivating performances, and proximity to renowned landmarks. Registration on www.connexhotelsandevents.com/eumw-gala-dinner.html

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.eumweek.com before registration for final availability and numbering.

Sunday 17 th September 2023			
SC1	EuMIC	Full Day	Fundamentals of Microwave PA Design
SC2	EuMC/EuMIC/ EuRAD	Half Day	Wideband Microwave Measurements of Multi-Port Devices on VNA-Type Measurement Systems
WS1	EuMC/EuMIC	Full Day	Broadband and Microwave Signal Processing Using Electronic-Photonic Integration
WS2	EuMIC	Full Day	Terahertz Device, Circuit and System Fundamentals and Applications
WS3	EuMC	Half Day	Highly-Integrated mm-Wave Circuits and Systems for Emerging Radar Applications
WS4	EuMC/EuRAD	Half Day	Joint Communications and Sensing
WS5	EuMIC/EuMC	Half Day	Heterogeneous Integration for Next Generation of Communication and Sensing
WS6	EuMIC/EuRAD	Half Day	mm-Wave Integrated Radar Circuit Design and SoC Integration in Silicon Technologies
WS7	EuMC/EuMIC	Half Day	Design, Linearization, and Optimization Techniques for Multiple-Input Power Amplifiers
WS8	EuMC	Half Day	Polarization Surfaces for Next-Generation Communications Systems
WS9	EuMC/EuRAD	Half Day	RF Packaging and IC Integration for Communication and Radar Applications above 100 GHz

Monday 18 th September 2023			
WM1	EuMC	Full Day	Millimeter-Wave On-Wafer Measurement and Material Measurement for Future Communications and Automotive Radar Sensors
WM2	EuMC	Full Day	Measurement Methods for Passive Intermodulation and Environmental Testing of Electronic Circuits
WM3	EuMC	Half Day	mMIMO Active Antenna System Calibration for 5G/6G
WM4	EuMC	Half Day	Technology for RF/MW and Pulsed Power Bioelectromagnetics
WM5	EuMC	Half Day	SiGe BiCMOS Technologies as Enabler for D-Band Applications and Beyond
WM6	EuMC	Half Day	REAL Base Station and Related Device Techniques for 5G and Beyond 5G mm-Wave Systems
WM7	EuMC	Half Day	Multi-tone Power Amplifier Characterization as Enabler of Higher Efficiencies and Better Linearity Under Wideband Modulation
WM8	EuMC	Half Day	Additive Manufacturing
WM9	EuMIC	Full Day	Integrated Antenna Systems: Technologies and Innovations for High-Density Antennas and Phased Arrays

Friday 22 nd September 2023			
WF1	EuRAD	Full Day	Virtual Validation of ADAS with Automotive Sensors
WF2	EuRAD	Full Day	Unlocking the Potential of Radar by Compressed-Sensing, Machine-Learning, and High-Resolution Data Processing
WF3	EuRAD	Half Day	Characterization of sub-THz Channels for Communication and Sensing
WF4	EuRAD	Half Day	Radar Target Simulation
WF5	EuRAD	Half Day	Applications for Advanced Passive Radar Systems
WF6	EuRAD	Half Day	Industrial Radar

Registration Information

CONFERENCE REGISTRATION DETAILS

See pricing table on the following page.

ONLINE REGISTRATION

- All online registrations should be made at www.eumweek.com.
- Registrations completed up to and including 25th August 2023 will be charged at the 'Advance Discounted Rate' and those from 26th August 2023 will be charged at the 'Standard Rate'.
- Online registration is open from mid June 2023 up to and during the event until 22nd September 2023.

ONSITE REGISTRATION

- Onsite registration is available:
 - Saturday, 16th September 2023, 16:00 - 19:00
 - Sunday, 17th September 2023, 08:00 - 17:00
 - Monday, 18th September 2023, 08:00 - 17:00
 - Tuesday, 19th September 2023, 08:00 - 17:00
 - Wednesday, 20th September, 2023, 08:00 - 17:00
 - Thursday, 21st September 2023, 08:00 - 17:00
 - Friday, 22nd September 2023, 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 email:

- Conference Registration questions: registration.eumw2023@eumwa.org
- Exhibition Registration questions: exhibitionreg@eumweek.com

REGISTER ONLINE AT WWW.EUMWEEK.COM

- Delegates can register for one, two or all three of the conferences.
- Discounts will be given to those registering for two or more conferences.
- 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.
- Bring your receipt, barcode and photo ID with you to the event.
- Go to the Fast Track Check In Desk and print out your badge.

ONSITE REGISTRATION

- 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.

For any questions,
please email:
registration.eumw2023@eumwa.org
(conference) or
exhibitionreg@eumweek.com
(exhibition)

Registration Fees

Get the most out of this year's Microwave Week with a Full Week ticket. Combine all three conferences with additional access to the Defence, Security and Space and the 5G to 6G Forum (the Automotive Forum and the Schools are not included) as well as all the Workshops and Short Courses.

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

Subsidised lunchboxes are € 8 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 17th September 2023). The fees shown below are invoiced in the name and on behalf of the European Microwave Association. All payments must be in € Euros - cards will be debited in € Euros.

CONFERENCES REGISTRATION	ADVANCE DISCOUNTED RATE (FROM NOW UP TO & INCLUDING 25 th August 2023)				STANDARD RATE (FROM 26 th August 2023 & ONSITE)			
	Society Member ⚡		Non-Member		Society Member ⚡		Non-Member	
1 Conference	Standard	Student/Sr.	Standard	Student/Sr.	Standard	Student/Sr.	Standard	Student/Sr.
EuMC	€ 560	€ 160	€ 790	€ 220	€ 790	€ 220	€ 1,110	€ 310
EuMIC	€ 430	€ 140	€ 600	€ 200	€ 600	€ 200	€ 850	€ 280
EuRAD	€ 380	€ 130	€ 540	€ 180	€ 540	€ 180	€ 750	€ 260
2 Conferences	Standard	Student/Sr.	Standard	Student/Sr.	Standard	Student/Sr.	Standard	Student/Sr.
EuMC + EuMIC	€ 800	€ 300	€ 1,120	€ 420	€ 1,120	€ 420	€ 1,560	€ 590
EuMC + EuRAD	€ 760	€ 290	€ 1,060	€ 400	€ 1,060	€ 400	€ 1,490	€ 570
EuMIC + EuRAD	€ 650	€ 280	€ 910	€ 390	€ 910	€ 390	€ 1,280	€ 540
3 Conferences	Standard	Student/Sr.	Standard	Student/Sr.	Standard	Student/Sr.	Standard	Student/Sr.
EuMC + EuMIC + EuRAD	€ 970	€ 430	€ 1,350	€ 600	€ 1,350	€ 600	€ 1,900	€ 850
Full Week Ticket	€ 1,480	€ 880	€ 1,960	€ 1,110	€ 1,880	€ 1,070	€ 2,530	€ 1,380

⚡ BECOME A MEMBER - NOW! EuMA membership fees: Professional € 25 / year, Student € 15 / 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 22,000 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, SESSIONS, AND EVENTS REGISTRATION	Date	ADVANCED DISCOUNTED RATE (UP TO & INCLUDING 25 th August 2023)		STANDARD RATE (FROM 26 th August 2023 & ONSITE)	
		Delegates*	All Others**	Delegates*	All Others**
Automotive Forum	18 th September 2023	€ 300	€ 420	€ 380	€ 490
5G to 6G Forum	21 st September 2023	€ 70	€ 100	€ 90	€ 110
Defense, Security & Space Forum	20 th September 2023	€ 40	€ 70	€ 40	€ 70
13 th Tom Brazil Doctoral School of Microwaves: From Microwaves to Machine Learning	17 th September 2023	€ 40	€ 40	€ 40	€ 40
7 th European Microwave Student School: Microwave Measurement Techniques	17 th /18 th September 2023	€ 40	€ 40	€ 40	€ 40
Gala Dinner***	20 th September 2023	€ 60	€ 60	€ 60	€ 60

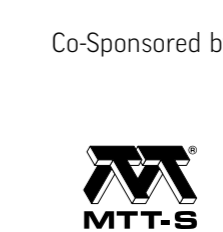
* Those registered for EuMC, EuMIC or EuRAD ** Those not registered for a conference *** Bookable at <http://www.connexhotelsandevents.com/eumw-gala-dinner.html>

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	€ 110	€ 90	€ 150	€ 110	€ 150	€ 110	€ 200	€ 150
Full Day	€ 160	€ 120	€ 220	€ 160	€ 220	€ 160	€ 290	€ 220

CONFERENCE TECHNICAL CO-SPONSORS



EUROPEAN MICROWAVE WEEK SPONSORS



13th Tom Brazil Doctoral School of Microwaves

From Microwaves to Machine Learning: Building and Training Artificial Neural Networks for Radar-Based Gesture Recognition

Sunday 17th September 2023

Room: Beta 8

Chair: Fabian Lurz, Hamburg University of Technology, Germany

The Tom Brazil Doctoral School is an exclusive opportunity for PhD students to gain hands-on experience in building and training artificial neural networks. Both theoretical fundamentals are taught, and practical understanding is fostered in a hands-on training where participants build and train artificial neural networks themselves. In the morning, fundamentals of FMCW radar, radar signal processing and gesture recognition will be reviewed. This is followed by an introduction to machine learning, covering the fundamentals of deep learning and network architectures.

In the afternoon, participants put the concepts into practice by using interactive Jupyter notebooks to build and train their own neural networks for radar-based hand gesture recognition. This program provides participants with valuable experience in applying machine learning techniques to solve real-world problems. An own laptop is required to participate in the hands-on sessions. Further information about necessary software packages will be sent by mail. Basic knowledge of FMCW radar signal processing and programming in Python is beneficial, but not mandatory.

The registration fee for this event is € 40. For registration and further information, please visit www.eumweek.com.

Registration closes 6th September 2023. The place is limited, so save your ticket well in advance!

7th European Microwave Student School Microwave Measurement Techniques

Sunday 17th and Monday 18th September 2023

Room: Beta 9

Chair: Holger Maune, Otto von Guericke University Magdeburg, Germany

The European Microwave Week 2023 features the European Microwave Student School for bachelor and master students from all over Europe. The topic is "Microwave Measurement Techniques" which includes topics in the fields of introduction to metrology, spectrum and signal analysis, network analysis, calibration, and on-wafer measurement techniques. The programme features highly accepted experts from academia and industry. The course will be formed by two intensive days of lectures accompanied by modern measurement equipment. Beside the lecture

The registration fee for this event is € 40. With the registration, bachelor and master students with a valid student ID of an accredited university will receive a complimentary guest ticket to all EuMW technical sessions as well as to the exhibition. For registration and further information, please visit www.eumweek.com.

programme, there will be a career event on Wednesday evening to get in contact with other students, research fellows from universities and companies. The programme is designed to lay the foundations, both mathematically and conceptually, for microwave measurements. It will enable a fundamental understanding of high-frequency measurement techniques and will prepare students to become intelligent users of commercial microwave measurement devices. The school is also open to PhD students who are interested in microwave measurements.

Programme

Sunday, September 17th

09:00	Welcome
09:10	Fabian Lurz, Chairman 13 th Tom Brazil Doctoral School of Microwaves
09:10	Fundamentals of FMCW Radar, Radar Signal Processing and Gesture Recognition
10:40	Coffee Break
11:20	Introduction to Machine Learning for Microwave Engineers
13:00	Lunch Break
14:20	Hands-On I: Building and Training Artificial Neural Networks for Radar-based Gesture Recognition

16:00	Coffee Break
16:40	Hands-On II: Building and Training Artificial Neural Networks for Radar-based Gesture Recognition
18:10	Closing Remarks
18:20	Fabian Lurz, Chairman 13 th Tom Brazil Doctoral School of Microwaves
20:00	Young Professionals Get-Together
23:00	Hofbräu Berlin am Alex

Wednesday, September 20th

12:00	Student Career Event @ hub27
15:00	
20:00	Student Career Evening Event @ Club Downtown Berlin
01:00	(Get tickets in the afternoon event.)

Sunday, September 17th

09:00	Introduction
09:10	Holger Maune, Chairman 7 th European Microwave Student School 2023
09:10	Introduction to Metrology
10:40	Gerd Wübbeler, Physikalisch-Technische Bundesanstalt (PTB)
10:40	Coffee Break
11:20	
11:20	RF-Power Measurements
13:00	Frauke Gellersen & Karsten Kuhlmann, Physikalisch-Technische Bundesanstalt (PTB)
13:00	Lunch Break
14:20	
14:20	Spectrum & Signal Analysis
16:00	Markus Funk, Rohde & Schwarz
16:00	Coffee Break
16:40	

16:40	Spectrum & Signal Analysis
18:20	Markus Funk, Rohde & Schwarz
20:00	Young Professionals Get-Together
23:00	Hofbräu Berlin am Alex

Monday, September 18th

09:00	Modern Methods for Vector Network Analysis
10:40	Joel Dunsmore, Keysight Technologies
10:40	Coffee Break
11:20	
11:20	Modern Methods for Vector Network Analysis
13:00	Joel Dunsmore, Keysight Technologies
13:00	Lunch Break
14:20	

14:20	Calibration Techniques for Network Analysis
16:00	Bianca Will, Fachhochschule Südwestfalen
16:00	Coffee Break
16:40	
16:40	On-Wafer Network Analysis
18:20	Gia Ngoc Phung, Physikalisch-Technische Bundesanstalt (PTB)
18:20	Closing Remarks
18:40	Holger Maune, Chairman 7 th European Microwave Student School 2023

Wednesday, September 20th

12:00	Student Career Event @ hub27
15:00	
20:00	Student Career Evening Event @ Club Downtown Berlin
01:00	(Get tickets in the afternoon event.)

Student Career Event

Wednesday 20th September 2023

Location: Entrance of the conference centre & Palais Kulturbrauerei

Organiser: Yannick Wenger, Keysight Technologies, Germany

Co-Organiser: Georg Gramlich, Karlsruhe Institute of Technology, Germany

The Student Career Event is a great new social event making its debut at the 2023 edition of EuMW! Registered student delegates can meet prospective employers. And party together in one of Berlin's famous nightclubs!

On September 20th students and major companies in the high-frequency business can connect between 12:00 and 15:00 at a dedicated space at the entrance of the conference center. Students, take the chance to meet

your potential future employer, and get a free ticket for the party in the evening!

Join us for the Career Party starting at 20:00 in the Palais Kulturbrauerei (Schönhauser Allee 36, 10435 Berlin). Enjoy the buffet, grab a beer, and get to know companies from a completely new angle. Party program: Short company presentations, company speed-dating, and more. As the night progresses, what starts as an informal career event will shift



into a Berlin party. A ticket from the afternoon event is required.

Get the latest updates and the participating companies at <https://www.eumweek.com/students/StudentCareerEvent.html>

13th THz Young Scientists Meeting

Thursday 14th and Friday 15th September 2023

Location: Free University of Berlin

Visit Tour: Ferdinand-Braun-Institut, Adlershof, 16th September 2023

The annual THz Young Scientists Meeting aims to provide a friendly and welcoming international platform for young scientists to exchange ideas and learn about the advances in fundamental and applied THz research.

The meeting is specifically targeted at master's and PhD students interested in THz-related research.

This year, the THz Young Scientists Meeting is organized by the Free University of Berlin and the Fritz Haber Institute of the Max Planck

Society. It will take place from 14th to 15th September 2023 at the facilities of the Free University of Berlin.

For interested participants a tour through the Ferdinand-Braun-Institut with information on THz and semiconductor activities at the Institut at the Adlershof campus outside the city. A joint evening in beer garden will also be arranged. Please indicate your participation at the registration.

The abstract submission deadline for the

meeting is 31st July 2023. Please note that there is no conference fee associated with attending the meeting.

For further information, including registration and updates, please visit the official website: <https://indico.fhi-berlin.mpg.de/event/123/>



Rosenberger



NOKIA



Student Career Party

Wednesday 20th September
20:00 - 01:00

Cost: Free for microwave students
(Tickets required. These will be distributed during the Student Career Event at the entrance of hub27 on Wednesday, 12:00 - 15:00. Please note that only a limited number of tickets are available.)

Location off-site: Palais Kulturbrauerei
Students, come party with representatives of leading RF companies. Expect a free buffet, open bar, DJ, and the chance to meet your future employer.



Joint Women in Microwaves (WiM) and Young Professionals (YP) Event

Tuesday 19th September 2023

13:00 - 19:00

Room: Beta 6

Chairs:

Ana Ines Inacio (YP), TNO, The Netherlands

Cristina Andrei (WiM), Brandenburg University of Technology, Germany

Jasmin Grosinger (WiM), Graz University of Technology, Austria

The joint WiM/YP event will take place on Tuesday afternoon, September 19th, 2023, starting at 13:00, with lunch boxes. The main event is a 90-minute moderated panel session with female industry representatives. They will share insights into their careers, companies, and industries and provide tips for young professionals pursuing a career in the industry.

Programme

13:00 **Get Together**
13:30 The joint WiM/YP event will take place on Tuesday afternoon, September 19th, 2023, starting at 13:00 with lunch boxes.

13:30 **Panel Session**
15:00 The main event is a 90-minute moderated panel session with female industry representatives. They will share insights into their careers, companies, and industries and provide tips for young professionals pursuing a career in the industry.

Panelists:

- Wendy Shu, CEO, Eravant (formerly known as SAGE Millimeter)
- Sherry Hess, Sr. Group Director, Product Management, Cadence
- Anouk Hubrechtsen, Co-founder and CEO, ANTENNEX
- Anna Miskiewicz, Engineering Manager, Wireless System Engineering and Architecture, Apple
- Mayazzurra Ruggiano, Radar Architect, Technical Directorate, Thales Nederland B.V.
- Irene Selvanathan, Founder and CEO, Neurospace

16:00 **Sightseeing Tour**
18:45 Following the panel, we will have a unique sightseeing tour of Berlin. Guided tours by Berliner Unterwelten will entertain us: From Flak Towers to Mountains of Debris & Bunkers, Subways, and the Cold War. The tour is restricted to 50 people. If you want to attend, please sign up here: <https://www.termi.no.gv.at/meet/en/b/c791172b8f8382a896a357f81ce77fe4-214164>. We will return to the conference centre before 18:45 to attend the Welcome Reception. A bus will take care of transportation. If you have any questions, please get in touch with jasmin.grosinger@tugraz.at and andrei@b-tu.de.

Young Professionals in Microwaves

Following previous years' initiative, EuMW 2023 has arranged 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 Region 8 Young Professionals, IEEE MTT-Society Young Professionals and IEEE Women in Microwaves.

We are looking forward to seeing you at one or more of our events.

For additional questions, please contact Ana Inês Inácio via yp@ieee8.org.

Young Professionals Get-Together

Sunday 17th September 2023
20:00 - 24:00

We welcome you to an evening dinner together with your fellow student colleagues, young professionals and industry participants.

Cost: Free for young professionals and school participants

(Tickets required. These will be distributed in schools and Sunday lunch break.)

Joint WiM-YP Lunch Session

Tuesday 19th September 2023
13:00 - 15:00

Come and enjoy a moderated panel session with a selected panel of industry representatives. Free lunch boxes will be handed out before the session starts, at room Beta 6.

Joint WiM-YP Sightseeing Tour

Tuesday 19th September 2023
16:00 - 18:45

Following the panel, we will have a unique sightseeing tour of Berlin. Guided tours by Berliner Unterwelten will entertain us: From Flak Towers to Mountains of Debris & Bunkers, Subways, and the Cold War.

Student Career Event & Party

Wednesday 20th September 2023

Come and look around what microwave industry has to offer. The Student Career Event is a great new social event making its debut at the 2023 edition of EuMW! Registered microwave students can meet prospective employers and party together in one of Berlin's famous nightclubs!

Cost: Free for microwave students

(Tickets required. These will be distributed during the Student Career Event at the entrance of hub27 on Wednesday, 12:00 - 15:00. Please note that only a limited number of tickets are available.)



The Automotive Forum Innovations and Trends for Automotive Radar Frontends and Imaging Radars



Monday 18th September 2023
09:00 – 18:20
Room: Alpha 5

Chair: Benjamin Nuss, Karlsruhe Institute of Technology, Germany

Co-Chairs: Martin Kunert, Bosch, Germany & Frank Gruson, ZF, Germany & Kostas Doris, NXP, The Netherlands

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.

In 2019, the first Automotive Forum was organized by EuMA 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 and discussions as well as networking time. This year's event will focus on:

1. Innovations and new trends in antenna and chip design
2. Perception requirements and enhancements of imaging radars

3. Resolution challenges and novel concepts of imaging radars
4. Radar testing & verification and future market & concept outlook

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.

Registration and Programme Updates

Advanced registration fee (up to & incl. 25th August 2023) is € 300 for those who registered for a conference and € 420 for those not registered for a conference. Standard registration fee (from 26th August 2023 & onsite) is € 380 for those who registered for a conference and € 490 for those not registered for a conference.

The EuMW website will give further details and updates.

Automotive Forum Networking Dinner

Monday 18th September 2023 · 19:30 – 23:30

Cost: Free to Automotive Forum delegates (Please bring your badge to gain admission.)

Location off-site: SAGE Restaurant

(Shuttle service from hub27 will be provided including a guided city tour of Berlin. Meeting point at 18:30.

The buses leave no later than 18:45.)

Join us for this unique event, which includes a 3-course dinner. This will provide you with the opportunity to network and discuss the

issues raised in the Forum in an informal setting.

Posters

Monday 18th September 2023
13:00 – 14:20

Location: Alpha 5

During the lunch break posters of different companies and startups will be shown in the room of the Automotive Forum. This will offer an additional platform to network and discuss upcoming topics. Free lunch boxes are included.

Programme

Session 1: Innovations and New Trends in Antenna and Chip Design

Chair: Benjamin Nuss, Karlsruhe Institute of Technology, Germany

09:00 – 09:25 **Integrated Waveguide-in-Radome Antenna Concept for Automotive Radar Applications**
Alejandro Garcia-Tejero, Fernando Rodriguez Varela, Jan Feike, Francesco Merli, Huber+Suhner, Switzerland

09:25 – 09:50 **Multi-Layer Waveguide Technology – A New Solution for Automotive Radar Antennas**
Abbas Voosogh, Stefan Carlsson, Carlo Bencivenni, Gapwaves, Sweden

09:50 – 10:15 **Innovative Architecture for High Performance Low Cost Radar Frontends**
Simona Bruni, Aline Friedrich, Marta Arias Campo, Markus Krengel, Oliver Litschke, Matthias Geissler, IMST, Germany

10:15 – 10:40 **Enabling Silicon Technologies for Automotive Radar Trends and Requirements**
Chi Zhang, Farzad Inanlou, GlobalFoundries, USA

10:40 – 11:20 **Coffee Break**

Session 2: Imaging Radar – Perception Requirements and Enhancements

Chair: Kostas Doris, NXP, The Netherlands

11:20 – 11:45 **Imaging Radar Focused on L4/L5 Applications**
Frank Gruson, ZF, Germany

11:45 – 12:10 **Automotive Radar for Autonomous Driving: Signal Processing Meets Deep Learning**
Shunqiao Sun, University of Alabama, USA

12:10 – 12:35 **A Novel Perception Framework Based on the New Generation of Automotive Imaging Radar**
Gang Li, Xuyang Li, Sinpro, China

12:35 – 13:00 **System-level Design for Enhanced Radar Performance**
Marta Martínez-Vázquez, Stephan Renner, Renesas Electronics Europe, Germany | Ashish Lachhwani, Alok Prakash Joshi, Steradian Semiconductors, India | Takuya Takizawa, Reiji Yoshida, Renesas Electronics Corporation, Japan

13:00 – 14:20 **Poster Lunch**
(Free lunch boxes)

Session 3: Imaging Radar – Resolution Challenges and Novel Concepts

Chair: Frank Gruson, ZF, Germany

14:20 – 14:45 **Radar Detection-based Point Cloud Imaging**
Jonathan Wache, Mohamed Nour Mejdoub, Andreas Loeffler, Christoph Brand, Continental, Germany

14:45 – 15:10 **Uncovering Hidden Information in Radar Point Cloud Data Through Super-Resolution Techniques**
Noam Arkind, Arbe, Israel

15:10 – 15:35 **Sparse Array Approach to Imaging Radar and Comparison with a Quasi Massive MIMO Technique**
Ryan Wu, NXP, USA

15:35 – 16:00 **Coherent Radar Networks for Automotive Applications**
Marcel Hoffmann, FAU Erlangen-Nürnberg, Germany

16:00 – 16:40 **Coffee Break**

Session 4: Radar Testing & Verification and Future Market & Concept Outlook

Chair: Martin Kunert, Bosch, Germany

16:40 – 17:05 **Automotive Radar V&V-Testing by Over-the-Air Scene Generation**
Erick Gonzalez Rodriguez, Marian Keck, Toby Brandt, Heiko Mayer, Bence Erdei, Robert Erhart, Markus Oenning, Martin Holder, Jürgen Hildebrandt, Armin Himmelstoß, Bosch, Germany

17:05 – 17:30 **SIL, HIL, OTA – Confidence in Test Results**
Andreas Himmler, dSpace, Germany

17:30 – 17:55 **Advances in Automotive Radar Beyond 76–81 GHz**
Holger Gryska, Rohde & Schwarz, Germany

17:55 – 18:20 **Automotive Radar Technology and Market Overview**
Cédric Malaquin, Yole Développement, France

Defence, Security and Space Forum Boosting Connectivity for Moving Platforms

Wednesday 20th September 2023

11:20 - 17:40

Room: Alpha 6

Organizer: Volker Ziegler, Airbus Defence and Space, Germany

Co-Organizer: Siegbert Martin, Tesat-Spacecom, Germany



Registration and Programme Updates

Registration fee is € 40 for those who registered for a conference and € 70 for those not registered for a conference. The EuMW website will give further details and updates.

Pervasive connectivity is one of the mega-trends for our society, influences everyone's daily life and is the backbone of countless business operations. Many people are enjoying seamless and high-data rate connectivity at their homes and operators of mobile platforms (cars, ships, airplanes) as well as the network operators (ground-based or space-based) are investing a lot to deliver equivalent services for the people on the move or in

remote areas. At the same time, information superiority is one, if not the, decisive factor in modern warfare. Being able to get an instant situational awareness, remotely connect to distant platforms or organize manned-unmanned collaborative missions is vital to successful operations.

This year's forum brings together leading industry, institutional and academic experts to showcase and discuss the latest trends to provide pervasive and persistent connectivity to moving platforms even under congested and contested spectrum access. It will encompass network operator requirements as well as leading edge technologies for spaceborne, airborne and ground vehicles. These topics will be addressed from the commercial

point of view of satellite network operators and antenna technology providers for mobile platforms in addition to the perspective of defense-related airborne networks. The forum will also highlight and discuss institutional roadmaps of new technologies needed to address future societal and industrial challenges. Enjoy a variety of invited talks, the lunch and learn session and exciting panel discussions.

Programme

11:20 - 12:10 **Antenna Technology Challenges for Multi-Orbital Satellite Systems**
Miquel Albiol, SES Satellites

12:10 - 13:00 **Next-Gen Communication for Advanced Airborne Defense Operations**
Thomas Schanne, Airbus Defence and Space

13:00 - 14:00 **Lunch and Learn**
Microwave Journal Industry Sessions (Free lunch boxes)

Testing for Coexistence in Crowded and Contested RF Environments
Tim Fountain, Rohde & Schwarz

14:00 - 14:35 **High Performance ESAs for Ku and Ka-band SATCOM and Point-to-Point Communications**
Gabriel M. Rebeiz, Extreme Waves

14:40 - 15:15 **The Role of ESA in Supporting Connectivity from Space**
Xavier Lobao, ESA

15:20 - 16:00 **Direct-to-Device Connectivity via Zephyr HAPS**
Andre Grabs, Airbus Defence and Space

16:00 - 16:40 **Coffee Break**

16:40 - 17:40 **DSS Round Table**
1. Moderators: Volker Ziegler, Siegbert Martin
2. Miquel Albiol, SES Satellites, Senior Manager RF Systems Engineering
3. Thomas Schanne, Airbus Defence and Space, Chief Engineer FCAS
4. Gabriel M. Rebeiz, Extreme Waves, CEO
5. Xavier Lobao, ESA, Head of Future Projects Division within the Telecom Technologies, Product & Systems Department
6. Andre Grabs, Airbus Defence and Space, HAPS Solutions Architect



5G to 6G Forum

Thursday 21st September 2023

08:45 – 18:20

Room: Alpha 5

Chair: Norman Franchi, FAU Erlangen-Nuremberg, Germany

Co-Chair: Robert Weigel, Erlangen-Nuremberg, Germany & Andreas Müller, Robert Bosch, Germany

The 5G to 6G Forum is a one-day international industry forum that deep dives into the main important research and development trends that will permit the evolution of services from 5G to 6G with a clear focus on the radio frequency technologies that will enable the use of, e.g., the FR3, millimetre-wave, and sub-THz bands. The forum consists of a full-day session with invited speakers from industry,

operators, vendors, academia, and the 6G Platform Germany.

The forum will specifically focus on electronics-relevant technologies (e.g., analogue and digital chip design, RF technology, semiconductor technology, antennas, embedded systems, packaging, test systems, etc.) and will thus address the question "What do 5G/6G

and the transition from 5G to 6G mean at the hardware/electronics level?". The focus covers also aspects and technologies related to the integration of communications and sensing as well as aspects to improve coverage and performance of millimetre-wave and sub-THz networks. The presence of leading operators and 5G leading vendors together with academia will permit setting the scene in terms

of requirements, long-term vision, and most important research trends.



Registration and Programme Updates

Advanced Registration fee (up to & incl. 25th August 2023) is € 70 for those who registered for a conference and € 100 for those not registered for a conference. Standard Registration fee (from 26th August 2023 & onsite) is € 90 for those who registered for a conference and € 110 for those not registered for a conference. The Conference Special Events section of the EuMW website will give further details and updates.

Programme

08:45 **Welcome by the Chairmen**
Norman Franchi, Robert Weigel, FAU Erlangen-Nuremberg | Andreas Müller, Robert Bosch

09:00 **Secure 6G Campus Networks with Integrated Sensing**
Ivan Tsvetlykh, Lead Principal Engineer, Infineon Technologies

09:30 **MOCZ: A Novel Waveform for ISAC**
Philipp Walk, CEO, MOXZ

09:45 **Metaverse Ready Networks and Path to 6G**
Volker Ziegler, Senior Technology Advisor, Nokia

10:15 **Towards 6G: Greener MIMO Through Improved Efficiency**
Wim Rouwet, Senior Principal Engineer, Systems and Architecture, Secure Connected Edge, NXP Semiconductors

10:40 **Coffee Break**
11:20

11:20 **Open6GHub Germany – An Open Hardware Testbed for 6G Addressing Sub-6 GHz to THz Spectrum**
Thomas Zwick, Karlsruhe Institute of Technology | Norman Franchi, FAU Erlangen-Nuremberg

11:45 **Millimeter-Wave and sub-THz Technology and Research Trends for 5G and 6G Applications**
Renato Lombardi, President of Huawei Italy Research Center, VP of Microwave Product Line, Huawei Technologies

12:15 **RF-Frontends: Array and MMIC Design for 5G and 6G**
Ulrich Lewark, Team Leader, IMST

12:30 **6G – Connecting a Cyber-Physical World**
Jonas Hansryd, Head of HW Transport Systems, Ericsson

13:00 **Interactive Lunch**
(Free lunch boxes)

14:20 **6G-RIC – Energy-Efficiency 6G Transceiver Architectures, Building Blocks, and Hybrid Integration Concepts at D-Band and 300 GHz**
Friedel Gerfers, Technical University of Berlin

14:40 **Microwave Photonics for 6G Wireless**
Andreas Stöhr, Founder and CEO, Microwave Photonics

14:55 **The Start-Up Way from University to Industry for Future Wireless Communications and RADAR Systems**
Benedict Scheiner, Co-Founder & Managing Director, Sykno

15:10 **Towards 6G: The T&M Perspective from THz Communications to RIS**
Taro Eichler, Technology Manager, Rohde & Schwarz

15:45 **Enhancing Silicon Photonics Through Engineered Organic Materials**
Adrian Mertens, CEO, SiOriX

16:00 **Coffee Break**
16:40

16:40 **Enabler of New Features for Cooperative Perception**
Soheil Gherekhloo, Robert Bosch GmbH

17:10 **Next Generation Data Converters for 5/6G Communications & Radar Platforms**
Marcel Runge, Co-Founder & Managing Director, IC4X

17:25 **Private 5G Networks in the Industry – Implications for the Future**
Daniel Mai, Director of Industrial Wireless Communication, Siemens AG

18:00 **Conclusions and Closing**
Norman Franchi, Chairman, FAU Erlangen-Nuremberg

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MONDAY 09:00 - 10:40

ROOM

Alpha 6

EuMIC01 GaN LNA

Chair: Hermann Schumacher¹Co-Chair: Philipp Neisinger²¹Ulm University, ²Fraunhofer Institute for Solid State Physics IAF09:00
-
09:20

EuMIC01-1

A 23 - 32 GHz LNA with Near 5 W Power Handling Capability Using 180 nm GaN HEMT Technology

Nicholas Miller¹, Matthew Hodek², Christopher Barisich³, Edward Gebara⁴, John Albrecht⁵, John Papapolymerou⁶¹Air Force Research Laboratory, ²Michigan State University, ³Electromagnetic Sensor Technologies, Inc.09:20
-
09:40

EuMIC01-2

A D-Band Low-Noise Amplifier MMIC in a 70-nm GaN HEMT Technology

Fabian Thome¹, Peter Brückner², Rüdiger Quay³¹Fraunhofer Institute for Applied Solid State Physics IAF09:40
-
10:00

EuMIC01-3

Compact Stacked Rugged GaN Low-Noise Amplifier MMIC under Input Power Overdrive Condition

Evelyne Kaule¹, Peng Luo², Serguei A. Chevtchenko³, Matthias Rudolph⁴, Cristina Andrei⁵¹Brandenburg University of Technology (BTU), Cottbus, Germany, ²Chengdu Danxi Technology Co., Ltd., ³Ferdinand-Braun-Institut gGmbH, Berlin, Germany, ⁴Brandenburg University of Technology (BTU), Cottbus, Germany, ⁵Brandenburg University of Technology (BTU), Cottbus, Germany10:00
-
10:20

EuMIC01-4

A Reconfigurable Highly Linear and Robust X-Band GaN LNA

Bastien PINAULT¹, Jean-Guy Tartarin², Damien Saugnon³, Rémy Leblanc⁴¹Laboratoire d'analyse et d'architecture des systèmes (LAAS-CNRS), ²Ommic (France)10:20
-
10:40

EuMIC01-5

On the Survivability of a 28 - 32 GHz GaN Low Noise Amplifier

Sanaul Haque¹, Cristina Andrei², Hossein Yazdani³, Matthias Rudolph⁴¹Brandenburg University of Technology, ²Ferdinand-Braun-Institut (FBH)

Beta 5

EuMIC02

Novel Modelling Techniques for GaN and Cryogenic Devices

Chair: Jean-Christophe Nallatamby¹Co-Chair: Joaquín Portilla²¹XLIM UMR 7252, University of Limoges/CNRS, ²University of the Basque Country (UPV/EHU)

EuMIC02-1

Modeling of 50-nm Metamorphic HEMTs for Cryogenic Ultra-Low-Power Operation

Felix Heinz¹, Arnulf Leuther², Fabian Thome³¹Fraunhofer IAF, ²Fraunhofer Institute for Applied Solid State Physics

EuMIC02-2

Dynamic RD Modeling by Exploiting Gate Current Dependency of Virtual Gate Effect

Petros Beleniotis¹, Christos Zervos², Frank Schnieder³, Matthias Rudolph⁴¹Brandenburg University of Technology (BTU) Cottbus-Senftenberg, ²Ferdinand-Braun-Institut (FBH) gGmbH, Leibniz-Institut für Hochfrequenztechnik

EuMIC02-3

Comparison of the Low Noise Performance of GaN HEMTs and MIS-HEMTs at Cryogenic Temperatures

Mohamed Aniss Mebarki¹, Ragner Ferrand-Drake Del Castillo², Erik Sundin³, Denis Meledin⁴, Mattias Thorsell⁵, Niklas Rorsman⁶, Victor Belitsky⁷, Vincent Desmaris⁸¹Group for Advanced Receiver Development, Chalmers University of Technology, ²Microwave Electronics Laboratory, Chalmers University of Technology

EuMIC02-4

TCAD analysis of GaN HEMT AC parameters through accurate solution of trap rate equations

Eva Catoggio¹, Simona Donati Guerrieri², Fabrizio Bonani³¹Politecnico di Torino

EuMIC02-5

Capacitance RF Characterization and Modeling of 28 FD-SOI CMOS Transistors down to Cryogenic Temperature

Quentin Berlingard¹, Jose Lugo-Alvarez², Maryline Bawedin³, Tadeu Mota-Frutoso⁴, Cédric Durand⁵, Daniel Gloria⁶, Philippe Galy⁷, Mikael Cassé⁸¹CEA - LETI, ²Univ. Grenoble Alpes, Grenoble INP, CNRS, IMEP LaHC, ³STMICROELECTRONICS, France

Beta 6

EuMIC03

III-V mm-Wave Devices and Characterisation

Chair: Frank E. van Vliet¹Co-Chair: Rüdiger Quay²¹TNO Defense, Safety and Security, ²Fraunhofer Institute for Applied Solid State Physics (IAF)

EuMIC03-1

Low Barrier Schottky Technology for MM&Sub-MM Wave Receiver Systems

Matthias Hoefel¹**INDUSTRIAL KEYNOTE**
¹ACST GmbH

EuMIC03-2

A Novel Fmax Enhancement Method for GaN HEMTs by Utilising a Distributed Behaviour of a Gate Finger

Keiichi Sakuno¹, Eiji Suematsu², Shinji Hara³¹Nagoya University

EuMIC03-3

Transition Time of GaN HEMT Switches and its Dependence on Device Geometry

Andreas Divinyi¹, Niklas Rorsman², Niklas Billström³, Mattias Thorsell⁴¹Saab AB, ²Chalmers University of Technology, ³Saab AB and Chalmers University of Technology

EuMIC03-4

Accurate Modelling of GaN HEMT Capacitances in the Framework of the ASMHEMT Model

Sayed Ali Albahrani¹, Dirk Schwantuschke², Sourabh Bonani³¹Fraunhofer IAF, ²Fraunhofer Institute for Applied Solid State Physics, ³Macquarie University, Sydney

EuMIC03-5

Normally-off AlN/GaN HEMTs with a DIBL of 1.15 mV/V for RF Applications

Mahmud Dwidar¹¹High Frequency Electronics Group, James Watt School of Engineering, University of Glasgow

Beta 7

EuMIC04

Techniques for Measurement and Detection

Chair: Tommaso Cappello¹Co-Chair: Shmuel Auster²¹Villanova University/University of Bristol, ²IEEE Israel Section, Chair

EuMIC04-1

Driving Integration in the RF and mmWave Semiconductor Testing Industry

Daniel Kather¹**INDUSTRIAL KEYNOTE**
¹Advantest Europe GmbH

EuMIC04-2

A 12.2 - 14.9 GHz Amplitude-Sensitive VCO-based EPR-on-a-Chip Detector Achieving a Spin Sensitivity of 6×10^9 spins/VHzMuhammad Khubaib Ul Hassan Khan¹, Mohamed Atef Hassan², Michal Kern³, Jens Anders⁴¹University of Stuttgart

EuMIC04-3

K-Band FMCW Radar Transceiver with a Reconfigurable Analog Baseband for Breast Cancer Detection on Large Tissue Spread

Martin Maier¹, Finn-Niclas Stapelfeldt², Fabian Hövel³, Alexander Meyer⁴, Vincent Lammert⁵, Vadim Issakov⁶¹TU Braunschweig

EuMIC04-4

Phase- and Amplitude Noise Suppression using a Josephson Arbitrary Waveform Synthesizer

Jaap Essing¹, Maurice van Wanum², Justin Bouwmeester³, Oliver Kieler⁴, David Michalak⁵, James Kroll⁶, Frank Vliet⁷, van⁸¹TNO, ²Physikalisch-Technische Bundesanstalt (PTB)

EuMIC04-5

100- μ W Cryogenic HEMT LNAs for Quantum ComputingYIN ZENG¹, Junjie Li², Jörgen Stenarson³, Peter Sobis⁴, Jan Grähn⁵¹Chalmers University of Technology, ²Low Noise Factory AB

ROOM

Gamma 8

15th ARFTG On-Wafer User's Forum

Chairs: Andrej Rumiantsev¹, Gia Ngoc Phung²¹MPI Corporation, Taiwan, ²Physikalisch-Technische Bundesanstalt, Germany09:00
-
10:40

For those new to us, we are an informal discussion group initiated by the Automatic Radio Frequency Techniques Group (ARFTG) and devoted to sharing information and issues related to on-wafer measurement and calibration practices. The Forum is also a platform to define workgroups and gather experts in the field to progress the field of on-wafer measurements and calibrations.

Forum principles:

- Facilitate discussion with like-minded engineers
- Open exchange of experience, ideas, discussion of problems
- Informal atmosphere

With the great support of the EuMW 2023 Steering Committee, we are bringing the 15th ARFTG On-Wafer User's Forum closer to the European microwave engineering community. The topics for our meeting in Berlin will include methods for verifying wafer-level calibration accuracy, measurement traceability, and sub-THz measurements.

The ARFTG On-Wafer Forum is free for the EuMW delegates, exhibitors, and exhibition visitors.

If you have any questions, please contact the forum organizers at: forums@arftg.org

MONDAY 11:20 - 13:00

Alpha 6

EuMIC05

EuMIC Opening

Chair: Friedel Gerfers¹Co-Chairs: Corrado Carta², Ulrich Lewark³¹Technical University of Berlin, ²IHP, ³IMST GmbH

11:20

Welcome Address: Opening of the European Microwave Integrated Circuits Conference 2023

11:30

Friedel Gerfers, EuMIC Chair

11:30

RF, Power and Sensor Solutions for greener ICT networks

12:15

Ludger Verweyen

Infineon Technologies, Germany

12:15

Transceivers for Automotive Radar Sensor Status and Trends

13:00

Christian Zelger

Robert Bosch GmbH, Germany

Radar sensors are indispensable components of modern vehicles. State-of-the-art safety and comfort functions cannot be realized without them. The widening range of requirements from low to high end can only be covered with a family of several SoCs (system-on-chip). To achieve cost targets, installation space and power dissipation, it is essential to integrate as much as possible on a SoC. Modern RF CMOS semiconductor technologies enable such integration, and the single-chip radar is now a reality. By increasing the number of transceivers, computing power, bandwidth, and optimization of the FMCW modulation, the generation currently under development will also enable further performance enhancement. Range and separability are significantly increasing again.

Faults caused by interference are not yet a major problem. However, the further increase in sensors could lead to future conflicts.

In this Plenary Talk, the above-mentioned status will be presented in a more precise way and based on this, future potential trends shall be sketched up.

MONDAY 14:20 – 16:00

ROOM	Alpha 6	Beta 5	Beta 6	Beta 7
	EuMIC06 Advanced PAs for Microwave Bands Chair: Paolo Colantonio ¹ Co-Chair: Patrick Schuh ² ¹ University of Rome Tor Vergata, ² HENSOLDT Sensors	EuMIC07 Novel Techniques for Microwave and mm-Wave Circuits and Systems Design Chair: Teresa M. Martin-Guerrero ¹ Co-Chair: Alessandro Cidronali ² ¹ Universidad de Málaga, ² University of Florence	EuMIC08 High-Speed Mixed-Signals Circuits and Systems Chair: Christoph Scheytt ¹ Co-Chair: Friedel Gerfers ² ¹ Heinz Nixdorf Institut Universität Paderborn, ² Technische Universität Berlin	EuMIC09 Sub-THz Circuits and Techniques Chair: Patrick Reynaert ¹ Co-Chair: Sébastien Chartier ² ¹ KU Leuven ESAT-MICAS, ² IAF-Fraunhofer: Fraunhofer Institute for Applied Solid-State Physics
14:20 – 14:40	EuMIC06-1 Power Amplifier MMICs for Phased-Array Applications Patrick Schuh ¹ INDUSTRIAL KEYNOTE ¹ Hensoldt	EuMIC07-1 RF Circuit Design in the Era of Artificial Intelligence Ben Gu ¹ INDUSTRIAL KEYNOTE ¹ Cadence Design Systems	EuMIC08-1 SiGe BiCMOS Receiver Chain for FMCW Automotive Photonic-Radar Applications Christoph Hoehn ¹ , Can Çalıskan ¹ , Stefan Preußler ¹ ¹ Sicoya GmbH	EuMIC09-1 GaN-based Power Amplifier MMIC and Module for D-Band Applications Dirk Schwantuschke ¹ , Erdin Ture ¹ , Peter Brückner ¹ , Philipp Neisinger ¹ , Axel Tessimann ¹ , Martin Zink ¹ , Michael Kuri ¹ , Dirk Meder ¹ , Sandrine Wagner ¹ , Roger Lozar ¹ ¹ Fraunhofer Institute for Applied Solid State Physics (IAF), Germany
14:40 – 15:00	EuMIC06-2 A Push-Pull 6–12 GHz GaN Dual-Stage MMIC PA with Capacitive Cross-Coupling Neutralization for Increased Gain Gregor Lasser ¹ , Rob Vissers ¹ ¹ Chalmers University of Technology	EuMIC07-2 Wideband Automated Tuning of Ka-Band Dual Input Doherty MMIC PA using Bayesian Optimization Mattia Mengozzi ¹ , Gian Piero Gibiino ¹ , Alberto Maria Angelotti ¹ , Alberto Santarelli ¹ , Corrado Florian ¹ , Paolo Colantonio ¹ , Christoph Schulze ¹ , Olof Bengtsson ¹ ¹ University of Bologna (Italy), ² University of Roma Tor Vergata (Italy), ³ Ferdinand Braun Institut (FBH)	EuMIC08-2 100-GBd Linear Optical Modulator Driver for Short-Reach Links in 130-nm SiGe:C BiCMOS Tsung-Ching Tsai ¹ , Christian Bohn ¹ , Ahmet Çağrı Uluşoy ¹ ¹ Karlsruhe Institute of Technology (KIT)	EuMIC09-2 A Third Harmonic 0.54-0.53 THz VCO Radiating Source in 28 nm CMOS Sumeet Londhe ¹ , Eran Socher ¹ ¹ Tel Aviv University
15:00 – 15:20	EuMIC06-3 A Differential GaN Power Amplifier with 1° AM-PM Distortion for 5G mm-Wave Applications Dongyang Yan ¹ , Sehoon Park ¹ , Yang Zhang ¹ , Dries Peumans ¹ , Mark Ingels ¹ , Piet Wambacq ¹ ¹ IMEC and Vrije Universiteit Brussel, ² imec, Belgium	EuMIC07-3 Load Pull-Driven Behavioral Modelling of Microwave Switches for the Design of Tunable Reflective Terminations Seyed Urman Ghozati ¹ , Roberto Quaglia ¹ , Ehsan Azad ¹ , Jeff R. Powell ¹ , Paul Tasker ¹ , Steve C. Cripps ¹ ¹ Cardiff University, ² Compound Semiconductor Application Catapult, ³ Skyarna Ltd	EuMIC08-3 A Bulk-Controlled 12 GS/s Track and Hold Amplifier with >58 dBc SFDR and >53.5 dB SNDR in 22 nm FD-SOI CMOS Enne Wittenhagen ¹ , Patrick James Artz ¹ , Patrick Kurth ¹ , Sebastian Linnhoff ¹ , Philipp Scholz ¹ , Friedel Gerfers ¹ ¹ Technische Universität Berlin	EuMIC09-3 A 182 GHz Triple-Stacked Distributed Amplifier in InP HBT Process Can Cui ¹ , Phat Nguyen ¹ , Nguyen Nguyen ¹ , Natalie Killeen ¹ , Alexander Stameroff ¹ , Anh-Vu Pham ¹ ¹ University of California Davis (UC Davis), ² Keysight Technologies
15:20 – 15:40	EuMIC06-4 A Ka-Band 15 W Output Power and >30% PAE GaN MMIC Power Amplifier with Low IMD3 Over 600 MHz Tone Spacing for SATCOM Keigo Nakatani ¹ , Yutaro Yamaguchi ¹ , Ko Kanaya ¹ , Shintaro Shinjo ¹ ¹ Mitsubishi Electric Corporation	EuMIC07-4 InP DHBT On-Wafer RF Characterization and Small-Signal Modelling up to 220 GHz Nil Davy ¹ , Marina Deng ¹ , Virginie Nodjadjim ¹ , Chhandak Mukherjee ¹ , Muriel Riet ¹ , Colin Mismar ¹ , Bertrand Ardouin ¹ , Cristell Maneux ¹ ¹ III-V Lab, a joint Lab from Nokia, Thales and CEA, ² University of Bordeaux, Bordeaux INP, UMR CNRS 5218, IMS Laboratory	EuMIC08-4 The Fastest CMOS Single-Channel 5-bit Flash ADC Operating at 18.5 GS/s in 22 nm FD-SOI Nima Lotfi ¹ , Philipp Scholz ¹ , Friedel Gerfers ¹ ¹ Technische Universität Berlin, ² Technische Universität Berlin	EuMIC09-4 A 272 GHz InP HBT Direct-Conversion Transmitter with 14.1 dBm Output Power Utku Soyulu ¹ , Amirreza Alizadeh ¹ , Ahmed Samir Hamed Sayed Ahmed ¹ , Munkyo Seo ¹ , Mark J. W. Rodwell ¹ ¹ University of California Santa Barbara, ² Sungkyunkwan University
15:40 – 16:00	EuMIC06-5 A 100 W High Efficiency Hybrid Broadband GaN Power Amplifier for Galileo Navigation System Stela Furxhi ¹ , Simone De Marzi ¹ , Lorena Cabria ¹ , Rocco Giofrè ¹ , Paolo Colantonio ¹ ¹ Università degli Studi di Roma Tor Vergata, ² TTI	EuMIC07-5 Varactor Characterization Procedure for Large-Signal High-Frequency Applications Aarón García-Luque ¹ , Teresa M. Martin-Guerrero ¹ , Francisco J. Mata-Contreras ¹ ¹ Telecommunication Research Institute (TELMA), Universidad de Málaga	EuMIC08-5 190 GBd PAM-4 Signal Generation using Analog Multiplexer IC with On-Chip Clock Multiplier Jonathan Schostak ¹ , Tobias Tannert ¹ , Markus Grözing ¹ , Volker Jungnickel ¹ , Christian Schmidt ¹ , Holger Rucker ¹ , Manfred Berroth ¹ , Ronald Freund ¹ ¹ Fraunhofer Heinrich Hertz Institute, ² University of Stuttgart, ³ IHP - Leibniz-Institut für innovative Mikroelektronik	EuMIC09-5 A Broadband D-Band Power Detector System in SiGe 130 nm BiCMOS Technology Christoph Herold ¹ , Thomas Mausolf ¹ , Corrado Carta ¹ , Andrea Malignaggi ¹ ¹ IHP - Leibniz Institut für innovative Mikroelektronik

MONDAY 16:40 – 18:20

ROOM	Alpha 6	Beta 5	Beta 6	Beta 7
	EuMIC10 GaN-PAs for mm-Wave Bands Chair: Patrick Schuh ¹ Co-Chair: Vittorio Camarchia ² ¹ HENSOLDT Sensors, ² Politecnico di Torino	EuMIC11 Novel Devices and their Integration Chair: Marion Matters ¹ Co-Chair: Lars-Erik Wernersson ² ¹ TU Eindhoven, ² Lund University	EuMIC12 Frequency Conversion Circuits Chair: Vadim Issakov ¹ Co-Chair: Nils Pohl ² ¹ TU Braunschweig, ² Ruhr University Bochum	EuMIC13 Circuits and Techniques for Phased-Array Systems Chair: Aleksey Dyskin ¹ Co-Chair: Frank E. van Vliet ² ¹ Nvidia, ² TNO Defense, Safety and Security
16:40 – 17:00	EuMIC10-1 A 63-73 GHz GaN Power Amplifier with a Compact Power Combiner Mingquan Bao ¹ , Bharath kumar Cimbili ² , Dirk Schwantuschke ¹ , Kristoffer Andersson ¹ , Peter Brückner ¹ , Rüdiger Quay ¹ , Jonas Hansryd ¹ ¹ Ericsson AB, ² Fraunhofer Institute for Applied Solid State Physics (IAF), Germany	EuMIC11-1 Heterointegration of mm-Wave InP-HBT Power Amplifier Chipllets on SiGe-BiCMOS Chip Hady Yacoub ¹ , Marko Rausch ¹ , Christoph Stölmacker ¹ , Ralf Doerner ¹ , Maruf Hossain ¹ , Ina Ostermay ¹ , Taylor Moule ¹ , Matthias Wietstruck ¹ , Steffen Knigge ¹ , Olaf Krüger ¹ , Wolfgang Heinrich ¹ ¹ Ferdinand Braun Institut, ² IHP - Leibniz-Institut für innovative Mikroelektronik	EuMIC12-1 A 75-140 GHz Frequency Quadrupler with Milli-Watt Level Output Power in 22nm FDSOI Ahmed Elmenshawi ¹ , Muhammad Waleed Mansha ¹ , Sirkam Muralidharan ¹ , Mona M. Hella ¹ ¹ Rensselaer Polytechnic Institute, ² Analog Devices Inc.	EuMIC13-1 Wideband Reflection-Type p-i-n Diode Phase Shifters in GaAs MMIC Technology at W-Band Artem Vilenskiy ¹ , Yingqi Zhang ¹ , Vessen Vassilev ¹ , Viktor Chernikov ¹ , Marianna Ivashina ¹ ¹ Chalmers University of Technology
17:00 – 17:20	EuMIC10-2 E-Band Downlink GaN PA with a Homogeneous Output Power of 2.3W and a Peak PAE of 30.9% Bharath kumar Cimbili ¹ , Christian Friesicke ¹ , Friedbert Van Raay ¹ , Mingquan Bao ¹ , Rüdiger Quay ¹ ¹ Fraunhofer IAF, Fraunhofer Institute for Applied Solid State Physics, ² Ericsson AB, Sweden	EuMIC11-2 Impact of Off-State Stress on SiGe-channel p-FETs in 22nm FD-SOI under Large-Signal Operation Dang Khoa Huynh ¹ , Quang Huy Le ¹ , Steffen Lehmann ¹ , Zhixing Zhao ¹ , Germain Bossu ¹ , Wafa Arfaoui ¹ , Thomas Kämpfe ¹ , Matthias Rudolph ¹ ¹ Fraunhofer IPMS-CNT, ² Fraunhofer IPMS, Center Nanoelectronic Technologies, ³ Globalfoundries Dresden, ⁴ Ulrich L. Rohde Chair of RF and Microwave Techniques, Brandenburg University of Technology (BTU), Cottbus, Germany	EuMIC12-2 A X4 Multiplier MMIC to E-Band Frequencies with High Spectral Purity in 50 nm mHEMT Technology Rainer Weber ¹ , Sandrine Wagner ¹ , Arnulf Leuther ¹ , Michael Mikulla ¹ ¹ Fraunhofer IAF	EuMIC13-2 A Dual-Band Vector-Sum Phase Shifter using I-Q Phase Compensation Technique for 5G Applications Xin Xu ¹ , Jens Wagner ¹ , Frank Ellinger ¹ ¹ Technische Universität Dresden
17:20 – 17:40	EuMIC10-3 GaN/SiC V-band 33 dBm Power Amplifier with 10% PAE for Inter Satellite Communication Alessandro Fonte ¹ , Giuseppe Siverini ¹ , Andrea Meazza ¹ , Antonio Traversa ¹ , Alberto Colzani ¹ , Stefano Moscato ¹ , Christian Friesicke ² ¹ SIAE Microelettronica S.p.A., ² Fraunhofer IAF	EuMIC11-3 RF Performance of Large Germanium Telluride Switches for Power Application Ismaël Charlet ¹ , Bruno Reig ¹ , Corentin Mercier ¹ , Julien Delprat ¹ , Vincent Puyal ¹ , Clémence Hellion ¹ , Marjolaine Allain ¹ , Stéphane Monfray ¹ , Alain Fleury ¹ , Frédéric Ganesello ¹ , Philippe Cathelin ¹ , Jose Lugo-Alvarez ² ¹ CEA - LETI, ² STMicroelectronics	EuMIC12-3 A Wideband W-Band Frequency Tripler With a Novel Mode-Selective Filter for High Harmonic Rejection Arjith Chandra-Prabhu ¹ , Janusz Grzyb ¹ , Philipp Hillger ¹ , Bernd Heinemann ¹ , Holger Rucker ¹ , Ullrich Pfeiffer ¹ ¹ University of Wuppertal, Wuppertal, ² IHP-Leibniz-Institut für innovative Mikroelektronik	EuMIC13-3 SiGe BiCMOS Ka-Band Integrated Transmitter for SatCom Phased-Array Applications Matteo Angelo Fumagalli ¹ , Alberto Colzani ¹ , Alessandro Fonte ¹ ¹ SIAE Microelettronica S.p.A.
17:40 – 18:00	EuMIC10-4 A 2.5W/mm High-Power Density V-Band Power Amplifier Using 150 nm GaN Technology Beyond fT Bharath kumar Cimbili ¹ , Christian Friesicke ¹ , Sebastian Krause ¹ , Friedbert Van Raay ¹ , Rüdiger Quay ¹ ¹ Fraunhofer IAF, Fraunhofer Institute for Applied Solid State Physics	EuMIC11-4 A Novel Reconfigurable RF Switch Based on Ferroelectric Hafnium Oxide FeFET Fabricated in 22 nm FDSOI Technology Sukhrob Abdulazhanov ¹ , Dang Khoa Huynh ¹ , Quang Huy Le ¹ , Thomas Kämpfe ¹ , Gerald Gerlach ¹ ¹ Fraunhofer IPMS, Center Nanoelectronic Technologies, ² TU Dresden, Germany	EuMIC12-4 A D-Band Frequency Doubler with Gm-Boosting Technique in 28-nm CMOS Chung-Chia Chien ¹ , Hwei Wang ¹ , Yunshan Wang ¹ , Yuen-Sum Ng ¹ ¹ National Taiwan University, Taiwan	EuMIC13-4 K-Band Receiver on SiGe BiCMOS Technology for SatCom Phased Array Systems Alberto Colzani ¹ , Matteo Angelo Fumagalli ¹ , Alessandro Fonte ¹ ¹ SIAE Microelettronica S.p.A.
18:00 – 18:20	EuMIC10-5 V-Band Power Amplifier MMIC on InAlGaNSiC HEMT Technology Mohamed Boustama ¹ , Stéphane Piotrowicz ¹ , Nicolas Michel ¹ , Linh Trinh-Xuan ¹ , Jonathan Leroy ¹ , Sébastien Aroulanda ¹ , Samira Driad ¹ , Louiza Hamidouche ¹ , Jean-Claude Jacques ¹ , Quentin Lévesque ¹ , Mourad Oualli ¹ , Christophe Chang ¹ , Philippe Fellon ¹ , Sylvain L. Delage ¹ ¹ III-V Lab, a joint Lab from Nokia, Thales and CEA, ² UMS GmbH, ³ UMS SAS	EuMIC11-5 An Integrated Planar Guanella Balun with the Quasi-Coaxial Structure on GaAs Substrate Masamni Tsuru ¹ , Tsukasa Hirai ¹ , Yusuke Omori ¹ , Naoki Sakai ¹ , Kenji Itoh ¹ ¹ Kanazawa Institute of Technology	EuMIC12-5 A 365-410 GHz Push-Push Frequency Doubler with Driving Stage in SiGe BiCMOS Tobias Carl Welling ¹ , Justin Romstadt ¹ , Florian Vogelsang ¹ , Klaus Aufinger ¹ , Nils Pohl ¹ ¹ Institute of Integrated Systems, Ruhr University Bochum, Germany, ² Infineon Technologies, Germany, ³ Institute of Integrated Systems, Ruhr University Bochum, Germany / Fraunhofer Institute for High Frequency Physics and Radar Techniques, Germany	EuMIC13-5 Ultra-Wideband mmW Digital Step Attenuator Philipp Neisinger ¹ , Fabian Thome ¹ , Laurenz John ¹ , Arnulf Leuther ¹ , Sébastien Chartier ¹ , Rüdiger Quay ¹ ¹ Fraunhofer Institute for Applied Solid State Physics IAF

TUESDAY 09:00 - 10:40

ROOM	Alpha 5/6	Beta 2	Beta 3/4	Beta 6
	EuMIC14 CMOS Circuits Techniques for Communication Applications Chair: Aleksey Dyskin ¹ Co-Chair: Herbert Zirath ² ¹ Nvidia, ² Chalmers University of Technology	EuMC01 Interconnects and Packaging - I Chair: Mehmet Kaynak ¹ Co-Chair: Akanksha Bhutani ² ¹ Texas Instruments, ² Karlsruhe Institute of Technology (KIT)	EuMIC/EuMC01 Focused Session Low Noise mm-Wave Integrated Technologies for Sub-THz Wireless Communication Chair: Alessandro Fonte ¹ Co-Chair: Luca Aluigi ² ¹ STMicroelectronics S.p.A., ² Huawei Technologies	EuMIC15 Building Blocks of Beamforming Front-Ends Chair: Ingmar Kallfass ¹ Co-Chair: Ho-Jin Song ² ¹ University of Stuttgart, ² Pohang University of Science and Technology
09:00 - 09:20	EuMIC14-1 A 433MHz OOK Wake-up Transmitter with Integrated Inverse Class E in 22 nm FD-SOI Andres Seidel ¹ , Bastian Lindner ¹ , Jens Wagner ¹ , Frank Ellinger ¹ ¹ TU Dresden, Germany	EuMC01-1 Advanced Packaging Technologies: Interconnects and Front-End Modules for Millimetre-Wave 5G/Beyond Applications Kamal Samanta ¹ INDUSTRIAL KEYNOTE ¹ AMWT Ltd UK	EuMIC/EuMC01-1 Design methodologies for mm-Wave transceivers in Bi(CMOS) for next-generation wireless and optical applications Domenico Pepe ¹ INDUSTRIAL KEYNOTE ¹ Renesas Design Zurich AG	EuMIC15-1 V- Through W-Band GaN Active Circulator Anthony Romano ¹ , Timothy Sonnenberg ¹ , Laila Figuera Marzall ¹ , Zoya Popovic ¹ ¹ University of Colorado - Boulder
09:20 - 09:40	EuMIC14-2 A 60 GHz Carrier Recovery Circuit in CMOS 28nm FD SOI for BPSK/QPSK PLL-less High Data Rate Receivers Alexandre Siligaris ¹ , Cédric Dehos ¹ , Jean-Baptiste David ¹ , Léa Barrau ¹ , José-Luis Gonzalez Jimenez ² ¹ University of Grenoble Alpes, CEA-Leti	EuMC01-2 Design and evaluation of a Substrate Integrated Waveguide with solid side walls for H-Band applications on organic substrate Joachim Hebelner ¹ , Akanksha Bhutani ² , Thomas Zwick ³ ¹ Karlsruhe Institut of Technology, ² Karlsruhe Institute of Technology (KIT) Institute of Radio Frequency Engineering and Electronics (IHE)	EuMIC/EuMC01-2 Fully Integrated Built-In Self Test of Millimeter-Wave LNA based on Avalanche Noise Diodes in 130 nm SiGe BiCMOS Technology Guendalina Simoncini ¹ , Valentina Palazzi ¹ , Giulia Orecchini ¹ , Federico Alimenti ¹ ¹ Università degli Studi di Perugia	EuMIC15-2 A Ka-band CMOS Active Phase Shifter Using Active Balun for Phase Optimization Jimin Lee ¹ , Jaeyong Lee ¹ , Seongjin Jang ¹ , Changkun Park ¹ ¹ Intelligent Microwave Systems Lab., Soongsil University, Republic of Korea
09:40 - 10:00	EuMIC14-3 Transformed-Based mm-Wave Low-Loss Active Isolator in 22nm FD-SOI Bharat Kalyan Thota ¹ , Patrick Reynaert ¹ ¹ KU Leuven	EuMC01-3 Innovative Packaging Integration Strategy for BiCMOS ICs Operating beyond 200 GHz David A. Ovalle-Taylor ¹ , Frédéric Ganesello ¹ , Cyril Luxey ¹ , Guillaume Ducournau ¹ ¹ STMicroelectronics, ² Université Côte d'Azur, ³ EMN	EuMIC/EuMC01-3 Modelling, Design, and Characterization Challenges of a Gallium Arsenide High-linearity Low-Noise Amplifier With Gain Control at W-band Patrick Ettore Longhi ¹ , Antonio Serino ¹ , Sergio Colangeli ¹ , Walter Ciccognani ¹ , Shikha Swaroop Sharma ¹ , Swati Sharma ¹ , Ernesto Limiti ¹ ¹ Università di Roma "Tor Vergata"	EuMIC15-3 V- and W-band GaN MMIC Switches Timothy Sonnenberg ¹ , Anthony Romano ¹ , Shane Verploegh ¹ , Zoya Popovic ¹ ¹ University of Colorado Boulder
10:00 - 10:20	EuMIC14-4 A Broadband LNA and Sub-Harmonic Mixer Based Multi-Mode Rx in 22 nm CMOS Soumya Gupta ¹ , Benjamin Jann ¹ , Kareem Rashed ¹ , Arun Natarajan ¹ ¹ Oregon State University	EuMC01-4 Compact Transitions for Loopback Testing of Packaged Antennas with Waveguide Launchers Abhijit Pal ¹ , Martin Schneider ¹ ¹ University of Bremen	EuMIC/EuMC01-4 A D-Band Low-Noise-Amplifier in SiGe BiCMOS with Broadband Multi-Resonance Matching Networks Guglielmo De Filippi ¹ , Lorenzo Pioletto ¹ , Andrea Bilato ¹ , Andrea Mazzanti ¹ ¹ Dept. of Electrical, Computer and Biomedical Engineering, University of Pavia	EuMIC15-4 Design of a 22-55 GHz SPDT Switch MMIC with GaAs PIN Diodes Sahand Noorzadeh ¹ , Stephen Ngamate ² , Trang Nguyen ¹ ¹ Northrop Grumman Corporation, ² NI
10:20 - 10:40	EuMIC14-5 A D-Band Gain-Switching Phase Shifter with Wideband and Low Temperature-Dependency in 22-nm FD-SOI CMOS Toshihide Kuwabara ¹ , Naoki Oshima ¹ , Koki Tanji ¹ , Shinji Hachiyama ¹ , Kazuaki Kunihiro ¹ ¹ NEC Corporation	EuMC01-5 High Density Multi-Layer Millimeter-Wave Packaging and Interconnects Using Aerosol Jet Printing Nicholas Sturim ¹ , Matthew Hodek ¹ , Premjeet Chahal ¹ , John Albrecht ¹ , John Papapolymerou ¹ ¹ University catholique de Louvain, ² Fraunhofer IPMS, Center Nanoelectronic Technologies	EuMIC/EuMC01-5 A Compact 120 GHz LNA in 22 nm FD-SOI with Back-Gate Controllable Variable-Gain Martin Rack ¹ , Lucas Nyssens ² , Quang Huy Le ³ , Dang Khoa Huynh ⁴ , Thomas Kämpfe ⁵ , Jean-Pierre Raskin ⁶ , Dimitri Lederer ⁷ ¹ University catholique de Louvain, ² Université catholique de Louvain, ³ Fraunhofer IPMS, Center Nanoelectronic Technologies	EuMIC15-5 60 W Stacked-HEMT Based Asymmetric X-Band GaN SPDT Switch for Single Chip T/R Modules Volkan Erturk ¹ , Armagan Gurdal ¹ , Busra Cankaya Akoglu ¹ , Ekmel Özbay ¹ ¹ Georgia Institute of Technology, ² Gallium Semiconductor, ³ Nanotechnology Research Center (NANOTAM), ⁴ Bilkent University

TUESDAY 09:00 - 10:40

ROOM	Beta 7	Beta 8	Beta 9
	EuMIC16 Advanced PAs on SiGe & InP Technologies Chair: Franco Giannini ¹ Co-Chair: Gijs van der Bent ² ¹ University of Rome Tor Vergata, ² TNO	EuMC02 Advances in front-end architectures and active components Chair: Lorenz-Peter Schmidt ¹ Co-Chair: Nils Weimann ² ¹ Uni Erlangen, ² University of Duisburg-Essen	EuMC03 Integration technologies based on advanced materials and topologies Chair: Martin Vossiek ¹ Co-Chair: Ke Wu ² ¹ Friedrich-Alexander University Erlangen-Nuremberg, ² Polytechnique Montreal
09:00 - 09:20	EuMIC16-1 A Compact SiGe BiCMOS Distributed Power Amplifier in 5 - 24 GHz Kutay Altintas ¹ , Abdurrahman Burak ¹ , Tahsin Alper Ozkan ¹ , Yasar Gurbuz ¹ ¹ Sabancı University	EuMC02-1 Low-Noise Amplifiers for the Arctic Weather Satellite Laurenz John ¹ , Fabian Thome ¹ , Rainer Weber ¹ , Arnulf Leuther ¹ , Axel Tessimann ¹ , Hermann Massler ¹ , Anders Emrich ¹ , Josefine Adebahr ¹ , Ville Kangas ¹ ¹ Fraunhofer IAF, Fraunhofer Institute for Applied Solid State Physics, ² Omnisys Instruments, ³ European Space Agency, ESA/ESTEC	EuMC03-1 Low-Loss MIM Capacitor on Thick SiO ₂ Dielectric for GaN-on-Si Substrates with Standard and Elevated Top Electrode Configurations Abdalla Eblabia ¹ , Arathy Varghese ¹ , Khaled Elgaid ¹ , Hareesh Chandrasekar ¹ , Michael Uren ¹ , Martin Kuball ¹ ¹ Cardiff University (UK), ² University of Bristol
09:20 - 09:40	EuMIC16-2 A 22-42 GHz 28 nm FD-SOI 3:1 VSWR Resilient Balanced Power Amplifier for 5G Application Gwennaël Diverrez ¹ , Eric Kerherve ¹ , Magali De Matos ¹ , Andrea Cathelin ¹ ¹ Univ. Bordeaux, CNRS, Bordeaux INP, IMS, UMR 5218, F-33400 Talence, France, ² ST Microelectronics, Crolles, France	EuMC02-2 Enabling RF Circuit Techniques for 5G and beyond Florinel Balteanu ¹ ¹ Skyworks Solutions Inc.	EuMC03-2 Sub-mmWave Transmission Lines on Silicon-Based Technologies shigi ma ¹ , Lucas Nyssens ¹ , Jean-Pierre Raskin ¹ , Dimitri Lederer ¹ ¹ Université catholique de Louvain
09:40 - 10:00	EuMIC16-3 A W-band Class-F234 SiGe-HBT Power Amplifier with 35/19.7 % Peak/PBO6dB PAE and 26 % 1-dB Large-Signal Power Bandwidth Eren Vardarli ¹ , Mario Krattenmacher ¹ , Christoph Weimer ¹ , Austin Ying-Kuang Chen ¹ , Michael Schröter ¹ ¹ Dresden University of Technology, ² University of California, Santa Cruz	EuMC02-3 Fast-Phase-Switching Current-Mode Phase Shifter for Beyond 5G Phased Array Antenna Asaka Kobayashi ¹ , Ren Imanishi ¹ , Hideyuki Nosaka ¹ ¹ Ritsumeikan University	EuMC03-3 An Ultra-Wideband DC-Block on Thin-Film Ceramic for the Next Generation of Test and Measurement Applications Up to 150 GHz Andre Scheder ¹ , Tim Pfahler ¹ , Anna Bridier ¹ , Jan Schür ¹ , Martin Vossiek ¹ ¹ Friedrich-Alexander Universität Erlangen-Nürnberg, ² Rohde & Schwarz GmbH & Co. KG
10:00 - 10:20	EuMIC16-4 A Full G-band Power Amplifier with 34 % Peak PAE in InP-DHBT Technology Maruf Hossain ¹ , Ralf Doerner ¹ , Wolfgang Heinrich ¹ , Viktor Krozer ¹ ¹ Ferdinand-Braun-Institut (FBH) gGmbH, Leibniz-Institut für Höchstfrequenztechnik	EuMC02-4 A V-Band 16% Efficiency Frequency Doubler-Based RF Beamforming Front-End Module for Vector Modulated Signal Transmission Mahitab Eladwy ¹ , Ahmed Ben Ayed ¹ , Ali M. Darwish ¹ , Slim Boumaiza ¹ ¹ University of Waterloo, ² Army Research Laboratory	EuMC03-4 Reconfigurable Impedance Matching Network for 5G Mid-Band Utilizing Phase-Change Materials Tejinder Singh ¹ , Raafat R. Mansour ¹ ¹ University of Waterloo
10:20 - 10:40	EuMIC16-5 Design and Analysis of a 50 GHz InP DHBT Class-E Power Amplifier Providing 2.3 mW/μm ² Venkata Pawan K M Rao Sriperumbuduri ¹ , Hady Yacoub ¹ , Andreas Wentzel ¹ , Tom Keinicke Johansen ¹ , Matthias Rudolph ¹ ¹ BTU, ² Ferdinand-Braun-Institut (FBH), Leibniz-Institut für Höchstfrequenztechnik, ³ Technical University of Denmark (DTU), ⁴ Brandenburgische Technische Universität Cottbus-Senftenberg	EuMC02-5 Aluminium Based Ka-Band Radiator Combined with an Innovative SSPA Housing Michael Kilian ¹ , Philipp Kohl ¹ , Matthias Tonnier ¹ , Maria Wochner ¹ , Christian Hartwanger ¹ ¹ Airbus Defence & Space, ² Airbus Defence and Space GmbH, ³ Tesat Spacecom GmbH & Co. KG	

TUESDAY 10:40 – 13:00

Exhibition Hall

EuMIC17

EuMIC Poster

Chair: Ulrich Lewark¹

¹IMST GmbH

Posters presenters
will be ready around
their stands by 10:40.

EuMIC17-1

THz Oscillation in Doped-GaN Based Planar Gunn Diode with the T-shape Channel

LILI HUO¹, Ravikiran Lingaparthi², Nethaji Dhar-
marasu³, K Radhakrishnan⁴, Sergio Garcia-Sánchez⁵,
Javier Mateos⁶, Kirill Shabdurasulov⁷

¹CINTRA CNRS/NTU/Thales UMI 3288, Nanyang
Technological University, ²Temasek Laboratories,
Nanyang Technological University, ³Center for
Micro/Nano-electronics (CMNE), Nanyang Techno-
logical University, ⁴Universidad de Salamanca

EuMIC17-2

Thermal Transient Measurements of GaN HEMT Structures by Electrical Measurements

Tobias Kristensen¹, Andreas Divinyi², Johan Bremer³,
Torbjörn M.J. Nilsson⁴, Mattias Thorsell⁵

¹Chalmers University of Technology, ²Saab AB,
³Chalmers University of Technology, Saab AB

EuMIC17-3

The Role of Gate Leakage on Surface-Related Current Collapse in AlGaIn/GaN HEMTs

Christos Zervos¹, Petros Beleniotis², Sascha Krause³,
Dan Ritter⁴, Matthias Rudolph⁵

¹Brandenburg University of Technology Cottbus-
Senftenberg (BTU), ²Kongsberg Defence and
Aerospace, Space Electronics, ³Technion-Israel
Institute of Technology, ⁴Brandenburg University of
Technology Cottbus-Senftenberg (BTU), Ferdinand-
Braun-Institut gGmbH, Leibniz-Institut für
Hochfrequenztechnik (FBH)

EuMIC17-4

22FDX® EDMOS for 5G mmW Power Amplifier Applications

Ming-Cheng Chang¹, Zaid Al-Husseini², Shafi Syed³,
Shihni Ong⁴, Lye-hock Chan⁵, Wafa Arfaoui⁶, Dieter
Lipp⁷, Eian Veeramani⁸, Jerome Mazurier⁹, Andreas
Knorr¹⁰, Nick Comfotey¹¹, Tianbing Chen¹²

¹Global Foundries

EuMIC17-5

A Ku- and Ka-Band Dual-Band Signal Source SiGe MMIC Realization by Using Wideband SPDT Switches

Christian Bredendiek¹, Simon Küppers², Klaus
Aufinger³, Nils Pohl⁴

¹Fraunhofer Institute for High Frequency Physics
and Radar Techniques FHR, ²Zpi LABS GmbH, ³In-
fineon Technologies AG, ⁴Ruhr-University Bochum,
Bochum, Germany

EuMIC17-6

An 11-15.8 GHz Class-D DCO with -117.5 dBc/Hz Phase Noise at 1 MHz Offset in 22nm FDSOI CMOS Technology

Qiao Yang¹, Olaf Zimmerhackl², Michael Otto³, Xuemei
Hui⁴, Shafi Syed⁵

¹GlobalFoundries,China, ²GlobalFoundries,Germany,
³GlobalFoundries, USA

EuMIC17-7

SPST and SPDT 60 GHz Travelling-Wave Switches in 22 nm FD-SOI

Quentin Courte¹, Martin Rack², Dimitri Lederer³,
Jean-Pierre Raskin⁴

¹UCLouvain

EuMIC17-8

A 12 GS/s RF-Sampler Employing Inductive Peaking in 22 nm FD-SOI CMOS

Enne Wittenhagen¹, Patrick Kurth², Nima Lotfi³, Julius
Edler⁴, Philipp Scholz⁵, Friedel Gerfers⁶

¹Technische Universität Berlin

EuMIC17-9

A Continuously Adjustable True Time Delay for D-Band Timed Antenna Arrays

Manuel Koch¹, Florian Probst², Sascha Breun³,
Robert Weigel⁴

¹Friedrich-Alexander-Universität Erlangen-Nürnberg

EuMIC17-10

InP RTD Detector for THz Applications

Simone Clochiatti¹, Robin Kress², Enes Mutlu³, Florian
Vogelsang⁴, Marcel van Delden⁵, Nils Pohl⁶, Werner
Prost⁷, Nils Weimann⁸

¹University of Duisburg Essen, ²Ruhr-Universität
Bochum

EuMIC17-11

Switchable V-Band Power Amplifier with Ultra-Fast Turn-On for Aggressive Duty-Cycling

Maximilian Gottfried Becker¹, Marco Gunia², Diego
Mendez³, Frank Ellinger⁴

¹TU Dresden, ²Pontificia Universidad Javeriana

TUESDAY 11:20 – 13:00

ROOM Alpha 5/6

EuMW01

EuMW/EuMC Opening Session

Chair: Thomas Zwick¹

Co-Chair: Ilona Rolfes²

¹Karlsruhe Institute of Technology, ²Ruhr University Bochum

11:20

11:25

Welcome Address: Opening of the European Microwave Week 2023

Thomas Zwick

EuMW General Chair

11:25

11:35

EuMA Welcome Address

Frank van den Bogaart

EuMA President

11:35

11:40

Greetings from the IEEE MTT-S

Nuno Borges Carvalho

IEEE MTT-S President

11:40

11:45

Greetings from the EuMW 2023 Platinum Sponsor

Keysight Technologies

11:45

11:50

Technical Programme of the EuMW 2023

Ingmar Kallfass

EuMW General TPC Chair

11:50

11:55

Announcements and Notifications

Ilona Rolfes and Amelie Hagelauer

EuMC Chair and EuMC TPC Chair

11:55

12:40

Near-Field Terahertz Networking

Daniel Mittleman

School of Engineering at Brown University, USA

The recent dramatic growth in interest in the use of high-frequency (millimetre-wave and terahertz) carrier waves for wireless communications has spurred a great deal of research activity. In some cases, such as fixed point-to-point backhaul, systems operating above 100 GHz are already in or nearing commercial deployment. On the other hand, significant research challenges remain for the deployment of local area networks, which must manage factors such as user mobility and line-of-sight blockage of directional beams. Interestingly, such networks may often be able to operate in a regime in which most or all of the broadcast sector is located in the near field of the transmitter. This possibility opens up a host of new ideas for wave front engineering, in particular wave fronts that can only exist in the electromagnetic near field. Here, we discuss a few examples, focusing on the class of wave fronts that can be engineered to curve around an intervening obstacle, delivering data to a user located in the shadow of the obstacle. This near-field effect presents an intriguing alternative to the popular notion of intelligent reflecting surfaces for blockage mitigation.

12:40

13:00

Awards Ceremony

Andy Gibson

EuMA Awards Chair

EuMA Outstanding Career Award
EuMA Distinguished Service Award
EuMA Roberto Sorrentino Prize
International Journal of Microwave and Wireless Technolo-
gies Best Paper Prize

TUESDAY 14:20 – 16:00

ROOM	Beta 2	Beta 3/4	Beta 6	Alpha 5/6
	EuMC04 Passive Device Development with Innovative Design Approaches Chair: Anthony Ghiotto ¹ Co-Chair: Angela Stelson ² ¹ University of Bordeaux, ² NIST	EuMC05 Focused Session THz antennas and systems Chair: Guillaume Ducournau ¹ Co-Chair: Joachim Oberhammer ² ¹ University of Lille, ² KTH	EuMW03 Joint Women in Microwaves (WiM) and Young Professionals (YP) Event Chairs: Ana Ines Inacio (YP), Cristina Andrei (WiM), Jasmin Grosinger (WiM) ¹ TNO, The Netherlands, ² Brandenburg University of Technology, Germany, ³ Graz University of Technology, Austria	EuMIC/EuMC02 Panel Session on European Chips Act Chair: Wolfgang Heinrich ¹ Co-Chair: Paolo Colantonio ² ¹ Ferdinand-Braun-Institut gGmbH, Leibniz-Institut für Höchstfrequenztechnik, ² University of Rome Tor Vergata
14:20 – 14:40	EuMC04-1 Dual-Band Schiffman Phase Shifter with Large Frequency Ratio and Wide Bandwidths Faisal Amin ¹ ¹ Nanjing University of Aeronautics & Astronautics	EuMC05-1 A 2x2 0.232-0.243 THz Coherent Scalable Array in 28 nm CMOS Sumeet Londhe ¹ , Eran Socher ² ¹ Tel Aviv University	13:00 – 13:30 Get Together with Lunch Boxes 13:30 – 15:00 Panel Session Panelists: Wendy Shu ¹ , Sherry Hess ² , Anouk Hubrechtsen ³ , Anna Miskiewicz ⁴ , Mayazurra Ruggiano ⁵ , Irene Selvanathan ⁶ ¹ Eravant, ² Cadence, ³ AntenneX, ⁴ Apple, ⁵ Thales Nederland, ⁶ Neurospace	14:20 – 16:00 Introduction: What is the EU Chips Act Gerhard Kahmen ¹ ¹ IHP/FMD
14:40 – 15:00	EuMC04-2 Ultra-Low-Loss Slot-Line Based Common-Mode Isolator Timothée Le Gall ¹ , Anthony Ghiotto ² , Stefan Varault ³ , Bruno Louis ⁴ , Grégoire Pillet ⁵ ¹ THALES DMS, Elancourt, France, ² Bordeaux INP, IMS Laboratory	EuMC05-2 Experimental Evaluation of a Subharmonic Detector and Corresponding 1-D Array Concept at 300 GHz Zhenming Tian ¹ , Meng Zhang ¹ , Hui Yuan ² , Benedikt Sievert ³ , Michael Eube ⁴ , Peter Hildenhagen ⁵ , Hartmut Roskos ⁶ , Daniel Erni ⁷ , Andreas Rennings ⁸ ¹ University of Duisburg-Essen, ² Goethe-Universität Frankfurt am Main, ³ RF-Frontend GmbH	16:00 – 18:45 Sightseeing Tour Following the panel, we will have a unique sightseeing tour of Berlin. Guided tours by Berliner Unterwelten will entertain us: From Flak Towers to Mountains of Debris & Bunkers, Subways, and the Cold War.	The Research View: 3 Pitches by European RTOs (FMD, IMEC & LETI) Gerhard Kahmen ¹ , Nadine Collaert ² , Martin Gallezot ³ ¹ IHP/FMD, ² imec, ³ LETI
15:00 – 15:20	EuMC04-3 A Quasi-TEM Approach for Designing Microvias for PCB Layer Transition with Minimal Return Loss Ziad Hatab ¹ , Hiroaki Takahashi ² , Ahmad Bader Allothman Alterkaw ³ , Michael Ernst Gadringer ⁴ , Wolfgang Bösch ⁵ ¹ Graz University of Technology, ² AT&S	EuMC05-3 THz Dielectric Resonator Antenna with Rectangular Waveguide Slot Feed Marius Kretschmann ¹ , Akanksha Bhutani ² , Peng Lu ³ , Andreas Stöhr ⁴ , Thomas Zwick ⁵ ¹ Karlsruhe Institute of Technology (KIT), ² University of Duisburg-Essen		The Foundry View: Panel with Foundry Representatives IHP, MACOM (formerly OMMIC), STM, UMS, QORVO, WIN
15:20 – 15:40	EuMC04-4 Compact SIW Six-Port With Improved Output Matching and Isolation Bartosz Tegowski ¹ , Alexander Kölpin ² ¹ Hamburg University of Technology (TUHH)	EuMC05-4 A Chip-Integrated 240-GHz-Reflectarray with Antennas on Glass Superstrate Susanne Brandt ¹ , Mario Mueh ² , Christian Waldschmidt ³ ¹ Ulm University		Panel Discussion
15:40 – 16:00		EuMC05-5 Wideband, High Gain Dielectric Resonator Antenna in Embedded Surface Mount Short Horn in D-Band Elizabeth Bekker ¹ , Georg Gramlich ² , Lucas Giroto de Oliveira ³ , Akanksha Bhutani ⁴ , Thomas Zwick ⁵ ¹ Karlsruhe Institute of Technology (KIT)		

TUESDAY 14:20 – 16:00

ROOM	Beta 7	Beta 8	Beta 9
	EuMIC18 PAs for Communication Systems Chair: Rocco Giofrè ¹ Co-Chair: María J. Madero-Ayora ² ¹ Università di Roma Tor Vergata, ² Universidad de Sevilla	EuMIC19 Circuits for Broadband mm-Wave Transceivers Chair: Hua Wang ¹ Co-Chair: Ulrich Lewark ² ¹ ETH Zurich, ² IMST GmbH	EuMC06 Multi-Functional and Reconfigurable Planar Filters Chair: Roberto Gomez-Garcia ¹ Co-Chair: Vittorio Tornielli di Crestvolant ² ¹ University of Alcalá, ² HUBER+SUHNER AG
14:20 – 14:40	EuMIC18-1 Transmission Line Transformer Based Broadband Differential Class-E PA for Cellular Handset Masatoshi Hase ¹ ¹ Murata Manufacturing Co., Ltd.	EuMIC19-1 Design of an E-TSPC Flip-Flop for a 43 Gb/s PRBS Generator in 22 nm FDSOI Florian Probst ¹ , Jonas Weninger ² , Andre Engelmann ³ , Vadim Issakov ⁴ , Robert Weigel ⁵ ¹ Friedrich-Alexander-Universität Erlangen-Nürnberg, ² TU Braunschweig	EuMC06-1 Nonreciprocal Filtering Power Divider Using Mixed Static and Time-Modulated Resonators: Numerical Design Approach and Experimental Validation Girdhari Chaudhary ¹ , Phanam Pech ² , Samdy Saron ³ , Dimitra Psychogiou ⁴ , Yongchae Jeong ⁵ ¹ Jeonbuk National University, South Korea, ² University College Cork & Tyndall National Institute
14:40 – 15:00	EuMIC18-2 A 24 GHz Harmonic-Injection Doherty Power Amplifier with 42 % PAE at 6 dB OPBO in 100 nm GaN Technology Moise Safari Mugisho ¹ , Christian Friesicke ² , Mohamed Ayad ³ , Thomas Maier ⁴ , Rüdiger Quay ⁵ ¹ Fraunhofer IAF, Fraunhofer Institute for Applied Solid State Physics, ² UMS - United Monolithic Semiconductors	EuMIC19-2 A Silicon-Based Optical Signal Transmitter for Sub-THz Wireless Communication Systems Kalliopi Spanidou ¹ , Luis Orbe ² , Robinson Cruzeo Guzmán ³ , Luis González-Guerrero ⁴ , Guillermo Carpintero ⁵ ¹ University Carlos III of Madrid, ² Synopsys Photonics Solutions	EuMC06-2 Multi-Functional Bandpass Filters with Frequency Tunability and RF Co-designed Isolator Functionality Kexin Li ¹ , Dimitra Psychogiou ² ¹ UCC-Tyndall
15:00 – 15:20	EuMIC18-3 A Design Approach for Bandwidth Enhancement of 3-Way Doherty PAs Anna Piacibello ¹ , Rocco Giofrè ² , Paolo Colantonio ³ , Vittorio Camarchia ⁴ ¹ Politecnico di Torino, ² Università di Roma Tor Vergata	EuMIC19-3 A 32 GHz, 12.8 GSps Direct Sampler and Converter for Direct Microwave Sampling for Terrestrial and Space Applications Francois Bore ¹ ¹ Teledyne E2V Semiconductors SAS	EuMC06-3 Ultrawide In-Band Self-Interference Suppression Using Bandpass Filter-Based RF Cancellers Kevin Martin ¹ , Dimitra Psychogiou ² ¹ University College Cork and Tyndall National Institute
15:20 – 15:40	EuMIC18-4 A 20-Watts, GaN MMIC Doherty Power Amplifier for Ku-Band Satellite Communications Seifeddine Fakhfakh ¹ ¹ United Monolithic Semiconductors (UMS)	EuMIC19-4 A Fully-Differential Travelling-Wave Amplifier up to 110 GHz in a 22 nm FD-SOI CMOS Technology Athanasios Gatzastras ¹ , Christian Volmer ² , Ingmar Kallfass ³ ¹ Institute of Robust Power Semiconductor Systems (ILH) - University of Stuttgart, ² Advantest Europe GmbH, ³ Institute of Robust Power Semiconductor Systems (ILH), University of Stuttgart, Stuttgart, Germany	EuMC06-4 Non-Reciprocal RF Co-Designed Filtering Phase Shifters With Continuously Tunable Phase Shift Zixiao Zhang ¹ , Dimitra Psychogiou ² ¹ UCC-Tyndall
15:40 – 16:00	EuMIC18-5 A 39.5 dBm GaN Doherty Amplifier MMIC with Phase Control for Ka-band Space Applications Jose Romero Lopera ¹ , Michael Ernst Gadringer ² , Erich Leitgeb ³ , Wolfgang Bösch ⁴ , Helmut Paulitsch ⁵ ¹ Graz University of Technology	EuMIC19-5 A D-band Low-Noise Amplifier in 28-nm CMOS Technology for Radio Astronomy Applications Li-Jung Huang ¹ , Chau-Ching Chiong ² , Yunshan Wang ³ , Hwei Wang ⁴ , Chung-Chia Chien ⁵ ¹ National Taiwan University, ² Institute of Astronomy and Astrophysics, Academia Sinica	EuMC06-5 Signal-Interference Bandpass Filters Using Resonant Transversal Filtering Sections With Asymmetrical Transfer Function Characteristics David Chatzichristodoulou ¹ , Symeon Nikolau ² , Photos Vryonides ³ , Dimitra Psychogiou ⁴ ¹ Frederick Research Center, Cyprus, ² Frederick Research Center, Cyprus, ³ Tyndall National Institute, Cork, T12 RSCP, Ireland

TUESDAY 16:00 – 18:20

Posters presenters
will be ready around
their stands by 16:00.

Exhibition Hall

EuMIC/EuMC03

EuMIC/EuMC Poster

Chair: Ulrich Lewark¹

Co-Chair: Amelie Hagelauer²

¹IMST GmbH, ²Fraunhofer EMFT

EuMIC/EuMC03-1 Comparative Life Cycle Assessment of Hybrid Bonding and Copper Pillar Die-to-Wafer 3D Integrations for sub-THz Applications

Léa Roulleau¹, Laura Vauche¹, Olivier Valorge¹,
Christophe Dubarry¹, Léa Di Cioccio¹

¹CEA - LETI

EuMIC/EuMC03-5 New Approach to Absolute Power Measurements in the WR-3 Band

Benjamin Röben¹, Karsten Lange², Priyanka Mondal¹,
Pierre Gellie¹, Andreas Steiger¹

¹Physikalisch-Technische Bundesanstalt (PTB), ²SLT Sensor- und Lasertechnik GmbH, ³Lytid SAS

EuMIC/EuMC03-9 Bondwire Integration Challenges in E-band Systems: from PCB to Die Level

Sherif R. Zahran¹, Antonio Alati¹, Raffaele De Marco¹,
Stefano Moscato¹, Alessandro Fonte², Giandomenico Amendola¹, Philippe Ferrari¹, Luigi Boccia¹

¹University of Calabria, ²SIAE Microelettronica, ³University of Grenoble Alpes, TIMA Laboratory

EuMIC/EuMC03-2 An Unconventional Measurement Technique for the Nonlinear Characterization of mm-Wave GaN HEMT

Valeria Vadalà¹, Antonio Raffo¹, Gianni Bosi¹, Rocco Giofrè², Paolo Colantonio³, Giorgio Vannini¹

¹University of Milano-Bicocca, ²University of Ferrara, ³University of Roma Tor Vergata

EuMIC/EuMC03-6 Phase Distortion Reduction of Flat Gain Envelope Tracked GaN RF PAs

Morten Olavsbråten¹, Anders Ivar Hagen¹, Hans-Robert Lahren¹

¹Norwegian University of Science and Technology (NTNU)

EuMIC/EuMC03-10 Air-Filled and Slow-Wave CNT-Based Substrate Integrated Waveguide

Phi-Long Doan¹, Jordan Corsi¹, Rongtao Jiang¹,
Joseph de Saxe¹, Philippe Coquet¹, Jianxiong Wang¹,
Dominique Baillargeat¹, Emmanuel Pistono¹, Florence Podevin¹

¹TIMA Laboratory, Grenoble INP, CNRS, University of Grenoble Alpes, ²CINTRA CNRS/NTU/Thales UMI 3288, Nanyang Technological University, ³University of Limoges/CNRS, XLIM UMR7252

EuMIC/EuMC03-3 A Hybrid Radiating Element for 1-D Scanning Clustered Phased Array

Raffaele De Marco¹, Emilio Armiéri¹, Giandomenico Amendola¹, Luigi Boccia¹

¹Università della Calabria

EuMIC/EuMC03-7 Analysis of the Dispersion Characteristics in Substrate Integrated Waveguides with Periodic Walls

Raul Garcia¹, Angela Covas², Angel-Antonio San Blas¹,
Maurizio Bozzi¹

¹University Miguel Hernandez of Elche, ²Universidad Miguel Hernandez de Elche, ³University of Pavia

EuMIC/EuMC03-11 Dual-Band Substrate Integrated Waveguide Filters with Independently Controllable Passband Based on Cambered Cavity and Circular Cavity

Xianlong Yang¹, Xiao-Wei Zhu¹, Xiang Wang¹,
Rui-Jia Liu¹

¹Southeast University, Nanjing, ²NUST(Nanjing University of Science and Technology), ³University College Dublin

EuMIC/EuMC03-4 Experimental Validation of Class F Waveform Engineering in Class C Biasing Condition

Francesco Manni¹, Rocco Giofrè¹, Franco Giannini¹,
Valeria Vadalà¹, Gianni Bosi¹, Antonio Raffo¹, Giorgio Vannini¹, Paolo Colantonio¹

¹University of Rome Tor Vergata, ²University of Milano-Bicocca, ³University of Ferrara

EuMIC/EuMC03-8 GaN-on-Porous Silicon for RF applications

Gilles Scheen¹, Romain Tuyvaerts¹, Pieter Cardinal¹,
Enrique Ekoga¹, Khaled Aouadi¹, Christophe Pavageau¹, Amin Rassekh¹, Massinissa Nabet²,
Sachin Yadav¹, Jean-Pierre Raskin¹, Bertrand Parvais¹,
Mostafa Emam¹

¹Incize, ²UCLouvain, ³imec, Belgium

TUESDAY 16:40 – 18:20

Alpha 5/6

EuMIC20

EuMIC Closing Session

Chair: Friedel Gerfers¹

Co-Chairs: Corrado Carta², Ulrich Lewark³

¹Technical University of Berlin, ²IHP, ³IMST GmbH

16:40 Session Welcome

Friedel Gerfers, EuMIC Chair

16:45

16:45 Leaving the Marconi Era and Entering the Directive Communications and Sensors Era for 5G/6G and SATCOM

17:25

Gabriel M. Rebeiz

University of California, USA

Affordable phased-arrays, built using low-cost silicon, have become an essential technology for high data-rate terrestrial (5G) and satellite (SATCOM) systems to their high gain, electronically steerable patterns, narrow beamwidths, high tolerance to interference and adaptive nulling capabilities. They have also become the backbone of all LEO and MEO satellites both at the payload level and at the user-terminal. High EIRP, high-performance systems at X-band to W-band with analog and digital beamforming capabilities and with multiple beams, are now available at low-cost. These advances are reshaping our communication and sensor systems, as we work to change our world from the Marconi-Era driven by low-gain antenna systems to the Directive Communications era where every antenna, every beam, every sensor is electronically steered. This talk summarizes our work in this area, present some amazing/unbelievable systems, and conclude with future 5G-Advanced and 6G where every device will be connected at Gbps speeds. And all done using Silicon RFICs!

17:25 RFSOI Technology for the RF Front-End: Then, Now and Tomorrow

18:00

Julio C. Costa

Global Foundries, USA

RFSOI technologies are used today in the RF section of all cellular handsets, performing a number of different critical RF switching and tuning functions, and recently also providing an even larger number of low noise amplifiers, digital CMOS blocks and critical analog functions. This talk will discuss the history of RFSOI technology, the critical enablers that allowed it to in a relatively short amount of time, completely replace the existing III-V switch technologies. The progression to today's modern RFSOI technologies and its array of device options will also be described, as well as future trends in RF switching technologies. In particular, the RF front end of the future will incorporate a number of 3D technologies in both die-to-wafer and wafer-to-wafer bonding approaches in order to reduce critical dimensions while providing superior RF performance.

18:00 Awards Ceremony

18:15

Michael Gadringer, EuMW 2023 Awards Chair

Friedel Gerfers, EuMIC Chair

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

18:15 Closing Remarks

18:20

Friedel Gerfers

EuMIC 2023 Chair

Invitation to EuMW 2024

Nathalie Deltimple

EuMIC 2024 Chair

TUESDAY 16:40 - 18:20

ROOM

Beta 2

EuMC07

Interconnects and Packaging - II

Chair: Yinggang Li¹

Co-Chair: Aurelian Crunteanu²

¹Shenzhen Technology University, ²Xlim - UMR 7252 - CNRS - Limoges University

16:40
-
17:00

EuMC07-1

Low-Cost Transition from Chip to Waveguide for E-Band

Klas Eriksson¹, Torbjörn Dahl¹, Richard Lindman¹, Andreas Martin¹, Kristoffer Andersson¹

¹Ericsson AB, Sweden

17:00
-
17:20

EuMC07-2

Broadband, Via-less Grounded Coplanar Waveguide-to-Microstrip Transition in D-band

Elizabeth Bekker¹, Georg Gramlich¹, Alexander Quint¹, Luca Valenziano¹, Lucas Giroto de Oliveira¹, Akanksha Bhutani¹, Thomas Zwick¹

¹Karlsruhe Institute of Technology (KIT)

17:20
-
17:40

EuMC07-3

A K-Band Wideband Air-Filled Coaxial Transmission Line With CNC-Machined Gap Waveguide Package

Jin Li¹, Zheming Li¹, Sicheng Chen¹, Zhihong Xu¹, Tao Yuan¹

¹Shenzhen University

17:40
-
18:00

EuMC07-4

A W-band, Wideband, and Low-Loss Slot-Coupled Multi-Layer Transition with Compact Leakage-Suppressing Scheme

Ding Wang¹, Yu Jian Cheng¹, Yong Fan¹

¹University of Electronic Science and Technology of China

18:00
-
18:20

EuMC07-5

Design of Chip-to-Waveguide Transition Centered at 220 GHz for sub-THz Packaging

Haojie Chang¹, Zhongxia Simon He¹, Herbert Zirath¹

¹Chalmers University of Technology

Beta 3/4

EuMC08

Focused Session
6G THz Communications

Chair: Andreas Stöhr¹

Co-Chair: Sebastian Randel²

¹Universität Duisburg-Essen, ²Karlsruhe Institute of Technology (KIT)

EuMC08-1

300 GHz Super Heterodyne Link over 645 m with Freq. Duplexing for Point to Point Backhauls

A. Renau¹, C. Maye¹, D. Wrana², S. Haussmann², I. Kallfass², L. John³, B.-K. Jung⁴, T. Kuerner⁵, U. Hellrung⁶, P. Schlegel⁷, R.-P. Braun⁸, Y. Leiba⁹, T. Kawanishi¹⁰, S. Hisatake¹¹, K. Kondou¹², P. Szriftgiser¹³, G. Ducournau¹⁴

¹Univ. of Lille, ²Univ. of Stutt., ³Fraunh. IAF, ⁴TU Braunsch., ⁵Dt. Telekom, ⁶SIKLU Comm., ⁷Waseda Univ., ⁸Gifu Univ., ⁹HRC, ¹⁰PHLAM

EuMC08-2

200 Gbit/s Wireless THz Transmission over 52 m using Optoelectronic Signal Generation

Joel Dittmer¹, Jonas Tebart¹, Christoph Füllner¹, Christian Koos², Andreas Stöhr², Sebastian Randel²

¹Institute of Photonics and Quantum Electronics, Karlsruhe Institute of Technology, ²Department of Optoelectronics, University of Duisburg-Essen, Duisburg, ³Institute of Photonics and Quantum Electronics, Karlsruhe Institute of Technology

EuMC08-3

Effects of Harmonics from Frequency-Multiplicative Carrier Generation in a Superheterodyne 300 GHz Transmit Frontend

Dominik Wrana¹, Simon Haussmann¹, Benjamin Schoch¹, Laurenz John¹, Axel Tessimann¹, Ingmar Kallfass¹

¹Institute of Robust Power Semiconductor Systems (ILH), University of Stuttgart, ²Fraunhofer Institute of Applied Solid State Physics (IAF)

EuMC08-4

Mobile 6G Communications at THz Frequencies Enabled by Leaky-wave Antenna Beam Steering

Jonas Tebart¹, Joel Dittmer², Thomas Haddad¹, Peng Lu¹, Sebastian Randel¹, Andreas Stöhr¹

¹University of Duisburg-Essen, ²Karlsruhe Institute of Technology (KIT)

EuMC08-5

Scalable Phased-Arrays at 140 GHz using RF and IF Beamforming Techniques

Amr Ahmed¹, Minjae Jung¹, Siwei Li¹, Linjie Li¹, Gabriel M. Rebeiz¹

¹University of California San Diego, USA

Beta 6

EuMW04

Special Session MTT-S
Inter-Society Technology
Panel Session - Biomedical
Applications

Chairs: Sandra Costanzo¹, Michal Cifra², Jungchih Chiao³, Ke Wu⁴

¹Univ. of Calabria, ²Czech Acad. of Sci., ³South. Methodist Univ., ⁴Polyt. Montreal

16:40
-
18:20

EuMW04-1

Beyond Science Fiction: How Wireless Signals, RF Properties of Biomolecules, Antenna Engineering, and Short Electric Pulses are Shaping the Future of Biomedical Technologies

Panelists

Changzhi Li¹, Ralph Hoelzel², Sema Dumanli³, Philippe Leveque⁴, Francesca Apollonio⁵

¹Texas Tech University, USA, ²Fraunhofer Institute for Cell Therapy and Immunology, Germany, ³Boğaziçi Üniversitesi, Turkey, ⁴XLIM Research Institute, University of Limoges, France, ⁵University of Rome Sapienza, Italy

Beta 7

EuMC09

Microwave and mm-Wave
Systems and Applications

Chair: Mark Bentum¹

Co-Chair: Ioan E. Lager²

¹Eindhoven University of Technology (TU/e), ²Delft University of Technology

EuMC09-1

Characterising Scattering Parameters of Coaxial Microwave Devices at Milli-Kelvin Temperatures for Quantum Computing Technologies

Manoj Stanley¹, Sang-Hee Shin¹, James Skinner¹, Jonas Urbanas², Nick Ridler³

¹National Physical Laboratory (NPL), Teddington, ²Maury Microwave

EuMC09-2

Temperature-Controlled Disinfection System Using Microwave and Plasma

Saleh Alfawaz¹, Ibrahim Alquaydheb¹, Sara Ghayouraneh¹, Amirreza Ghadimi Avval¹, Samir El-Ghazaly¹, Yuchun Du¹, Jianhong Zhou¹

¹University of Arkansas

EuMC09-3

Low-Complexity Control of an Electrical-Balance Duplexer

Jonas Winkelhake¹, Lukas Hüssen¹, Muh-Dey Wei¹, Renato Negra¹

¹HFE RWTH-Aachen

EuMC09-4

Analysis of a LINC Transmitter Architecture Based on Frequency Multipliers

Till Schifffmann¹

¹Chair of High Frequency Electronics, RWTH Aachen University

EuMC09-5

Detection of Metal Edge Orientation in Near-Field Imaging Using Higher-Order Mode Coupling

Dennis Hoffmann¹, Jan Hesselbarth¹

¹University of Stuttgart

ROOM

Beta 8

EuMW05

Special Session APMC

Chair: Wenquan Che¹

Co-Chair: Maurizio Bozzi²

¹South China University of Technology, ²University of Pavia

EuMW05-1

Microwave and Millimeter-Wave Filtennas and Their Applications

Xiuyin Zhang¹

¹South China University of Technology

EuMW05-2

Recent Progress in Assistant Coil Techniques to Overcome Misalignment Problems in Near-Field Wireless Power Transfer (WPT) Systems

Yongshik Lee¹, SeoYeon Yoon¹

¹Yonsei University

EuMW05-3

Theory of Characteristic Modes for Modelling Composite Structures

Chao-Fu Wang¹

INDUSTRIAL KEYNOTE

¹National University of Singapore

Beta 9

EuMC10

New Technologies in Planar
Filters

Chair: Giuseppe Macchiarella¹

Co-Chair: Photos Vryonides²

¹Politecnico di Milano, ²Frederick Research Center, Cyprus

EuMC10-1

Quasi-Elliptic Multi-Band BPFs Using Multi-Resonant Acoustic-Wave Lumped-Element Resonators

Mohammed R. A. Nasser¹, Dimitra Psychogiou¹

¹Tyndall NI/ University College Cork

EuMC10-2

Wideband Reconfigurable Bandpass-to-Bandstop Filter Based on Embedded Switches on Silicon Technology

Miguel Sanchez-Soriano¹, Rozenn Allanic², Cédric Quendo³, Denis Le Berre⁴, Douglas Silva De Vasconcelos⁵, Virginie Grimal⁶, Damien Valente⁷, Jérôme Billoué⁸

¹University of Alicante, ²University of Brest, ³University of Tours

EuMC10-3

Compact Dual-band Filters Using Substrate Integrated Coaxial and Slot-line Resonators

Steven Matthew Cheng¹, Dimitra Psychogiou¹

¹University College Cork & Tyndall National Institute

EuMC10-4

Quasi-Input Reflectionless Bandpass Filter with Quasi-Elliptic Response and Controllable Transmission Zeros Using Coupled Lines

Girdhari Chaudhary¹, Phanam Pech¹, Samdy Saron¹, Dimitra Psychogiou¹, Yongchae Jeong²

¹Jeonbuk National University, South Korea, ²University College Cork & Tyndall National Institute

EuMC10-5

Sezawa Mode Enhancement of SAW Resonators on GaN-on-insulator by Optimizing the Metal Thickness and its Application to RF Filters

Yutian Zhang¹, Krishna Balram¹, Martin Cryan¹

¹University of Bristol

WEDNESDAY 09:00 - 10:40

ROOM	Alpha 5	Beta 2	Beta 3/4	Beta 6
	EuMC11 Characterization of Multi-Antenna Systems Chair: Ville Viikari ¹ Co-Chair: Matthias Geissler ² ¹ Aalto University, ² IMST GmbH	EuMC12 Non-Planar Filters Chair: Richard Snyder ¹ Co-Chair: Michael Höft ² ¹ RS Microwave, ² Christian-Albrechts-Universität zu Kiel	EuMC13 Additive Manufacturing of Microwave Components Chair: Hjalti H. Sigmarsson ¹ Co-Chair: Gerald Gold ² ¹ Oklahoma University, ² Friedrich-Alexander Universität Erlangen-Nürnberg	EuMW06 Special Session MTT-S Inter-Society Technology Panel Session - Wireless Power Technologies Chairs: Vadim Issakov ¹ , David Zhizhang Chen ² , Jungchih Chiao ³ , Ke Wu ⁴ ¹ TU Braunschweig, ² Dalhousie Univ., ³ South. Methodist Univ., ⁴ Polyt. Montreal
09:00 - 09:20	EuMC11-1 Active Probe Array Structure for Assessment of mmWave Antenna Arrays Martin Obermaier ¹ , Martin Laabs ¹ , Thomas Deckert ¹ , Dirk Plettemeier ¹ ¹ Technical University Dresden, ² NI	EuMC12-1 Evolution of high-power Filters for Space Applications Christoph Schwager ¹ INDUSTRIAL KEYNOTE ¹ Tesat-Spacecom GmbH & Co. KG	EuMC13-1 Additive Integration with Aerosol-Jet Printed SIWs Christopher Areias ¹ , Andrew Luce ¹ , Yuri Piro ¹ , Alkim Akyurtlu ¹ ¹ University of Massachusetts Lowell	09:00 - 10:40 EuMW06-1 Wireless Power Technologies: Practical Considerations in Industry Panelists Dinesh Kithany ¹ , Changjun Liu ² , Kenji Itoh ³ , Johnny Yiqiang Yu ⁴ , Doris Keitel-Schulz ⁵ , Jjiangang Bi ⁶ , Naoki Shinohara ⁷ ¹ Wired and Wireless Technologies, UK, ² Sichuan University, China, ³ Kanazawa Inst. Tech., Japan, ⁴ Chengdu Sprouting Technology, China, ⁵ Infineon Technologies, Germany, ⁶ Xiaomi Technology, China, ⁷ Kyoto University, Japan
09:20 - 09:40	EuMC11-2 An Experimental Study of Energy and Bit Efficiency in Collocated and Distributed-MIMO using 28 GHz Testbed Tomoya Kaneko ¹ , Toshihide Kuwabara ¹ , Noriaki Tawa ¹ , Yasushi Maruta ¹ ¹ NEC Corporation	EuMC12-2 Input-Absorptive Quasi-Elliptic-Type Cavity Bandpass Filter Design YingQian He ¹ , Jing-Yu Lin ² , Xuzhou Yu ³ , Sai-Wai Wong ⁴ ¹ College of Electronics and Information Engineering, Shenzhen University, Shenzhen, China, ² Institute of Electromagnetics and Acoustics, Xiamen University, Xiamen, Fujian 361005, China	EuMC13-2 A 3D Printed V-Band Twisted Monolithic Waveguide Bandpass Filter Talal Skaik ¹ , Daxin Wang ¹ , Peter Hunyor ¹ , Hui Wang ¹ , Peter Huggard ¹ , Thomas Starke ² , Qingfeng Zhang ³ , Yi Wang ⁴ ¹ University of Birmingham, UK, ² STFC Rutherford Appleton Laboratory, ³ 3D Micro Print, ⁴ Southern University of Science and Technology, Shenzhen, China	
09:40 - 10:00	EuMC11-3 Passive Characterization of the Couplings within a Multi-Antenna System Through Noise Correlation meriem tamart ¹ , Elodie Richalot ² , Julien de Rosny ³ ¹ Université Gustave Eiffel, ² Gustave Eiffel university, ³ Institut Langevin, ESPCI Paris, CNRS	EuMC12-3 Reconfigurable Groove Gap Microwave Filter Based on Liquid Crystal Technology with One Transmission Zero Fynn Kamrath ¹ , Ersin Polat ² , Holger Maune ³ , Rolf Jakoby ⁴ , Michael Höft ⁵ ¹ Kiel University, ² Technische Universität Darmstadt, ³ Otto-von-Guericke University Magdeburg	EuMC13-3 Low-Pass Filters in Standard Rectangular Waveguide Using 3D Printed Dielectric Inserts Tinus Stander ¹ ¹ University of Pretoria	
10:00 - 10:20	EuMC11-4 Experimental Study of Channel Estimation and Transmit Diversity for IRS-based MISO system Yueheng Li ¹ , Sven Bettinga ¹ , Mohamad Basim Alabd ¹ , Xueyun Long ¹ , Lucas Giroto de Oliveira ¹ , Thomas Zwick ¹ ¹ Karlsruhe Institute of Technology	EuMC12-4 A Novel Multi-Resonant Rectangular Waveguide Junction and Its Applications in Compact Waveguide Multi-Band Filters and Multiplexers Mohamed Fahmi ¹ , Jorge A. Ruiz-Cruz ² , Raafat R. Mansour ³ ¹ Defence R&D Canada - Ottawa, ² Universidad Autónoma de Madrid, ³ University of Waterloo	EuMC13-4 D-Band 90° Waveguide Twists using 3D Printing and PVD Metallization Alexander Quint ¹ , Jerzy Kowalewski ² , Francesco Merli ² , Thomas Zwick ¹ ¹ Karlsruhe Institute of Technology (KIT), ² HUBER+SUHNER AG	
10:20 - 10:40	EuMC11-5 Robotic Measurement Solutions for Phased Array Calibration and Pattern Testing Patrick Pelland ¹ , Daniël Janse van Rensburg ¹ ¹ NSI-MI Technologies	EuMC12-5 Analysis and Validation of Fabrication and Assembly Effects on Terahertz Waveguide Bandpass Filter Yong Zhang ¹ , Bo Zhang ¹ , Tianhao Cao ¹ , Huali Zhu ¹ ¹ University of Electronic Science and Technology of China	EuMC13-5 SLS-Printed E-Band Waveguides and the Impact of Surface Roughness Andreas Hofmann ¹ , Konstantin Lomakin ¹ , Micha Kleinlein ¹ , Tobias Bader ¹ , Mark Sippel ¹ , Gerald Gold ¹ ¹ Friedrich-Alexander Universität Erlangen-Nürnberg	

WEDNESDAY 09:00 - 10:40

ROOM	Beta 7	Beta 8/9
	EuMC14 Signal Integrity and EMC Chair: Christian Damm ¹ Co-Chair: Bela Brian Szendrenyi ² ¹ Ulm University, ² Advantest America Inc.	EuMC15 High Efficiency Power Amplifier and Linearization Techniques Chair: Zoya Popovic ¹ Co-Chair: Olof Bengtsson ² ¹ University of Colorado Boulder, ² Ferdinand-Braun-Institut, Leibniz-Institut für Höchstfrequenztechnik
09:00 - 09:20	EuMC14-1 Tunable Dual-Frequency Interference Suppression Circuit with GaN MMIC Delay Lines Megan Robinson ¹ , Gregor Lasser ² , Zoya Popovic ¹ ¹ University of Colorado at Boulder, ² Chalmers University of Technology, Sweden	EuMC15-1 Experimental Characterization of a Dual-Input OLMBA for Back-Off Efficiency Improvement Jean-Baptiste Urvoay ¹ , Roberto Quaglia ¹ , Jeff R. Powell ² , Steve C.ripps ³ ¹ Cardiff University, ² Skyarna Ltd.
09:20 - 09:40	EuMC14-2 Linearity of PIN Diode Switch in Both ON-State and OFF-State Farhad Ghorbani ¹ , Jiafeng Zhou ¹ , Mattias Gustafsson ¹ , Yi Huang ¹ ¹ University of Liverpool, ² University of Liverpool, ³ R&D Center Huawei Technologies Sweden AB	EuMC15-2 A Wideband Dual-Input Reconfigurable Doherty Power Amplifier for Mismatch Recovery Junfu Guo ¹ , Songbai He ¹ , Weimin Shi ² , Chuan Li ¹ , Xubin Zhang ¹ ¹ University of Electronic Science & Technology of China, ² Chongqing University
09:40 - 10:00	EuMC14-3 EMF-Measurements of Rooftop Attenuation of Cellular Radio Base Stations Deployed on Gable Roofs Roland Reese ¹ , Florian Michler ² , Benedic Scheiner ² , Eva Radermacher ² ¹ Deutsche Telekom Technik GmbH, ² Sykno GmbH	EuMC15-3 Dual-Band Pseudo-Doherty Load Modulated Balanced Amplifier Design by Exploiting the Periodicity of the Coupler Jieen Xie ¹ , Kwok-Keung Michael Cheng ¹ ¹ The Chinese University of Hong Kong
10:00 - 10:20	EuMC14-4 Exposure Simulation and Analysis using Downlink Beam Tracking of a Mobile User in City Scenario Xueyun Long ¹ , Mario Pauli ¹ , Yueheng Li ¹ , Oliver Fritz ² , Thomas Zwick ¹ ¹ Karlsruhe Institute of Technology (KIT)/ Institute of Radio Frequency Engineering and Electronics (IHE), ² Karlsruhe Institute of Technology (KIT)	EuMC15-4 Efficiency Enhancement of Dual-PA Transmitters Using Over-The-Air Combination Wengji Wu ¹ ¹ University of Electronic Science and Technology of China
10:20 - 10:40	EuMC14-5 An Optically-Coupled Logger for the Measure of RF-Induced Voltage on Pacemakers and ICs Cecilia Vivarelli ¹ ¹ Italian National Institute of Health; University of Rome Tor Vergata	EuMC15-5 Comparison Between Latest Si-LDMOS and GaN Technology for RF-Power Base Station Transistors Daniel Maassen ¹ , Jan de Boet ¹ , Jos van der Zanden ¹ , Rob M. Heeres ¹ , Fred van Rijs ¹ ¹ ampleon

WEDNESDAY 09:00 – 10:40

ROOM Alpha 6

EuRAD01

EuRAD Opening Session

Chair: Christian Waldschmidt¹

Co-Chair: Marlene Harter²

¹University of Ulm, ²Offenburg University of Applied Sciences

09:00 Opening of the European Radar Conference 2023

Christian Waldschmidt, EuRAD Chair
Marlene Harter, EuRAD TPC Chair

09:10 – 09:55 Phased Array Radar for an Era of Autonomy: Progress, Challenges and Outlook

Tom Driscoll
Echodyne Corp., USA

The rapid increase in capability and prevalence of autonomous systems is driving demand for new and better sensors. Radar has always held a prestigious position among sensor suites as one of the only all-weather long-range modalities. However, the missions and environments for autonomous systems are now demanding higher performance than most traditional radars architectures can provide. Phased array radars – including MIMO phased arrays – are capable of the high performance required, but historically have been out of reach for all but the most exclusive systems due to their cost and complexity. This talk will outline the growing opportunity for next-generation radar sensors across multiple markets. We will look at major trends and progress advancing phased array technology, as well as examine key challenges and inevitable design tradeoffs. We'll end with an optimistic outlook for areas that seem poised for breakthrough and market success.

09:55 – 10:40 Secure – Fast – Convenient: UWB-based Real-time Walkthrough Passenger Screening

Matthias Gareis and Andreas Schiessl
Rohde & Schwarz, Germany

Terrorist attacks on civil aviation starting early 2001 created an increased demand in security for people screening. The desire to detect non-metallic items like ceramic knives or explosives drove the roll-out of millimeter-wave imaging based security scanners. As part of the introduction of the second generation body scanners, the Rohde&Schwarz[®]QPS201 lifted passenger screening to the next level.

The post-Covid recovery of air traffic paired with staff shortages created a strong need for higher efficiency, higher throughput and simplification of the screening process. Rohde & Schwarz' response to this is the new QPS Walk2000 security scanner based on the ultra-wideband (UWB) technology operating in the frequency range from 3.6 GHz to 10.6 GHz, which allows screening even through thick layers of clothing while the passengers walk through it.

UWB pulse generation in transmit and receive allows to produce a three-dimensional volume reconstruction in real-time. To reduce complexity and hardware cost, the receivers are using the sequential sampling radar technique. After the images of a person's passage through the scanner are reconstructed, the posture of the person is extracted from the images and threat objects are detected at all body regions using artificial intelligence (AI). The automatic threat detection results are then displayed on a neutral avatar to ensure privacy.

WEDNESDAY 10:40 – 13:00

Exhibition Hall

EuMC16

EuMC Poster 1

Chair: Amelie Hagelauer¹

¹TUM

Poster presenters
will be ready around
their stands by 10:40.

EuMC16-1 L-band Lithium Niobate-On-Insulator SHO Resonators Avoiding Transverse Spurious Modes through Electrode Apodization

Lluís Acosta¹, Eloi Guerrero¹, Carlos Caballero¹, Jordi Verdú¹, Albert Guerrero², Xavier Borrís², Jaume Esteve², Pedro de Paco³

¹Universitat Autònoma de Barcelona, ²Institut de Microelectrònica de Barcelona, ³Catalan Institute of Nanoscience and Nanotechnology (ICN2)

EuMC16-5 Lightweight, Low-Profile 3-Port Antenna Using Additive Manufacturing Process

Adrien Coatanea¹, Nghia Nguyen-Trong², Christophe Fumeaux², Benjamin Potelon¹, Christian Person¹

¹IMT Atlantique, ²The University of Adelaide

EuMC16-9 A ROM-Less DDS Using Pseudo-Sine Generator

Koki NAGATA¹, Hideyuki Nosaka¹

¹Ritsumeikan University

EuMC16-2 Pin-Loaded Rectangular Hollow-Waveguide Cavities for Filter Design with Excellent Suppression of Spurious Passbands

Jonas Weindl¹, Ananto Prasadi², Thomas F. Eibert¹

¹Technical University of Munich, ²Wainwright Instruments GmbH

EuMC16-6 Multi-Windows Spectral Transparency and Slow Light Effect Induced by Complex Near Field Mode Coupling in Microwave Metasurface

Oleksiy Breslavets¹, Yuri Savin¹, Zoya Eremenko²

¹O. Ya. Usikov Inst. for Radiophysics and Electr. of the National Academy of Sciences of Ukraine, ²O. Ya. Usikov Inst. for Radiophysics and Electr. of the National Academy of Sciences of Ukraine, Leibniz Institute for Solid State and Materials Research

EuMC16-10 Partially Coherent RF Noise Addition and its Mitigation in Power-combined Solid-State Amplifiers

Michael MacDonald¹, Nestor Lopez²

¹MIT Lincoln Laboratory, ²BAE Systems

EuMC16-3 Inline Waveguide Filter with Compact Frequency-Dependent Coupling Producing Two Additional Poles and Three Transmission Zeros

Muhammad Sandhu¹, Umar Abdul Majeed¹, Adam Lamecki², Roberto Gomez-Garcia³, Michal Mrozowski²

¹Sukkur IBA University, ²Gdansk University of Technology, ³University of Alcalá

EuMC16-7 FDTD Analysis of Space-Time Metamaterials using Modulated TVTLs for Frequency Translation, Mixing and Non-reciprocity

Anand Kumar¹, Debdeep Sarkar²

¹Indian Institute of Science, ²Indian Institute of Science, Bangalore

EuMC16-11 A Broadband 140 GHz Aperture-Coupled SPA Antenna in LTCC-Technology

Martin Ihle¹, Christian Zech², Benjamin Baumann², Steffen Ziesche³

¹Fraunhofer Institut für Ceramic Technologies and Systems - IKTS, ²Fraunhofer IAF, Fraunhofer Institute for Applied Solid State Physics

EuMC16-4 Suspended CPW Integration on Nanoporous Alumina Interposer for Millimeter Wave Application

Gustavo Palomino¹, Gustavo Pamplona Rehder¹, Ariana Lacorte Caniato Serrano¹, Gustavo Marcati¹, Gabriel Griep¹

¹Universidade de Sao Paulo

EuMC16-8 Resonant Response in Tunable Metasurface Based on Crossed All-Dielectric Grating

Vladimir Yachin¹

¹Institute of Radio Astronomy

WEDNESDAY 11:20 – 13:00

ROOM	Alpha 5	Beta 2	Beta 3/4	Beta 6
	EuRAD02 mm-Wave Antennas for Radar Applications Chair: Hasan Iqbal ¹ Co-Chair: Jerzy Kowalewski ² ¹ Continental AG, ² Huber+Suhner	EuMC17 Passive Components Chair: Maurizio Bozzi ¹ Co-Chair: Anthony Ghiotto ² ¹ University of Pavia, ² University of Bordeaux	EuMC/EuRAD01 Waveforms for Distributed Networks and Integrated Communications and Sensing Chair: Thomas Dallmann ¹ Co-Chair: Maria Sabrina Greco ² ¹ Technische Universität Ilmenau, ² University of Pisa	EuRAD03 Radar Target Measurement and Detection Chair: Michael Antoniou ¹ Co-Chair: Yoke Leen Sit ² ¹ University of Birmingham, ² Valco Schalter und Sensoren GmbH
11:20 – 11:40	EuRAD02-1 3D Metallized Polymer Waveguide Antennas for Radar Systems - from mmW to sub-THz Jerzy Kowalewski ¹ , Alejandro Garcia Tejero ¹ , Marco Rossi ¹ , Francesco Merli ¹ INDUSTRIAL KEYNOTE ¹ Huber+Suhner	EuMC17-1 Design of a Low-Loss E-Band Self-Biased Waveguide Circulator for Space Applications Evan Roué ¹ , Vincent Laur ¹ , Alexis Chevalier ¹ , Antoine Hozé ¹ , Gérard Tanné ¹ , Olivier Vendier ¹ , Rose-Marie Sauvage ¹ , Richard Lebourgeois ¹ ¹ Univ Brest, Lab-STICC, CNRS, UMR 6285, ² Thales Alenia Space, ³ Agence de l'innovation de défense, ⁴ Thales research and technology	EuMC/EuRAD01-1 A Dual-Carrier Linear-Frequency Modulated Waveform for High-Accuracy Localization in Distributed Antenna Arrays Ahona Bhattacharyya ¹ , Jason Merlo ¹ , Jeffrey A. Nanzer ¹ ¹ Michigan State University	EuRAD03-1 Statistical Polarimetric RCS Model of an Asphalt Road Surface for mm-Wave Automotive Radar Wietse Bouwmeester ¹ , Francesco Fioranelli ¹ , Alexander Yarovy ¹ ¹ TU Delft
11:40 – 12:00	EuRAD02-2 3D Mold Embedded PCB-Based MIMO Antenna Arrays for 79 GHz Automotive RADAR Thi Huyen Le ¹ ¹ Fraunhofer Institute for Reliability and Microintegration (IZM)	EuMC17-2 A Novel Compact Six-Pole Filtering Gysel Combiner Mohamed Fahmi ¹ , Jorge A. Ruiz-Cruz ² , Raafat R. Mansour ¹ ¹ Defence R&D Canada - Ottawa, ² Universidad Autónoma de Madrid, ³ University of Waterloo	EuMC/EuRAD01-2 Optimized Window Function for Improved Estimation Capabilities in 5G Joint Communication and Sensing Michael Hofstadler ¹ , Maximilian Larcher ¹ , Reinhard Feger ¹ , Andreas Springer ¹ , Andreas Stelzer ¹ ¹ Johannes Kepler University Linz	EuRAD03-2 Radar Cross-Section Pattern Measurement of a Complex Target in Reverberation Chamber Corentin Charlo ¹ , Stéphane Méric ¹ , François Sarrazin ¹ , Jérôme Sol ¹ , Philippe Pouliguen ¹ , Elodie Richalot ¹ , Philippe Besnier ¹ ¹ IETR UMR6164, INSA Rennes, ² Defense Innovation Agency, French Ministry of Armed Forces, ³ Univ. Gustave Eiffel, ESYCOM
12:00 – 12:20	EuRAD02-3 Microstrip-Line Type Bruce Array Antenna with Low Sidelobe Level for Millimeter-Wave Radar Hyunyoung Cho ¹ , Chanhee Lee ¹ , Jeong-Wook Kim ¹ , Sol Kim ¹ , Jong-Won Yu ¹ ¹ Korea Advanced Institute of Science and Technology	EuMC17-3 Comparison of Compact Liquid Crystal-based Phase Shifting Topologies for Reconfigurable Intelligent Surfaces Robin Neuder ¹ , Tom Burmeister ¹ , Dongwei Wang ¹ , Schülter Martin ¹ , Rolf Jakoby ¹ , Alejandro Jiménez-Sáez ¹ ¹ TU Darmstadt, IMP	EuMC/EuRAD01-3 Design of Long-Sequence Unimodular Waveforms Using an Original Autoencoder for MIMO Radar Systems Ryota Sekiya ¹ , Hiroki Mori ¹ , Hiromi Hashimoto ¹ , Junichiro Suzuki ¹ ¹ Research and Development Center, Toshiba Corporation, ² Toshiba Infrastructure Systems & Solutions Corporation	EuRAD03-3 Numerical Synthesis of Radar Target Detections Based on Measured Reference Data Philip Aust ¹ , Florian Hau ¹ , Jürgen Dickmann ¹ , Matthias A. Hein ¹ ¹ Mercedes-Benz AG, ² Technische Universität Ilmenau
12:20 – 12:40	EuRAD02-4 Double-Slot Waveguide Array with Tilted Wide-Angle Beam for Corner Automotive Radar Yunsu Kang ¹ ¹ HL Klemove	EuMC17-4 AFSIW E-plane Bifurcation for Compact High-performance Systems on Substrate and its Demonstration in the Design of a Dual-Band Filter Maxime Le Gall ¹ , Anthony Ghiotto ¹ , Issam Marah ¹ ¹ Exens-solutions/Bordeaux INP, IMS Laboratory, ² Bordeaux INP, IMS Laboratory, ³ Exens-solutions	EuMC/EuRAD01-4 Distributed Sensor Network for 3D Tag Localization Using Harmonic Radar at 61/122 GHz ISM Band Steffen Hansen ¹ , Sandra Nowok ¹ , Alex Shoykhetbrod ¹ , Stefan Thomas Wickmann ¹ , Jan Wessel ¹ , Nils Pohl ¹ ¹ Fraunhofer FHR (Fraunhofer Institute for High Frequency Physics and Radar Techniques FHR), ² Ruhr-University Bochum	EuRAD03-4 FMCW Radar Height Estimation of Moving Vehicles by Analyzing Multipath Reflections Sören Kohnert ¹ , Michael Vogt ² , Reinhard Stolle ¹ ¹ Augsburg Technical University of Applied Sciences, ² Ruhr University Bochum
12:40 – 13:00	EuRAD02-5 Wideband Corrugated Horn Antenna for Cross-Polarization Jamming Applications at Ka-Band Göksemin Bozdağ ¹ , Mustafa Kuloglu ¹ , Burak Eser ¹ ¹ Aelsan Inc.	EuMC17-5 Structured-Glass Waveguides (SGW) and TRL Calibration Standards Chad Bartlett ¹ , Antonio Malavé ¹ , Martin Letz ¹ , Michael Häft ¹ ¹ Kiel University, ² SCHOTT AG	EuMC/EuRAD01-5 CP-DSSS for Radar-Centric Integrated Sensing and Communication Linda Gehre ¹ , Lucas Giroto de Oliveira ¹ , Axel Diewald ¹ , Thomas Zwick ¹ , Benjamin Nuss ¹ ¹ Karlsruhe Institute of Technology (KIT)	EuRAD03-5 Design and Measurements of MIMO Radar Arrays for Autonomous Vehicles Ofer Markish ¹ ¹ Mobileye, Israel

WEDNESDAY 11:20 – 13:00

ROOM	Beta 7	Beta 8/9
	EuMC18 Microwave Components for Space Applications Chair: Michael Kilian ¹ Co-Chair: Alexander Kölpin ² ¹ Airbus Defence & Space, ² Hamburg University of Technology	EuMC19 High Power Device and Amplifier Technology Chair: José Carlos Pedro ¹ Co-Chair: Gavin Watkins ² ¹ Universidade de Aveiro - IT, ² Toshiba Europe Limited
11:20 – 11:40	EuMC18-1 Tackling the Challenges of Over-The-Air Testing for New Space Benoit Derat ¹ INDUSTRIAL KEYNOTE ¹ Rohde & Schwarz GmbH & Co. KG	EuMC19-1 A Low Loss, 6 GHz Large-Signal Bandwidth Analog Pre-Distortion Linearizer for K-Band High Power Amplifiers Tommaso Cappello ¹ , Sarmad Ozan ¹ , Laura McDonald ¹ , Andrew Tucker ¹ , Peter Krier ¹ , Tudor Williams ¹ , Kevin Morris ¹ ¹ Villanova University/University of Bristol, ² Filtronix, ³ University of Leeds
11:40 – 12:00	EuMC18-2 Helically Corrugated Interaction Regions for W-Band Gyrotron-Traveling Wave Amplifiers Craig Donaldson ¹ , Liang Zhang ¹ , Craig Robertson ¹ , Philip MacInnes ¹ , Colin Whyte ¹ ¹ University of Strathclyde	EuMC19-2 A 100 V, 90 W, 50 % Efficiency Distributed Amplifier John Walker ¹ , Gabriele Formicone ¹ , William Veitschegger ¹ ¹ Integra Technologies, Inc.
12:00 – 12:20	EuMC18-3 Measurement and Analysis of FDM for E-Band Satellite Communication Simon Haussmann ¹ , Laura Manoliu ¹ , Lukas Gebert ¹ , Benjamin Schoch ¹ , Markus Koller ¹ , Jakob Meier ¹ , Fabian Steinmetz ¹ , Jens Freese ¹ , Ralf Henneberger ¹ , Axel Tessmann ¹ , Sabine Klinkner ¹ , Ingmar Kallfass ¹ ¹ University of Stuttgart, ² University of Stuttgart, ³ Thales Alenia Space, ⁴ Tesat Spacecom GmbH & Co. KG, ⁵ Radiometer Physics GmbH, ⁶ Fraunhofer IAF, ⁷ Fraunhofer Institute for Applied Solid State Physics	EuMC19-3 A 4 kW, 100 V GaN on SiC HEMT Transistor for 1.3 GHz Particle Accelerator Applications John Walker ¹ , James Custer ¹ , Gabriele Formicone ¹ ¹ Integra Technologies, Inc.
12:20 – 12:40	EuMC18-4 Frequency and Phase Investigation of the Local Oscillator Offset in a W-Band Satellite Communication Link Laura Manoliu ¹ , Dominik Wrana ¹ , Benjamin Schoch ¹ , Simon Haussmann ¹ , Axel Tessmann ¹ , Ingmar Kallfass ¹ ¹ Institute of Robust Power Semiconductor Systems (ILH) - University of Stuttgart, ² Fraunhofer IAF, ³ Fraunhofer Institute for Applied Solid State Physics	EuMC19-4 Balanced Amplifier Design for Improvement of Reverse Inter-modulation Distortion in Wireless Microphone Systems Sven Hampel ¹ , Christian Krüger ¹ , Timo Jeske ¹ ¹ Sennheiser electronic GmbH & Co. KG
12:40 – 13:00	EuMC18-5 A Heterodyne Transceiver for Hybrid-Integrated K-/Ka-Band Phased Arrays Kevin Erkelenz ¹ , Florian Goepfert ¹ , Noah Sielck ¹ , Alexander Kölpin ¹ , Arne F. Jacob ¹ ¹ Hamburg University of Technology	EuMC19-5 HF Class-E Power Amplifier with Improved Efficiency for Mismatched Loads Frederick Raab ¹ ¹ Green Mountain Radio Research

WEDNESDAY 14:20 – 16:00

ROOM	Alpha 5	Beta 2	Beta 3/4	Beta 5
	EuRAD04 Automotive Radar Signal Processing Chair: Marlene Harter ¹ Co-Chair: Christian Waldschmidt ² ¹ Offenburg University Of Applied Sciences, ² University of Ulm	EuMC20 Filters by Additive Manufacturing Chair: Cristiano Tomassoni ¹ Co-Chair: Adam Lamecki ² ¹ University of Perugia, ² Gdansk University of Technology	EuMC/EuRAD02 Focused Session Joint Communication and Radar Sensing - A Step Towards 6G Part 1 Chair: Reiner S. Thomä ¹ Co-Chair: Thomas Dallmann ¹ ¹ Technische Universität Ilmenau	EuMC21 Metamaterials and Metasurfaces Chair: Pierre Blondy ¹ Co-Chair: Ferran Martín ² ¹ Xlim - UMR 7252 - CNRS- Limoges University, ² Universitat Autònoma de Barcelona
14:20 – 14:40	EuRAD04-1 DCM Radar: Advantages, Challenges and Future Evolutions Murtaza Ali ¹ INDUSTRIAL KEYNOTE ¹ Uhnder	EuMC20-1 Additive-manufactured TM01δ Mode Dielectric Resonators for Compact On-Board Wideband Filters Paolo Vallerotonda ¹ , Luca Pelliccia ² , Fabrizio Cacciamani ³ , Cristiano Tomassoni ⁴ , Omid Bouzekri ⁵ ¹ RF Microtech Srl, ² University of Perugia, ³ ESA / ESTEC	EuMC/EuRAD02-1 Distributed ISAC Systems - Multisensor Radio Access and Coordination Reiner S. Thomä ¹ , Thomas Dallmann ¹ ¹ Technische Universität Ilmenau	EuMC21-1 A Stacked Transparent Metasurface for Wideband LP-to-CP Conversion and Phase Control Guowei Li ¹ , Yuehe Ge ² , Zhizhang Chen ³ ¹ Fuzhou University, ² Dalhousie University
14:40 – 15:00	EuRAD04-2 Generation of 3D Grid-Maps Using an Incoherent Network of Radar Sensors with 1D Angle Estimation Timo Grebner ¹ , Thomas Weichenmeier ² , Vinzenz Janoudi ³ , Pirmin Schöder ⁴ , Christian Waldschmidt ⁵ ¹ University of Ulm	EuMC20-2 BST-Based Tunable Helical Filter Operating in the Higher Order Mode Seyyed Mojtaba Pourjaafari ¹ , Raafat R. Mansour ² ¹ University of Waterloo	EuMC/EuRAD02-2 6G Integrated Sensing and Communication: From Vision to Realization Thorsten Wild ¹ , Artjom Grudnitsky ² , Silvio Mandelli ³ , Marcus Henninger ⁴ , Junqing Guan ⁵ , Frank Schleich ⁶ ¹ Nokia	EuMC21-2 Metamaterial Waveguide Based Detector for Mass-Flow Measurements of Particulate Paint Solids Amrit Zoad ¹ , Alexander Kölpin ² , Andreas Penirschke ³ ¹ Technische Hochschule Mittelhessen, ² Hamburg University of Technology (TUHH), Hamburg, Germany, ³ Technische Hochschule Mittelhessen
15:00 – 15:20	EuRAD04-3 Detection and Backprojection of Ghost Targets within a Network of Radar Sensors Timo Grebner ¹ , Fabian Konrad ² , Schwarz Dominik ³ , Christian Waldschmidt ⁴ ¹ University of Ulm	EuMC20-3 Bandpass Filter Based on 3D-Printed Ceramic Triple-Mode Resonator with Branches Combining TM and TE Mode Operation Patrick Boe ¹ , Daniel Miek ² , Dominik Brouczek ³ , Michael Höft ⁴ ¹ Christian-Albrechts-Universität zu Kiel, ² Lithoz GmbH	EuMC/EuRAD02-3 Bistatic OFDM-based Joint Radar-Communication: Synchronization, Data Communication and Sensing Lucas Giroto de Oliveira ¹ , David Brunner ² , Axel Diebold ³ , Charlotte Muth ⁴ , Laurent Schmalen ⁵ , Thomas Zwick ⁶ , Benjamin Nuss ⁷ ¹ Karlsruhe Institute of Technology (KIT)	EuMC21-3 Switchable FSS-based 3D Printed Radome using Diodes at 3.6 GHz Thi-Hong-Le Dam ¹ , Alejandro Niembro-Martin ² , Thierry Lacrevaz ³ , Gregory Houzet ⁴ , Damien Paulet ⁵ , Nadège Reverdy-Bruas ⁶ , Quoc-Bao Duong ⁷ , Tan-Phu Vuong ⁸ ¹ Univ. Grenoble Alpes, Univ. Savoie Mont Blanc, CNRS, Grenoble INP, IMEP-LAHC, ² Schneider Electric, ³ Univ. Grenoble Alpes, CNRS, Grenoble INP, IUT1, ⁴ Univ. Grenoble Alpes, CNRS, Grenoble INP, LGP2, ⁵ Univ. Grenoble Alpes, Smart Grenoble Alpes
15:20 – 15:40	EuRAD04-4 Analyzing the Movement of Motorcyclist's Extremities based on its Angular Resolved RCS Measurement Sevdä Abadpour ¹ , Christian Schyr ² , Mario Pauli ³ , Florian Klein ⁴ , Rene Degen ⁵ , Jan Siska ⁶ , Nils Pohl ⁷ , Thomas Zwick ⁸ ¹ Karlsruhe Institute of Technology (KIT), ² AVL Deutschland, ³ HHVISION, ⁴ Cologne University of Applied Sciences, ⁵ Ruhr-University Bochum	EuMC20-4 Rectangular Waveguide Filters Based on Deformed Dual-Mode Cavity Resonators Michal Baranowski ¹ , Łukasz Balewski ² , Adam Lamecki ³ , Michal Mrozowski ⁴ ¹ Gdansk University of Technology, ² EM Invent Ltd	EuMC/EuRAD02-4 Mutual Over-The-Air Frequency Synchronization of Continuous Wave Signals Thomas Dallmann ¹ , Reiner S. Thomä ¹ ¹ Technische Universität Ilmenau	EuMC21-4 Glide-Symmetric Reconfigurable Metasurface in Substrate-Integrated-Waveguide Technology Boris Fischer ¹ , Julien Sarrazin ² , Guido Valerio ³ ¹ Sorbonne Université
15:40 – 16:00	EuRAD04-5 Joint Angle and Velocity Estimation in an Extended Velocity Unambiguity for TDM MIMO Radars Robert Prophet ¹ , Tobias Schmid ² , Benedikt Lössch ³ ¹ Robert Bosch GmbH	EuMC20-5 A 3-D-Printing-Compatible 90°-Bending and Polarization-Rotated Waveguide Filter Based on Capsule-Shape Resonators and Spherical Joints Yuhong Ye ¹ , Jin Li ¹ , Sicheng Chen ¹ , Tao Yuan ¹ ¹ Shenzhen University	EuMC/EuRAD02-5 A Compact Reconfigurable Power Splitter Enabling a Full-Duplex Integrated Transceiver Employed for Joint Communication and Radar Sensing Farhad Bozorgi ¹ , Padmanava Sen ² ¹ Barkhausen Institut gGmbH	EuMC21-5 14dB Active Gain Magnetic Negative Permeability Metamaterial Cell with Self-Coupling Compensation Hongtao Zhong ¹ , David Ricketts ² ¹ North Carolina State University

WEDNESDAY 14:20 – 16:00

ROOM	Beta 6	Beta 7	Beta 8/9
	EuMC/EuRAD03 Antenna Techniques for Radar Chair: Pierfrancesco Lombardo ¹ Co-Chair: Alexander Yarovoy ² ¹ Sapienza University of Rome, ² Delft University of Technology	EuMC22 Medical Microwave Applications and Dosimetric Studies Chair: Jan Vrba ¹ Co-Chair: Christian Damm ² ¹ Czech Technical University in Prague, ² Ulm University	EuMC23 Advanced THz device and photonic techniques Chair: Christian Carlowitz ¹ Co-Chair: Guillaume Ducournau ² ¹ FAU Erlangen-Nürnberg, ² University of Lille
14:20 – 14:40	EuMC/EuRAD03-1 Sparse 2D MIMO Antenna Designs using Simulated Annealing Muge Bekar ¹ , Christopher John Baker ² , Marina Gashinova ³ ¹ University of Birmingham, UK	EuMC22-1 Characterization of the Influence of Clothing and Other Materials on Human Vital Sign Sensing using mmWave Radar Nils C. Albrecht ¹ , Jan P. Weiland ² , Dominik Langer ³ , Marvin Wenzel ⁴ , Alexander Kölpin ⁵ ¹ Hamburg University of Technology (TUHH)	EuMC23-1 Sub-THz Silicon-Micromachined Reconfigurable Beam-Steering Frontend Armin Karimi ¹ , Umer Shah ² , Joachim Oberhammer ³ ¹ KTH Royal Institute of Technology
14:40 – 15:00	EuMC/EuRAD03-2 Reconstructed 2D MIMO Using Burg Algorithm Muge Bekar ¹ , Christopher John Baker ² , Marina Gashinova ³ ¹ University of Birmingham, UK	EuMC22-2 A High-Stability and High-Sensitivity Active Sensor for Non-Invasive Breast Cancer Detection Sandra Santiago-Mesas ¹ , Elizabeth Fernandez-Aranzamendi ² , Daniel Segovia-Vargas ³ , Adrián Amor-Martin ⁴ , Vicente González-Posadas ⁵ ¹ Universidad Carlos III de Madrid, Leganes, Madrid, Spain, ² Universidad Politécnica de Madrid	EuMC23-2 Compact High-Isolation Sub-THz Micro-Electromechanical SPST Switch Armin Karimi ¹ , Umer Shah ² , Joachim Oberhammer ³ ¹ KTH Royal Institute of Technology
15:00 – 15:20	EuMC/EuRAD03-3 Monopulse Channels Beamforming with Overlapped Subarrays for Low-Cost Multi-Mission Radars Giulio Giovannetti ¹ ¹ ELDES srl	EuMC22-3 Using Effective Medium Theory to Simulate Skin Cancer Detection with a Substrate-Integrated-Waveguide-Probe Nicolas Treier ¹ , Benedicta Frofo Doku ² , Denis Jaisson ³ , Serdal Ayhan ⁴ , Herman Jalli Ng ⁵ , Marlene Harter ⁶ ¹ Hochschule Offenburg, ² Hochschule Karlsruhe	EuMC23-3 Comparison of the Performance of State-of-the-Art Photoconductive Receivers for Terahertz Photonic Spectrum Analysers Benedikt Krause ¹ , Sascha Prew ² ¹ Technical University of Darmstadt, Darmstadt
15:20 – 15:40	EuMC/EuRAD03-4 Avoidance of Near-Field Influences in Calibration Measurements of Radars by Means of Active Calibration Targets Matthias Linder ¹ , Benedikt Meinecke ² , Dominik Schwarz ³ , Christian Waldschmidt ⁴ ¹ Ulm University, Germany	EuMC22-4 Microwave Diagnosis of Bone Fractures: an Artificial Intelligence-Based Approach Fardin Ghorbani ¹ , Sina Beyraghi ² , Javad Shabanpour ³ , Mir Emad Lajevardi ⁴ , Vahid Nayyeri ⁵ , Pai-Yen Chen ⁶ , Omar M. Ramahi ⁷ ¹ Iran University of Science and Technology, ² Pompeu Fabra University, ³ Aalto University, ⁴ Islamic Azad University, South Tehran Branch, ⁵ The University of Illinois Chicago, ⁶ University of Waterloo	EuMC23-4 Ultra-stable tunable THz system for 6G communication based on photonics Taro Eichler ¹ , Wilhelm Keusgen ² , Rafal Wilk ³ , Thomas Puppe ⁴ ¹ Rohde & Schwarz GmbH & Co. KG, ² TU Berlin, ³ TOPTICA Photonics
15:40 – 16:00	EuMC/EuRAD03-5 Beam Space MIMO Radar Using Butler Matrices for Transmit and Receive Beamforming Reinhard Feger ¹ , Christoph Dutzler ² , Andreas Stelzer ³ ¹ Johannes Kepler University Linz	EuMC22-5 Auto-Induced, Radiofrequency, Downlink Exposure Focused at the Human Ear Hanne Herssens ¹ , Arno Thielen ² ¹ Ghent University-imec	EuMC23-5 Photonics Assisted Analog-to-Digital Conversion of Wide-Bandwidth Signals by Orthogonal Sampling Younus Mandalawi ¹ , Janosch Meier ² , Mohamed I. Hosni ³ , Karanveer Singh ⁴ , Souvaraj De ⁵ , Evans Baidoo ⁶ , Thomas Schneider ⁷ ¹ TU Braunschweig

WEDNESDAY 16:00 – 18:20

Poster presenters
will be ready around
their stands by 16:00.

Exhibition Hall

EuMC24

EuMC Poster 2

Chair: Amelie Hagelauer¹

¹TUM

EuMC24-1

Experimental Demonstration of a High Capacity THz-Wireless P2MP Transmission System

Oliver Stiewe¹, Robert Eischner¹, Thomas Merkle¹, Kalyan Das¹, Stefan Weide¹, Colja Schubert¹, Ronald Freund¹

¹Fraunhofer Heinrich Hertz Institute, ²Fraunhofer Institute for Applied Solid State Physics (IAF)

EuMC24-5

Cylindrical Luneburg Lens Equipped with Conformal Graphene Strip as Efficient THz Absorber

Iryna Mikhailikova¹, Sergii Dukhopelnikov¹

¹V. N. Karazin Kharkiv National University

EuMC24-9

Evaluation of a Ku-Band Phased Array Performances with Cosimulation Including Measurements

Huan Nguyen¹, Julien Lintignat¹, Cyrille Menuet¹, Clement Hallepee¹, Marc Thévenot¹

¹XLIM - University of Limoges

EuMC24-2

On Solving Higher Order Volume-Surface Integral Equations for Composite Conductor and Anisotropic Media Structures

Zhi-peng Zhang¹, Qiang-Ming Cai¹, Yong Li¹

¹Yun Micro Electronics Co., Ltd, ²Southwest University of Science and Technology, ³Yun Micro Electronics Co., Ltd

EuMC24-6

Numerical Modeling and Simulation of Large Transmitarrays Antennas for X and Ka Band Applications

Alessandro Henrique De Oliveira Cabral Junior¹, André Barka¹, Hamza Kaouach¹

¹ONERA & Laplace Laboratory, ²ONERA, ³LAPLACE, Université de Toulouse, CNRS

EuMC24-10

Mobile Robots Design for Industrial Applications in Private 5G Networks: Essential Factors to Consider

Ying Rao Wei¹, Jayabalaji Sathiyamoorthi¹, Mahib Rahman¹, Piotr Janik¹

¹Intel Deutschland GmbH

EuMC24-3

Extracting Curvature Information From Low Fidelity Mesh for Electromagnetic Ray-Tracing Simulations in Automotive Scenarios

Mohannad Saïfo¹, Alexander Ioffe¹, Cai Xiuzhang¹, Markus Stefer¹, Markus Clemens¹

¹Bergische Universität Wuppertal, ²APTIV services deutschland GmbH, ³APTIV Services US LLC, USA

EuMC24-7

Determination of Manufacturing Tolerances using Uncertainty Quantification for the Realization of a Dual Circularly Polarized Elliptical Feed Horn

Mustafa Murat Bilgic¹, Peter Meincke¹, Tonny Rubæk¹

¹TICRA

EuMC24-11

Compact Millimeter-Wave Filter Fed by SIW with BC-CSRRs for Optimal Suppression

Yiqiu Liang¹, Liyu Zhu¹, Zhiqiang Yu¹, Jianyi Zhou¹

¹Southwest University

EuMC24-4

Switched-Mode Power Supply Impact on a Bluetooth Low Energy Receiver Inside a Micro-controller

Pierre Malbec¹, Jean-Daniel Arnould¹, Christian Voltaire¹, Jean-Marc Duchamp¹, David Chesneau¹

¹Univ. Grenoble Alpes, TIMA, ²Univ. Lyon, Laboratoire Ampère, ³Univ. Grenoble Alpes, G2ELab, ⁴STMicroelectronics

EuMC24-8

Orthogonal Linear Polarization Dependent Bifunctional Meta-Mirror / Meta-Lens Antenna for Millimeter-Wave Applications

Suchitra Tiwari¹, Amit Kumar Singh¹, Ankit Dubey¹

¹INDIAN INSTITUTE OF TECHNOLOGY JAMMU, ²Indian Institute of Technology Patna

WEDNESDAY 16:40 – 18:20

ROOM

Alpha 5

EuRAD05

High-Resolution Radar and Imaging

Chair: Michael Antoniou¹

Co-Chair: Jacco de Wit²

¹University of Birmingham, ²TNO

16:40
-
17:00

EuRAD05-1
Innovations in Modulation and Processing for Perception Radar: Improving Interference Mitigation and Enabling High-Resolution Imaging

Noam Arkind¹

INDUSTRIAL KEYNOTE

¹Arbe

17:00
-
17:20

EuRAD05-2
Nearfield Multiple-Input Multiple-Output Inverse Synthetic Aperture Radar for High-Resolution Imaging of Large Objects

Marius Brinkmann¹, Gerhard F. Hamberger¹, Thomas F. Eibert¹

¹Rohde & Schwarz GmbH & Co. KG, ²Technical University of Munich

17:20
-
17:40

EuRAD05-3
Investigation on Internal Wall Defects of Pipes Using FMCW Radar Imaging Methods

Irwin Barengolts¹, Jochen Altholz¹, Robin Julian Schmitz¹, Ilona Rolfes¹, Jan Barowski¹

¹Ruhr University Bochum

17:40
-
18:00

EuRAD05
Microwave Radar Imaging System for Industrial Applications

Mark Eberspächer¹

INDUSTRIAL KEYNOTE

¹Balluff GmbH

18:00
-
18:20

EuRAD05-5
An Adaptive Threshold-Based Unambiguous Robust Doppler Beam Sharpening Algorithm for Forward-Looking MIMO Radar

sen yuan¹, Francesco Fioranelli¹, Alexander Yarovoy¹

¹TU Delft

Beta 2

EuMC25

Beamsteering Arrays and Reconfigurable Intelligent Surfaces

Chair: Stefania Monni¹

Co-Chair: Simona Bruni²

¹TNO Defense, Security and Safety, ²IMST GmbH

EuMC25-1
Modeling Integrated Antennas and Unisolated High-Power Amplifiers in Infinite Scanning Arrays

Martijn de Kok¹, Stefania Monni², Marc van Heijningen², Alessandro Garufo¹, Peter de Hek², Bart Smolders¹, Ulf Johansson¹

¹Eindhoven University of Technology, ²TNO Defense, Safety and Security

EuMC25-2
An AI-Based Model for Smart Control of High-Mobility Phased Arrays

Arman Bordbar¹, Luigi Boccia¹, Luca Catarinucci², Giandomenico Amendola¹, Riccardo Colella²

¹University of Calabria, ²University of Salento

EuMC25-3
Approximating the Performance of a 28 GHz Corrugated Horn Antenna with an 8x8 Time-Modulated Array

Ricardo A. M. Pereira¹, Enrico Fazzini², Alessandra Costanzo², Diego Masotti¹, Nuno Borges Carvalho¹

¹Instituto de Telecomunicacoes - Universidade de Aveiro, ²DEI "Guglielmo Marconi", University of Bologna

EuMC25-4
Nonlinear Modelling of Steerable Antenna Array by Ferroelectric Capacitors Based on Nanoscale Layers of HfZrO

Simone Trovarello¹, Alessandra Di Florio Di Renzo¹, Martino Aldrigo¹, Diego Masotti¹, Mircea Dragoman², Alessandra Costanzo²

¹University of Bologna, ²National Institute for Research and Development in Microtechnologies - IMT Bucharest

EuMC25-5
A Miniaturized 1-bit Reflective Unit Cell for Reconfigurable Intelligent Surface

Jiexi Yin¹, Yueheng Li¹, Thomas Zwick¹

¹Karlsruhe Institute of Technology (KIT) / Institute of Radio Frequency Engineering and Electronics (IHE)

Beta 3/4

EuMC/EuRAD04

Focused Session
Joint Communication and Radar Sensing - A Step Towards 6G Part 2

Chair: Aydin Sezgin¹

Co-Chair: Reiner S. Thomä²

¹Ruhr-Universität Bochum, ²Technische Universität Ilmenau

EuMC/EuRAD04-1
Map Fusion and Heterogeneous Objects Tracking in Joint Sensing and Communication Networks

Elia Favarelli¹, Elisabetta Matricardi¹, Lorenzo Pucci¹, Enrico Paolini¹, Wen Xu¹, Andrea Giorgetti¹

¹University of Bologna, ²Huawei Technologies Dusseldorf GmbH

EuMC/EuRAD04-2
Reinforcement Learning for Cognitive Integrated Communication and Sensing Systems

Aya Ahmed¹, Leila ghassemi¹, Stefano Fortunati¹, Aydin Sezgin¹

¹Ruhr-Universität Bochum, ²Polytechnic Institute of Advanced Science (IPSA), ³CNRS, Univ. Paris-Sud

EuMC/EuRAD04-3
Impact of Blockage on the Sensing Performance Using Distributed MIMO Architecture

Adham Sakhnini¹, Mamoun Guenach¹, André Bourdoux², Sofie Pollin²

¹IMEC and KU Leuven, ²imec

EuMC/EuRAD04-4
Radar-Sensing Based on Non-Contiguous OFDM Signals Using Compressed Sensing

Andreas Bathelt¹, Ruben Thill¹

¹Fraunhofer FHR (Fraunhofer Institute for High Frequency Physics and Radar Techniques FHR)

EuMC/EuRAD04-5
Radar Waveform Design for Sensing and Communications Coexistence

Robin Amar¹, Ehsan Raei¹, Mohammad Alaei-Kerahroodi¹, Bhavani Shankar M.R.¹

¹SnT

Beta 5

EuMC26

Field Theory and Numerical Techniques

Chair: Alessandro Galli¹

Co-Chair: Christian Damm²

¹Sapienza University of Rome, ²Ulm University

EuMC26-1
A Fast Physical Optics Framework for Optimizing Quasi Optical Millimeter Wave Measurement Setups

Tobias Körner¹, Jochen Altholz¹, Steffen Gerling¹, Jan Barowski¹, Christian Schulz¹, Ilona Rolfes¹

¹Ruhr University Bochum

EuMC26-2
Efficient Antenna Pattern Sampling using Complex Source Beams for Millimeter Wave Short Range Scenarios

Steffen Gerling¹, Tobias Körner¹, Christian Schulz², Jan Barowski¹, Ilona Rolfes¹

¹Ruhr-University Bochum, Germany, ²Ruhr University Bochum, ³Ruhr-University Bochum

EuMC26-3
An Efficient WLP-Based Method with Operator Splitting Technique for Solving Wave Equation

Jie Li¹, Min Tang¹, Junta Mao¹

¹Shanghai Jiao Tong University

EuMC26-4
Diffraction Radiation Analysis of Finite Graphene-Covered Nanowire Grating Excited by Electron Beam

Daria Herasymova¹

¹Institute of Radio-Physics and Electronics NASU

EuMC26-5
Emission Frequencies and Thresholds for Microsize Graphene Strip Grating Laser on Gain Substrate

Fedir Yevtushenko¹, Sergii Dukhopelnikov¹

¹Institute of Radio-Physics and Electronics NASU, ²Institute of Radio-Physics and Electronics NASU

WEDNESDAY 16:40 - 18:20

ROOM	Beta 6	Beta 7	Beta 8/9
	EuMC/EuRAD05 AESA & MIMO Antenna Technology Chair: Stephen Harman ¹ Co-Chair: Matthias Weiss ² ¹ THALES Defense Missions Systems, ² Fraunhofer FHR	EuMC27 Microwave Sensing Techniques for Biological Materials Chair: Katia Grenier ¹ Co-Chair: Michal Cifra ² ¹ LAAS-CNRS, ² Institute of Photonics and Electronics, Czech Academy of Sciences	EuMC28 Material and Waveguide Measurement Chair: Ilona Piekarz ¹ Co-Chair: Georg Gramse ² ¹ AGH University of Science and Technology, ² Keysight Labs
16:40 - 17:00	EuMC/EuRAD05-1 A Configurable All Digital Antenna Array with a Feed-Forward Efficiency Enhancement Scheme Bulent Sen ¹ ¹ NSPA	EuMC27-1 Broadband Analysis of Sample Permittivity on a Conductor-Backed Coplanar Waveguide Petr Kůrka ¹ , Jaroslav Havlíček ¹ , Daniel Havelka ¹ , Michal Cifra ² ¹ Institute of Photonics and Electronics of the Czech Academy of Sciences	EuMC28-1 Complex Permittivity Extraction of IC-Package Materials beyond 110 GHz by Band-Limited Waveguide-Cavity Measurements Tim Pfähler ¹ , Gerald Gold ¹ , Felix Bachbauer ¹ , Jan Schür ¹ , Martin Vossiek ¹ ¹ Friedrich-Alexander Universität Erlangen-Nürnberg
17:00 - 17:20	EuMC/EuRAD05-2 Evaluation of a Novel Commercial Beamforming Integrated Circuit for a Ka-band AESA Radar Application Sören Harms ¹ , Gabriel El-Arnauti ² , Olaf Saalmann ² , Andreas Fröhlich ² ¹ Eindhoven University of Technology, ² Fraunhofer FHR (Fraunhofer Institute for High Frequency Physics and Radar Techniques)	EuMC27-2 Tapered CPW Transmission Line for Enlarging Dynamic Range of Dielectric Spectroscopy Marie Mertens ¹ , Raphaël Trouillon ² , Ke Wu ³ , Bart Nauwelaers ⁴ , Tomislav Markovic ⁵ , Dominique Schreurs ⁶ ¹ KU Leuven, ² Polytechnique Montreal, ³ University of Zagreb	EuMC28-2 An Open Hemispherical Resonant Cavity for Relative Permittivity Measurements of Fluid and Solid Materials at mm-Wave Frequencies Gabriele Federico ¹ , Diego Caratelli ² , Bart Smolders ³ , Ad Reniers ⁴ ¹ Eindhoven University of Technology - TU/e, ² The Antenna Company, ³ Eindhoven University of Technology
17:20 - 17:40	EuMC/EuRAD05-3 Analysis and Simulation of a Coherent FMCW Lidar-Photonic Radar Combined Sensor System for Large Aperture Phased Array MIMO Stephan Kruse ¹ , Marc-Michael Meinecke ² , Pascal Kneuper ³ , Tobias Schwabe ⁴ , Heiko Gustav Kurz ⁵ , Christoph Scheytt ⁶ ¹ Paderborn University, ² Volkswagen	EuMC27-3 Fully 3D-printed Microfluidic Substrate Integrated Waveguide based Sensor for in Vitro Diagnostics of Diabetes Abdelhak Hamid Allah ¹ , Guy Ayissi Eyebé ² , Frederic Domingue ³ ¹ Université du Québec à Trois-Rivières	EuMC28-3 Waveguide Measurements of Highly Anisotropic Graphene Augmented Inorganic Nanofibers Nikolaos Xenidis ¹ , Serguei Smirnov ² , Aleksandra Przewłoka ³ , Aleksandra Krajewska ⁴ , Dmitri V. Lioubtchenko ⁵ , Joachim Oberhammer ⁶ ¹ KTH Royal Institute of Technology, Stockholm, Sweden, ² CENTERA Laboratories, Institute of High Pressure Physics PAS, ³ KTH Royal Institute of Technology
17:40 - 18:00	EuMC/EuRAD05-4 Analysis of 2D CA-CFAR for DDMA FMCW MIMO Radar Minh Nguyen ¹ , Reinhard Feger ² , Thomas Wagner ³ , Andreas Stelzer ⁴ ¹ Johannes Kepler University Linz	EuMC27-4 Microfabricated Capacitive Microwave Biosensor for Label-free Escherichia Coli Bacteria Detection Ilona Piekarz ¹ , Jakub Sorocki ² , Sabina Gorska ³ , Krzysztof Wincza ⁴ , Sławomir Gruszczynski ⁵ ¹ AGH University of Science and Technology, ² Hirsfeld Institute of Immunology and Experimental Therapy, Polish Academy of Sciences	EuMC28-4 Comparison of VNA and TDS Measurements for Material Characterization Using a Balanced-type Circular Disk Resonator Yuto Kato ¹ , Masaichi Hashimoto ² , Eiji Kato ³ , Akira Kuwahara ⁴ , Hiroyuki Shiotsuka ⁵ ¹ National Institute of Advanced Industrial Science and Technology (AIST), ² Advantest Corporation
	EuMC/EuRAD05-5 A Scalable X-Band Overlapped Subarray Beamformer for Linear Phased Array Antennas Yasin Ozer ¹ , Selçuk Pakar ² ¹ AELSAN, ² ITU		EuMC28-5 Comparison of TRL Calibration Standards and Techniques for Waveguide S-parameter Measurements up to Terahertz Frequencies James Skinner ¹ , James Campion ² , Nick Ridler ³ ¹ National Physical Laboratory (NPL), Teddington, ² TeraSI AB, Sweden

THURSDAY 09:00 - 10:40

ROOM	Alpha 6	Beta 2	Beta 3/4	Beta 5
	EuRAD06 Focused Session Automotive PMCW Radars Part 1 Chair: André Bourdoux ¹ Co-Chair: Benjamin Nuss ² ¹ imec, ² Karlsruhe Institute of Technology	EuMC29 MHz to GHz Wireless Data and Power Transfer Systems Chair: Jasmin Grosinger ¹ Co-Chair: Alessandra Costanzo ² ¹ Graz University of Technology, ² Università di Bologna	EuMC/EuRAD06 Innovative Designs for Radar, Satcom and mm-Wave Antennas Chair: Frédéric Giancesello ¹ Co-Chair: Diego Caratelli ² ¹ STMicroelectronics, ² Eindhoven University of Technology (TU/e)	EuMC31 Calibration and deembedding Chair: Chong Li ¹ Co-Chair: Xiaobang Shang ² ¹ University of Glasgow, ² National Physical Laboratory (NPL)
09:00 - 09:20	EuRAD06-1 Pi/K Phase Modulation for Large Scale MIMO Digitally Modulated Radars in Automotive Applications Marc Bauduin ¹ , André Bourdoux ² ¹ imec	EuMC29-1 Impact of 2-ASK Back-Scattering Modulation on Harvesting Efficiency for 5.8 GHz Batteryless Transponder based on a Rectenna Array Marco Passafiume ¹ , Giovanni Collodi ¹ , Monica Righini ² , Alessandro Cidonali ³ ¹ University of Florence, Italy	EuMC/EuRAD06-1 Active Phased Arrays for 5G and 6G Mobile Communication at Millimeterwaves Matthias Geissler ¹ INDUSTRIAL KEYNOTE ¹ IMST GmbH	EuMC31-1 VNA Calibration using Coaxial Air Lines with Two Plug Connectors Frauke Gellersen ¹ , Karsten Kuhlmann ¹ , Florian Rausche ² ¹ Physikalisch-Technische Bundesanstalt (PTB)
09:20 - 09:40	EuRAD06-2 Doppler Ambiguity Resolution for a PMCW Automotive Radar System Moritz Kahlert ¹ , Tai Fei ² , Claas Tebruegge ³ , Markus Gardliff ⁴ ¹ HELLA GmbH & Co. KGaA, ² Brandenburg University of Technology	EuMC29-2 Ultra-Thin RF Wireless Power Transmitter Alois Friedberger ¹ , Thomas Multerer ² , Aygün Baltacı ³ , Jan Tepper ⁴ , Dominic Schupke ⁵ ¹ Airbus	EuMC/EuRAD06-2 Frequency Scanning X-Band Antenna for 3D Radar Systems Stanislav Sekretarov ¹ , Dmytro Vavriv ² , Volodymyr Vynogradov ³ , Andriy Kravtsov ⁴ , Ievgen Bulah ⁵ , Vladimir Zolotarev ⁶ ¹ Institute of Radio Astronomy of the National Academy of Sciences of Ukraine, ² Institute of Radio Astronomy of the National Academy of Sciences of Ukraine	EuMC31-2 S-Parameters De-Embedding at Cryogenic Temperature using One Reflect Standard Marie Mbeutcha ¹ , Frank Schäfer ² , Patrick Pütz ³ , Gundolf Wieching ⁴ ¹ Max Planck Institute for Radio Astronomy
09:40 - 10:00	EuRAD06-3 Radar Characterization of a Broadband 77 GHz IQ Transceiver Chipset in 22 nm FDX CMOS Rossen Michev ¹ , Gregor Tretter ² , Martin Fink ³ , Jürgen Hasch ⁴ , Christian Waldschmidt ⁵ ¹ Robert Bosch GmbH, ² University of Ulm	EuMC29-3 Six-port Technology for Passive Millimeter-Wave Identification Systems Chaouki Hannachi ¹ , Matthieu Egels ² , Philippe Pannier ³ , Ronan Sauleau ⁴ ¹ Aix-Marseille University, ² Institut National de la Recherche Scientifique (INRS)	EuMC/EuRAD06-3 Low-profile and High-gain Dual-Linearly Polarized Offset Reflector Antenna at W-Band Thi-Kim-Ngan Nguyen ¹ , David González-Ovejero ² , Ronan Sauleau ³ ¹ UNIVERSITÉ DE RENNES 1-UMR CNRS 6164 - IETR	EuMC31-3 RF Performances and De-Embedding Techniques of Passive Devices in 3D Homogeneous Integration at Sub-THz Alexandre Oliveira ¹ , Olivier Valorge ² , Christophe Dubarry ³ , Yannick Roelens ⁴ , Mohammed Zakoune ⁵ , Jose Lugo-Alvarez ⁶ ¹ CEA - LETI, ² IEMN - CNRS
10:00 - 10:20	EuRAD06-4 Long Range High Resolution Imaging Radar with Digital Code Modulation (DCM) and Sparse Array Murtaza Ali ¹ , Lun Chen ² , S. Gokhun Tanyer ³ , Jingning Tang ⁴ , Andrew Graff ⁵ , Arunesh Roy ⁶ ¹ Uhnder, ² University of Victoria, ³ University of Texas at Austin	EuMC29-4 Radiation Suppression Regime in Wireless Power Transfer using Two Loop Antennas Nam Ha-Van ¹ , Constantin R. Simovski ² , Francisco S. Cuesta ³ , Prasad Jayathurathnage ⁴ , Sergei A. Tretyakov ⁵ ¹ Aalto University	EuMC/EuRAD06-4 A Novel Automotive Palmtree Antenna for 5G Inside Scarabeus Ring Antennas for Satellite Reception Emanuel Panholzer ¹ , Stefan Lindenmeier ² ¹ Universität der Bundeswehr München	EuMC31-4 Influence of Dimensional and Material Parameters and their Uncertainties on Calculable Offset Shorts Andreas Schramm ¹ , Frauke Gellersen ² , Karsten Kuhlmann ³ ¹ Physikalisch-Technische Bundesanstalt (PTB)
10:20 - 10:40	EuRAD06-5 Enabling Joint Radar-Communication Operation in Shift Register-Based PMCW Radars Lucas Giroto de Oliveira ¹ , Elizabeth Bekker ² , Axel Diebold ³ , Benjamin Nuss ⁴ , Theresa Antes ⁵ , Yueheng Li ⁶ , Akanksha Bhutani ⁷ , Thomas Zwick ⁸ ¹ Karlsruhe Institute of Technology	EuMC29-5 Detection of Vulnerable Road Users based on Spread Spectrum Modulated Millimeter Wave Tags Antonio Ramon Lázaro Guillén ¹ , Ramon Villarino ² , Marc Lázaro Martí ³ , David Girbau Sala ⁴ ¹ Rovira and Virgili University	EuMC/EuRAD06-5 Circular Polarized Compact Dual Antenna set for L-Band Space Applications Azat Meredov ¹ , Stefan Lindenmeier ² ¹ University of the Bundeswehr Munich	EuMC31-5 Interlaboratory Investigation of On-wafer S parameter Measurements from 110 GHz to 1.1 THz X. Shang ¹ , N. Ridler ² , U. Arz ³ , G. N. Phung ⁴ , I. Roch-Jeune ⁵ , G. Ducournau ⁶ , K. Haddadi ⁷ , T. Flisgen ⁸ , R. Doerner ⁹ , D. Allal ¹⁰ , D. Jayasankar ¹¹ , J. Stake ¹² , R. Schmidt ¹³ , G. Fisher ¹⁴ , F. Mubarak ¹⁵ ¹ NPL, ² PTB, ³ Univ. de Lille, ⁴ FBH, ⁵ LNE, ⁶ Chalmers Univ. of Technology, ⁷ Keysight Technologies, ⁸ FormFactor, ⁹ VSL

THURSDAY 09:00 - 10:40

ROOM

Beta 6

EuMC32

Beam-Steering and Beam-Switching Array Antennas

Chair: Bela Brian Szendrenyi¹

Co-Chair: Yi Wang²

¹Advantest America Inc., ²University of Birmingham

09:00
-
09:20

EuMC32-1

Gapwaves Waveguide Technology Comes of Age

Carlo Bencivenni¹, Abbas Voosogh¹, Abolfazl Haddadi¹

INDUSTRIAL KEYNOTE

¹Gapwaves AB

09:20
-
09:40

EuMC32-2

A 64-Element Ultra-Wideband 23-46 GHz Tx/Rx 5G Phased Array with 50 dBm Peak EIRP and 2.4 Gb/s 64-QAM Operation

Shufan Wang¹, Tian Liang¹, Abdulrahman Alhamed¹, Gabriel M. Rebeiz²

¹University of California, San Diego, ²PSATRI, King Saud University

09:40
-
10:00

EuMC32-3

Multibeam Metasurface Antenna Based on a Single Substrate Layer and One Feeding Port For Millimeter Wave Applications

Mohammed Arif¹, Adrien Guthi², Muh-Dey Wei¹, Dirk Heberling¹, Renato Negra¹

¹Chair of High Frequency Electronics, RWTH Aachen University, ²Institute of High Frequency Technology - RWTH Aachen University

10:00
-
10:20

EuMC32-4

A Wideband 16x16 Butler Matrix for Millimeter-Wave Beam-Switching Applications

Mehri Borhani Kakhki¹, Ahmed Shehata Abdellatif¹, Hari Krishna Pothula¹, David Wessel¹

¹Huawei Technologies Canada Co.

10:20
-
10:40

EuMC32-5

Radar-Based Human Activity Recognition with Range-distributed Time-Doppler Sparse Point Cloud and Multi-Channel PointNet

Beiran Wang¹, Chuanwei Ding¹, Haoyu Chen¹, Hong Hong¹, Xiaohua Zhu¹

¹Nanjing University of Science and Technology

Beta 7

EuMC33

Satcom and Millimeter-Wave Antennas

Chair: Arne F. Jacob¹

Co-Chair: Daniel Segovia-Vargas²

¹Hamburg University of Technology, ²Universidad Carlos III de Madrid, Leganes, Madrid, Spain

EuMC33-1

New Design of a Bidirectional K- and Ka-Band Antenna Array for Multiple Beam-Steering

Engelbert Tyroller¹, Andreas Krause¹, Stefan Lindenmeier¹

¹Institut für Hoch- und Höchstfrequenztechnik der Universität der Bundeswehr München

EuMC33-2

A Planar Polarization-Agile Array with Shared Aperture at K/Ka-Band

Noah Stielck¹, Kevin Erkelenz², Alexander Kölpin¹, Arne F. Jacob¹

¹Hamburg University of Technology

EuMC33-3

A Compact Wide-Scanning Connected-Slot Array in a Standard PCB for Ku/Ka-Band Applications

Syrine Hidri¹, Francesco Foglia Manzillo¹

¹CEA - LETI

EuMC33-4

Silicon parallel-plate waveguide with controlled boundaries for broadcast applications in WiNoC architecture.

Bryan Treguer¹, Thierry Le Gougec¹, Pierre-Marie Martin¹, Rozenn Allanic¹, Cédric Quendo¹

¹Lab-STICC - UBO Brest

EuMC33-5

Surface Wave Mitigation Based on Finite EBG Structures for W-Band Radar Millimeter-Wave MIMO Antenna Arrays

Riana Helena Geschke¹, Carlos Sempere Sempere Chaves¹, Christian Krebs¹

¹Fraunhofer FHR (Fraunhofer Institute for High Frequency Physics and Radar Techniques FHR)

Beta 8/9

EuRAD07

Emerging Industrial Applications

Chair: Felix Yanovsky¹

Co-Chair: Fabian Friederich²

¹National Aviation University, Kyiv, Ukraine, ²Fraunhofer Institute for Industrial Mathematics ITWM

EuRAD07-1

Challenges and Solutions in Radar Device Developments for Industrial Applications

Christoph Schmits¹

INDUSTRIAL KEYNOTE

¹KROHNE Innovation GmbH

EuRAD07-2

Non-Destructive Characterization of Electrode Films for Lithium-Ion Battery Cells with an Optoelectronic Terahertz FMCW Radar

Shiva Mohammadzadeh¹, Andreas Keil¹, Joachim Jonuschett¹, Fabian Friederich²

¹Fraunhofer ITWM

EuRAD07-3

Analysis of Range-Doppler Radar Echos for Condition Monitoring in Industrial Processes

Robin Julian Schmitz¹, Michael Vogt², Maximilian Roitzheim¹, Markus Hammes¹, Christian Schulz², Jan Barowski¹, Ilona Roltes¹

¹Ruhr-University Bochum, Bochum, Germany, ²Ruhr-University Bochum, Bochum, Germany/ KROHNE Messtechnik GmbH, Duisburg, ³KROHNE Messtechnik GmbH, Duisburg

EuRAD07-4

Two Fully Integrated SiGe Radar Sensors for the Detection of Particle Streams Using Dual-Frequency Measurements

Kennet Braasch¹, Daniel Bruhn¹, Alexander Teplyuk¹, Leve Freiwald¹, Phillip Durdaut¹, Florian Vogelsang¹, Nils Pohl¹, Michael Höft¹

¹Christian-Albrechts-Universität zu Kiel, ²Aerosense GbR, ³Ruhr-Universität Bochum

EuRAD07-5

FFT Based Angle Detection of Fiber Glass Layers

André Froehly¹, Bibash Thapaliya¹, Reinhold Herschel¹, Patrick Wallrath¹

¹Fraunhofer Institute for High Frequency Physics and Radar Techniques (FHR)

THURSDAY 10:40 - 13:00

Exhibition Hall

EuMC/EuRAD07

EuMC/EuRAD Poster

Chair: Marlene Harter¹

Co-Chair: Amelie Hagelauer²

¹Offenburg University of Applied Sciences, ²Fraunhofer EMFT

EuMC/EuRAD07-1

IEEE 802.15.4z UWB Angle of Departure Tag Design for Indoor Positioning

Sumin Han¹, HOWON YO¹, Hosung Choo², ByungJun Jang¹

¹Kookmin University, ²Hongik University

EuMC/EuRAD07-5

Time-Frequency Synchronization for CaCS-Based Radar Systems in Interference Scenarios

Mohamad Basim Alabd¹, Joel Dittmer¹, Benjamin Nuss¹, Yueheng Li¹, Lucas Giroto de Oliveira¹, Axel Diewald¹, Thomas Zwick¹

¹Karlsruhe Institute of Technology (KIT)

EuMC/EuRAD07-9

Experimental Investigation of Millimeter-Wave 3D Image Projection Using Dielectric Lens for Security Application

Arie Setiawan¹, Naruto Yonemoto², Hitoshi Nohmi², Hiroshi Murata³

¹Mie University, Japan, ²Electronic Navigation Research Institute, National Institute of Maritime, Port, and Aviation Technology, ³Alouette Technology Inc.

EuMC/EuRAD07-2

A Non-Linear Transmission Line with Secondary Soliton Decimation

Tyler Kelley¹, Stephen Pancrazio¹, Pouya Emani¹, Nhat Tran¹, Anh-Vu Pham¹

¹University of California Davis (UC Davis)

EuMC/EuRAD07-6

Design and Evaluation of a Joint Communication and Sensing System Using FMCW-Radar and FSK in V-Band

Samira Faghif-Naini¹, Sebastian Peters¹, Thomas Kurin¹, Torsten Reilbrand¹, Robert Weigel¹

¹Friedrich-Alexander Universität Erlangen-Nürnberg

EuMC/EuRAD07-10

Design of a Contactless Vital-Signal Sensor based on Six-Port Technology and Experiment of WiFi Interference

Chun-Yu Fan¹, Adham Karakish¹, Muh-Dey Wei¹, Renato Negra¹

¹RWTH Aachen University, ²Fraunhofer FHR

EuMC/EuRAD07-3

Monopulse Angle Measurement with Orbital Angular Momentum Charge Distribution

Shikang Li¹, Meng Zhang¹, Xianzhe Xu¹, Rentuo Tao¹, Yawei Chen¹

¹Key Laboratory of Intelli Sense Technology, CETC

EuMC/EuRAD07-7

Modeling, Analysis and Optimization of Low-Altitude Air Traffic Control in Joint Radar and Communication Networks

Xianzhe Xu¹, Shikang Li¹, Rentuo Tao¹, Yawei Chen¹

¹Nanjing Research Institute of Electronics Technology

EuMC/EuRAD07-4

A Quantized Lobes Reduction Method based on Thinned Strategy for Overlapped Subarray Architecture

Hui Zeng¹, Zhenhai Xu¹, Gongqing Yang¹, Wei Dong¹, Shun ping Xiao¹

¹National University of Defense Technology

EuMC/EuRAD07-8

An Initialization Method for Ultra-Precise Holographic Wireless Local Positioning

Stefan Brückner¹, Erik Sippel¹, Patrick Gröschel¹, Markus Hehn¹, Martin Vossiek¹

¹Institute of Microwaves and Photonics, FAU, Erlangen-Nürnberg, Germany

Poster presenters
will be ready around
their stands by 10:40.

THURSDAY 11:20 - 13:00

ROOM	Alpha 6	Beta 2	Beta 3/4	Beta 5
	EuRAD08 Focused Session Automotive PMCW Radars Part 2 Chair: André Bourdoux ¹ Co-Chair: Alessio Filippi ² ¹ imec, ² NXP Semiconductors	EuMC34 Wearable and Flexible Solutions for Energy Harvesting Chair: Thomas Ußmüller ¹ Co-Chair: Alessandra Costanzo ² ¹ University of Innsbruck, ² Università di Bologna	EuMC35 Innovative Concepts for Radar, Satcom and mm-Wave Antennas Chair: Matthias Geissler ¹ Co-Chair: Laure Huitema ² ¹ IMST GmbH, ² XLIM - CNRS - Université de Limoges	EuMC36 Channel Modelling and Measurement Chair: Jakob Sorocki ¹ Co-Chair: Reiner S. Thomä ² ¹ AGH University of Science and Technology, ² Technische Universität Ilmenau
11:20 - 11:40	EuRAD08-1 The Impact of Transceiver Non-linearity in PMCW Radar using Polyphase Coded Sequences Daan Rosenmuller ¹ , Bas van de Ven ¹ , Kostas Doris ¹ , Georgi Radulov ¹ , Marion Matters ¹ , Erwin Janssen ¹ ¹ NXP Semiconductors Eindhoven, ² Eindhoven University of Technology (TU/e)	EuMC34-1 A Flexible Wearable Rectenna Using AMC for WBAN Applications Elie Zaraket ¹ , Yéro Dia ¹ , Ludvine Fadel ¹ , Laurent Oyhenart ¹ , Valérie Vignéras ¹ ¹ Laboratoire IMS, CNRS UMR, 5218, Université de Bordeaux, Bordeaux INP, Talence Cedex, France	EuMC35-1 Challenges and Outlook of the Overall Front-End of Future SATCOM Missions Based on Active Array Antennas Jean-Philippe Frayssé ¹ INDUSTRIAL KEYNOTE ¹ Thales Alenia Space	EuMC36-1 Ray-Optical Modeling of Wireless Coverage Enhancement Using Engineered Electromagnetic Surfaces: Experimental Verification at 28 GHz Yvo de Jong ¹ , Reza Chaharmir ¹ , Shailesh Raut ¹ , Donald McLachlan ¹ , Ming Zhang ¹ , Gary Bedrosian ¹ , Mendel Schmiedekamp ¹ , James DeLancey ¹ , Ruth Silber Belmonte ² ¹ Communications Research Centre Canada, ² Remcom
11:40 - 12:00	EuRAD08-2 Waveform Design for 4D-Imaging mmWave PMCW MIMO Radars with Spectrum Compatibility Nazila Karimian Sichani ¹ , Mohammad Alaei-Kerahroodi ¹ , M. R. Bhavani Shankar ¹ , Esfandiari Mehrshahi ¹ , Seyyed Ali Ghorashi ¹ ¹ Shahid Beheshti University, ² University of Luxembourg, ³ University of East London	EuMC34-2 Design of Compact and High-Efficiency Broadband Rectifier With Harmonic Suppression Transferring for Biomedical Implants Applications Gia Thang Bui ¹ , Dang-An Nguyen ¹ , Chulhun Seo ¹ ¹ Soongsil University	EuMC35-2 Filtenna Array Design via a Lossy Coupled-Resonators Filter Approach Matteo Oldoni ¹ , Gian Guido Gentili ¹ , Fabien Seyfert ¹ , Giuseppe Macchiarella ¹ , Cristina D'Asta ¹ ¹ Politecnico di Milano, ² HighFSolutions	EuMC36-2 Measurement and Statistics of Rain Attenuation on Terrestrial Link at 240, 270 and 300 GHz Heejun Park ¹ , Jangsuk Choi ¹ , Hyunji Bae ¹ , Jaeho Seok ¹ ¹ National Radio Research Agency(RRA)
12:00 - 12:20	EuRAD08-3 Mismatched Filters for High-Velocity Target Detection in PMCW Radars Adham Sakhini ¹ , Marc Bauduin ¹ , André Bourdoux ¹ , Sofie Pollin ¹ ¹ KU Leuven & IMEC, ² imec, Leuven	EuMC34-3 Flexible Textile Antenna for Detection of 5G Bandwidth in Wearable Systems Joana Tavares ¹ , Caroline Loss ¹ , Pedro Pinho ¹ , Helena Alves ¹ ¹ INESC MN, ² Instituto de Telecomunicacoes - Univ. Aveiro, ³ University of Aveiro	EuMC35-3 A Monolithically Polyjet 3-D Printed Millimeter-Wave Quasi-Planar Air-Filled Cavity-Backed Patch Antenna With Enhanced Gain Jianqiu Qin ¹ , Jin Li ¹ , Yueguang Lu ¹ , Sicheng Chen ¹ , Kai-Dong Hong ¹ , Tao Yuan ¹ ¹ Shenzhen University	EuMC36-3 Contactless Flange Made the Sub-THz VNA Calibration and Testing Faster and More Accurate Lingyun Ren ¹ , David Nixt ¹ , Yonghui Shu ¹ ¹ Eravant
12:20 - 12:40	EuRAD08-4 Mutual Interference Mitigation in PMCW Automotive Radar Zahra Esmaeilbeigi ¹ , Arindam Bose ² , Mojtaba Soltanalian ¹ ¹ UIC, ² KMB Telematics, Inc.	EuMC34-4 Flexible Printed Rectenna Based on a 2.45 GHz CPW Rectifier for Energy Harvesting Applications Alassane Sidibe ¹ , Alexandru Takacs ¹ , Samuel Charlot ¹ , Daniela Dragomirescu ¹ ¹ LAAS-CNRS, Université de Toulouse, CNRS, UT3, Toulouse, France, ² LAAS-CNRS, ³ LAAS-CNRS, INSA	EuMC35-4 A Novel Type of 76 GHz Array Antenna Based on Synthesis with Filter Technique Kenichi Iio ¹ , Isao Ohta ² ¹ Furuno Electric Co.Ltd, ² University of Hyogo	EuMC36-4 Complexity Reduction Techniques for a Frame Based Dynamic Ray Tracing Approach Enes Aksoy ¹ , Haroon Khan ¹ , Leszek Raschkowski ² , Lars Thiele ¹ , Slawomir Stanczak ² ¹ Huawei Munich Research Center, ² Fraunhofer Heinrich Hertz Institute
12:40 - 13:00	EuRAD08-5 Joint Design of Binary Probing Sequences and Mismatched Receive Filters for PMCW Radar Ronghao Lin ¹ , Yutao Chen ¹ , Jian Li ² ¹ University of Science and Technology of China, ² University of Florida	EuMC34-5 IR-UWB Reader for Credit Card-Sized NFC Chipless RFID Tag using Asymmetrical Stepped Impedance Resonators Fuminori Sakai ¹ , Koji Wada ¹ , Mitsuo Makimoto ² ¹ Sakura Tech corporation, ² The University of Electro-Communications	EuMC35-5 Dielectric Filled Waveguide Antenna for Air-Borne Application Madhumita Chakravarti ¹ , Anil Chopala ¹ , Asudeb Dutta ¹ ¹ Indian Institute of Technology, Hyderabad, ² Research Centre Imarat, DRDO	EuMC36-5 RCS-Based Quasi-Deterministic Ray Tracing for Statistical Channel Modeling Javad Ebrahimzadeh ¹ , Evgenii Vinogradov ² , Guy Vandenbosch ³ ¹ KULeuven, ² Technology Innovation Institute, ³ KULeuven

THURSDAY 11:20 - 13:00

ROOM	Beta 6	Beta 7	Beta 8/9
	EuRAD09 Machine Learning for Radar Chair: Francesco Fioranelli ¹ Co-Chair: Jacco de Wit ² ¹ TU Delft, ² TNO	EuRAD10 Modelling and Simulation Chair: Piotr Samczyński ² Co-Chair: Fatemeh Norouzian ¹ ¹ University of Birmingham, ² Warsaw University of Technology WUT	EuMC37 Microwave Sensors for Material Measurements Chair: Tuami Lasri ¹ Co-Chair: Ilona Rolfes ² ¹ EMN-University of Lille, ² Ruhr-Universität Bochum
11:20 - 11:40	EuRAD09 Best of Both Worlds: Physics and Machine Learning in Automotive Radar Simulation Alexander Subre ¹ INDUSTRIAL KEYNOTE ¹ Valeo Schalter und Sensoren GmbH	EuRAD10-1 Collaborative Sensing with UWB Radar Kristian Granhaug ¹ INDUSTRIAL KEYNOTE ¹ Novelda AS	EuMC37-1 One-Port CSRR Structure for Dielectric Characterization of Lossy Materials Matko Martinic ¹ , Maede Chavoshi ¹ , Dominique Schreurs ¹ , Tomislav Markovic ² , Bart Nauwelaers ³ ¹ KU Leuven ESAT, ² University of Zagreb, FER
11:40 - 12:00	EuRAD09-1 Machine Learning-Enhanced Gyro mmID-Sensor for Virtual Reality and Motion Tracking Applications Marvin Joshi ¹ , Charles Lynch ¹ , Genaro Soto-Valle ¹ , Ajibayo Adeyeye ¹ , Ryan Bahr ¹ , Manos M. Tentzeris ¹ ¹ Georgia Institute of Technology, ² Nano Dimension	EuRAD10-2 A Beat Signal Processing System with Parabolic Frequency Chirp Radar and Computation-in-Memory Kazuhide Higuchi ¹ , Ken Takeuchi ¹ ¹ The University of Tokyo	EuMC37-2 Microwave Microfluidic Sensor for Detecting Organic and Inorganic Compounds in Water Amir Ebrahimi ¹ , Kamran Ghorbani ¹ ¹ RMIT University
12:00 - 12:20	EuRAD09-2 Hardware Deployable Radar Spectrum-based CNN Classifier for Drone Targets Dario Del Gaizo ¹ , Francesco De Palo ¹ , Fabio Cipriani ¹ , Luca Giancane ¹ ¹ KTH - Royal Institute of Technology, ² Rheinmetall Italia S.p.A	EuRAD10-3 Repeatable Wave Data for Sub-THz Radar Marine Target Detection Experiments Dillon Kumar ¹ , Samuel Harris ¹ , Liam Daniel ¹ , Marina Gashinova ¹ , Mikhail Cherniakov ¹ , Edward Hoare ¹ , Anum Pirikani ¹ ¹ University of Birmingham	EuMC37-3 Analytical Design of Phase Variation-Based Dielectric Constant Sensors Zahra Mehrjoo ¹ , Amir Ebrahimi ¹ , Kamran Ghorbani ¹ ¹ RMIT University
12:20 - 12:40	EuRAD09-4 Angle-Equivariant Convolutional Neural Networks for Interference Mitigation in Automotive Radar Christian Oswald ¹ , Mate Toth ¹ , Paul Meissner ² , Franz Pernkopf ¹ ¹ Signal Processing and Speech Communication Laboratory, Graz University of Technology, Austria, ² Infinion Technologies Austria AG	EuRAD10-4 A Simulator for CaCS-based Radar Systems in Multi-User Automotive Scenarios Mohamad Basim Alabd ¹ , Joel Dittmer ¹ , Jean-Pierre Messmer ¹ , Benjamin Nuss ¹ , Yueheng Li ¹ , Johannes Galinsky ¹ , Thomas Zwick ¹ ¹ Karlsruhe Institute of Technology (KIT)	EuMC37-4 High Temperature Probe for Measuring Dielectric Parameters Baptiste HENRIOT ¹ , Jesse Allens TOUYEM TALLA ² , Olivier Tantot ¹ , Nicolas Delhote ¹ , Serge Verdeyme ¹ , Jaona RANDRIANALISOA ¹ , Thierry DUVAUT ¹ , Michaël CHARLES ¹ ¹ Xlim - UMR 7252 - CNRS - Limoges University, ² TheMM/Université de Reims Champagne-Ardenne, ³ CEA Le Ripault
12:40 - 13:00	EuRAD09-5 Generating and Using Synthetic Data for Machine Learning in Personnel Security Screening Scenarios Georg Schnattinger ¹ , Christoph Baur ¹ , Benedikt Huber ¹ ¹ Rohde & Schwarz GmbH	EuRAD10-5 Radar Target Simulator Based on Instantaneous Intra-Chirp FMCW Parameter Estimation Christoph Birkenhauer ¹ , Matthias Kühnlein ¹ , Georg Körner ¹ , Patrick Stief ¹ , Matthias Gareis ¹ , Christian Carlowitz ¹ , Martin Vossiek ¹ ¹ Institute of Microwaves and Photonics (LHFT), Friedrich-Alexander-Universität Erlangen-Nürnberg	EuMC37-5 Characterization of Edible Oils Subjected to Industrial Frying Processes through High Sensitivity Microwave Sensors Jonathan Muñoz-Enano ¹ , Paris Véléz ¹ , Pau Casacuberta ¹ , Lijuan Su ¹ , Ferran Martín ¹ ¹ Universitat Autònoma de Barcelona

THURSDAY 14:20 - 16:00

ROOM	Alpha 6	Beta 2	Beta 3/4	Beta 5
	EuMC/EuRAD08 Microwave Sensing Systems and Components Chair: Thomas Musch ¹ Co-Chair: Kamran Ghorbani ² ¹ Ruhr-Universität Bochum, ² RMIT University	EuMC38 MHz to GHz Components and Sub-Systems for Wireless Data and Power Transfer Chair: Jasmin Grosinger ¹ Co-Chair: Nuno Borges Carvalho ² ¹ Graz University of Technology, ² University of Aveiro / Instituto de Telecomunicações	EuMC39 OTA and Wideband Measurements Chair: Marco Farina ¹ Co-Chair: Paola Russo ¹ ¹ Università Politecnica delle Marche	EuMW07 Special Session India Business Chair: Ramesh Gupta ¹ ¹ Ligado Networks
14:20 - 14:40	EuMC/EuRAD08-1 A Picosecond Pulse Transmission and Reception System for Next Generation Wireless Sensing and Imaging Applications MuhibUr Rahman ¹ , Ke Wu ² ¹ Polytechnique Montreal	EuMC38 Millimeter-Wave Ferrite Components Operating in Rectangular Waveguide Bands from 25 to 400 GHz David Porterfield ¹ INDUSTRIAL KEYNOTE ¹ Micro Harmonics Corporation	EuMC39-1 Comparison of OTA Test Methodologies for Vehicle EIRP Measurements Lukas Berkelmann ¹ , Carsten Monka-Ewe ¹ , Zhichao Chen ¹ , Bert Janssen ¹ ¹ Volkswagen Aktiengesellschaft	EuMW07-1 RF Technology Considerations for Space Based Telecom Networks Ramesh Gupta ¹ ¹ Ligado Networks
14:40 - 15:00	EuMC/EuRAD08-2 Model-Based Sensor Fusion Approach for FMCW Radar Sensors in Non-Destructive Testing Jochen Altholz ¹ , Francesca Schenkel ¹ , Nils Pohl ¹ , Ilona Rolles ¹ , Jan Barowski ¹ ¹ Ruhr-University Bochum, Bochum, Germany	EuMC38-1 Highly Efficient HEMT Rectifier with a Wide Dynamic Range Based on a Hybrid Coupler for Wireless Power Transfer Jinyao Zhang ¹ , Yi Huang ¹ , Jiafeng Zhou ¹ ¹ University of Liverpool	EuMC39-2 An Experimental Study on Efficient Antenna OTA Test Method for Automotive Applications Zhichao Chen ¹ , Lukas Berkelmann ¹ , Carsten Monka-Ewe ¹ , Bert Janssen ¹ ¹ Volkswagen Aktiengesellschaft	EuMW07-2 Medical Applications of Electromagnetics Shiban Koul ¹ ¹ Indian Institute of Technology
15:00 - 15:20	EuMC/EuRAD08-3 Experimental Verification of a Digital Delay Transponder Used as an In-Ice Synthetic Aperture Radar Reference Target Michael Stelzig ¹ , Andreas Benedikter ² , Ralf Horn ¹ , Marc Jäger ¹ , Martin Keller ¹ , Rolf Scheiber ¹ , Niklas Haberberger ¹ , Lena Krabbe ¹ , Gerhard Krieger ¹ , Martin Vossiek ¹ ¹ Friedrich-Alexander-Universität Erlangen-Nürnberg, ² German Aerospace Center (DLR)	EuMC38-3 Backscatter Tag Based on an Actively-Controlled Reflection Amplifier Marc Lázaro Martí ¹ , Antonio Ramon Lázaro Guillén ¹ , Ramón María Villarino Villarino ¹ , David Girbau Sala ¹ ¹ Rovira and Virgili University	EuMC39-3 Deterministic Detection and Vector Band Stitching for the Measurement of 6G Wideband Test Signals Jean-Pierre Teyssier ¹ , Joel Dunsmore ¹ , Nizar Messaoudi ¹ , Jan Verspecht ¹ ¹ Keysight Technologies	EuMW07-3 Wireless Power Transfer Research in India Chinmoy Saha ¹ ¹ Indian Institute of Science and Technology
15:20 - 15:40	EuMC/EuRAD08-4 A 30 kW Peak - 350 W CW Mechanically Controlled Low-Loss X-Band Variable-Ratio 2-way Power Divider using VESPEL [®] Dielectric Material Maurizio Cirillo ¹ , Danio Salimbeni ¹ , Antonio Morini ¹ ¹ Rheinmetall Italia SpA, ² NotOnlyWaves S.r.l.	EuMC38-4 Wireless Radiative Near-Field Links through Wideband Bessel-Beam Launchers Edoardo Negri ¹ , Luca Del Biondo ¹ , Walter Fuscaldo ² , Paolo Burghignoli ¹ , Alessandro Galli ¹ ¹ Sapienza University of Rome, Italy, ² CNR-IMM, Consiglio Nazionale delle Ricerche, Rome, Italy	EuMC39-4 Wideband Cross-Domain Characterization of a W-Band Amplifier MMIC Benjamin Schoch ¹ , Dominik Wrana ¹ , Axel Tessmann ¹ , Ingmar Kallfass ¹ ¹ Institute of Robust Power Semiconductor Systems (ILH) - University of Stuttgart, ² Fraunhofer Institute for Applied Solid State Physics (IAF)	EuMC40-4 A Novel Dual-Wideband Four-Port MIMO Filtenna for Sub-6 GHz 5G Communication Systems Alper Turkelii ¹ , Ali Kursad Gorur ² , Yasemin Altuncu ³ ¹ Neveshir Haci Bektas Veli Univ., ² Neveshir Haci Bektas Veli University, ³ Nigde Omer Halisdemir University
15:40 - 16:00	EuMC38-5 Data Transfer in an Injection-Locked Oscillator Coupled to an External Resonator Franco Ramirez ¹ , Victor Ardila ¹ , Almudena Suarez Rodriguez ² ¹ Universidad de Cantabria	EuMC39-5 Sub-THz/mm-Wave Out-of-Band Distortion Product Measurements: A Hybrid Banded-Broadband Approach Jon Martens ¹ ¹ Anritsu		

THURSDAY 14:20 - 16:00

ROOM	Beta 6	Beta 7	Beta 8/9
	EuMC40 5G and MIMO Antennas Chair: Dirk Heberling ¹ Co-Chair: Ioan E. Lager ² ¹ Institute of High Frequency Technology - RWTH Aachen, ² Delft University of Technology	EuMC/EuRAD09 Advancement in Radar Systems and Concepts Chair: Mayazurra Ruggiano ¹ Co-Chair: Hasan Sharif ² ¹ Thales Nederland B.V., ² HRL	EuRAD11 Automotive Radar Chair: Claudia Vasanelli ¹ Co-Chair: Stéphane Kemkemian ² ¹ Texas Instruments, ² Thales Defence Mission Systems (TDMS)
14:20 - 14:40	EuMC40-1 Small Dual-Band 3D Beamforming MIMO Antenna Abel Zandamela ¹ , Nicola Marchetti ¹ , Adam Narbudowicz ² ¹ Trinity College Dublin	EuMC/EuRAD09-1 Supporting Space Domain Awareness with the SMART-L MM radar Erwin van der Poel ¹ INDUSTRIAL KEYNOTE ¹ Thales Nederland B.V.	EuRAD11-1 Radar Semiconductors for Driver Assistance, Automated Driving and Adjacent Applications Philipp Ritter ¹ INDUSTRIAL KEYNOTE ¹ Robert Bosch GmbH
14:40 - 15:00	EuMC40-2 A Highly Integrated 5G mm-Wave Phased Array System at N257/N261 Bands with 54 dBm Linear EIRP Chih-Hsiang Ko ¹ , Tumay Kanar ¹ , Arjun Kamath ¹ , Calogero Presti ¹ , Himanshu Khatri ¹ , Jitesh Shah ¹ , Mohammad Ghadiri-Sadrabadi ¹ , Morteza Abbasi ¹ , Samet Zehir ¹ , Sataporn Pomprornlikat ¹ , Wei-Ting Wong ¹ , Ming Lim ¹ ¹ Renesas Electronics America	EuMC/EuRAD09-2 TanDEM-X Mission Status Christo Grigorov ¹ , Markus Bachmann ¹ , Johannes Böer ¹ , Thomas Kraus ¹ , Marie Lachaise ¹ , Manfred Zink ¹ ¹ Microwaves and Radar Institute, German Aerospace Center (DLR), ² Remote Sensing Technology Institute, German Aerospace Center (DLR)	EuRAD11-2 Doppler Division Multiplexing Using Non-Power-of-Two PSK Orders Mayeul Jeannin ¹ , Dian Tresna Nugraha ¹ , Oliver Lang ¹ ¹ Infinion Technologies AG, ² P.T. Infinion Technologies Indonesia, ³ KU University Linz
15:00 - 15:20	EuMC40-3 Influence of the Communication Environment on Orbital Angular Momentum (OAM) Mode Orthogonality Michael Wulff ¹ , Lei Wang ² , Alexander Kölpin ¹ , Christian Schuster ¹ ¹ Hamburg University of Technology (TUHH), ² Heriot-Watt University	EuMC/EuRAD09-3 Dynamic Multi-Target Detection and Focus in Maritime Conditions Anum Pirkanjani ¹ , Dillon Kumar ¹ , Liam Daniel ¹ , Edward Hoare ¹ , Mikhail Cherniakov ¹ , Marina Gashinova ¹ ¹ The University of Birmingham	EuRAD11-3 Single Cycle Velocity Vector Estimation Using a Full-Coherent MIMO Radar Network Sergio López Fernández ¹ , Andawattage Chaminda Janaka Samarasekera ¹ , Reinhard Feger ¹ , Andreas Stelzer ¹ , Anusha Hanumegowda ¹ ¹ Johannes Kepler University Linz, ² ZF Friedrichshafen AG
15:20 - 15:40	EuMC40-4 A Novel Dual-Wideband Four-Port MIMO Filtenna for Sub-6 GHz 5G Communication Systems Alper Turkelii ¹ , Ali Kursad Gorur ² , Yasemin Altuncu ³ ¹ Neveshir Haci Bektas Veli Univ., ² Neveshir Haci Bektas Veli University, ³ Nigde Omer Halisdemir University	EuMC/EuRAD09-4 Robustness of Photonics-based Coherent Multi-Band MIMO Radar to Fiber-based Signal Distribution Antonio Malacarne ¹ , Salvatore Maresca ² , Gaurav Pandey ¹ , Malik Muhammad Haris Amir ¹ , Antonella Bogoni ¹ , Mirco Scaffardi ¹ ¹ CNIT, ² CNR - IEIT, ³ SCUOLA SUPERIORE SANT'ANNA	EuRAD11-4 Range-Doppler Circulating LFM for Automotive MIMO Radars Nikita Petrov ¹ ¹ NXP Semiconductors Eindhoven
15:40 - 16:00	EuMC40-5 Circularly Polarized Patch Antenna Array for 5G Automotive Satellite Communications Umais Tayyab ¹ , Ashish Kumar ¹ , Hans-Peter Petry ² , Md. Golam Robbani ¹ , Thomas Wack ³ , Matthias A. Hein ¹ ¹ Technische Universität Ilmenau, ² Deutsches Zentrum für Satellitenkommunikation (DeSK), ³ Wiegand GmbH	EuMC/EuRAD09-5 Cramer-Rao Lower Bound of Localization of a Moving Target by a Dynamic Multistatic Radar Dietmer A. Bosma ¹ , Philipp Markitor ² ¹ TNO, Netherlands, ² Fraunhofer FHR (Fraunhofer Institute for High Frequency Physics and Radar Techniques FHR)	EuRAD11-5 Convergence of Scattering Parameters and H-alpha-A Features of Road Surfaces Wietse Bouwmeester ¹ , Francesco Fioranelli ¹ , Alexander Yarovoy ¹ ¹ TU Delft

THURSDAY 16:00 – 18:20

Poster presenters
will be ready around
their stands by 16:00.

Beta Level

EuRAD12

EuRAD Poster

Chair: Marlene Harter¹

Co-Chair: Mayazurra Ruggiano²

¹Offenburg University of Applied Sciences, ²Thales Nederland B.V.

EuRAD12-1

Scattering Center Extraction for ISAR Image using Deep Neural Network

Dal-Jae Yuni¹, Haewon Jung¹, Hoon Kang¹, Jisoo Kim¹, In-Yong Park¹, Ha Rim Lee¹, Young-Dam Kim²

¹Korea Research Institute of Standards and Science (KRISS), ²Chungnam National University

EuRAD12-6

Radar Dataset Synthesis Approach for Gesture Recognition

Yanhua Zhao¹, Vladica Sark¹, Milos Krstic¹, Eckhard Grass¹

¹IHP - Leibniz-Institut für innovative Mikroelektronik

EuRAD12-10

Radar Signature of a Micro-Doppler Generating Soft-Target for Automotive Pre-Crash Systems

Patrick Zaumseil¹, Rainer Engert¹, Dennis Zdzetski¹, Dagmar Steinhauser¹, Thomas Brandmeier¹, Ulrich Jumar²

¹Technische Hochschule Ingolstadt, ²Otto-von-Guericke University Magdeburg

EuRAD12-2

On Sampling and Bandwidth Influences of Distributed Radar Sensors on Automotive SAR Applications

Timo Grebner¹, Dominik Schwarz¹, Christian Waldschmidt¹

¹Ulm University

EuRAD12-7

SAR Based Target Recognition and Elevation Estimation for Automotive Applications

Hasan Iqbal¹, Kiril Boger¹, Mohamed Nour Mejdoub¹, Andreas Löffler¹

¹Continental AG

EuRAD12-11

Experimental Evaluation of Moving Target Compensation in High Bandwidth Noise Radar

Martin Ankel¹, Robert Jonsson¹, Mats Tholén², Tomas Bryllert¹, Lars Ulander¹, Per Delsing¹

¹Chalmers University of Technology, ²KTH - Royal Institute of Technology

EuRAD12-4

Motion Compensation for Long Time Integration in Passive Radar Scenarios with High-Speed Manoeuvring Target

Anabel Almodóvar-Hernández¹, Nerea del Rey-Maestre¹, David Mata-Moya¹, María-Pilar Jarabo-Amores¹, María-Cortés Benito-Ortiz¹

¹Universidad de Alcalá

EuRAD12-8

Radar-Only Instantaneous Ego-motion Estimation using Neural Networks

Simin Zhu¹, Francesco Fioranelli¹, Alexander Yarovoy¹

¹TU Delft

EuRAD12-5

HOMARDS: An Airborne Ka-Band Radar Sensor for Supporting Future Satellite Missions

Erwan Rahault¹, Stéphane Méric¹, María García-Vigueras¹, Stéphane Avrillon², Eric Pottier³, Jordi Chinaud⁴, Alain Mallet⁴

¹IETR UMR6164, INSA Rennes, ²IETR - UMR CNRS 6164 - UNIVERSITÉ DE RENNES 1, ³Centre National d'Études Spatiales (CNES)

EuRAD12-9

Automotive ST-CDM MIMO Radar Imaging

Hangyu Liu¹, Xiaolei Shang¹, Ronghao Lin¹

¹University of Science and Technology of China

THURSDAY 16:40 – 18:20

ROOM Alpha 6

EuMC41

EuMC Closing Session

Chair: Ilona Rolfes¹

Co-Chair: Amelie Hagelauer²

¹Ruhr University Bochum, ²Fraunhofer EMFT

16:40 Session Welcome

Ilona Rolfes, EuMC Chair

16:50 Amelie Hagelauer, EuMC TPC Chair

16:50 Quantum Computing – Building a New Computing Technology

Heike Riel

IBM, Switzerland

For the first time in history, we are seeing a branching point in computing paradigms with the emergence of quantum computers. The progress of Quantum Computing has significantly accelerated in recent years due to increased resources for research and development across the world. The focus has changed from just building quantum devices to establishing a quantum computing system including software and applications. An overview of the recent advancements of superconducting quantum computing systems is presented including the achievements made to scale processors to 433 qubits and scale up to 4000 qubits in 2025. Three key metrics are defined, scale, quality, and speed to measure performance. The computational capabilities of today's quantum chips can be extended by applying circuit knitting techniques as well as error suppression and mitigation to reach quantum advantage. Developing approaches to connect quantum processors with classical as well as quantum communication links enables a modular approach to further scale quantum systems.

17:20 Beams from Space: The Future of Energy?

Jean-Dominique Coste

17:50 Airbus, Germany

Energy challenges are arguably the most pressing for our society today: the source of energy, its distribution, and strategic control. Power beaming technology addresses all of these challenges. It enables the transfer of energy across air and space, via beams – similarly to how we transmit data today. It removes the need for cables, using focused microwave beams. Taken to space, it unlocks the world's only persistent renewable energy source: The Sun in space. While all other renewables on Earth are intermittent, solar energy in space is available 24/7 at maximum power, making it ideal for baseload grid capacity. A solar farm deployed in space could beam green energy to Earth on demand, where it is needed, with full strategic control over the energy network. Closer to the ground, power beaming could also redefine energy networks by making them flexible and easily deployable. This talk will introduce the concept, and present how Airbus is pioneering the technology in Europe.

14:55 Awards Ceremony

Michael Gadringer

EuMW 2023 Awards Chair

EuMW 2023 Awards Chair

EuMC Prize

EuMC Young Engineer Prizes

18:10 Closing Remarks

Thomas Zwick

18:20 EuMW 2023 General Chair

Invitation to EuMW 2024

Guillaume Ducournau

EuMW 2024 General Chair

FRIDAY 09:00 - 10:40

ROOM	Beta 6	Beta 7	Beta 8/9
	EuRAD13 Focused Session UAV-based Radar Chair: Christina Bonfert ¹ Co-Chair: Ingrid Ullmann ² ¹ University of Ulm, ² Institute of Micro-waves and Photonics, Friedrich-Alexander-Universität Erlangen-Nürnberg	EuRAD14 mm-Wave Hand Gesture Recognition Chair: Jürgen Hasch ¹ Co-Chair: Ronny Harmanny ² ¹ Robert Bosch GmbH, ² Thales Nederland B.V.	EuRAD15 Short Range Imaging Radar Chair: Marina Gashinova ¹ Co-Chair: Laurent Ferro-Famil ² ¹ University of Birmingham, ² ISAE-SUPAERO
09:00 - 09:20	EuRAD13-1 Compact Radar Technology Development for Small Maritime Unmanned Aerial Vehicles Jacco de Wit ¹ , Keith T.J. Klein ¹ , Matern Otten ¹ ¹ TNO	EuRAD14-1 Non-automotive Applications of Millimeter-Wave Radars André Bourdoux ¹ INDUSTRIAL KEYNOTE ¹ imec	EuRAD15-1 Imaging Performance of 79 GHz MIMO Radars: High-Resolution 4D Snapshots, Grid Maps, and SAR Dominik Schwarz ¹ , Timo Grebner ¹ , Christian Waldschmidt ¹ ¹ Ulm University
09:20 - 09:40	EuRAD13-2 Surface Clutter Analysis for Detectability Prediction of Buried Objects with a UAV-Based GPSAR Julian Kanz ¹ , Alexander Grathwohl ¹ , Christian Waldschmidt ¹ ¹ Ulm University	EuRAD14-2 A Realistic Radar Ray Tracing Simulator for Hand Pose Imaging Johanna Bräunig ¹ , Christian Schüßler ¹ , Vanessa Wirth ¹ , Marc Stamminger ¹ , Ingrid Ullmann ¹ , Martin Vossiek ¹ ¹ Friedrich-Alexander-Universität Erlangen-Nürnberg	EuRAD15-2 A New Ground-Based SAR Technique for Roadway Characterization and Deterioration Inspection Mengda Wu ¹ , Laurent Ferro-Famil ² , Frédéric Boutet ¹ , Yide Wang ¹ ¹ IETR, University of Rennes, ² ISAE-SUPAERO, ³ IETR, Polytech Nantes, University of Nantes
09:40 - 10:00	EuRAD13-3 ONERA SAR-Light UAV Platform Latest Developments and SAR Results Remi Bague ¹ , Nicolas Castet ¹ , Jean-François Nouvel ¹ , Gilles Duteil-Paulouin ¹ , Jérôme Henrion ¹ , Olivier Boisset ¹ , Xavier de Milly ¹ ¹ ONERA	EuRAD14-3 A Dataset for Radar-based Traffic Gesture Recognition with Out-of-Distribution Detection Nicolai Kern ¹ , Daniel Laqua ¹ , Christian Waldschmidt ¹ ¹ Ulm University	EuRAD15-3 Optoelectronic Multistatic Terahertz Imaging FMCW Radar Andreas Keil ¹ , Shiva Mohammadzadeh ¹ , Lars Liebermeister ¹ , Lauri Maximilian Schwenson ¹ , Björn Globisch ¹ , Robert Kohlhaas ¹ , Fabian Friederich ¹ ¹ Fraunhofer ITWM, ² Fraunhofer Heinrich Hertz Institute, ³ OPTICA EAGLEYARD
10:00 - 10:20	EuRAD13-4 Prototyping a Radar Sensor based on a Xilinx FSoC Device for Detect-And-Avoid Onboard Small UAV Valentine Wasik ¹ , Laurent Casadebaig ¹ , Benjamin Gabard ¹ , Benjamin Gigleux ¹ , Loïc Castanet ¹ , Yoann Paichard ¹ , Hervé Jeuland ¹ ¹ ONERA	EuRAD14-4 Fine Hand Gesture Recognition Using D-band FMCW Radar Salah Abouzaid ¹ , Leander Nothelle ¹ , Timo Jaeschke ² , Nils Pohl ¹ ¹ Ruhr-Universität Bochum, ² Zpi-Labs GmbH, ³ Ruhr-Universität Bochum, Fraunhofer Institute for High Frequency Physics and Radar Techniques	EuRAD15-4 Assessment of Terahertz High Resolution Inverse SAR Imaging both with Compact and Sparse Data Muhammad Amjad Iqbal ¹ , Andrei Anghel ¹ , Iñigo Ederra ¹ , Juan Carlos Iriarte ¹ , Mihai Datcu ¹ ¹ University Politehnica of Bucharest, ² Universidad Publica de Navarra, ³ German Aerospace Center (DLR)
10:20 - 10:40	EuRAD13-5 Towards UAV-Based Ultra-Wideband Multi-Baseline SAR Interferometry Victor Mustieles-Perez ¹ , Sumin Kim ¹ , Christina Bonfert ¹ , Gerhard Krieger ¹ , Michelangelo Villano ¹ ¹ German Aerospace Center (DLR), ² Ulm University	EuRAD14-5 Low Power Radar-based Air-Writing System using Genetic Algorithm-assisted Spiking Legendre Memory Unit Muhammad Arsalan ¹ , Avik Santra ¹ , Vadim Issakov ² ¹ Infinion Technologies AG, ² TU Braunschweig	EuRAD15-5 Architecture and Sensor-Level Performance of a 78 GHz Automotive Radar System-on-Chip in 22 nm FD-SOI CMOS Markus Gonser ¹ , Steffen Doerner ¹ , Tilman Gloekler ¹ , Philipp Ritter ¹ ¹ Robert Bosch GmbH

FRIDAY 11:20 - 13:00

ROOM	Beta 6	Beta 7	Beta 8/9
	EuRAD16 Radar Sensing and Joint Communication Chair: Stéphane Méric ¹ Co-Chair: Mayazzurra Ruggiano ² ¹ IETR, INSA Rennes, ² Thales Nederland B.V.	EuRAD17 Human Activity Monitoring incl. Vital Sign Extraction Chair: Willem A. Hol ¹ Co-Chair: Jürgen Hasch ² ¹ Thales, ² Robert Bosch GmbH	EuRAD18 Imaging by Automotive Radars Chair: Alexander Yarovoy ¹ Co-Chair: Marc Bauduin ² ¹ Delft University of Technology, ² Interuniversity Microelectronics Centre (Imec)
11:20 - 11:40	EuRAD16-1 mm-Wave Joint Sensing and Communication System Nima Souzandeh ¹ , Mehrdad Harifi Mood ¹ , Javad Pourahmadazar ¹ , Sonia Aïssa ¹ , Serioja Ovidiu Tatu ¹ ¹ Institut National de la Recherche Scientifique (INRS), ² Concordia University	EuRAD17-1 Continuous People Crowd Monitoring defined as a Regression Problem using Radar Networks Ronny Gerhard Guendel ¹ , Ingrid Ullmann ² , Francesco Fioranelli ¹ , Alexander Yarovoy ¹ ¹ TU Delft, ² Institute of Microwaves and Photonics (LHFT), Friedrich-Alexander-Universität Erlangen-Nürnberg	EuRAD18-1 Coherent Distributed Automotive Radar Marc-Michael Meinecke ¹ , Thomas Gisder ¹ , Heiko Gustav Kurz ¹ INDUSTRIAL KEYNOTE ¹ Volkswagen AG
11:40 - 12:00	EuRAD16-2 Time Domain Analysis of Joint Broadband Radar and Single Carrier Communication in Frequency Division Multiplexing Winfried Johannes ¹ , Stephan Stanko ² , Ingmar Kallfass ¹ ¹ Fraunhofer FHR, ² Fraunhofer FHR, ³ University of Stuttgart	EuRAD17-2 Improved Indoor Semi-Static Human Target Detection and Localization using FMCW Radar Kevin Kaiser ¹ , Thomas Stadelmayer ¹ , Jens Felgentreff ¹ , Robert Weigel ¹ , Fabian Lurz ² , Avik Santra ² ¹ Infinion / Friedrich-Alexander University Erlangen-Nuremberg, ² Infinion, ³ Friedrich-Alexander University Erlangen-Nuremberg, ⁴ Hamburg University of Technology	EuRAD18-2 Enhanced Angular Resolution in Automotive Radar Imagery Using Burg-Aided MIMO-DBS Approach Muge Bekar ¹ , Christopher John Baker ¹ , Marina Gashinova ² ¹ University of Birmingham, UK, ² University of Birmingham, UK
12:00 - 12:20	EuRAD16-3 Multi-Band Intermodulation RADAR and a New Method to Enhance its Detection Capability Alain Grezes ¹ , Jeremy Raoult ¹ , Alexandre Martorell ¹ ¹ Thales SIX GS, ² IES - University Montpellier	EuRAD17-3 Continuous Human Activity Classification with Radar Point Clouds and Point Transformer Networks Nicolas Kruse ¹ , Francesco Fioranelli ¹ , Alexander Yarovoy ¹ ¹ Delft University of Technology	EuRAD18-3 Distributed Automotive Radar Multi-Modal Sensing Anum Pirkani ¹ , Dillon Kumar ¹ , Mikhail Cherniakov ¹ , Marina Gashinova ² ¹ The University of Birmingham, ² University of Birmingham
12:20 - 12:40	EuRAD16-4 End-to-End Recognition of Interleaved Radar Emitters from the Spectrogram Stefan Scholl ¹ ¹ Fraunhofer FHR (Fraunhofer Institute for High Frequency Physics and Radar Techniques FHR)	EuRAD17-4 Contactless In-Bed Movement in Various Scales Classification with CW Radar Hui Lu ¹ , Marvin Wenzel ² , Tobias Steigleder ² , Isabell Klinger ² , Christoph Ostgathe ² , Alexander Kölpin ¹ ¹ Brandenburg Technical University Cottbus-Senftenberg, ² Hamburg University of Technology, Institute of High-Frequency Technology, ³ Universitätsklinikum Erlangen, Department of Palliative Medicine	EuRAD18-4 1 + 1 is Greater Than 2: Collaborative Automotive Radar Imaging Exploiting Spatial Diversity Shunqiao Sun ¹ , Changzhi Li ² ¹ The University of Alabama, Tuscaloosa, AL, USA, ² Texas Tech University, Lubbock, TX, USA
12:40 - 13:00	EuRAD16-5 Beamforming for a Fast Scanning Phased Array Weather Radar Tworit Dash ¹ , Alexandru Girdianu ² , Oleg Krasnov ¹ , Alexander Yarovoy ¹ ¹ TU Delft, ² NXP Semiconductors	EuRAD17-5 Interference Free Vital Sign Extraction with Radar Using a Signal Fusion Approach Philipp Stockel ¹ , Patrick Wallrath ¹ , Reinhold Herschel ¹ , Nils Pohl ¹ ¹ Fraunhofer FHR (Fraunhofer Institute for High Frequency Physics and Radar Techniques), ² BIT Technology Solutions GmbH, ³ Ruhr-Universität Bochum, Germany	EuRAD18-5 Implementation of Real-Time Automotive SAR Imaging Marcel Hoffmann ¹ , Theresa Noegel ¹ , Christian Schüßler ¹ , Lars Schwenger ¹ , Peter Gulden ¹ , Dietmar Fey ¹ , Martin Vossiek ¹ ¹ Friedrich-Alexander-Universität Erlangen-Nürnberg, ² indie Semiconductor

FRIDAY 14:00 – 15:40

ROOM Alpha 5/6

EuRAD19 EuRAD Closing

Chair: Christian Waldschmidt¹

Co-Chair: Marlene Harter²

¹University of Ulm, ²Offenburg University of Applied Sciences

14:00 Session Welcome

14:10 Christian Waldschmidt
EuRAD Chair

14:10 Improving Radar Based Space Situational Awareness: Recent 14:55 Technical Concepts for the TIRA and GESTRA Systems

Christoph Reising
Fraunhofer Institute for High Frequency Physics and Radar Techniques (FHR), Germany

The daily life on earth increasingly relies on services provided by satellites in orbit like communication and navigation. With the rapidly growing number of artificial space objects, it is mandatory to detect, identify and track space objects with highly sensitive radar sensors. For this purpose, the Fraunhofer Institute for High Frequency Physics and Radar Techniques (FHR) is working on two complementary radar systems: The Tracking and Imaging Radar (TIRA) and the German Experimental Space Surveillance and Tracking Radar (GESTRA). TIRA is fully operated by FHR and is currently the most powerful radar sensor in Europe. The system is in ongoing development to increase its tracking and space reconnaissance capabilities over the next years. The GESTRA system is a phased array system that can cover huge areas of space simultaneously. Development and construction of GESTRA are commissioned by the German Space Agency at DLR. It is going to be fully operational during 2023. In order to establish a multistatic radar network, construction and further development of additional transmit and receive units are already underway. The new capabilities of TIRA and the GESTRA network will provide a significant contribution to global space situational awareness activities in the future.

In this Plenary Talk, the above-mentioned status will be presented in a more precise way and based on this, future potential trends shall be sketched up.

14:55 Awards Ceremony

15:10 Michael Gadringer
EuMW 2023 Awards Chair

EuRAD Prize
EuRAD Young Engineer Prize

15:10 Closing Remarks

15:20 Christian Waldschmidt, EuRAD 2023 Chair
Marlene Harter, EuRAD 2023 TPC Chair

15:20 Invitation to EuRAD 2024

15:30 Guido Valerio
EuRAD 2024 Chair

Welcome of Workshop/Short Course Chairs

Welcome to the workshops and short courses of the EuMW 2023 in Berlin! We are thrilled to present an extensive lineup that serves as a pivotal link between academia and industry. Our goal was to curate a compelling program, offering two short courses and an impressive selection of 23 workshops that cover diverse fields within the microwave domain.

We invite scientists and engineers from all disciplines to gain a broader perspective on microwave and RF systems and devices, as well as explore new specializations within our vast field. Aligned with the thematic areas of the EuMC, EuMIC, and EuRAD conferences, these workshops provide a comprehensive overview of emerging microwave systems topics. Participants will have the opportunity to explore cutting-edge subjects, including workshops focused on 6G communication systems, radar application, addressing architectural, system, and technological challenges across semiconductor technologies and integration techniques.

We extend our heartfelt gratitude to the workshop organizers, presenters, and authors who have contributed their expertise at every stage of the conference. Each workshop and short course is individually endorsed by one or more conferences within EuMW, ensuring accessibility for all attendees interested in broadening their understanding of microwave and RF systems and devices.

During the sessions, we encourage active discussion and interaction among participants, fostering valuable networking opportunities. The EuMIC and EuRAD workshops will be concentrated on Sunday and Friday, respectively, while the EuMC workshops are spread across Sunday and Monday.

To enhance convenience, electronic slides for the workshops and short courses will be provided at the conference, enabling participants to access them digitally. Please remember that no hard copies of the slides will be distributed. Further instructions for the download process will be shared with registered participants closer to the conference date.

Once again, welcome to EuMW 2023 in Berlin. We look forward to an inspiring and fruitful week of knowledge sharing and collaboration in the field of microwave technology all in the mission of "waves beyond walls".



NILS POHL
Workshop & Short Course Chair
Ruhr University Bochum, Germany



JAN WESSEL
Workshop & Short Course Co-Chair
Fraunhofer FHR, Germany

SUNDAY 09:00 – 18:20

Fundamentals of Microwave PA Design

Chair: Paolo Colantonio¹

Co-Chair: Rocco Giofrè²

¹University of Roma Tor Vergata, ²University of Roma Tor Vergata

Room: Beta 1/2

Semiconductor Power Amplifiers are key components in radio frequency and microwave transmitter systems. They have received a great deal of attention and development effort over the last decades and are still a hot topic in research area. This short course aims to provide a comprehensive overview of all aspects of fundamental semiconductor microwave power amplifier design. It is an introductory course, aimed at 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. Very recent advances in semiconductor amplifiers and their applications will also be covered.

Starting from the fundamental concepts on semiconductor devices, the core of a power amplifier design, 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 on 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 more recent 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 for PAs

Ilitcho Angelov¹

¹Chalmers University, Sweden

PA Theoretical Foundation

Franco Giannini¹

¹University of Roma Tor Vergata, Italy

Design and Model Oriented Load Pull Techniques

Marco Pirola¹

¹Politecnico di Torino (Italy)

The Doherty Power Amplifier

Rocco Giofrè²

¹University of Roma Tor Vergata, Italy

Balanced PAs: An Old Trick Revival

Roberto Quaglia¹, Aleksander Bogusz²

¹Cardiff University, UK

X-Parameters High-Power PAs Modeling for System Level Analysis

Alessandro Cidronali¹

¹University of Florence, Italy

Linear and Nonlinear Stability Analysis of Power Amplifiers

Giorgio Leuzzi¹

¹University of L'Aquila, Italy

Linearization Techniques Overview

Pere L. Gilabert¹

¹Universitat Politècnica de Catalunya (UPC-Barcelona Tech), Spain

SUNDAY 09:00 – 13:00

Wideband Microwave Measurements of Multi-Port Devices on VNA-Type Measurement Systems

Chair: Olof Bengtsson¹

Co-Chair: Gian Piero Gibiino²

¹Ferdinand-Braun-Institut (FBH), ²University of Bologna (UNIBO)

Room: Gamma 6



The half day short course is mainly targeting Ph.D. students working on PA characterization and linearization. It addresses calibrated multiport wideband measurements with analysis bandwidths exceeding several GHz conducted on mixer based VNA-type systems. In a series of presentations, the VNA architecture, its development to the general versatile multi-tool it is today, and the possibility to adapt it for very wideband measurements are presented. Wideband signal generation, capturing and synchronization is covered as well as calibration methods for IF and RF correction. Alternative methods for IF bandwidth extension like stitching are also introduced. The course covers alternative measurement applications including wideband active load-pull, mixers, multiple-input PAs and full MIMO systems.

The advantaged and disadvantages of VNA based architectures and their limits are also discussed compared to other oscilloscope or mixer-based solutions.

The two final talks of the short-course offer hands-on demonstrations going through the wideband calibration and conducting real-time measurements on the wideband-MIMO measurement system at FBH. The participants will be guided through live chip measurements of GaN-HEMT amplifiers. They will learn how a system can be configured and calibrated to present the targeted wideband signals at the calibrated interfaces including pre-amplifier linearization. Step-by-step it is shown how calibrated wideband measurement of a multiport device can be conducted, what results can be expected, and how these results can be used in e.g. device

benchmarking and model verification.

All participants of the short course are invited to register for a visit at the Ferdinand-Braun-Institut (FBH) in Adlershof, Berlin, to get a live demonstration of the wideband measurements system on Monday 18th of September. The visit and hands-on demonstration is free of charge and only offered to short course attendees. Please contact Olof Bengtsson (olof.bengtsson@fbh-berlin.de) for more information.

PROGRAMME

The PNAX, a Modern Vector Network Analyzer (VNA)

Joel Dunsmore¹

¹Keysight technologies

Application of VNA Wideband Functionalities to Active Device Characterization

Gian Piero Gibiino¹

¹University of Bologna (UNIBO)

Configuration and Calibration of the FMD 5G-MIMO System at FBH

Olof Bengtsson¹

¹Ferdinand-Braun-Institut (FBH)

Demo: Setup and Calibration of the 5G-MIMO System at FBH

Christoph Schulze¹

¹Ferdinand-Braun-Institut (FBH)

Demo: Calibrated Wideband Measurements on a Multiport GaN Amplifier

Mattia Mengozzi¹

¹University of Bologna (UNIBO)

SUNDAY 09:00 – 18:20

Broadband and Microwave Signal Processing Using Electronic-Photonic Integration

Chair: Johann Christoph Scheytt¹

Co-Chair: Jeremy Witzens²

¹Paderborn University, ²RWTH Aachen University

Room: Beta 7

In recent years, tremendous progress was made in photonic and electronic-photonic integration technologies. Especially the underlying semiconductor technologies such as silicon photonics and InP photonics have advanced considerably. So far, the major driving force for electronic-photonic integration has been fiber-optic communication. However, many other high frequency applications can greatly benefit from combined electronic-photonic signal processing and integration, such as e.g. mm-wave/THz communications and sensing, ultra-broadband data converters, ultra-low-noise frequency synthesis, and large-scale microwave phased-array transceivers. The workshop

covers recent developments and applications of broadband and microwave signal processing using discrete and integrated electronic-photonic circuits and systems.



PROGRAMME

Ultra-Broadband Photonic-Electronic Analogue-to-Digital Converters (ADCs)

Dengyang Fang¹

¹Karlsruhe Institute of Technology, Germany

Orthogonal Sampling Based Broadband Photonic Assisted ADC and DAC with Low-Bandwidth Electronics

Thomas Schneider¹

¹TU Braunschweig, Germany

Optoelectronic Frequency Synthesis with Extreme Low Phase Noise Using Mode-Locked Lasers

Meysam Bahmanian¹

¹Paderborn University, Germany

Low Phase Noise Microwave Signal Generation with Optical Frequency Combs

Yann LeCoq¹

¹SYRTE, France

Photonic-Electronic Ultra-Broadband Signal Processing: Devices, Concepts, and Applications

Christian Koos¹

¹Karlsruhe Institute of Technology, Germany

Microwave Photonics for 5G Networks and Radar and Sensing Applications

Jerome Bourederrionnet¹

¹Thales Research and Technology, France

Photonic-Assisted Microwave Near-Field Imagers

Firooz Aflatouni¹

¹University of Pennsylvania, USA

Microwave-Photonics Processor

Chris Roeloffzen¹

¹LIONIX International, Netherlands

Electronic-Photonic Integrated Sensor Platform

Denis Taz¹

¹FAU Erlangen-Nuremberg, Germany

Photonic Neuromorphic Systems

Andrea Zazzi¹

¹RWTH Aachen University, Germany

SUNDAY 09:00 – 18:20

Terahertz Device, Circuit and System Fundamentals and Applications

Chair: Dimitris Pavlidis¹

Co-Chair: Imran Mehdi²

¹Florida International University, ²Jet Propulsion Laboratory

Room: Beta 5

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-Travelling-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 Mehdi¹

¹Jet Propulsion Laboratory

Nitride-based Two- and Three-Terminal Devices for THz Applications

Dimitris Pavlidis¹

¹Florida International University

On the Practical Limitations for the Generation of sub-THz Gunn Oscillations in Highly Doped GaN Diodes

Javier Mateos¹

¹University of Salamanca

InP HBTs for THz Microsystems

Zach Griffith¹

¹Teledyne Scientific Company

RF Injection Locking of THz Metasurface Quantum-Cascade Lasers

Benjamin Williams¹

¹University of California Los Angeles

THz Photonic Devices

Guillaume Ducournau¹

¹University of Lille

Terahertz Silicon Photonics towards 6G and beyond

Masayaki Fujita¹

¹Osaka University

Recent Advances in CMOS-Based THz Radar Imaging: Towards Millimeter Ranging Resolution and Electronic 2D Beam Steering with 1-Degree Angular Resolution

Ruonan Han¹

¹MIT

Temporal Quantitative Detection of Water Contents with THz Technology

Marion K. Matters-Kammerer¹

¹Eindhoven University of Technology

Resonant Tunneling Diode Technology for Future THz Applications

Safumi Suzuki¹

¹Tokyo Institute of Technology

Terahertz Antenna Design Using 2D Materials

Qammer H. Abbasi¹

¹University of Glasgow

A New Probing Approach for Millimeter-Wave and Terahertz Devices

Guillermo Carpintero¹

¹Universidad Carlos III de Madrid, Leapwave Technologies SL

GaAs THz planar Schottky diodes for Future Space Missions

Jeanne Treuttel¹

¹Observatoire de Paris - PSL / LERMA

SUNDAY 09:00 – 13:00

Highly-Integrated mm-Wave Circuits and Systems for Emerging Radar Applications

Chair: Vadim Issakov¹

Co-Chair: Justin Romstadt²

¹TU Braunschweig, ²Ruhr University Bochum

Room: Beta 3

This half-day workshop will cover the latest achievements in design and characterization of the millimeter-wave (mmWave) broadband integrated differential circuits. The amount of new applications based on millimeter-wave radar sensors is continuously growing. Driven by the demand for cost reduction, module size reduction, lower power consumption and complexity of usage for the end user, several trends can be observed recently. First, the operating frequencies keep on increasing, enabling integration of antenna arrays in package and on-chip. Secondly, the increasing level of integration enables advanced functionality. Finally, with the emerging applications operated from a battery, ultra-low-power operation is required.

In this workshop, we discuss these recent

trends in the design of mm-Wave transceiver front-ends for radar applications and give examples of radar systems at mm-wave frequencies providing system-level solutions. Particularly, some talks focus on radar gesture applications. Other talks discuss considerations for consumer and industrial applications. The electrical requirements are resolved by various modulation techniques FMCW or PMCW, or even combination of both.

In this workshop we have a good mixture of industry/research institutes (Infineon, Silicon Austria Labs) and academia (FAU Erlangen, Ruhr University Bochum, TU Braunschweig, Tel Aviv University). As well, we have contributions from three different countries (Austria, Germany and Israel) by experts and recognized speakers in the field

of radar circuits and systems.

WS3
EuMIC

PROGRAMME

140 GHz CMOS PMCW Radar Tx-Frontends for Gesture Recognition

Andre Engelmann¹, Florian Probst¹, Albert-Marcel Schrotz¹

¹Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany

D-Band Transceiver Front-End for Consumer Radar Applications using on-Chip Radiators

Vincent Lammer¹, Vadim Issakov¹

¹TU Braunschweig, Germany

Design and Development of a Wideband and Efficient Radar Transceiver at 256 GHz

Raqibul Hasan¹, Corrado Carta¹

¹IHP Microelectronics, Germany

Circuit And Design Considerations for Scalable MIMO D-Band Radar MMICs

Justin Romstadt¹

¹Ruhr University Bochum, Germany

mm-Wave Radar for Short and Ultra-Short Distance

Yun Fang¹, Hao Gao²

¹Silicon Austria Labs, Austria, ²Eindhoven University of Technology, The Netherlands

SUNDAY 09:00 – 13:00

Joint Communications and Sensing

Chair: Benjamin Nuss¹

Co-Chair: Norman Franchi²

¹Karlsruhe Institute of Technology, ²FAU Erlangen-Nuremberg

Room: Beta 6

Joint communications and sensing (JCAS) is one of the hot topics that is currently discussed in the research and development for 6G. It offers the possibility to reuse the spectrum that is primarily used for communications to sense the environment, for example, to control and supervise intra-logistic facilities within campus networks or to increase the safety in traffic scenarios or at airports. However, there are still many open questions that have to be answered and solved before such JCAS systems can come to market. Some of these questions are, for example, how the hardware and protocols have to be adapted to enable sensing and which additional algorithms and signaling overhead is required and can be tolerated. In addition, the question is, which use cases are of interest for the mobile and campus

network operators and what parameters have to be extracted by the sensing. Coming along with these questions, also possibilities to test and verify the newly developed algorithms and sensing schemes are required which will be tackled by several demonstrators and measurement facilities that are currently under development in several research projects.

The workshop will provide a platform for the participants to highlight challenges coming along with JCAS, exchange possible ideas to solve them, and present their latest research.

WS4
EuMIC/
EuRAD

PROGRAMME

JCS from the Perspective of the Physical Layer: Limitations and Possibilities

Lara Wimmer¹

¹IHP Microelectronics, Frankfurt Oder, Germany

First Steps of JCAS Hardware Reuse

Padmanava Sen¹

¹Barkhausen Institut

Joint Communication and Sensing with Tag Based mmWave Harmonic Radar: Concepts, Chip Design and Measurement Results

Steffen Hansen¹, Tobias T. Braun²

¹Fraunhofer FHR, ²Ruhr-Universität Bochum

PMCW-Based JCAS Systems: A Tutorial on Signal Processing Schemes and RF Hardware Impacts

Yanpeng Su¹

¹Friedrich-Alexander-Universität Erlangen-Nürnberg

Broadband mmWave MIMO Testbed for 6G and JCAS

Benjamin Nuss¹

¹Karlsruhe Institute of Technology

BiRa – Wideband Bi-Static Reflectivity Measurement System for ICAS

Carsten Andrich¹

¹TU Ilmenau

Radar-based Gesture Recognition Using Artificial Intelligence

Yanhua Zhao¹

¹IHP Microelectronics, Frankfurt Oder, Germany

SUNDAY 14:20 – 18:20

Heterogeneous Integration for Next Generation of Communication and Sensing

Chair: Nadine Collaert¹

¹imec

Room: Beta 6

Heterogeneous integration is ubiquitous and considered a key enabling technology across different applications. It enables the integration of different types of semiconductor devices and materials into a single package or system, resulting in improved system performance and energy efficiency.

To achieve heterogeneous integration, various approaches have been considered, including 2.5D interposer, 3D wafer-level integration (W2W and D2W), and sequential 3D integration. Each of these processes has its challenges and benefits, and they have been extensively explored for logic and memory applications. However, there is a growing need to implement these processes for wireless and photonic component technologies, which have different requirements and challenges.

The integration of wireless and photonic components is particularly important for the development of advanced communication systems, such as 5G wireless networks and data centers. Heterogeneous integration can enable the integration of different wireless and photonic components, such as power amplifiers, antennas, modulators, and detectors, into a single package or system. This integration can lead to improved performance, reduced size, and lower power consumption.

This workshop on heterogeneous integration will provide an overview of the latest advancements in this field. The workshop will cover topics such as materials and processes, device fabrication, circuits demonstrators, testing and characterization. The goal of the workshop is to bring together experts

from academia and industry to exchange ideas, discuss challenges, and identify future research directions in heterogeneous integration.



WS5
EuMIC/
EuMC

PROGRAMME

Materials and Technologies for Heterogeneous Integration

Michael Töpfer¹

¹Fraunhofer

Recent Developments in Advanced Heterogeneous Wafer-Level Integration

Jean-Charles Souriau¹

¹CEA

3D Sequential Integration for RF Applications

Anne Vandooren¹

¹imec

Hetero-integrating InP-HBT Circuits with BiCMOS on Chip Level for sub-THz Frequencies

Wolfgang Heinrich¹

¹FBH

SUNDAY 14:20 – 18:20

mm-Wave Integrated Radar Circuit Design and SoC Integration in Silicon Technologies

Chair: Sönke Vehring¹

Co-Chair: Jan Schöpfel²

¹Robert Bosch GmbH, ²Ruhr University Bochum

Room: Beta 3

Next generation radar sensors require multiple transmitter and receiver front-ends combined with a high computation power on a single chip at lowest possible costs. Nowadays, silicon exhibits sufficient mm-wave performance to co-integrate mm-wave front-ends with high performance controllers and digital signal processors. However, the mm-wave circuit design in silicon remains a challenge. Typical challenges are high-resolution phaseshifters, reliability in power amplifiers, or chirp-linearity. One emerging new field due to progressive SoC integration is the opportunity of complex build-in-self-test algorithms. Furthermore, the high integration brings up new challenges for the lab sample characterization.

The workshop combines top academic and industry speakers with a breadth of expertise

and experience in this field ranging from the fundamental aspects of mm-wave circuit design, technology, SoC-integration, and sample verification.



WS6
EuMIC/
EuRAD

PROGRAMME

mm-Wave Circuit Design, SoC Integration, and Lab-Sample Verification in 22 nm FD-SOI CMOS Technology

Sönke Vehring¹

¹Robert Bosch GmbH

120 GHz MIMO CMOS Transceiver for High Volume Applications

Wojciech Debski¹

¹Indie Semiconductors

Circuits and System Concepts for MIMO OFDM Radar at 77 GHz

Jan Schöpfel¹

¹Ruhr University Bochum

Highly Efficient Scalable mm-Wave Radar Transceiver Front-end ICs

Sütbas Batuhan¹

¹IHP Microelectronics

SUNDAY 14:20 – 18:20

Design, Linearization, and Optimization Techniques for Multiple-Input Power Amplifiers

Chair: Gian Piero Gibiino¹

Co-Chair: Pere L. Gilibert²

¹University of Bologna (UNIBO), ²Universitat Politècnica de Catalunya (UPC-Barcelona Tech.)

Room: Gamma 6

Power amplifier performance at radio and millimeter wave frequencies is critical for the successful deployment of 5G and 6G communication systems. In order to meet the challenges of broadband linearity and energy efficiency, multiple-input PA topologies such as supply modulation, dual-input Doherty, and load-modulated balanced amplifiers have emerged as promising solutions. During this workshop, we will explore the design challenges and optimal control techniques, including digital predistortion and linearization, for multiple-input PAs. The use of machine learning in these approaches will also be discussed. Attendees will come away with a better understanding of the state-of-the-art approaches for improving power amplifier performance in the context of 5G and 6G communication systems.

PROGRAMME

Dual-Input Load Modulated Power Amplifiers for Advanced Transmitters

Aleksander Bogusz², Roberto Quaglia¹, Jeff R. Powell³, Jonathan Lees⁴, Steve C.ripps⁴

¹Cardiff University (UK), ²Skyarna Ltd, ³Cardiff University

RF Power Amplifier Architectures for Wideband Operation at High Efficiency in Cellular Base Stations

Marc Cope¹, William Thompson¹, Anis BenArfi¹, Noureddine Outaleb¹

¹Analog Devices

Dual-Input GaN Power Amplifiers Enabled by AI Machine Learning

Shintaro Shinjo¹, Shuichi Sakata¹, Yuji Komatsuzaki¹

¹Mitsubishi Electric Corporation

Linearization and Global Optimization Techniques for Multi-Input RF Power Amplifiers

Mattia Mengozzi¹, Gian Piero Gibiino¹, Alberto Maria Angelotti², Olof Bengtsson³, Corrado Florian⁴, Alberto Santarelli⁵, Paolo Colantoni⁶

¹University of Bologna (UNIBO), ²University of Bologna, ³Ferdinand-Braun-Institut (FBH), ⁴University of Roma Tor Vergata

Dual Input PA Control and Linearization for Maximizing Efficiency

Wantao Li¹, Gabriel Montoro¹, Pere L. Gilibert²

¹Universitat Politècnica de Catalunya, ²Universitat Politècnica de Catalunya (UPC-Barcelona Tech.), Spain



WS7
EuMIC/
EuMC

SUNDAY 14:20 – 18:20

Polarization Surfaces for Next-Generation Communications Systems

Chair: Emilio Arneri¹

Co-Chair: George Goussetis²

¹University of Calabria, ²Heriot-Watt University

Room: Beta 4

Frequency selective surfaces (FSSs) have garnered considerable attention from researchers in the last years because of their numerous applications like the realization of spatial filters, radomes, absorbers etc. FSS can also be designed to manipulate the polarization of electromagnetic (EM) waves in desired directions. Circularly polarized (CP) waves are widely used in wireless communications because are more robust to multipath and Faraday rotation effects compared to the linear polarization (LP) case. Polarization converters provide a valuable method to generate CP waves without affecting the complexity of the antenna system. In this workshop, we will discuss the state of the art of polarization surfaces. Several design examples will be discussed for both reflection and transmission-type surfaces.

Particular emphasis will be given to the main design techniques based on equivalent circuit models and sophisticated optimization procedures.



WS8
EuMC

PROGRAMME

Analysis and Design of Multi-layer Metasurface Polarizers for Satcom Applications

Mauro Ettore¹

¹Michigan State University, USA

Equivalent Circuit Models for the Characterization Linear-to-Circular Polarizer Surfaces

Emilio Arneri¹

¹University of Calabria, Italy

Wide-/Dual-Band Linear-to-Circular Polarization Converter and its Application in Antenna

Hong Bin Wang¹

¹University of Electronic Science and Technology of China, China

Information Metasurfaces

Tie Jun Cui¹, Wankai Tang², Jun Yan Dai³

¹State Key Laboratory of Millimeter Waves School of Information Science and Engineering Southeast University, Nanjing, China ²National Mobile Communications Research Laboratory Southeast University Nanjing, China

SUNDAY 14:20 – 18:20

RF Packaging and IC Integration for Communication and Radar Applications above 100 GHz

Chair: Ivan Ndip¹

¹Fraunhofer IZM

Room: Gamma 7

In this workshop, experts from industry and academia will present the latest developments on RF packaging, IC development and antenna integration, especially for wireless communication and radar sensing applications above 100 GHz. At IC level, the focus will be on SiGe BiCMOS technology. A SiGe-based D-band transceiver with significantly improved dynamic range will first be presented. This will be followed by a presentation of recent developments of Infineon's SiGe BiCMOS technology and process design kit for mm-Wave monolithically integrated circuits. Transitions from these ICs to waveguides will be discussed. We will move on to present the challenges in RF packaging

and system-integration of ICs at frequencies above 100 GHz, considering the packaging of 6G phased arrays as an example. Examples of RF packaging solutions and materials required at these frequencies will be discussed. Finally, the integration of antennas operating above 100 GHz and their co-design with ICs and packages will be presented.



WS9
EuMC/
EuRAD

PROGRAMME

Highly Integrated D-Band Transceiver for Low-Cost Radar Applications

Ahmet Çağrı Ulusoy¹

¹Karlsruhe Institute of Technology

SiGe BiCMOS Technology and Circuits for mm-Wave Applications

Klaus Aufinger¹

¹Infineon Technologies

Transitions to a Waveguide Suitable for Integration with Large Size MMICs

Vessen Vassilev¹

¹Chalmers University of Technology

Antenna Integration and Packaging Challenges for 6G Millimetre-Wave Phased Arrays

Chantal Liao¹

¹Ericsson

RF Packages with Integrated Antennas above 100 GHz

Uwe Maaß¹

¹Fraunhofer IZM

RF Si Interposer Enabling Heterogeneous Integration Opportunities for Wireless System

Xiao Sun¹

¹imec

Glass Substrates as a Packaging Platform for Applications above 100 GHz

Martin Letz¹

¹SCHOTT

On-chip and Embedded in Package Antennas Beyond for mm-Wave Applications

Vadim Issakov¹

¹TU Braunschweig

MONDAY 09:00 – 18:20

Millimeter-Wave On-Wafer Measurement and Material Measurement for Future Communications and Automotive Radar Sensors

Chair: Xiaobang Shang¹

Co-Chair: Nick Ridler¹

¹National Physical Laboratory (NPL)

Room: Beta 1/2

This full-day workshop will cover the latest developments in millimeter-wave (mm-wave) measurements, including on-wafer S-parameters as well as complex permittivity of dielectric materials. Such measurements play a crucial role in the development of planar circuits for next generation communication systems and automotive radar sensors. The workshop consists of ten talks, five of which relate to S-parameters and the remainder to dielectric measurement. The presenters are from different scientific backgrounds (i.e. metrology institutes, instrumentation manufacturers, and end-users in industry and academia), and therefore will provide different perspectives on these topics.

For material measurement, the talks will focus on different types of popular measurement techniques, including the free-space quasi-optical method, the guided free-space method, and the transmission line method based on substrate-integrated waveguides, etc. The topics covered for on-wafer measurement include the selection of calibration techniques, the design of calibration substrates, corrections for probe-to-probe leakage, and compensation technique for probe misplacements, etc. Through the workshop, participants are expected to learn more about the state-of-the-art in mmWave measurement techniques and gain insight into future developments.



WM1
EuMC

PROGRAMME

Review of Millimeter-Wave Material Characterisation Using a Guided Free-Space Method (MCKs)

Xiaobang Shang¹, Nick Ridler¹

¹National Physical Laboratory (NPL), UK

Extraordinary Permittivity Characterization Using 4H-SiC Substrate-Integrated Waveguides and Resonators

James C. M. Hwang¹

¹Cornell University, USA

Optimization of a Free Space Test Bench in the J-Band (220-330 GHz) for Material Characterization

Grégory Gaudin¹, Daniel Bourreau¹, Alain Peden¹

¹IMT Atlantique, France

Nanorobotics-Based Millimeter-wave Techniques and Instrumentations for Multi-Scale Material Characterization

Kamel Haddadi¹

¹University of Lille, France

Broadband Methods for the Characterization of Transmission Lines and Material Parameters at Millimeter-Wave Frequency Bands

Enrique Márquez-Segura¹

¹Universidad de Málaga, Spain

Your Keys to the Successful RF Calibration of the mmWave Wafer-Level Measurement System

Andrej Rumiantsev¹

¹MPI Corporation, Germany

Guidelines and Recommendations for Traceable On-Wafer S-Parameter Measurements

Gia Ngoc Phung¹, Uwe Arz¹

¹PTB, Germany

Challenges of On-Wafer S-Parameter Characterization of Advanced SiGe HBTs at Very High Frequencies

Sébastien Fregonese¹, Thomas Zimmer¹

¹University of Bordeaux, France

Correcting Probe to Probe Leakage with a Dummy On-Chip Device

Chong Li¹

¹University of Glasgow, UK

Compensation of Probe Misplacements in On-Wafer S-Parameter Measurements

Robin Schmidt¹

¹Keysight Technologies, Belgium

MONDAY 09:00 – 18:20

Measurement Methods for Passive Intermodulation and Environmental Testing of Electronic Circuits

Chair: Martin Salter¹

Co-Chair: Ahmed Sayegh²

¹National Physical Laboratory, ²Physikalisch-Technische Bundesanstalt (PTB)

Room: Beta 3

Telecom equipment manufacturers, telecom operators and regulators face ever-increasing customer demands for higher data rates and power consumption. Among other things, problems in communication systems are increasing due to passive intermodulation (PIM) in telecommunication base stations, since more power and larger bandwidths are required to transmit higher data rates, but also the diverse use of RF components places high demands on the reliability of the components under different environmental conditions. In the first half of this workshop, therefore, methods and analysis procedures that are required to measure passive intermodulation will be presented. In particular, traceable measurements of passive intermodulation, precise high-power measurements, and theories

of nonlinear components using mixed frequency S-parameters are highlighted. In the second part, the focus is on methods for analyzing the effects of environmental conditions. For applications such as autonomous vehicles, it is expected that future communication systems will often be deployed under relatively harsh environmental conditions, such as at temperatures above or below ambient temperature and at low or high humidity levels. It is therefore important that methods are developed to assess the impact of these various environmental conditions on the operation of the electronic circuits comprising such communication systems. This workshop will discuss test methods that are being developed and implemented to study the effects of environmental influences on electronic circuits, including both

aging effects and effects on in-operando performance.



PROGRAMME

Detecting PIM Sources for Better 4/5G Mobile Network Performance

Christian Entsfellner¹
¹Rosenberger

Uncertainty Budget for PIM-measurements

Ahmed Sayegh¹
¹Physikalisch-Technische Bundesanstalt (PTB)

Sources of Uncertainty Related to Variable Environmental Conditions for RF Testing Activities

Martin Garcia-Patron¹
¹INTA (Instituto Nacional de Técnica Aeroespacial)

Mixed Frequency S-Parameter

Holger Heuermann¹
¹FH Aachen

Panel Session on Measurement Methods for Passive Intermodulation

Christian Entsfellner¹, Ahmed Sayegh², Martin Garcia-Patron³, Holger Heuermann⁴

¹Rosenberger, ²Physikalisch-Technische Bundesanstalt (PTB), ³INTA (Instituto Nacional de Técnica Aeroespacial), ⁴FH Aachen, University of Applied Sciences

PCB Reliability Testing Methods

Martin Wickham¹
¹National Physical Laboratory (NPL)

PCB Connector Launch Design

Bill Rosas¹
¹Signal Microwave

Design and Testing of an FR-4 Based Reference PCB for Environmental Testing of Electronic Circuits

Lewis Manning¹
¹National Physical Laboratory (NPL)

Environmental Age Testing and Environmental In-Operando Testing of RF PCBs: Some Preliminary Results

Osman Sibonjic¹
¹Institute of Metrology of Bosnia and Herzegovina (IMBiH)

Panel Session on Environmental Testing of Electronic Circuits

Martin Salter¹, Martin Wickham², Bill Rosas³, Lewis Manning⁴, Osman Sibonjic⁵

¹National Physical Laboratory (NPL), ²Signal Microwave, ³Institute of Metrology of Bosnia and Herzegovina (IMBiH)

MONDAY 09:00 – 13:00

mMIMO Active Antenna System Calibration for 5G/6G

Chair: Lin Lin¹

Co-Chair: Jared Kantor¹

¹Jabil

Room: Beta 8

It is clear by now, mMIMO radio is one of the most successful technologies came along with 5G. Radio frontend behavior is rarely ideal and consistent. It also varies with temperature and other factors. For beam-forming, almost all mMIMO radios need to be calibrated either in real time or in production. Many papers have been published on this. But it is still a subject with many unanswered questions in both theory and practice. Below, is a list of questions we have been working on.

1. Transceiver calibration is a process of uncertainty removal using input-output data and followed by behavior correction. Can we establish a unified framework for all mMIMO radio calibration problems, including FR1, FR2, phased-array, true-delay-array, real-time, in factory, etc.?

2. Given a performance target and a priori knowledge of the radio behavior, what is the least amount of calibration data and the simplest compensation function needed to make radio fall into design specification?

3. How can calibration data be acquired quickly and accurately in real-time and factory calibration? (Calibration of an FR2 radio can take hours if one chooses to use a brute force method like REV.)

4. How can we do factory calibration in a low-cost compact OTA chamber efficiently?

5. For factory calibration in OTA chambers, is boresight calibration enough for all beam-forming requirements? How can we speed-up calibration when it is not?

6. For real-time calibration, how can we get feedback signals reliably? Do we need to calibrate feedback network?

In this workshop, we will have presentations from industry and academia to address these issues.



PROGRAMME

A Novel OTA Near-Field Measurement Approach Suitable for mmWave Array Characterization and Calibration

Thomas Deckert¹
¹National Instruments, Germany

Multi-Probe Enabled mMIMO Calibration and Diagnosis

Wei Fan¹
¹Aalborg University, Denmark

Fast mmWave Antenna Array Calibration

Harish Krishnaswamy¹
¹Sivers Semiconductors, Sweden

28 GHz Phased Array Antenna Module with Analog Optimized Design to Relieve Calibration Effort

Yoshiharu Fujisaku¹
¹Fujikura, Japan

Phased-Array Calibration using Code-Domain Techniques and its Dynamic Range Requirements

Gabriel M. Rebeiz¹
¹UCSD, ECE Department, USA

A Unified Framework for Antenna Array Calibration

Lin Lin¹
¹Jabil, Japan

MONDAY 09:00 – 13:00

Technology for RF/MW and Pulsed Power Bioelectromagnetics

Chair: Michal Cifra¹

Co-Chair: Francesca Apollonio²

¹Institute of Photonics and Electronics of the Czech Academy of Sciences ²Sapienza University of Rome

Room: Gamma 6

The workshop will highlight progress in technology for intense pulsed electric and RF/MW signals for the modification of function of organisms on the cellular and molecular scale. The talks will cover the recent development of unique high voltage ultra-short pulse generators as well as methods for the integration of RF chips to advanced optical microscopies. These experimental platforms leverage RF&MW engineering to uncover so far unseen non-thermal effects of short intense electric pulses. The systems for pulsed microwave treatment of biological cells and approaches for decyphering thermal and nonthermal effects will be also covered. Finally the workshop will highlight advances in the design of MW exposure systems related to new generation of bioelectromagnetic experiments.

PROGRAMME

Sub-Nanosecond Intense Pulsed Electric Fields Technology for Biological Applications

Delia Arnaud-Cormos¹

¹XLIM Research Institute, University of Limoges, France

Agile High Voltage High Frequency Sources for On-Chip Cell Manipulation

Cristiano Palego¹

¹Bangor University, UK

On-Microscope RF Chips for Intense Pulsed Electric Field Manipulation of Biomolecular Systems

Michal Cifra¹, Daniel Havelka²

¹Institute of Photonics and Electronics of the Czech Academy of Sciences, Czech Republic, ²Institute of Photonics and Electronics, Czech Academy of Sciences, Czech Republic

Fundamental Interactions of Cells with Electromagnetic Fields

Heungjae Choi¹

¹Cardiff University, UK

The Next Generation of MW Exposure Systems in 5G Related Bioelectromagnetic Experiments

Francesca Apollonio¹

¹Sapienza University of Rome, Italy

WM4
EuMC

MONDAY 09:00 – 13:00

SiGe BiCMOS Technologies as Enabler for D-Band Applications and Beyond

Chair: Andreas Mai¹

Co-Chair: Réne Scholz¹

¹IHP

Room: Gamma 7

In recent years, the demand for rf semiconductor technologies that can be manufactured on a large scale has been steadily increasing. SiGe BiCMOS is one of the main contenders in the area of mm and sub-mm-wave applications due to the large performance potential of SiGe HBTs. State-of-the-art SiGe HBTs have demonstrated maximum oscillation frequencies up to 0.7 THz addressing applications in D-band and beyond. The workshop presents the current status and roadmaps of various SiGe BiCMOS technology developments in Europe. These technologies make an important contribution to European technology sovereignty in semiconductor industry. Beside recent research results, the potential for foundry offers and large-scale IDM processes will be presented by various companies. Applications

such as high frequency signal generation for advanced measuring scopes and radar frontends up to 300GHz will be presented by leading representatives of these fields.

PROGRAMME

XB012 - Evolution of RF-SOI with SiGe

Gregory Uren¹

¹XFAB

90 nm 500 GHz f_{max} SiGe BiCMOS Technology for mm-Wave Applications

Josef Boeck¹

¹Infineon

BiCMOS DAC Circuits for Signal Generation in T&M Equipment

Radu Fetche¹

¹Rohde & Schwarz

Design of 300 GHz Transceiver Front-End in IHP's SG13G2 Technology

Srdjan Glisic¹

¹Indie semiconductor (Silicon Radar)

130 nm SiGe BiCMOS Technology for mm and sub-mm Wave Applications

Holger Rucker¹

¹IHP

WM5
EuMIC/
EuMC

MONDAY 14:20 - 18:20

REAL Base Station and Related Device Techniques for 5G and Beyond 5G mm-Wave Systems

Chair: Kenjiro Nishikawa¹

Co-Chair: Kazuya Yamamoto²

¹Kagoshima University, ²Mitsubishi Electric Corporation

Room: Gamma 7

More than three years have passed since 5G services started in several country's carriers. 5G sub-6 GHz services, so-called FR1 services, are rapidly becoming popular in cellular communications. However, 5G mm-wave services, so-called FR2 (28 to 39GHz) services have NOT been popular still now. From a viewpoint of device technology, in the sub-6GHz base stations, GaN HEMTs are becoming a main player for higher efficiency operation, compared to Si-LDMOS. In contrast, in the mm-wave base stations, Si-based transistors, such as SiGe HBT and SOI-CMOS, contribute to the realization of most of the real FR2 systems.

This workshop will introduce REAL base station techniques and their supporting REAL device techniques for 5G and beyond 5G mm-wave systems. The feature of this workshop is that the latest information of not only Si-based MIMO and related devices but also GaN-based MIMO and related devices is given at a time.

The workshop attendees, therefore, will be able to learn and understand a variety of technical issues, their countermeasures, and the latest results related to base station transmitters and devices of 5G FR2 at a time. Thus, it is expected that this workshop will be very useful for 5G amplifier designers;

students, beginners or less-experienced circuit/device designers as well as experienced designers engaged in circuit- and device-suppliers for use in 5G and beyond 5G systems.



PROGRAMME

5G and Beyond 5G mm-Wave Market Trend and Related Technical Requirements

Yasunori Suzuki¹

¹NTT docomo, Japan

Millimeter-Wave Colocated- and Distributed-Massive-MIMO, its Spatial Division Multiplexing Selectivity and Energy Efficiency

Tomoya Kaneko¹

¹NEC, Japan

Advanced Millimeter-Wave GaN Power Amplifiers for BTS

Takuma Torii¹, Keigo Nakatani¹, Yutaro Yamaguchi¹, Shintaro Shinjo¹

¹Mitsubishi Electric Corporation, Japan

Highly Scalable GaN Processes for Millimeter Wave Front-End MMICs

Rémy Leblanc¹, Ahmed Gasmil¹, Majid Elkamouchi¹, Joël Moron¹, Philippe Altuntas¹

¹QMMIC SAS, France

Qorvo mm-Wave MMIC Technology for 5G and Beyond

Shuoqi Chen¹, Charles F. Campbell¹, Kevin W. Kobayashi¹

¹Qorvo, USA, ²Qorvo

MONDAY 14:20 - 18:20

Multi-Tone Power Amplifier Characterization as Enabler of Higher Efficiencies and Better Linearity Under Wideband Modulation

Chair: Marc Vanden Bossche¹

Co-Chair: Dries Peumans²

¹NI, ²Vrije Universiteit Brussel - imec

Room: Gamma 6

Power amplifier insight and design have been and still are relying often on continuous wave (CW) characterization. This clearly reflects in the waveform engineering for different classes of operation where voltage and current waveforms are being shaped by manipulating fundamental and harmonic impedances

Unfortunately given the present wideband modulation schemes this approach leads to sub-optimal amplifiers, sacrificing often in power efficiency and/or linearity.

In communications power amplifiers need to meet the 3GPP specifications and as such after fabrication they are tested with realistic signals compliant to the 3GPP standard.

Often efficiency is sacrificed to meet these specifications. Would it not make sense to use the 3GPP compliant realistic signals during the design process so that different figure of merits, like linearity and efficiency are taken directly into account.

Unfortunately these realistic signals are too complex to provide insight that leads to better power efficiency at acceptable linearity. Is the amplifier designer then doomed to use CW signals?

This workshop will introduce the attendees to the practical use of multi-tones making the bridge between CW characterization and the use of realistic modulation signals. Of course, one cannot use any type of

multi-tone to be compliant with the 3GPP standards. Properly designed multi-tone signals are rich enough enabling design trade-offs while meeting closely the 3GPP specification. At the same they are simple enough to provide deep insight in the power amplifier behavior, feeding back into the design.



PROGRAMME

Replacing 3GPP Signals by Multi-Tones: Is It a Bad Idea?

Ricardo Figueiredo¹

¹Universidade de Aveiro

Using Multi-Tones to Unravel the (Non)linear Performance of RF Power Amplifiers

Dries Peumans¹

¹Vrije Universiteit Brussel - imec

Digital Predistortion and Multisines: A Good Marriage?

Amedeo Varano¹

¹imec - Vrije Universiteit Brussel

Multi-Tone and 3GPP Characterization: Not Just Theory!

Marc Vanden Bossche¹

¹NI

MONDAY 14:20 – 18:20

Additive Manufacturing

Chair: Tinus Stander¹

Co-Chair: Riana Helena Geschke²

¹University of Pretoria, ²Fraunhofer FHR

Room: Beta 8

Additive manufacturing of microwave components is augmenting traditional development processes in new ways by enabling complex geometries and single-process production of assemblies and subsystems. This leads to significantly shortened development cycles and cost-effective short production runs.

This workshop on Additive Manufacturing (AM) presents recent developments in the domain of dielectric, metallic and 3D planar additive manufacturing for various applications. Application domains include industrial radar and space applications, with highlighted components including planar circuits, antennas and filters for microwave

and millimeter-wave systems.

Given the typical application areas, criteria such as environmental aspects of the AM materials, as well as cost and weight reduction, are important themes in this workshop. Other aspects of the complete AM design and manufacturing workflow are presented, such as material characterisation, surface metallization, and thermal management. The measurement of surface roughness of AM parts up to millimeter-wave frequencies is presented, as well as its effect on performance. Advantages and disadvantages of different material characterisation techniques are discussed, with data on the effect of uncertainties. Furthermore, it is

demonstrated how efficient thermal management based on metallic AM techniques can be incorporated as a functional and efficient part of the AM design.

In the domain of design approaches, it is often said of AM that "complexity comes for free". This is demonstrated in this workshop, where several projects specifically exploit the unique capabilities of AM production. This includes new approaches to the layout of planar circuits, where unconventional 2.5D and 3D system-in-package solutions can now be realized.



PROGRAMME

Using SLA-Printed Resin Parts as Functional Elements in Microwave Design

Tinus Stander¹

¹University of Pretoria, South Africa

Additive Manufacturing of Millimeter-wave Components for Industrial Radar

Carlos Sempere Sempere Chaves¹

¹Fraunhofer FHR, Germany

Additive Manufacturing for Space Applications: Antennas and Passives

Itziar Maestrojuán Biurrun¹

¹Anteral, Spain

3D Printed Microelectronics & New Design Thinking

Rafael del Rey¹

¹Nano Dimensions, Israel

Determining the Properties of Dielectric Materials in the Millimeter Wave Frequency Range Produced by Additive Manufacturing

Ad Reniers¹, Elmine Meyer¹, Paola Escobari Vargas¹

¹Technical University Eindhoven, The Netherlands

From Surface Roughness Modeling to 3D-Printed Microwave Components

Gerald Gold¹

¹Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany

MONDAY 09:00 – 18:20

Integrated Antenna Systems: Technologies and Innovations for High-Density Antennas and Phased Arrays

Chair: Luigi Boccia¹

Co-Chair: Yong-Ling Ban²

¹University of Calabria, ²University Of Electronic Science and Technology of China

Room: Beta 4

One of the most common requirements of modern antenna systems is the high integration density that is the capability to implement exceptionally dense circuits where radiating elements, electronics, interconnects and DC/control lines are tightly distributed across multiple technology domains. Different technologies are used to combine multiple components and functions onto a single system, and to protect the circuit from external factors such as temperature and moisture.

The possibility to have different implementation solutions for the building blocks of the same antenna system can be functional to a reduction of its cost, size, and mass or

to affect its final performance and functionalities. This aspect is particularly important for millimeter wave systems where the constantly increasing demand for reconfigurable systems makes integration aspects a key enabling technology.

This workshop covers various topics related to the design and integration of phased arrays and antenna systems for millimeter-wave and sub-THz applications. The talks will include discussions on modularity approaches to phased array integration, highly-efficient and miniaturized circuits in SiGe and CMOS for millimeter-wave phased arrays, and scalable multibeam low-cost SATCOM and 5G phased-arrays with wide

scan angles using commercial silicon chips. Additionally, the workshop will feature talks on wide-angle implementation methods for scanning array antennas, multi-layer integration solutions for multibeam antenna design, and advanced transceiver-antenna co-integration techniques at mmWave and sub-THz. The workshop will also discuss the heterogeneous integration strategy of antennas and phased arrays using transparent, flexible, and sub-skin depth layers, as well as antenna array design in multi-layer PCB allowing chip-embedding and air-filled substrate integrated waveguides for D-Band radar applications



PROGRAMME

A Modularity Approach to Phased Array Integration

Luigi Boccia¹

¹University of Calabria, Italy

Multi-Layer Integration Solution to Multibeam Antenna Design

Ji-Wei Lian¹

¹Nanjing University of Science and Technology, China

Antenna Array Design in Multi-layer PCB Allowing Chip-Embedding and Air-Filled Substrate Integrated Waveguides for D-Band Radar Applications

Francesco Filice¹

¹IMEC, Belgium

Advanced Packaging Techniques for mm-Wave Antennas in Package for Array Applications

Rhonda Franklin Drayton¹

¹University of Minnesota, USA

Heterogeneous Integration Strategy of Antennas and Phased Arrays using Transparent, Flexible, and sub-Skin Depth Layers

Wonbin Hong¹

¹Pohang University of Science and Technology, South Korea

Scalable Multibeam Low-Cost SATCOM and 5G Phased-Arrays with Wide Scan Angles Using Commercial Silicon Chips

Gabriel M. Rebeiz¹

¹UCSD, ECE Department, USA

Highly-Efficient and Miniaturized Circuits in SiGe and CMOS for Millimeter-Wave Phased Arrays

Cagri Ulusoy¹

¹Karlsruhe Institute of Technology, Germany

Wide-Angle Implementation Method to Scanning Array Antenna

Qiang Sun¹

¹University of Electronic Science and Technology of China, China

Advanced Transceiver-Antenna Co-Integration Techniques at mmWave and sub-THz: Recent Achievements and Future Challenges

Antonio Clemente¹, Jose Luis Gonzalez¹

¹CEA Leti, France

High-Density Metasurface Antennas with Advanced Capabilities – Design and Integration

Mohsen Sazegar¹

¹Kymeta, USA

FRIDAY 09:00 – 17:20

Virtual Validation of ADAS with Automotive Sensors

Chair: Thomas Zeh¹

Co-Chair: Arsalan Haider¹

¹Kempton University of Applied Sciences

Room: Beta 1/2

Advanced driver-assistance systems (ADAS) are currently an area of focus in the automotive industry. Modern vehicles are equipped with different ADAS, increasing the driver's comfort and safety. The complexity of ADAS is also increasing rapidly, and validation of such systems is becoming challenging. The validation of such a complex system in the real world is expensive and time-consuming. According to the statistical studies, billions km of test driving are required to demonstrate the autonomous vehicle failure rate being lower than that of humans. Moreover, we see increasing efforts and work from academia and industry about virtual validation processes. 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 and LiDAR sensors.

WF1
EuRAD

PROGRAMME

Physical Modelling for Sensors, Millimeter-Wave Radar, LiDAR, and Camera

Hideo Inoue¹

¹Kanagawa Institute of Technology

Environment Recognition Using Deep Learning

Tokihiko Akita¹

¹Toyota Technological Institute

A Workflow to Generate Synthetic Data to Train AI Based Algorithms for AD

Günther Hasna¹, Petr Fomin¹, Aydin Uzin¹

¹ANSYS

Metrics for Specification and Validation of Perception Sensor Simulation

Philipp Rosenberger¹

¹Persival

Making ViL, SiL and Collected Radar Data Comparable: An Application of the Novel Double Area Validation Metric

Lukas Elster¹, Aidar Khakimov²

¹TU Darmstadt, ²TU Ilmenau

Virtual Validation of Radars

Karl Vanäs¹, Stella Bevilacqua¹, Sara Tell¹

¹Volvo Car Corporation

Ray Tracing & 6th Generation Radar Sensor Model

Hasan Iqbal¹, Sreehari Buddappagari¹

¹Continental

Development and Validation of Automotive LiDAR Sensor Model with Standardized Interfaces

Arsalan Haider¹, Michael Köhler¹

¹Hochschule Kempten Blickfeld

Modeling and Validation of Automotive RADAR MMIC Impairments by using the Standardized

Interfaces for Closed-Loop Simulation

Tim Poguntke¹, AbduelKadir Eryildirim², Arsalan Haider³

¹Hochschule Kempten, Infineon Technologies, ²Hochschule Kempten, Infineon Technologies, ³Hochschule Kempten Blickfeld

Simulating Radar Systems: An Overview Over Methods, Applications and Challenges

Christian Bluthardt¹, Thomas Binzer¹

¹Robert Bosch GmbH

Validation of Radar-Based ADAS and AD Functions on Vehicle-In-The-Loop Testbeds

Holger Gryska¹, Jürgen Holzinger²

¹Rohde&Schwarz International GmbH, ²AVL Deutschland GmbH

ASAM Standards for Highly Automated Driving – Helping Achieve the Safety Argumentation

Benjamin Engel¹

¹ASAM e.V.

FRIDAY 09:00 – 17:20

Unlocking the Potential of Radar by Compressed-Sensing, Machine-Learning, and High-Resolution Data Processing

Chair: Maria Antonia Gonzalez Huici¹

Co-Chair: Max Schurwanz²

¹Fraunhofer FHR, ²Hamburg University of Applied Sciences (HAW)

Room: Beta 3/4

In the field of radar, there is a growing need for higher resolutions to enable the detection and accurate localization of targets in complex scenarios, in order to improve the tracking of multiple closely spaced targets or to support correct target identification. Compressive Sensing (CS), which was first proposed in 2005, is by now a mature mathematical theory that allows to achieve higher resolution than conventional methods and which is able to extract underlying information from fewer samples than required by the Nyquist sampling theorem. This can be achieved by a combination of random sampling and sparse signal reconstruction algorithms and under the constraint that the solutions of interest are sparse in some domain (i.e., there are only few non-zero elements plus noise). Radar is an excellent application field for CS methods, because target object scenarios are often intrinsically sparse. For example, in the range domain, Doppler domain, or angular domain,

typically only a few target objects are found. CS algorithms can reliably recover these sparse signals, even when the measurements are noisy or corrupted. In addition to radar, CS can also be applied to optical sensors. Overall, CS has emerged as a powerful tool for signal processing, enabling efficient acquisition, processing, and interpretation of data. However, the adoption of CS techniques in operational systems is still limited in some cases due to practical constraints such as latency, memory size, and power consumption dictated especially by the iterative nature of the sparse reconstruction algorithms used in CS.

In parallel, in recent years Machine Learning (ML) has achieved tremendous success in many commercial applications such as automatic face recognition, speech recognition, natural language processing, autonomous vehicles, and robotics. Machine Learning has the potential to provide computationally efficient approaches to improve target

detection, localization and classification in radar with enhanced resolution. However, an important element in the success of ML for these applications is the availability of large databases required for the training, which may be a strong limitation in certain cases. Properly designed, ML techniques may complement existing CS solutions for tasks like target object detection and localization, while deep-learning techniques may open up new potentials for tasks such as target object classification.

This workshop will cover exciting applications of advanced data processing approaches for radar, joint radar and communications (RadCom) as well as optical sensors, with special focus in CS and ML based techniques, including also aspects of high-resolution data processing, such as synthetic aperture radar (SAR). The potential and limitations of the proposed solutions will be highlighted.

WF2
EuRAD

PROGRAMME

The Needle in the Haystack – Exploiting Sparsity with Compressed-Sensing-Aided Angle-of-Arrival Estimation for MIMO Radar and Optical Sensors

Max Schurwanz¹, Andrej Harlakini², Peter A. Hoeher²

¹Hamburg University of Applied Sciences (HAW), ²Kiel University

Optimal Design of MIMO Sparse Arrays

Maria Antonia Gonzalez Huici¹, Aitor Correas-Serrano¹, Christian Greiff¹, Christian Kurtzschied¹, Renato Simoni¹, Saravanan Nagesh¹

¹Fraunhofer FHR

Advancing Future Generation Digital Radars Through Compressive Sensing

Christina Bonfert¹, David Werbunat¹, Christian Waldschmidt¹

¹University of Ulm

Exploiting Learning and Sparsity for Joint Radar-Communications

Kumar Vijay Mishra¹

¹United States DEVCOM Army Research Laboratory

Artificial Neural Networks for DoA Estimation in Radar

Markus Gardill¹

¹Brandenburg University of Technology

Machine Learning and Compressive Sensing Techniques for DoA Estimation in Automotive Radars

Ignacio Roldan¹, Francesco Fioranelli², Alexander Yarovoy²

¹TU Delft, ²TU Delft

Automotive SAR Enabled by Autarkic Odometry Determination for Dynamic Driving Applications

Thomas Gisder¹, Marc-Michael Meinecke¹, Heiko Gustav Kurz¹

¹Volkswagen

Novel Concepts for Implementing Deep Neural Network Based Radar Angle Bearing and Imaging with Ultra Sparse Arrays

Christian Schüßler¹, Marcel Hoffmann¹, Martin Vossiek¹

¹University of Erlangen-Nuremberg

FRIDAY 09:00 – 13:00

Characterization of sub-THz Channels for Communication and Sensing

Chair: Fatemeh Norouzian¹

Co-Chair: Marina Gashinova¹

¹University of Birmingham

Room: Beta 5

Sub-THz frequency region has gained a lot of attention globally owing to promise to deliver high data rate communications and high-resolution sensors and imaging systems. Maturity of the components and demonstration of capabilities of sub-THz sensing and communication systems indicate the pre-commercial level, yet, there are some gaps; first of all related to anticipated degradation of performance in adverse environmental conditions and other phenomena within the propagation channel.

A comprehensive channel characterization is critical step to determine and quantify the potential limitations and bounds for the sub-THz operations. This workshop explores several approaches and methodologies of sub-THz channel characterization for indoor and outdoor applications, highlighting

recent advances and identifying challenges.

WF3
EuRAD

PROGRAMME

Characterization of mm-Wave and sub-THz Channels for Automotive Sensing

Fatemeh Norouzian¹

¹University of Birmingham, UK

Channel and Propagation Modelling for Future High Frequency Applications

Joonas Kokkonen¹

¹University of Oulu, Finland

Characterisation of Frequency Selective Reflections Off Indoor Surfaces for sub-THz Band

Mohsen Khalily¹

¹University of Surrey, UK

Terahertz Sensing for Future Healthcare

Qammer H. Abbasi¹

¹University of Glasgow, UK

The Development of THz Systems for Industrial Applications in the Frequency Range from 0.1 THz to 0.5 THz

Dirk Nüßler¹

¹Fraunhofer FHR, Germany

FRIDAY 09:00 – 13:00

Radar Target Simulation

Chair: Benjamin Nuss¹

Co-Chair: Christina Bonfert²

¹Karlsruhe Institute of Technology, ²Ulm University

Room: Gamma 6

Automotive radar sensors play an important role in the current development of autonomous driving. Their ability to detect objects even under difficult conditions makes them indispensable for environment detection in autonomous vehicles. Since their functionality must be validated in the field, a fully integrated test system is required. Radar target simulators (RTS) are a potential solution to this task that has recently attracted much attention from both the research and commercial sectors. Target simulators are capable of deceiving a radar under test (RuT) by creating an artificial environment of virtual radar targets. To accomplish this task, RTS systems receive the radar signal emitted by the RuT and send back a modified version of it. However, this modification can be implemented using different methods

depending, for example, on the modulation scheme of the radar as well as on the range to be emulated. This workshop provides an overview and comparison of different RTS implementations and their expected characteristics. The advantages and disadvantages of the different concepts are discussed and possible solutions to meet different specifications are shown with concrete examples. In addition, new developments, e.g. for the precise generation of complex traffic scenarios and realistic propagation effects, are presented.

WF4
EuRAD

PROGRAMME

Current Status and Recent Advances in Radar Target Simulation

Christoph Birkenhauer¹

¹FAU Erlangen-Nuremberg

Emerging Challenges in Radar Target Emulation

Thomas Dallmann¹

¹TU Ilmenau

High-Precision Automotive Radar Target Simulation

Benjamin Nuss¹, Axel Diewald¹

¹Karlsruhe Institute of Technology

Automotive Radar Target Simulation Techniques for the Generation of Complex Traffic Scenarios

Pirmin Schöder¹

¹Ulm University

ASGARD2: Automotive RTS with Angle Perception in Near-field

Fahimeh Rafieinia¹, Kasra Haghighi¹

¹UniqueSec

Enhancing ADAS Performance through Radar Data Injection

Vitali Anselm¹

¹NI

Radar Test Technology for Production Test and Vehicle End-of-line Applications – Challenges and Solutions

Henrik Liebau¹, Arvid Sims¹

¹Keysight

FRIDAY 09:00 – 13:00

Applications for Advanced Passive Radar Systems

Chair: Philipp Markiton¹

¹Fraunhofer FHR

Room: Gamma 7

The workshop is about advanced techniques and applications for passive radars with the aim to provide a wide audience with an overview of the theoretical aspects as well as an insight into real world applications of advanced passive radar techniques. The first lecture will present passive radar fundamentals to provide the attendees with basic knowledge required for this workshop.

Advanced applications of passive radar are covered next: the first presentation focuses on passive radar on moving platforms for moving target indication using multi-channel PCL. Then modern passive radar imaging techniques using Synthetic Aperture Radar (SAR) techniques will be discussed, including the definition of the signal model, which allows to design and develop appropriate signal processing algorithms.

The next part of the workshop focuses on new opportunities for passive radar, which are offered by advanced space-based and terrestrial communication infrastructures, that have been deployed for operation in recent years. Massive space-based constellations, e.g. Starlink and OneWeb, offer new opportunities and challenges for passive radar in terms of target detection and imaging, which will be discussed in a lecture. The overview of new future potential illuminators of opportunity concludes with an overview of terrestrial communication infrastructures such as 5G and 6G, which are currently being deployed in many countries worldwide.

A theoretical background will be presented as introduction for each addressed topic, in order to provide the audience with the

required knowledge. After presentation of the appropriate signal processing techniques, results from evaluation of experimental data will be shown.



PROGRAMME

Introduction to Passive Radars

Philipp Markiton¹

¹Fraunhofer FHR

Multi-Channel PCL for GMTI

Philipp Markiton¹

¹Fraunhofer FHR

Passive Radar Imaging

Damian Gromek¹

¹Warsaw University of Technology

Passive Radar Techniques Based on Broadband Communication LEO Satellite Constellations

Rodrigo Blazquez-Garcia¹

¹Fraunhofer FHR

Opportunities and Limitations in 5G-Based Passive Radars

Piotr Samczyński¹

¹Warsaw University of Technology

FRIDAY 09:00 – 13:00

Industrial Radar

Chair: Dirk Nüßler¹

Co-Chair: Marta Arias Campo²

¹Fraunhofer FHR, ²IMST GmbH

Room: Gamma 8

Modern radar systems use in industrial measurement technologies has increased rapidly in recent years. The driver of this development is the increasing availability of compact, high-performance radar systems, which have become more common for inline measurement systems and mainly serve to inspect singular goods or bulk materials. The ongoing development of Si/SiGe technology enables large bandwidths at sub-THz frequencies, which is translated in high-resolution measurements. Furthermore, in the foreground of this rapid evolution are the further development of real-time capable signal processing to meet the high production stack, as well as new antenna concepts and multi-channel system designs. In addition to a high measurement speed, the systems now achieve measurement accuracies in the

µm range. Initially, the field of application of radar systems was pure distance measurement in the production process, primarily at measuring positions with harsh environmental conditions prevented or complicated the use of optical sensors. Nowadays, system concepts for material characterization, layer thickness measurement or 3D imaging are gaining in importance. The range of applications of modern radar systems in industrial metrology extends from the monitoring of rolling processes in the steel industry to layer thickness measurement technology in plastics production, or the recycling and sorting of plastics to the measurement of layer thickness in car production. The workshop will provide an overview of current technological trends and current and future applications for radar systems in industrial

metrology.



PROGRAMME

Radar Application in the Recycling Economy - Project Waste4Future

Dirk Nüßler¹

¹Fraunhofer FHR, Germany

Road Surface Recognition at mm-Wavelengths Using a Polarimetric Radar

Vessen Vassilev¹

¹Chalmers, Sweden

Industrial D-Band FMCW Radar: Hardware, Signal Processing, and Applications

Jan Barowski¹

¹Ruhr University Bochum, 2Pi-Labs, Germany

Radar Solutions for Applications in Hot Rolling Mills

Bettina Fischer¹

¹IMS Messsysteme, Germany

Lens Antenna Design for Sub-THz Industrial Radar Applications

Marta Arias Campo¹

¹IMST GmbH, Germany

Industrial Terahertz Imaging Radar

Fabian Friederich¹

¹Fraunhofer ITWM, Germany

ANSYS

Technical Workshop



Tuesday 19th, Wednesday 20th, and Thursday 21st September 2023

10:00 – 17:00

Room: Beta 1

When visionary companies need to know how their world-changing ideas will perform, they close the gap between design and reality with Ansys simulation. For more than 50 years, Ansys software has enabled innovators across industries to push boundaries by using the predictive power of simulation. From sustainable transportation to advanced semiconductors, from satellite systems to life-saving medical devices, the next great leaps in human advancement will be powered by Ansys.

Take a leap of certainty ... with Ansys.

	TUESDAY 19 TH	WEDNESDAY 20 TH	THURSDAY 21 ST
10:00 11:00	The Latest and Greatest Features in HFSS 2023 (Update Overview) Markus Laudien Ansys	Multiphysics Analysis of 5/6 G Antenna Arrays David Prestaux Ansys	RF Filter Synthesis for Planar and 3D Filter Topologies Using Nuhertz and Synmatrix Markus Laudien & Diamond Liu Ansys & Synmatrix Tech
11:00 11:15	Q&A	Q&A	Q&A
11:15 11:30	Break	Break	Break
11:30 12:30	Installed Performance Analysis of Antenna Phased Arrays: Challenges and Solutions Alexander Shalaby CADFEM	An Easy Workflow Made Even Easier: Combining PCB-Layout and 3D elements Markus Laudien Ansys	The Latest and Greatest Features in HFSS 2023 (Update Overview) Olivier Pelhatre Ansys
12:30 12:45	Q&A	Q&A	Q&A
12:45 13:00	Break	Break	Break
14:30 15:30	Accurate and Efficient RFIC Simulation Workflow in HFSS Markus Laudien & David Prestaux Ansys	Save Your Time: Automation Approaches in Circuit and Layout Geometries Using PyAEDT Olivier Pelhatre Ansys	Meet the Experts: Open Table for Questions
15:30 15:45	Q&A	Q&A	
15:45 16:00	Break	Break	
16:00 17:00	The Latest Advances in Simulation for Automotive Radar Applications Amazir Moknache Ansys	Simulating Cable Harness and EMC sources for Automotive Applications – An Easy Tool for a Complex Task: Ansys EMC Plus Amazir Moknache Ansys	

Dassault Systemes

Technical Workshop



Tuesday 19th September 2023

09:00 – 18:00

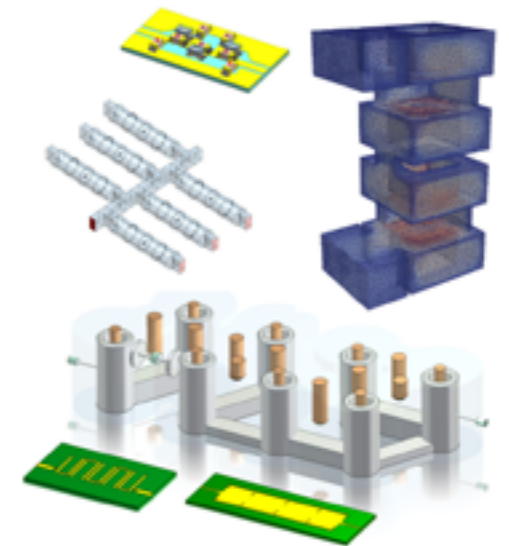
Room: Beta 5

Chair: Theunis Beukman

Co-Chair: Carlos Vicente

Filters & RF Passive Components with SIMULIA CST Studio Suite

Dassault Systèmes, the 3DEXPERIENCE Company, is a catalyst for human progress. We provide business and people with collaborative virtual environments to imagine sustainable innovations. By creating 'virtual twin experiences' of the real world with our 3DEXPERIENCE platform and applications, our customers push the boundaries of innovation, learning and production. On top of that, SIMULIA, a brand of Dassault Systèmes, delivers realistic simulation applications that enable users to explore real-world behavior of product, nature and life. Modern radio frequency (RF) front-end systems in both satellite and telecommunications require a multitude of filters to mitigate interference – especially with the increased use of carrier aggregation and demands on spectrum utilization. Furthermore, such systems have stringent power considerations such as efficiency, throughput of large RF signals or reliability; careful design and analysis are required in all of these cases. SIMULIA CST Studio Suite® offers a wide range of solver technologies, synthesis tools and optimization algorithms. Join us in this technical workshop to explore the state-of-the-art in simulation for your RF applications.



09:00 – 10:40 New in CST Studio Suite®

We will show a range of significant features and functionality introduced in recent releases of SIMULIA CST Studio Suite®. To name a few: the non-parametric shape optimization, which revolutionizes the way we approach 3D models for EM; the new Eigenmode solver offers the ability to include lossy materials, boundaries and complex port terminations; sensitivities in general parametric models are available for tuning or optimization; coupled workflows in a single environment makes it easy to take both low- and high-frequency effects into account for ferrite devices.

11:20 – 13:00 Filter Design

The design of filtering devices is challenging, and typically requires expert knowledge. At the same time, the process easily results in a multitude of repetitive tasks and trials. To ease this burden and make it more accessible to even less experienced designers, SIMULIA CST Studio Suite® offers advanced technologies with Filter Designer 3D for the synthesis, modelling and optimization of RF filters. Advanced techniques, based on the coupling matrix and ladder circuits, allow the extraction of filter parameters and thus opens the door to design complex 3D geometries efficiently. This also includes the newly added functionality for lowpass/highpass filters.

14:20 – 16:00 Passive Components & Feed Networks

Diplexers and multiplexers require a complicated design process. We will show how to simplify this procedure by making use of our specific tools and workflows. In particular, Fest3D for waveguide-based components can greatly speed up the design of multiplexers. Similarly, Filter Designer 3D is able to design diplexers directly and speed up the design of multiplexers regardless the technology they are implemented in. Also, a non-parametric optimization strategy, combining CST Studio Suite® and Tosca, will be presented for the optimization of various components in an antenna feed chain. This is a key workflow to take profit of all the advantages that additive manufacturing present.

16:40 – 18:00 High Power Components

Many different applications require the use of high power levels. Some examples are base stations, satellite communication systems, electronics, etc. CST Studio Suite® environment provides different tools and solvers to deal with specific aspects of high power components such as thermal effects, fluid flow analysis, stress and deformation analysis or RF breakdown. We will show some use cases such as RF breakdown analysis in filters with Spark3D or water-cooled devices for which one uses the Conjugate Heat Transfer (CHT) solver within CST Studio Suite®.

IHP

Technical Workshop

Wednesday 20th September 2023

09:30 - 13:00

Room: Beta 5

Free to attend
For registration
contact: [sojka@ihp-
microelectronics.com](mailto:sojka@ihp-microelectronics.com)



22nd IHP Technology & Service Workshop

IHP is one of the world's leading research institutions in the field of silicon-germanium electronics, and its electronic and photonic-electronic technologies and circuits are among the most powerful in the world. The workshop will present the latest information on IHP's technologies and offerings, which are well established in applications such as wireless and broadband communications, health, space and Industry 4.0.

09:30 - 10:10 IHP's Research & Development for CMOS+X Technology Extensions

A. Mai

IHP technology research and developments are focused on functional extensions of core SiGe BiCMOS technologies to enable smart system solutions e.g. for wireless- and broadband communication. This talk will present the current status and roadmap of various integration concepts that focus on new generations of SiGe-RF devices, electronic-photonic co-integration and dedicated device developments. Moreover, approaches for future hybrid integration methods for InP-on-Si, scaled CMOS with SiGe-HBT as well as radiation-hard and high-voltage (LDMOS) device integration in IHP technologies will be introduced.

10:10 - 10:50 MPW Service for SiGe BiCMOS, Silicon Photonics and Customized Technologies

R. Scholz

IHP offers research partners and customers access to its high-performance SiGe BiCMOS technologies with dedicated integrated RF and silicon photonics modules, as well as development support for dedicated process steps and devices. IHP's portfolio includes the world's fastest integrated SiGe heterobipolar transistors, and moreover special MPW runs with memristor devices for AI, with a graphene module for photonic devices, or with a backside redistribution layer for advanced packaging. The offer also includes support for the development of dedicated processes on single tools, or of process flows for special devices or interposer flows, as well as the adaption of existing standard process flows. The talk will provide an overview on the technologies, available special modules, MPW organization and scheduling, and technology development services.

10:50 - 11:10 Coffee Break

11:10 - 11:50 Process Design Kit to develop products, serve education and support research projects

F. Vater

This talk will introduce professional Process Design Kits (PDKs) for IHP's SiGe BiCMOS and electronic-photonic technologies, which are offered through the MPW service. This is the foundation for developing circuits with the world's fastest bipolar transistors in the sub-terahertz range. For photonic PDK, an approach to the development of electrical-optical co-simulation will be demonstrated. IHP has released the first process and PDK information as open source. A roadmap for analog and RF design flow using open source tools will be presented. The primary goal is to use this PDK in research and education programs. Finally, details of IHP's design support for new research modules such as memristive devices for AI or graphene for photonic devices as well as further steps in the development of Assembly Design Kits (ADKs) for RF interconnects will be presented.















11:50 - 12:30 IHP Solutions GmbH Production and Value-Added Services for Customers' ASICs

A. Gajda

IHP Solutions GmbH is a 100% subsidiary of IHP, established in 2015 as an industry-oriented company focusing on direct industrial exploitation and further development of IP from IHP. The foundry services for international customers, utilizing the IHP qualified high performance SiGe BiCMOS technologies for the fabrication of customer application specific integrated circuits (ASICs) will be presented. The talk will give an overview of the IHP Solutions offer for R&D and production services, as well as value added services (VAS) and supply chain management (SCM).


























12:30 Lunch

SUNDAY OVERVIEW

Room	09:00 - 10:40	11:20 - 13:00	14:20 - 16:00	16:40 - 18:20
Beta 1/2	  SC1 EuMIC Fundamentals of Microwave PA Design			
Beta 3	 WS3 EuMIC Highly-Integrated mm-Wave Circuits and Systems for Emerging Radar Applications		 WS6 EuMIC/EuRAD mm-Wave Integrated Radar Circuit Design and SoC Integration in Silicon Technologies	
Beta 4			 WS8 EuMC Polarization Surfaces for Next-Generation Communications Systems	
Beta 5	 WS2 EuMIC Terahertz Device, Circuit and System fundamentals and applications			
Beta 6	 WS4 EuMIC/EuRAD Joint Communications and Sensing		 WS5 EuMIC/EuMC Heterogeneous Integration for Next Generation of Communication and Sensing	
Beta 7	 WS1 EuMC Broadband and Microwave Signal Processing Using Electronic-Photonic Integration			
Beta 8	 13th Tom Brazil Doctoral School of Microwaves From Microwaves to Machine Learning: Building and Training Artificial Neural Networks for Radar-Based Gesture Recognition			
Beta 9	 7th European Microwave Student School Microwave Measurement Techniques			
Gamma 6	 SC2 EuMIC/EuMC Wideband Microwave Measurements of Multi-Port Devices on VNA-type Measurement Systems		 WS7 EuMIC/EuMC Design, Linearization, and Optimization Techniques for Multiple-Input Power Amplifiers	
Gamma 7			 WS9 EuMC/EuRAD RF Packaging and IC Integration for Communication and Radar Applications above 100 GHz	

■ 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
Alpha 5	  Automotive Forum			
Alpha 6	 EuMIC01 GaN LNA	 EuMIC05 EuMIC Opening	 EuMIC06 Advanced PAs for Microwave Bands	 EuMIC10 GaN-PAs for mm-Wave Bands
Beta 1/2	 WM1 EuMC Millimeter-Wave On-Wafer Measurement and Material Measurement for Future Communications and Automotive Radar Sensors			
Beta 3	 WM2 EuMC Measurement Methods for Passive Intermodulation and Environmental Testing of Electronic Circuits			
Beta 4	 WM9 EuMIC Integrated Antenna Systems: Technologies and Innovations for High-Density Antennas and Phased Arrays			
Beta 5	 EuMIC02 Novel Modelling Techniques for GaN and Cryogenic Devices		 EuMIC07 Novel Techniques for Microwave and mm-Wave Circuits and Systems Design	 EuMIC11 Novel Devices and their Integration
Beta 6	 EuMIC03 III-V mm-Wave Devices and Characterisation		 EuMIC08 High-Speed Mixed-Signals Circuits and Systems	 EuMIC12 Frequency Conversion Circuits
Beta 7	 EuMIC04 Techniques for Measurement and Detection		 EuMIC09 Sub-THz Circuits and Techniques	 EuMIC13 Circuits and Techniques for Phased-Array Systems
Beta 8	 WM3 EuMC mMIMO Active Antenna System Calibration for 5G/6G		 WM8 EuMC Additive Manufacturing	
Beta 9	 7th European Microwave Student School Microwave Measurement Techniques			
Gamma 6	 WM4 EuMC Technology for RF/MW and Pulsed Power Bioelectromagnetics		 WM7 EuMC Multi-Tone Power Amplifier Characterization as Enabler of Higher Efficiencies and Better Linearity Under Wideband Modulation	
Gamma 7	 WM5 EuMIC/EuMC SiGe BiCMOS Technologies as Enabler for D-Band Applications and Beyond		 WM6 EuMC REAL Base Station and Related Device Techniques for 5G and Beyond 5G mm-Wave Systems	
Gamma 8	 15th ARFTG On-Wafer User's Forum			

■ EuMC
 ■ EuMIC
 ■ EuRAD
 ■ Students
 ■ EuMW
 ■ Exhibitors

TUESDAY OVERVIEW

Room	09:00 - 10:40	11:20 - 13:00	14:20 - 16:00	16:40 - 18:20
Alpha 5/6	EuMIC14 CMOS Circuits Techniques for Communication Applications	EuMW01 EuMW/EuMC Opening Session	EuMIC/EuMC02 EuMIC Foundry Session Panel Session on European Chips Act	EuMIC20 EuMIC Closing
Beta 1	Exhibitor Workshop Ansys			
Beta 2	EuMC01 Interconnects and Packaging - I		EuMC04 Passive Device Development with Innovative Design Approaches	EuMC07 Interconnects and Packaging - II
Beta 3/4	EuMIC/EuMC01 Focused Session Low Noise mm-Wave Integrated Technologies for Sub-THz Wireless Communication		EuMC05 Focused Session THz Antennas and Systems	EuMC08 Focused Session 6G THz Communications
Beta 5	Exhibitor Workshop Dassault Systemes			
Beta 6	EuMIC15 Building Blocks of Beamforming Front-Ends	EuMW03 Joint Women in Microwaves (WiM) and Young Professionals (YP) Event		EuMW04 Special Session MTT-S Inter-Society Technology Panel Session - Biomedical Applications
Beta 7	EuMIC16 Advanced PAs on SiGe & InP Technologies		EuMIC18 PAs for Communication Systems	EuMC09 Microwave and Millimeter-wave Systems and Applications
Beta 8	EuMC02 Advances in Front-End Architectures and Active Components		EuMIC19 Circuits for Broadband mm-Wave Transceivers	EuMW05 Special Session APMC
Beta 9	EuMC03 Integration Technologies Based on Advanced Materials and Topologies		EuMC06 Multi-Functional and Reconfigurable Planar Filters	EuMC10 New Technologies in Planar Filters
Exhibition Hall		EuMIC17 EuMIC Poster		EuMIC/EuMC03 EuMIC/EuMC Poster

WEDNESDAY OVERVIEW

Room	09:00 - 10:40	11:20 - 13:00	14:20 - 16:00	16:40 - 18:20
Alpha 5	EuMC11 Characterization of Multi-Antenna Systems	EuRAD02 mm-Wave Antennas for Radar Applications	EuRAD04 Automotive Radar Signal Processing	EuRAD05 High-Resolution Radar and Imaging
Alpha 6	EuRAD01 EuRAD Opening	Defence, Security and Space Forum		
Beta 1	Exhibitor Workshop Ansys			
Beta 2	EuMC12 Non-Planar Filters	EuMC17 Passive Components	EuMC20 Filters by Additive Manufacturing	EuMC25 Beamsteering Arrays and Reconfigurable Intelligent Surfaces
Beta 3/4	EuMC13 Additive Manufacturing of Microwave Components	EuMC/EuRAD01 Waveforms for Distributed Networks and Integrated Communications and Sensing	EuMC/EuRAD02 Focused Session Joint Communication and Radar Sensing - A Step towards 6G Part 1	EuMC/EuRAD04 Focused Session Joint Communication and Radar Sensing - A Step towards 6G Part 2
Beta 5	Exhibitor Workshop IHP		EuMC21 Metamaterials and Metasurfaces	EuMC26 Field Theory and Numerical Techniques
Beta 6	EuMW06 Special Session MTT-S Inter-Society Technology Panel Session - Wireless Power Technologies	EuRAD03 Radar Target Measurement and Detection	EuMC/EuRAD03 Antenna Techniques for Radar	EuMC/EuRAD05 AESA & MIMO Antenna Technology
Beta 7	EuMC14 Signal Integrity and EMC	EuMC18 Microwave Components for Space Applications	EuMC22 Medical Microwave Applications and Dosimetric Studies	EuMC27 Microwave Sensing Techniques for Biological Materials
Beta 8/9	EuMC15 High Efficiency Power Amplifier and Linearization Techniques	EuMC19 High Power Device and Amplifier Technology	EuMC23 Advanced THz Device and Photonic Techniques	EuMC28 Material and Waveguide Measurement
Exhibition Hall		EuMC16 EuMC Poster 1		EuMC24 EuMC Poster 2

THURSDAY OVERVIEW

Room	09:00 - 10:40	11:20 - 13:00	14:20 - 16:00	16:40 - 18:20
Alpha 5	5G to 6G Forum			
Alpha 6	EuRAD06 Focused Session Automotive PMCW Radars Part 1	EuRAD08 Focused Session Automotive PMCW Radars Part 2	EuMC/EuRAD08 Microwave Sensing Systems and Components	EuMC41 EuMC Closing Session
Beta 1	Exhibitor Workshop Ansys			
Beta 2	EuMC29 MHz to GHz Wireless Data and Power Transfer Systems	EuMC34 Wearable and Flexible Solutions for Energy Harvesting	EuMC38 MHz to GHz Components and Sub-Systems for Wireless Data and Power Transfer	
Beta 3/4	EuMC/EuRAD06 Innovative Designs for Radar, Satcom and mm-Wave Antennas	EuMC35 Innovative Concepts for Radar, Satcom and mm-Wave Antennas	EuMC39 OTA and Wideband Measurements	
Beta 5	EuMC31 Calibration and Deembedding	EuMC36 Channel Modelling and Measurement	EuMW07 Special Session India Business	
Beta 6	EuMC32 Beam-Steering and Beam- Switching Array Antennas	EuRAD09 Machine Learning for Radar	EuMC40 5G and MIMO Antennas	
Beta 7	EuMC33 Satcom and mm-Wave Antennas	EuRAD10 Modelling and Simulation	EuMC/EuRAD09 Advancement in Radar Systems and Concepts	
Beta 8/9	EuRAD07 Emerging Industrial Applications	EuMC37 Microwave Sensors for Material Measurements	EuRAD11 Automotive Radar	
Beta Level				EuRAD12 EuRAD Poster
Exhibition Hall		EuMC/EuRAD07 EuMC/EuRAD Poster		

■ EuMC ■ EuMIC ■ EuRAD ■ Students ■ EuMW ■ Exhibitors

FRIDAY OVERVIEW

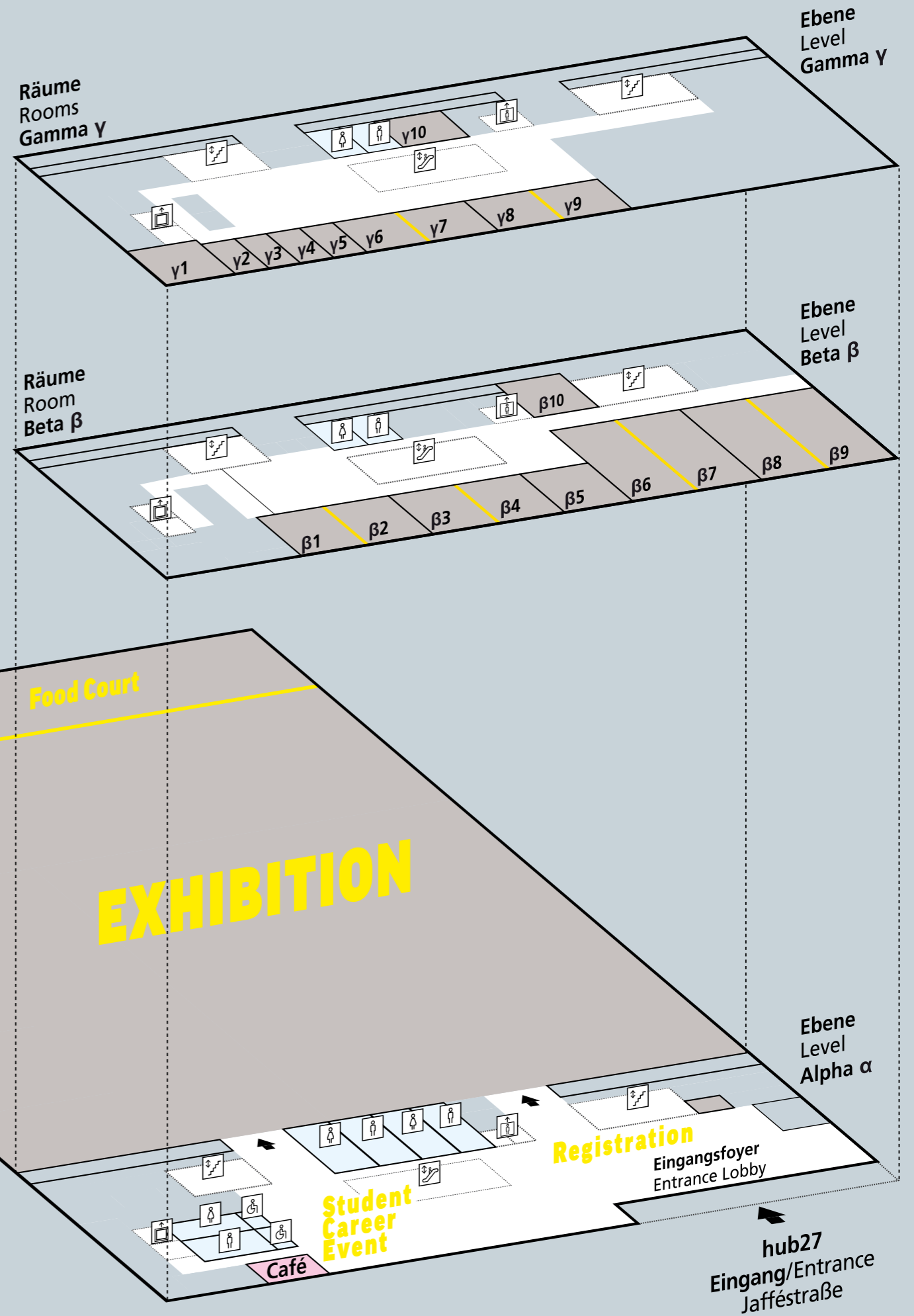
Room	09:00 - 10:40	11:20 - 13:00	14:00 - 15:40	15:40 - 17:20
Alpha 5/6		EuRAD Lunch	EuRAD19 EuRAD Closing	
Beta 1/2	WF1 EuRAD Virtual Validation of ADAS with Automotive Sensors			
Beta 3/4	WF2 EuRAD Unlocking the Potential of Radar by Compressed-Sensing, Machine-Learning, and High-Resolution Data Processing			
Beta 5	WF3 EuRAD Characterization of sub-THz Channels for Communication and Sensing			
Beta 6	EuRAD13 Focused Session UAV-based Radar		EuRAD16 Radar Sensing and Joint Communication	
Beta 7	EuRAD14 mm-Wave Hand Gesture Recognition		EuRAD17 Human Activity Monitoring incl. Vital Sign Extraction	
Beta 8/9	EuRAD15 Short Range Imaging Radar		EuRAD18 Imaging by Automotive Radars	
Gamma 6	WF4 EuRAD Radar Target Simulation			
Gamma 7	WF5 EuRAD Applications for Advanced Passive Radar Systems			
Gamma 8	WF6 EuRAD Industrial Radar			

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Venue Overview



- Walk to the Welcome Reception (15 min.)
- Walk to the TPC Lunch (15 min.)
- Walk to the S-Bahn (7 min.)



Exhibitor List

A 6G-RIC · A.H. Systems · ABS Technics · ACST · Active Tech. · Advanced Microwave Tech. · AFT Microwave · AGC · AINFO · Alter Tech. Tüv Nord · Altum RF · American Standard Circuits · Ampleon · AnaPico · Anhui LuXun Electronic and Tech. · Anritsu · Ansys · AO Tech. · Artech House · ASB · AT Microwave · ATEK MIDAS · Automatisierungstechnik Voigt · AXTAL **B** Becker Nachrichtentechnik · Benchmark Elec. · Bird Tech. · bsw TestSystems & Consulting **C** Cadence Design Systems · CADFEM · Ceyear Tech. · Chengdu Eastlead Elec. Tech. · Chengdu EastMicro Tech. · Chengdu Hanxin Guoke Integration Tech. · Chengdu Hardware Tuohai Comm. Tech. · Chengdu Hualuo Tech. · Chengdu Huaming Tech. · Chengdu Huaxing Dadi Technology · Chengdu Intelligent Microsystem Tech. · ChengDu JIACI TECH. · Chengdu Jingxin Tech. · Chengdu Lingyi Comm. Tech. · Chengdu Microem Tech. · Chengdu Precision Rong Creation Tech. · Chengdu Qihang Sys. Integration · Chengdu Sampling Master Elec. Tech. · Chengdu Seekon Microwave Comm. · Chengdu Sinoscite Tech. · Chengdu SIWI High-Tech Ind. · Chengdu Skylink Intellitech · Chengdu Sufastech Tech. · Chengdu Wattsine Elec. Tech. · Chengdu Weixiang Tech. · Chengdu Yatop · Chengdu Yuexiang Tech. · Chengdu Zysen Tech. · Chip Integration Tech. Center · ChongQing Ceratronics Tech. · CML Microcircuits · Coilcraft · Com.Int.El. · Comm. & Power Ind. · Compound Semicon. (Xiamen) Tech. · Copper Mountain **D** Dalian Dalicap Tech. · Danyang Teruilai Elec. · Dassault Systèmes · dataTec · DB Design Comm. Tech. · DICONEX DELTA OHM · DiTom Microw. · dSPACE **E** EISO · Electro Technik Ind. · EM Invent · EMCO ·

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