

# **2022 17th European Microwave Integrated Circuits Conference (EuMIC 2022)**

**Milan, Italy  
26-27 September 2022**



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## EuMIC01 : Multiphysics Modelling Techniques for Advanced Devices and Circuits

Chair: Raphaël Sommet, XLIM (UMR 7252), France

Co-Chair: Antonio Raffo, Università di Ferrara, Italy

09:00–10:40, Monday 26th September 2022, Amber 1

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- (NA)  **Innovations in Characterizing and Modelling Modulation Distortion in Active Components** (Invited Keynote)  
*Jan Verspecht, Keysight Technologies, USA*
- 1  **Surface and Buffer Trap Signatures in Fe-Doped AlGaIn/GaN HEMT Identified by LF S-Parameter TCAD Simulations**  
*Jean-Christophe Nallatamby<sup>1</sup>, Jose Anderson Silva Dos Santos<sup>1</sup>, P. Vigneshwara Raja<sup>2</sup>, Mohamed Bouslama<sup>1</sup>, R. Sommet<sup>1</sup>*  
<sup>1</sup>XLIM (UMR 7252), France; <sup>2</sup>IIT Dharwad, India
- 5  **Efficient EM-Based Variability Analysis of Passive Microwave Structures Through Parameterized Reduced-Order Behavioral Models**  
*C. Ramella, A. Zanco, M. De Stefano, T. Bradde, M. Pirola, S. Grivet-Talocia, Politecnico di Torino, Italy*
- 9  **A Mixer-Like Nonlinear Analysis for GaN HEMT Supply-Modulated Power Amplifier at 3.8GHz**  
*Lorenzo Pagnini, Giovanni Collodi, Alessandro Cidronali, Università di Firenze, Italy*
- 13  **TCAD-Based Dynamic Thermal X-Parameters for PA Self-Heating Analysis**  
*S. Donati Guerrieri, C. Ramella, E. Catoggio, F. Bonani, Politecnico di Torino, Italy*






## EuMIC02 : Millimeter-Wave Integrated Circuits

Chair: Friedel Gerfers, Technische Universität Berlin, Germany

Co-Chair: Lars-Erik Wernersson, Lund University, Sweden

09:00–10:40, Monday 26th September 2022, Amber 2

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- (NA)  **GaN MMICs for Millimeter-Wave Front Ends** (Invited Keynote)  
*Zoya Popović, University of Colorado Boulder, USA*
- 17  **GaAs MMIC Interferometer for Broadband Interference Suppression**  
*Paige Danielson, Megan Robinson, Gregor Lasser, Zoya Popović, University of Colorado Boulder, USA*
- 21  **Design of a 5G Application CML Frequency Divider for Improved Efficiency**  
*Adam Waks<sup>1</sup>, Olivier Tesson<sup>1</sup>, Mike Bellanger<sup>1</sup>, Thierry Taris<sup>2</sup>, Jean-Baptiste Begueret<sup>2</sup>*  
<sup>1</sup>NXP Semiconductors, France; <sup>2</sup>IMS (UMR 5218), France
- 25  **A Ka-Band GaN 2×4 MMIC Switch for Compact and Scalable Switch Matrices**  
*Andrea Biondi<sup>1</sup>, Francesco Scappaviva<sup>1</sup>, Luca Cariani<sup>1</sup>, Francesco Vitulli<sup>2</sup>, Francesco Coromina<sup>3</sup>, François Deborgies<sup>3</sup>*  
<sup>1</sup>MEC, Italy; <sup>2</sup>Thales, Italy; <sup>3</sup>ESA-ESTEC, The Netherlands
- 29  **A W-Band Transmitter in 0.13μm SiGe Technology**  
*Rui Cao, Zhuang Li, Yulong Xu, Yan Zhang, Xiaohui Tao, Lihui Jiang, CETC 38, China*




## EuMIC03 : Advanced Microwave Components

Chair: Ulrich Lewark, IMST, Germany

Co-Chair: Juhwan Yoo, Google, USA

09:00-10:40, Monday 26th September 2022, Amber 3

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- (NA)  **Multifunction X-Band MMIC with High Resolution in Phase and Amplitude Control in Antenna Beamforming Networks for Space Communication Application** (Invited Keynote)  
*Francesco Barletta, Thales, Italy*
- 33  **Compact Patch-Like Bandpass Filter Using Grounded CSRR on BiCMOS 55nm Technology**  
*Mohammed Wehbi<sup>1</sup>, Marc Margalef-Rovira<sup>2</sup>, Cedric Durand<sup>3</sup>, Philippe Ferrari<sup>1</sup>*  
*<sup>1</sup>TIMA (UMR 5159), France; <sup>2</sup>IEMN (UMR 8520), France; <sup>3</sup>STMicroelectronics, France*
- 37  **Characterization of GaN Recovery Effects Under High-Power Pulsed RF Stress**  
*Marc van Heijningen, D.C.A. Ribeiro, A.P. de Hek, Frank E. van Vliet, TNO, The Netherlands*
- 41  **Stabilisation and Burn-In of X-Band GaN HPA MMICs for Space Applications**  
*Václav Valenta<sup>1</sup>, Gearoid Loughnane<sup>1</sup>, Cesar Espana<sup>1</sup>, Jouni Latti<sup>1</sup>, Andrew Barnes<sup>1</sup>, Jean-Philippe Roux<sup>1</sup>, Oscar del Rio<sup>1</sup>, Gorka Rubio-Cidre<sup>2</sup>, Mario Ramirez-Torres<sup>2</sup>, Veronique Serru<sup>3</sup>, Laurent Caille<sup>3</sup>*  
*<sup>1</sup>ESA-ESTEC, The Netherlands; <sup>2</sup>Airbus, Spain; <sup>3</sup>UMS, France*
- (NA)  **Load-Pull Techniques for 5G Applications: State-of-the-Art and Future** (Invited Keynote)  
*Mauro Marchetti, Anteverta-mw, The Netherlands*

## EuMIC04 : EuMIC Opening Session

Chair: Paolo Colantonio, Università di Roma "Tor Vergata", Italy

Co-Chair: Francesco Barletta, Thales, Italy

11:20-13:00, Monday 26th September 2022, Brown 3

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- (NA)  **Welcome Address: Opening of the European Microwave Integrated Circuits Conference 2022**  
*Paolo Colantonio, EuMIC Chair*
- (NA)  **New Space Race: Architectures and Technologies for Space Economy Exploitation**  
*Massimo Comparini, Thales, Italy*
- (NA)  **EU's Approach to Evolving Connectivity and Related Research**  
*Anna Caterina Carli, European Commission*






## EuMIC05: SiGe mm-Wave Components & Sub-systems

Chair: Herbert Zirath, Chalmers University of Technology, Sweden

Co-Chair: Jürgen Hasch, Robert Bosch, Germany

14:20-16:00, Monday 26th September 2022, Amber 1

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- (NA)  **SiGe Circuits for Millimeter-Wave Radar Systems** (Invited Keynote)  
*Nils Pohl, Tobias T. Braun, Jan Schöpfel, Ruhr-Universität Bochum, Germany*
- 44  **A Broadband 110-170GHz Frequency Quadrupler with 29dBc Harmonic Rejection in a 130nm SiGe BiCMOS Technology**  
*Mohammed K. Ali<sup>1</sup>, Goran Panic<sup>2</sup>, Dietmar Kissinger<sup>1</sup>*  
*<sup>1</sup>Universität Ulm, Germany; <sup>2</sup>IHP, Germany*
- 48  **A Dual-Modulus Frequency Divider up to 128GHz in SiGe BiCMOS Technology**  
*Arzu Ergintav<sup>1</sup>, Frank Herzel<sup>1</sup>, Falk Korndörfer<sup>1</sup>, Thomas Mausolf<sup>1</sup>, Dietmar Kissinger<sup>2</sup>, Gunter Fischer<sup>1</sup>*  
*<sup>1</sup>IHP, Germany; <sup>2</sup>Universität Ulm, Germany*
- 52  **A Single-Stage Low-Noise SiGe HBT Distributed Amplifier with 13dBm Output Power and 20dB Gain in D-Band and Over 170GHz Bandwidth**  
*Yves Baeyens<sup>1</sup>, Muhammad Waleed Mansha<sup>1</sup>, Holger Rucker<sup>2</sup>*  
*<sup>1</sup>Nokia Bell Labs, USA; <sup>2</sup>IHP, Germany*
- 56  **A Fully Integrated 0.48THz FMCW Radar Transceiver MMIC in a SiGe-Technology**  
*David Starke<sup>1</sup>, Jonathan Wittmeier<sup>1</sup>, Florian Vogelsang<sup>1</sup>, Benedikt Sievert<sup>2</sup>, Daniel Erni<sup>2</sup>, Andreas Rennings<sup>2</sup>, Holger Rucker<sup>3</sup>, Nils Pohl<sup>1</sup>*  
*<sup>1</sup>Ruhr-Universität Bochum, Germany; <sup>2</sup>Universität Duisburg-Essen, Germany; <sup>3</sup>IHP, Germany*

## EuMIC06: LNAs for Wireless Communications

Chair: Markus Mayer, ARELIS, France

Co-Chair: Pere L. Gilabert, Universitat Politècnica de Catalunya, Spain

14:20-16:00, Monday 26th September 2022, Amber 2

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- (NA)  **GaN-Based Receiver Front-Ends** (Invited Keynote)  
*Matthias Rudolph, BTU, Germany*
- 60  **A 2.5-2.6dB Noise Figure LNA for 39GHz Band in 22nm FD-SOI with Back-Gate Bias Tunability**  
*L. Nyssens<sup>1</sup>, Martin Rack<sup>1</sup>, S. Wane<sup>2</sup>, C. Schwan<sup>3</sup>, S. Lehmann<sup>3</sup>, Z. Zhao<sup>3</sup>, L. Lucci<sup>4</sup>, J. Lugo-Alvarez<sup>4</sup>, F. Gaillard<sup>4</sup>, Jean-Pierre Raskin<sup>1</sup>, Dimitri Lederer<sup>1</sup>*  
*<sup>1</sup>UCLouvain, Belgium; <sup>2</sup>eV-Technologies, France; <sup>3</sup>GlobalFoundries, Germany; <sup>4</sup>CEA-Leti, France*
- 64  **Ka-Band Wide Gain Control Range CMOS Variable Gain Amplifier Using PMOS for 5G Communications**  
*Dongjin Min, Jaeyong Lee, Seonhye Jang, Seongjin Jang, Changkun Park, Soongsil University, Korea*
- 68  **A High Linearity 6GHz LNA in 130nm SiGe Technology**  
*A. Bahadır Ozdol<sup>1</sup>, Hamza Kandis<sup>1</sup>, Abdurrahman Burak<sup>1</sup>, Tahsin Alper Ozkan<sup>1</sup>, Mehmet Kaynak<sup>2</sup>, Yasar Gurbuz<sup>1</sup>*  
*<sup>1</sup>Sabancı University, Türkiye; <sup>2</sup>IHP, Germany*
- 72  **A Ka-Band Low Noise Amplifier in 0.1µm Gallium Arsenide pHEMT Process**  
*Duc Dung Vu, Sudipta Chakraborty, Quoc Toan Chau, Andrew Jones, Melissa C. Gorman, Macquarie University, Australia*

## EuMIC07: Advanced Active Gallium Nitride Devices

Chair: Vadim Issakov, Technische Universität Braunschweig, Germany

Co-Chair: Rüdiger Quay, Fraunhofer IAF, Germany

14:20-16:00, Monday 26th September 2022, Amber 3

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- (NA)  **Stacked-FETs for High Power** (Invited Keynote)  
*Gijs van der Bent, Frank E. van Vliet, TNO, The Netherlands*
- 76  **A 1.5kW 90V S-Band GaN Transistor for Air Traffic Control Radars**  
*Gabriele Formicone, Jeff Burger, Richard Keshishian, John Walker, Integra Technologies, USA*
- 80  **Development and RF-Performance of AlGaIn/GaN and InAlN/GaN HEMTs on Large-Diameter High-Resistivity Silicon Substrates**  
*M. Moser<sup>1</sup>, M. Pradhan<sup>1</sup>, M. Alomari<sup>1</sup>, Benjamin Schoch<sup>2</sup>, K. Sharma<sup>2</sup>, Ingmar Kallfass<sup>2</sup>, A. García-Luque<sup>3</sup>, T.M. Martín-Guerrero<sup>3</sup>, J.N. Burghartz<sup>1</sup>*  
*<sup>1</sup>IMS CHIPS, Germany; <sup>2</sup>Universität Stuttgart, Germany; <sup>3</sup>Universidad de Málaga, Spain*
- 84  **A Miniature 100V, 130W Multi-Octave UHF GaN on SiC Transistor with Internal Feedback**  
*James Custer, Gabriele Formicone, Jeff Burger, John Walker, Integra Technologies, USA*
- 87  **Differential Coupler Topologies for Built-In Self-Test of SiGe Automotive Radar Transceivers**  
*Yannick Wenger<sup>1</sup>, Herman Jalli Ng<sup>2</sup>, Falk Korndörfer<sup>3</sup>, Bernd Meinerzhagen<sup>4</sup>, Vadim Issakov<sup>4</sup>*  
*<sup>1</sup>Keysight Technologies, Germany; <sup>2</sup>Hochschule Karlsruhe, Germany; <sup>3</sup>IHP, Germany; <sup>4</sup>Technische Universität Braunschweig, Germany*


## EuMIC08: GaN Integrated Power Amplifiers

Chair: Franco Giannini, Università di Roma "Tor Vergata", Italy

Co-Chair: Holger Arthaber, Technische Universität Wien, Austria

14:20-16:00, Monday 26th September 2022, Amber 4

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- (NA)  **Assessment of the Doherty Amplifier Concept for Space Applications** (Invited Keynote)  
*Václav Valenta, Iain Davies, Salvatore D'Addio, Natanael Ayllon, ESA-ESTEC, The Netherlands*
- 91  **5 Watts, MMIC, K-Band Doherty PA for Satellite Communications**  
*Eduard Heidebrecht<sup>1</sup>, Renato Negra<sup>1</sup>, Václav Valenta<sup>2</sup>, Iain Davies<sup>2</sup>, Olivier Jardel<sup>3</sup>, Elodie Richard<sup>4</sup>*  
*<sup>1</sup>RWTH Aachen University, Germany; <sup>2</sup>ESA-ESTEC, The Netherlands; <sup>3</sup>Thales, France; <sup>4</sup>UMS, France*
- 95  **Compact High-Gain Driver Amplifier MMICs for 60nm GaN-on-Si W-Band Single-Chip Transceivers**  
*Robert Malmqvist<sup>1</sup>, Rolf Jonsson<sup>1</sup>, Mingquan Bao<sup>2</sup>, Rémy Leblanc<sup>3</sup>, Kristoffer Andersson<sup>2</sup>*  
*<sup>1</sup>FOI, Sweden; <sup>2</sup>Ericsson, Sweden; <sup>3</sup>OMMIC, France*
- 99  **Broadband 8W Ka-Band MMIC Power Amplifier Using 100nm GaN Technology**  
*Seifeddine Fakhfakh<sup>1</sup>, Samira Driad<sup>1</sup>, Philippe Fellon<sup>1</sup>, Manfred Madel<sup>2</sup>, Linh Trinh-Xuan<sup>2</sup>, Hervé Blanck<sup>2</sup>, Marc Camiade<sup>1</sup>*  
*<sup>1</sup>UMS, France; <sup>2</sup>UMS, Germany*
- 103  **A Non-Uniform Distributed GaN LO Amplifier for Wideband 5-38GHz Applications**  
*Matthew Hodek<sup>1</sup>, Edward Gebara<sup>2</sup>, Chris Barisich<sup>2</sup>, Nicholas C. Miller<sup>3</sup>, Ryan Gilbert<sup>4</sup>, John Papapolymerou<sup>1</sup>, John D. Albrecht<sup>1</sup>*  
*<sup>1</sup>Michigan State University, USA; <sup>2</sup>Electromagnetic Sensor Technologies, USA; <sup>3</sup>AFRL, USA; <sup>4</sup>KBR, USA*






## EuMIC09: Components & Technologies for mm-Wave Applications

Chair: Frank E. van Vliet, TNO, The Netherlands

Co-Chair: Ingmar Kallfass, Universität Stuttgart, Germany

16:40–18:20, Monday 26th September 2022, Amber 1

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- (NA)  **Latest Advanced MMIC Developments for ESA ARTES AT Studies in Thales Alenia Space Italia** (Invited Keynote)  
*Francesco Vitulli, Thales, Italy*
- 107  **A Fully Differential Hybrid Coupler for Automotive Radar Applications**  
*Jan Schoepfel<sup>1</sup>, Tobias T. Braun<sup>1</sup>, Simon Kueppers<sup>2</sup>, Klaus Aufinger<sup>3</sup>, Nils Pohl<sup>1</sup>*  
*<sup>1</sup>Ruhr-Universität Bochum, Germany; <sup>2</sup>2π-LABS, Germany; <sup>3</sup>Infineon Technologies, Germany*
- 111  **Demonstration of 300nm InP/GaInAsSb DHBT MMIC Technology in a 60–160GHz Ultra-Broadband Amplifier Test Vehicle**  
*Sara Hamzeloui, Akshay M. Arabhavi, Filippo Ciabattini, Diego Marti, Ralf Flückiger, Mojtaba Ebrahimi, Olivier Ostinelli, Colombo R. Bolognesi, ETH Zürich, Switzerland*
- 115  **A D-Band, High Switching Speed, Differential Reflection-Type Phase Shifter in 250nm InP HBT**  
*Jeff Shih-Chieh Chien, James F. Buckwalter, University of California, Santa Barbara, USA*
- 119  **A 23.5dBm, 7.9% PAE Pseudo-Differential Power Amplifier at 136GHz in 40nm GaN**  
*Eythan Lam, Andrea Arias-Purdue, Everett O'Malley, James F. Buckwalter, University of California, Santa Barbara, USA*






## EuMIC10: Millimeter-Wave LNAs

Chair: Marco Pirola, Politecnico di Torino, Italy

Co-Chair: Markus Mayer, ARELIS, France

16:40–18:20, Monday 26th September 2022, Amber 2

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- (NA)  **From Space-Born Arrays to MMIC Specifications** (Invited Keynote)  
*Marc van Heijningen, Frank E. van Vliet, TNO, The Netherlands*
- 123  **High Linearity 76–81GHz LNA Using a 16nm FinFET Technology for Phased Array Radar Applications**  
*N. Landsberg<sup>1</sup>, S. Woorim<sup>2</sup>, S. Levin<sup>1</sup>, T. Levinger<sup>1</sup>*  
*<sup>1</sup>Mobileye, Israel; <sup>2</sup>Apple, USA*
- 127  **A Q/V Band Low Noise Amplifier Using Space De-Rated Bias Conditions**  
*Ulrich J. Lewark<sup>1</sup>, Gerald Langgartner<sup>1</sup>, Rüdiger Follmann<sup>1</sup>, Deokki Min<sup>2</sup>, Øystein Jensen<sup>2</sup>*  
*<sup>1</sup>IMST, Germany; <sup>2</sup>Kongsberg Defence & Aerospace, Norway*
- 130  **20GHz LNA and 29GHz PA on SiGe BiCMOS Technology for SatCom Phased Array Systems**  
*Matteo Fumagalli, Alberto Colzani, Alessandro Fonte, SIAE MICROELETTRONICA, Italy*
- 134  **A V-Band Double-Transformer-Coupling and Current Steering VGLNA in 90nm CMOS**  
*Wei-Zhi Huang, Mu-Heng Li, Yuen-Sum Ng, Yunshan Wang, Huei Wang, National Taiwan University, Taiwan*






## EuMIC11 : Focused Session GaN Device Modelling

Chair: Teresa M. Martín-Guerrero, Universidad de Málaga, Spain

Co-Chair: Alberto Santarelli, Università di Bologna, Italy

16:40-18:20, Monday 26th September 2022, Amber 3

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- (NA)  **EM-Based Parasitic Extraction Applied to Scaled Transistor Models for High Frequency GaN Technologies** (*Invited Keynote*)  
*Christophe Chang, Valeria Di Giacomo Brunel, UMS, France*
- 137  **A Simple Thermally Activated Trapping Model for AlGaIn/GaN HEMTs**  
*Luís C. Nunes, João L. Gomes, Filipe M. Barradas, José Carlos Pedro, Universidade de Aveiro, Portugal*
- 141  **150nm GaN HEMT Degradation Under Realistic Load-Line Operation**  
*Antonio Raffo<sup>1</sup>, Valeria Vadalà<sup>2</sup>, Gianni Bosi<sup>1</sup>, R. Giofrè<sup>3</sup>, Giorgio Vannini<sup>1</sup>*  
*<sup>1</sup>Università di Ferrara, Italy; <sup>2</sup>Università di Milano-Bicocca, Italy; <sup>3</sup>Università di Roma "Tor Vergata", Italy*
- 145  **High Frequency GaN HEMT Modeling with ASM-HEMT**  
*R. Sommet, Jose Anderson Silva Dos Santos, A. Santos, Jean-Christophe Nallatamby, XLIM (UMR 7252), France*
- 149  **Localization of Trapping Effects in GaN HEMTs with Pulsed S-Parameters and Compact Models**  
*Petros Beleniotis<sup>1</sup>, Frank Schnieder<sup>2</sup>, Serguei Chevtchenko<sup>2</sup>, Matthias Rudolph<sup>1</sup>*  
*<sup>1</sup>BTU, Germany; <sup>2</sup>FBH, Germany*






## EuMIC12 : Integrated Power Amplifiers for Broadband Communications

Chair: Simon J. Mahon, Macquarie University, Australia

Co-Chair: Corrado Florian, Università di Bologna, Italy

16:40-18:20, Monday 26th September 2022, Amber 4

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- (NA)  **High Power GaN-Based SSPAs for Satellite Systems, Cutting-Edge Solutions for Ground and On-Board Satellite Applications** (*Invited Keynote*)  
*Jose María Agüero, Lorena Cabria, Francisco De Arriba, Miguel Angel Peña, TTI Norte, Spain*
- 153  **A 30-97GHz  $P_{\text{sat},3\text{dB}}$  Broadband PA with 18.5-21.5dBm  $P_{\text{sat}}$  and 18-26% PAE in 90nm SiGe Supporting Concurrent Multi-Band Operation**  
*Zheng Liu, Emir Ali Karahan, Kaushik Sengupta, Princeton University, USA*
- 157  **Microstrip GaAs Power Amplifiers for High Capacity 92-114GHz 5G and 6G Backhaul**  
*Simon J. Mahon<sup>1</sup>, Jakov Mihaljevic<sup>1</sup>, Sudipta Chakraborty<sup>1</sup>, Melissa C. Gorman<sup>1</sup>, Michael C. Heimlich<sup>1</sup>, Yinggang Li<sup>2</sup>*  
*<sup>1</sup>Macquarie University, Australia; <sup>2</sup>Ericsson, Sweden*
- 161  **Ka-Band Orthogonal Load-Modulated Balanced Amplifier in 22nm CMOS FDSOI**  
*Jere Rusanen, Alok Sethi, Nuutti Tervo, Timo Rahkonen, Aarno Pärssinen, Veeti Kiuru, Janne P. Aikio, University of Oulu, Finland*
- 165  **46% Peak PAE 28GHz High Linearity Stacked-FET Power Amplifier IC with a Novel Two-Step Adaptive Bias Circuit in 45nm SOI CMOS**  
*Tsuyoshi Sugiura, Toshihiko Yoshimasu, Waseda University, Japan*



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## EuMIC13: Highly Integrated mm-Wave Systems

Chair: Ingmar Kallfass, Universität Stuttgart, Germany

Co-Chair: Ernesto Limiti, Università di Roma "Tor Vergata", Italy

09:00-10:40, Tuesday 27th September 2022, Amber 1

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- (NA)  **Remote Sensing and High Data Rate Satellite Communication Based on Metamorphic HEMT Technology** (Invited Keynote)  
*Sébastien Chartier<sup>1</sup>, Axel Tessmann<sup>1</sup>, Arnulf Leuther<sup>1</sup>, Ingmar Kallfass<sup>2</sup>, Ralf Ewald<sup>3</sup>, Petri Piironen<sup>4</sup>*  
<sup>1</sup>Fraunhofer IAF, Germany; <sup>2</sup>Universität Stuttgart, Germany; <sup>3</sup>DLR, Germany; <sup>4</sup>ESA-ESTEC, The Netherlands
- 169  **A 44GHz-BW 18.5GS/s Sampling Front-End Robust to Power Supply and Common-Mode Variations in 22nm FDSOI**  
*Nima Lotfi, Philipp Scholz, Friedel Gerfers, Technische Universität Berlin, Germany*
- 173  **150GBd PAM-4 Electrical Signal Generation Using SiGe-Based Analog Multiplexer IC**  
*J. Schostak<sup>1</sup>, T. Tannert<sup>2</sup>, C. Schmidt<sup>1</sup>, Holger Rücker<sup>3</sup>, V. Jungnickel<sup>1</sup>, M. Grözing<sup>2</sup>, M. Berroth<sup>2</sup>, Ronald Freund<sup>1</sup>*  
<sup>1</sup>Fraunhofer HHI, Germany; <sup>2</sup>Universität Stuttgart, Germany; <sup>3</sup>IHP, Germany
- 177  **A 55-GHz Highly Linear Direct-Conversion RF Transmitter in 40nm CMOS**  
*Yongho Lee<sup>1</sup>, Seungsoo Kim<sup>2</sup>, Hyunchol Shin<sup>1</sup>*  
<sup>1</sup>Kwangwoon University, Korea; <sup>2</sup>Ansys, Korea
- 181  **A 38GHz Millimeter Wave Transmission System for Unmanned Aerial Vehicle in 65nm CMOS**  
*Yuen-Sum Ng<sup>1</sup>, Yunshan Wang<sup>1</sup>, Santosh Kumar Khyalia<sup>2</sup>, Chun-Nien Chen<sup>1</sup>, Tzu-Chien Tang<sup>1</sup>, Yen-Wei Chang<sup>1</sup>, Hsin-Chia Lu<sup>1</sup>, Tian-Wie Huang<sup>1</sup>, Huei Wang<sup>1</sup>*  
<sup>1</sup>National Taiwan University, Taiwan; <sup>2</sup>IIT Bombay, India

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## EuMIC14: Focussed Session Beyond Millimeter-Wave Integrated Technologies for Wireless Communications

Chair: Antonio Traversa, SIAE MICROELETTRONICA, Italy

Co-Chair: Alessandro Fonte, SIAE MICROELETTRONICA, Italy

09:00-10:40, Tuesday 27th September 2022, Amber 4

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- (NA)  **Energy Efficient and Flexible Baseband Processing for Wideband mmWave Radio** (Invited Keynote)  
*Anthony Collins, AMD, Ireland*
- 185  **An Assembly Process Oriented Thermal-Mechanical Characterization of a Fan-Out Wafer-Level Package**  
*Zhibo Cao<sup>1</sup>, Bruno Heusdens<sup>2</sup>, Afshin Ziaei<sup>3</sup>, Mehmet Kaynak<sup>1</sup>*  
<sup>1</sup>IHP, Germany; <sup>2</sup>Taipro Engineering, Belgium; <sup>3</sup>Thales, France
- 189  **A Third Order Analogue Pre-Distorter MMIC for E-Band PA Linearisation**  
*M. Gavell<sup>1</sup>, G. Granström<sup>1</sup>, Christian Fager<sup>2</sup>*  
<sup>1</sup>Gotmic, Sweden; <sup>2</sup>Chalmers University of Technology, Sweden
- 193  **A 28GHz Doherty PA with 22.9% PAE<sub>max</sub> and 17.4% PAE at 6dB PBO in 0.13μm SiGe Technology for 5G Application**  
*Hao Gao<sup>1</sup>, Sina Mortezaazadeh Mahani<sup>1</sup>, David Seebacher<sup>2</sup>, Gernot Hueber<sup>1</sup>, Matteo Bassi<sup>2</sup>*  
<sup>1</sup>Silicon Austria Labs, Austria; <sup>2</sup>Infineon Technologies, Austria
- 196  **Wideband mm-Wave Transceiver IC for 5G Radios**  
*Nikos Naskas, Nikos Alexiou, Spyros Gkardiakos, Aris Agathokleous, Nikos Tsoutsos, Kostas Kontaxis, George Ntounas, Ioannis Kousparis, Akronic, Greece*





## EuMIC15: EuMIC Posters

Chair: Rocco Giofrè, Università di Roma "Tor Vergata", Italy

Co-Chair: Marco Passafiume, Università di Firenze, Italy


10:40-13:00, Tuesday 27th September 2022, Exhibition Hall

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- 200  **3D EM Multi-Technology Simulation Flow for GaN and RF-SOI Heterogeneous Integration Technique**  
*J. Loraine<sup>1</sup>, I. Lahbib<sup>1</sup>, G. U'Ren<sup>1</sup>, V. Poisson<sup>2</sup>, H.-S. Yap<sup>2</sup>, C. Pujol<sup>2</sup>*  
<sup>1</sup>X-FAB, France; <sup>2</sup>Keysight Technologies, France
- 204  **A High-Power InP Resonant Tunnelling Diode Heterostructure for 300GHz Oscillator Sources**  
*Davide Cimbri, Razvan Morariu, Afesomesh Ofiare, Edward Wasige, University of Glasgow, UK*
- 208  **A Highly Efficient W-Band Rectifier MMIC in InP HBT Technology**  
*Andreas Wentzel<sup>1</sup>, Hady Yacoub<sup>1</sup>, Tom K. Johansen<sup>2</sup>, Wolfgang Heinrich<sup>1</sup>, Viktor Krozer<sup>1</sup>*  
<sup>1</sup>FBH, Germany; <sup>2</sup>Technical University of Denmark, Denmark
- 212  **Design of Two Low DC-Power High-Efficiency D-Band Power Amplifiers in 22nm FDSOI**  
*Andre Engelmann, Philip Hetterle, Florian Probst, Robert Weigel, Marco Dietz, FAU Erlangen-Nürnberg, Germany*
- 216  **A New Architecture of Broadband GaAs MMIC Balanced Mixer for Very High RF/IF Isolation for 0.5-18.5GHz Signal Analysis**  
*Lorenzo Pagnini, Giovanni Collodi, Marco Passafiume, Alessandro Cidronali, Università di Firenze, Italy*


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- 220  **GaN SPA-D with 8dB Back-Off for Wideband mm-Wave Applications**  
*Florian Dietrich<sup>1</sup>, Renato Negra<sup>1</sup>, Elodie Richard<sup>2</sup>, Iain Davies<sup>3</sup>, Olivier Jardel<sup>4</sup>, Václav Valenta<sup>3</sup>*  
<sup>1</sup>RWTH Aachen University, Germany; <sup>2</sup>UMS, France; <sup>3</sup>ESA-ESTEC, The Netherlands; <sup>4</sup>Thales, France
- 224  **On the Burn-In of GaN-on-Si MMIC High Power Amplifiers for SATCOM Applications**  
*R. Giofrè<sup>1</sup>, P. Colantonio<sup>1</sup>, F. Giannini<sup>1</sup>, Lorena Cabria<sup>2</sup>, M. Lopez<sup>2</sup>, Rémy Leblanc<sup>3</sup>, F. Vitobello<sup>4</sup>*  
<sup>1</sup>Università di Roma "Tor Vergata", Italy; <sup>2</sup>TTI Norte, Spain; <sup>3</sup>OMMIC, France; <sup>4</sup>European Commission, Belgium
- 228  **MMIC Up-Down-Converter with Integrated Band-Pass Filter for 5G mm-Wave Measurement Applications**  
*Martin Obermaier, Martin Laabs, Dirk Plettemeier, Technische Universität Dresden, Germany*
- 232  **A 315GHz Source with Integrated Antenna in InP-DHBT Technology**  
*M. Hossain<sup>1</sup>, Tom K. Johansen<sup>2</sup>, Ralf Doerner<sup>1</sup>, Hady Yacoub<sup>1</sup>, Wolfgang Heinrich<sup>1</sup>, Viktor Krozer<sup>1</sup>*  
<sup>1</sup>FBH, Germany; <sup>2</sup>Technical University of Denmark, Denmark
- 236  **Checking Rollett's Proviso for Degenerated Devices Through S-Parameter Analysis**  
*Sergio Colangeli, Patrick E. Longhi, Walter Ciccognani, Antonio Serino, Ernesto Limiti, Università di Roma "Tor Vergata", Italy*
- 240  **A 10GHz Single-Supply GaAs MMIC Self-Synchronous Rectifier**  
*Jack Molles, Megan Robinson, Eric Kwiatkowski, Zoya Popović, University of Colorado Boulder, USA*

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- 244  **Switched Shield mm-Wave Tunable Slow Wave CPW in FinFET CMOS Technology**  
*Carla Moran Guizan<sup>1</sup>, Peter Baumgartner<sup>1</sup>, Stefan Heinen<sup>2</sup>*  
*<sup>1</sup>Intel, Germany; <sup>2</sup>RWTH Aachen University, Germany*






## EuMIC16: 22nm CMOS Building Blocks

*Chair: Jürgen Hasch, Robert Bosch, Germany*

*Co-Chair: Herbert Zirath, Chalmers University of Technology, Sweden*

*14:20-16:00, Tuesday 27th September 2022, Amber 1*

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- (NA)  **Sub-THz Transceivers with Advanced CMOS Technologies (Invited Keynote)**  
*Nathalie Deltimple<sup>1</sup>, Sébastien Sadlo<sup>1</sup>, Antoine Lhomel<sup>1</sup>, Francois Rivet<sup>2</sup>,  
Andreia Cathelin<sup>3</sup>*  
*<sup>1</sup>IMS (UMR 5218), France; <sup>2</sup>Université de Bordeaux, France; <sup>3</sup>STMicroelectronics, France*
- 248  **A 79GHz Reconfigurable Highly Linear Low-Noise Amplifier for Civil-Automotive Short-Range-Radars in 22nm FD-SOI CMOS**  
*Songhui Li, Mengqi Cui, Laszlo Szilagyi, Corrado Carta, Frank Ellinger, Technische Universität Dresden, Germany*
- 252  **Design of a Low Voltage D-Band LNA in 22nm FDSOI**  
*Philip Hetterle, Andre Engelmann, Florian Probst, Robert Weigel, Marco Dietz, FAU Erlangen-Nürnberg, Germany*
- 256  **108 and 124GHz Fundamental VCOs with 21% and 7% DC-to-RF Efficiency in 22nm CMOS FDSOI**  
*Yasir Shafiullah, Mikko Hietanen, Marko E. Leinonen, Rehman Akbar, Janne P. Aikio, Jere Rusanen, Timo Rahkonen, Aarno Pärssinen, University of Oulu, Finland*
- 260  **An 8 Bit 1.73mW 1.25GS/s Single-Core SAR ADC in 22nm FDSOI CMOS**  
*Simon Buhr, Jan Pliva, Tobias Schirmer, Mohammad Mahdi Khafaji, Frank Ellinger, Technische Universität Dresden, Germany*






## EuMIC17: Frequency and Signal Generation

Chair: Lars-Erik Wernersson, Lund University, Sweden

Co-Chair: Frank van den Bogaart, TNO, The Netherlands

14:20-16:00, Tuesday 27th September 2022, Amber 2

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- (NA)  **Low-Phase-Noise Frequency Synthesizers for Wireless Communication and Radars**  
(Invited Keynote)  
*Dmytro Cherniak, Infineon Technologies, Germany*
- 264  **A 33-37GHz Phase-Aligning Frequency Generator with 3.5° Accuracy and 20ns Switching Time**  
*Ruixing He, Yahya Tousi, University of Minnesota, USA*
- 268  **A 30-GHz CMOS LC VCO with Optimal Tail Filter Considering Tail FET's Output Resistance**  
*Yongho Lee<sup>1</sup>, Seungsoo Kim<sup>2</sup>, Hyunchol Shin<sup>1</sup>*  
*<sup>1</sup>Kwangwoon University, Korea; <sup>2</sup>Ansys, Korea*
- 272  **A High-Efficiency D-Band Frequency Doubler in 22nm FDSOI CMOS**  
*Matthias Möck, İbrahim Kağan Aksoyak, Ahmet Çağrı Ulusoy, KIT, Germany*
- 276  **A 37-87GHz Continuously Tunable Signal Source in a 130nm SiGe:C BiCMOS Technology**  
*Christian Bredendiek<sup>1</sup>, Florian Vogelsang<sup>2</sup>, Klaus Aufinger<sup>3</sup>, Nils Pohl<sup>2</sup>*  
*<sup>1</sup>Fraunhofer FHR, Germany; <sup>2</sup>Ruhr-Universität Bochum, Germany; <sup>3</sup>Infineon Technologies, Germany*





## EuMIC18: Transmitters and Switches

Chair: Pere L. Gilibert, Universitat Politècnica de Catalunya, Spain

Co-Chair: Marco Pirola, Politecnico di Torino, Italy

14:20-16:00, Tuesday 27th September 2022, Amber 3

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- (NA)  **Micropackaged MMIC Switching Networks for Space Application** (Invited Keynote)  
*Giovanni Mannocchi, Thales, Italy*
- 280  **Scalable, Modular Feed-Forward Equalizer for Baseband Applications**  
*Stavros Giannakopoulos, Zhongxia Simon He, Lars Svensson, Herbert Zirath, Chalmers University of Technology, Sweden*
- 284  **Inductorless 96Gb/s PAM-4 Optical Modulators Driver in SiGe:C BiCMOS**  
*Mesut Inac<sup>1</sup>, Anna Peczek<sup>1</sup>, Friedel Gerfers<sup>2</sup>, Andrea Malignaggi<sup>1</sup>*  
*<sup>1</sup>IHP, Germany; <sup>2</sup>Technische Universität Berlin, Germany*
- 288  **Counter-Intermodulation in the Context of CMOS Outphasing Transmitters**  
*Stefan Mueller, Oner Hanay, Renato Negra, RWTH Aachen University, Germany*

## EuMIC19: EuMIC Closing Session

Chair: Alessandro Cidronali, Università di Firenze, Italy

Co-Chair: Rocco Giofrè, Università di Roma "Tor Vergata", Italy

16:40-18:20, Tuesday 27th September 2022, Brown 1-2

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- (NA)  **EuMIC Closing Session Welcome**  
*Alessandro Cidronali<sup>1</sup>, Rocco Giofrè<sup>2</sup>*  
*<sup>1</sup>EuMIC TPC Chair; <sup>2</sup>EuMIC TPC Co-Chair*
  
- (NA)  **Overview of MMIC Developments and Trends for Spaceborne Telecom Active Antennas at the European Space Agency**  
*Natanael Ayllon, ESA-ESTEC, The Netherlands*
  
- (NA)  **Foundry Session**
  
- (NA)  **EuMIC Awards Ceremony**  
*Giuseppe Macchiarella, EuMW 2022 Awards Chair*
  
- (NA)  **EuMIC Closing Remarks**  
*Paolo Colantonio, EuMIC 2022 Chair*
  
- (NA)  **Invitation to EuMIC 2023**  
*Friedel Gerfers, EuMIC 2023 Chair*










## EuMIC/EuMC01: Receivers

Chair: Friedel Gerfers, Technische Universität Berlin, Germany

Co-Chair: Frank van den Bogaart, TNO, The Netherlands

09:00-10:40, Tuesday 27th September 2022, Amber 2

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- (NA)  **Transmit/Receive Modules for ECM AESA: Architectures and Enabling Components**  
*(Invited Keynote)*  
*Andrea Bentini, Elettronica, Italy*
  
- 292   **A 67GHz 23mW Receiver Utilizing Complementary Current Reuse Techniques**  
*Jesse Moody, Stefan Lepkowski, Travis Forbes, Sandia National Laboratories, USA*
  
- 296   **28GHz Down-Conversion Mixer with RF Back-Gate Excitation Topology in 22nm FD-SOI**  
*Massinissa Nabet, Martin Rack, L. Nyssens, Jean-Pierre Raskin, Dimitri Lederer, UCLouvain, Belgium*
  
- 300   **A 60GHz Four-Element Beam-Tapering Receive Phased Array**  
*Geon Ho Park<sup>1</sup>, Tae Hwan Jang<sup>2</sup>, Chul Soon Park<sup>1</sup>*  
*<sup>1</sup>KAIST, Korea; <sup>2</sup>Hanyang University, Korea*
  
- 304   **A 8-18GHz Low Noise Variable Gain Amplifier with 30dB Gain Control Range**  
*Kutay Altintas<sup>1</sup>, Tahsin Alper Ozkan<sup>1</sup>, Melik Yazici<sup>1</sup>, Mehmet Kaynak<sup>2</sup>, Yasar Gurbuz<sup>1</sup>*  
*<sup>1</sup>Sabanci University, Türkiye; <sup>2</sup>IHP, Germany*

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## EuMIC/EuMC02 : Wireless Systems for Mobile Communication and Radar

Chair: Jonas Hansryd, Ericsson, Sweden

Co-Chair: Holger Maune, OvG Universität Magdeburg, Germany

14:20-16:00, Tuesday 27th September 2022, Amber 5

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- (NA)  **C** **E-Band Ultra-Low-Noise (4.5dB) and High-Power (27dBm) GaN T/R Front-End MMIC**  
*Erdin Ture, Fabian Thome, Dirk Schwantuschke, Michael Mikulla, Rüdiger Quay, Fraunhofer IAF, Germany*
- (NA)  **C** **Long-Reach E-Band HPA for 5G Radio Link**  
*Alberto Colzani<sup>1</sup>, Matteo Fumagalli<sup>1</sup>, Alessandro Fonte<sup>1</sup>, Antonio Traversa<sup>1</sup>, Erdin Ture<sup>2</sup>*  
*<sup>1</sup>STIE MICROELETTRONICA, Italy; <sup>2</sup>Fraunhofer IAF, Germany*
- (NA)  **C** **Opportunities, Progress and Challenges in Active Heatsink Antenna Arrays for 5G and Beyond**  
*Yanki Aslan, Technische Universiteit Delft, The Netherlands*
- (NA)  **C** **Highly Integrated Real-Time Imaging MIMO D-Band Radar for Industrial Applications**  
*S. Leuchs<sup>1</sup>, C. Krebs<sup>1</sup>, S. Gütgemann<sup>1</sup>, S. Wickmann<sup>1</sup>, J. Perske<sup>1</sup>, H. Cetinkaya<sup>1</sup>, Nils Pohl<sup>1</sup>, B. Fischer<sup>2</sup>, Enrico Tolin<sup>3</sup>, Marta Arias Campo<sup>3</sup>, Simona Bruni<sup>3</sup>, J. Romstadt<sup>4</sup>, H. Papurcu<sup>4</sup>, T. Haschke<sup>5</sup>, T. Hüge<sup>5</sup>*  
*<sup>1</sup>Fraunhofer FHR, Germany; <sup>2</sup>IMS Messsysteme, Germany; <sup>3</sup>IMST, Germany; <sup>4</sup>Ruhr-Universität Bochum, Germany; <sup>5</sup>SMS group, Germany*
- (NA)  **C** **D-Band Backhaul and Fronthaul Solutions for 5G Radio Access Network**  
*Mario G.L. Frecassetti<sup>1</sup>, Juan F. Sevillano<sup>2</sup>, David del Río<sup>2</sup>, Mehmet Izzet Saglam<sup>3</sup>, Antti Lamminen<sup>4</sup>, Vladimir Ermolov<sup>4</sup>*  
*<sup>1</sup>Nokia, Italy; <sup>2</sup>Ceit, Spain; <sup>3</sup>Turkcell Technology, Türkiye; <sup>4</sup>VTT Technical Research Centre of Finland, Finland*

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## EuMIC/EuMC03 : THz Communication Systems in D and H bands: from Circuits to System-level

Chair: Guillaume Ducournau, IEMN (UMR 8520), France

Co-Chair: Joachim Oberhammer, KTH, Sweden

14:20-16:00, Tuesday 27th September 2022, Suite 2

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- (NA) **C** **mm-Wave and Sub-THz Integrated Circuits for Wireless Link Applications: Technology and Research Trends** (*Invited Keynote*)  
*Maurizio Pagani, Huawei Technologies, Italy*
- (NA)  **C** **Polarisation Multiplex in 300GHz Wireless Communication Link Using Orthomode Transducer**  
*Simon Haussmann<sup>1</sup>, Dominik Wrana<sup>1</sup>, Benjamin Schoch<sup>1</sup>, Axel Tessmann<sup>2</sup>, Ralf Henneberger<sup>3</sup>, Ingmar Kallfass<sup>1</sup>*  
*<sup>1</sup>Universität Stuttgart, Germany; <sup>2</sup>Fraunhofer IAF, Germany; <sup>3</sup>Radiometer Physics, Germany*
- (NA)  **C** **Sub-THz Radio Communication Links from Research to Field Trial**  
*M. Babay<sup>1</sup>, M. Moretto<sup>2</sup>, P. Perrault<sup>1</sup>, R. Bara-Maillet<sup>1</sup>, P. Mcillree<sup>1</sup>, E. Froger<sup>1</sup>, P. Di Prisco<sup>2</sup>, P. Lopez<sup>1</sup>*  
*<sup>1</sup>Nokia, France; <sup>2</sup>Nokia, Italy*
- (NA)  **C** **A D-Band High-Gain Antenna Module Combining an In-Package Active Feed and a Flat Discrete Lens**  
*J.L. Gonzalez-Jimenez, F. Foglia Manzillo, A. Hamani, A. Siligaris, A. Clemente, C. Dehos, CEA-Leti, France*











## EuMIC/EuMC04: EuMIC/EuMC Posters

Chair: Alessandro Cidronali, Università di Firenze, Italy

Co-Chair: Lorenzo Silvestri, Università di Pavia, Italy

16:00-18:20, Tuesday 27th September 2022, Exhibition Hall

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- (NA)   **A CMOS-Compatible Signal-to-Noise Enhancer Enabling a Filter-Less 14.5dB C/IMD Boost in Slowly Modulated LTV RF Circuits**  
*Hussein M.E. Hussein, Cristian Cassella, Northeastern University, USA*
- (NA)   **W- to Ka-Band Frequency Converter for Ultra-High Throughput Satellite Systems**  
*Alessandro Barigelli<sup>1</sup>, Sergio Di Nardo<sup>1</sup>, Francesco Vitulli<sup>1</sup>, Ernesto Limiti<sup>2</sup>, Patrick E. Longhi<sup>2</sup>, Lorenzo Pace<sup>2</sup>, François Deborgies<sup>3</sup>*  
*<sup>1</sup>Thales, Italy; <sup>2</sup>Università di Roma "Tor Vergata", Italy; <sup>3</sup>ESA-ESTEC, The Netherlands*
- (NA)   **Compact Harmonic Transmitter and Receiver Architectures for Multifunction Wireless Systems**  
*Yasser Bigdeli, Pascal Burasa, Ke Wu, Polytechnique Montréal, Canada*
- (NA)   **Numerical Comparison of Plane Wave Propagation Inside Realistic Anatomical Models and Multilayer Slabs**  
*Micol Colella<sup>1</sup>, Simona Di Meo<sup>2</sup>, Micaela Liberti<sup>1</sup>, Marco Pasian<sup>2</sup>, Francesca Apollonio<sup>1</sup>*  
*<sup>1</sup>Università di Roma "La Sapienza", Italy; <sup>2</sup>Università di Pavia, Italy*
- (NA)   **Reconfigurable Dual-Type Sensor for Resonant and Broadband Liquid Materials Characterization**  
*Ilona Piekarz, Sławomir Gruszczyński, Krzysztof Wincza, Jakub Sorocki, AGH UST, Poland*


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*EuMIC/EuMC04 continued...*

- (NA)   **Structural Investigations on Leonardo da Vinci's Mural Painting "The Last Supper" with Terahertz FMCW and TDS Techniques**  
*Maris Bauer<sup>1</sup>, Kaori Fukunaga<sup>2</sup>, Andreas Keil<sup>1</sup>, Fabio Aramini<sup>3</sup>, M. Palazzo<sup>4</sup>, L. Dall'Aglio<sup>4</sup>, Fabian Friederich<sup>1</sup>*  
*<sup>1</sup>Fraunhofer ITWM, Germany; <sup>2</sup>NICT, Japan; <sup>3</sup>ISCR, Italy; <sup>4</sup>Museo del Cenacolo Vinciano, Italy*
- (NA)   **2-Dimensional Beam Scanning Using Reflector-Based Holographic Antenna Arrays**  
*Ali Mohammad Hakimi, Homayoon Oraizi, IUST, Iran*
- (NA)   **E-Band Magneto-Electric Dipole Antenna for 5G Backhauling Applications**  
*Carmine Mustacchio<sup>1</sup>, Luigi Boccia<sup>2</sup>, Riccardo Maggiora<sup>3</sup>, Emilio Arnieri<sup>2</sup>, Giandomenico Amendola<sup>2</sup>*  
*<sup>1</sup>CEA-Leti, France; <sup>2</sup>Università della Calabria, Italy; <sup>3</sup>Politecnico di Torino, Italy*
- (NA)   **Dielectric Response of Biological Systems at Cellular and Subcellular Level: A Modelling Study**  
*Laura Caramazza<sup>1</sup>, Annalisa De Angelis<sup>2</sup>, Franck M. Andre<sup>3</sup>, Lluis M. Mir<sup>3</sup>, Francesca Apollonio<sup>1</sup>, Micaela Liberti<sup>1</sup>*  
*<sup>1</sup>Università di Roma "La Sapienza", Italy; <sup>2</sup>IIT, Italy; <sup>3</sup>METSY (UMR 9018), France*
- (NA)   **Near-Field Millimetre Wave Vector Microscopy — Buried Structure Imaging**  
*T. Auriac, J. Raoult, IES (UMR 5214), France*
- (NA)   **Microwave Alignment and Displacement Sensors in Groove Gap Waveguide Technology**  
*Ali K. Horestani, Zahra Shaterian, Michał Mrozowski, Gdansk University of Technology, Poland*

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*EuMIC/EuMC04 continued...*

- (NA)   **A Wideband Sensor for Complex Permittivity of Carasau Bread Dough Based on a Double Ridge Waveguide**  
*C. Macciò<sup>1</sup>, M.B. Lodi<sup>1</sup>, N. Curreli<sup>2</sup>, A. Melis<sup>1</sup>, G. Mazzarella<sup>1</sup>, Maurizio Bozzi<sup>3</sup>, A. Fanti<sup>1</sup>*  
*<sup>1</sup>Università di Cagliari, Italy; <sup>2</sup>IIT, Italy; <sup>3</sup>Università di Pavia, Italy*