

## MONDAY WORKSHOPS AND SHORT COURSES

### WSEuMC01

#### Advanced Modelling Methods in Microwaves

**Duration: 8:30-17:50**      **Room: Doppler 2**

#### Organizers

Damienne Bajon, Supaero, Toulouse, France  
 - Peter Russer, Munich University of Technology, Germany  
 Co-Sponsored by the IEEE MTT French Chapter & the German IEEE MTT/AP Joint Chapter

#### Abstract

Accurate and efficient modeling of complex electromagnetic structures requires advanced computational methods and powerful CAD tools. Especially the modelling of micromachined devices, MEMS structures and nanoelectric devices requires to perform multiphysics modelling including also mechanical, thermal and other physical phenomena. System level full-wave analysis is based on advanced methodologies and techniques to render EM simulation effective at the design stage. This workshop intends to give an overview of advanced methods including grid computing based methods, model order reduction techniques and hybrid methods.

#### Programme

Model Order Reduction in Electromagnetic Field Computation  
 Andreas Cangellaris 1, Dzianis Lukashevich2, Peter Russer2  
 1University of Illinois at Urbana-Champaign, 2Munich University of Technology

Hybrid EM-Circuit CAD for the packaging of millimetre wave components and modules  
 S. Bila1, D. Baillargeat1, M. Aubourg1, S. Verdeyme1  
 1IRCOM, CNRS, University of Limoges, France

Some views on reduced order modelling for global simulation of electromagnetic systems  
 Man-Fai Wong1, Azeddine Gati1 1, Gérard Orjubin2, Elodie Richalot2, Odile Picon2, Joe Wiart1, Victor Fouad Hanna3  
 1France Telecom R&D, 2Université Marne-la-Vallée University, 3Jussieu Paris 6 University

Electromagnetic field and circuit co-modelling for microwave/millimeter-wave applications  
 Zoya Popovic, Dejan Filipovic, Brad Brim,  
 Univ. of Colorado, Boulder, Ansoft Corporation, Boulder Colorado.

Implementation via a Model Order Reduction technique of physics-based non-linear thermal models for global CAD  
 R. Sommet  
 IRCOM CNRS/University of Limoges France

System identification methods applied to electromagnetic field computation  
 Yury Kuznetsov, Andrey Baev, Peter Russer  
 Moscow Aviation Institute, Munich University of Technology

A Compact Cell methodology for including in EM simulation elements of disparate scales."  
 Sidina Wane, Damienne Bajon, Henri Baudrand  
 RCEM Toulouse, SUPAERO Toulouse France.

A Transmission Line Matrix Electromagnetic Field Solver in a Grid Computing Environment  
 Petr Lorenz, Peter Russer  
 Munich University of Technology

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### SCEuMC01

#### Advances in Microwave Photonics Technology

**Duration: 8:30-12:10**      **Room: Durer**

#### Organiser

Dilip K. Paul - ACES, Inc., Bethesda, USA

#### Abstract

R&D of high speed/microwave photonics conducted since early eighties produced many attractive terrestrial, undersea, and space/avionics applications, e.g., high speed data, telephone, and VoIP networks, multichannel CATV distribution, fiber optic feed network for wireless communications, onboard spacecraft signal processing, optical intersatellite links & networks, antenna remoting, and beam forming & steering of phased-array antenna and radar. Use of NLO polymer and semiconductor materials based OEICs developed in the nineties enhanced these photonics advantages by combining the benefits of device processing compatibility and multiple functionality such as optical generation, distribution, control, and detection of signals in a chip. Because of micro-miniaturization and novel properties, recently developed MEMS (Micro Electro-Mechanical Systems), MOEMS (Micro Opto-Electro-Mechanical Systems) nano-technology, nano-structures and meta-materials (EBG/PBG) are highly suitable for space-borne communications systems. A marriage of diverse materials and technologies promises next-generation lightweight, ultra-compact, prime power efficient, high reliability microwave/millimeter wave (MW/mmW) photonic hardware.

An overview of this development with a critical assessment of capability and commercial feasibility will be presented. Emphasis will be placed on the use of photonics in MW/mmW beam forming and steering of large multibeam, multichannel phased array antennas. Also, optical generation, transmission, block conversion (up/down), and distribution of high dynamic range MW/mmW signals in an optical feed network will be discussed. State-of-the-art optical/MOEMS/Nano-technologies, subsystems, and systems relevant to MW/mmW photonics will be presented.

## MONDAY WORKSHOPS AND SHORT COURSES

### WSEuMC02

#### Integrated Circuits for Multi-gigahertz Applications and Beyond

Duration: 14:00-17:50

Room: Durer

#### Organizers

Eric Kerhervé ,IXL, Bordeaux, France

Jean-Baptiste Bégueret , IXL, Bordeaux, France

#### Abstract

This workshop will show the potentialities (at a few gigahertz to several tens-gigahertz) of the silicon technologies for radiocommunication applications. Four of the proposed presentations will address one of the fundamental functions of a high frequency front-end system. The fifth presentation will specifically propose an overview of the silicon technologies dedicated to RF and microwave current and future applications.

#### Programme

CMOS Fully Integrated Transceiver Design at 17GHz  
Marc Tiebout (Infineon Technologies)

High Frequency Receiver

John Long (University of Delft)

Multi-gigahertz Frequency Synthesis on Silicon Technologies

Yann Deval (IXL), Robert Plana (LAAS)

High Efficiency Silicon Power Amplifier

Sayfe Kiaei (Arizona State University)

Advanced Silicon Technologies for RF Applications

Isabelle Telliez (STMicroelectronics)

### WSECWT/EuMC01

#### Millimeter-Wave Wireless Personal Area Network Systems

Duration: 8:30-12:10

Room: Ambroisie 4

#### Organiser

Hiroyo Ogawa, vice-chair of IEEE802.15.SG3c, National Institute of Information and Communications Technology (NICT), Japan

#### Abstract

IEEE802.15 WG recently organized the study group for standardization of millimeter-wave WPAN systems using 60-GHz unlicensed band. This workshop will discuss its standard activities and the related millimeter-wave technologies and applications.

#### Programme

Reed Fisher, chair of IEEE802.15.SG3c, OKI

Hiroyo Ogawa, NICT, Japan

Brian Gaucher, IBM ,USA

Bruce Bosco, Motorola, USA

Nobuhiko Kuribayashi, Siemens, Germany

## MONDAY WORKSHOPS AND SHORT COURSES

### WSECWT/EuMC02

#### RF System In Package

Duration: 14:00-17:50

Room: Ambroisie 4

#### Organiser

Dr. Patrice GAMAND, Philips Semiconductor, Innovation Centre RF, Caen France

#### Abstract

##### Wireless evolution

- Drivers for Wireless applications are, Miniaturisation, Cost and managing complexity
- Market demands 'easy to use' solutions and more and more features
- System In Package is then a fast answer to the market demand and complement the SoC approach

#### Consequences

- On design methods
- On industrialisation
- On the technology choice
- On Engineer job

#### Programme

Introduction: Technologies

Dr. Patrice GAMAND (Philips Semiconductor)

Passive technologies, SiP Technologies. RF SiP Design :

Dr. Mareike Klee (Philips Research)

Passive integration – an ASIC SiP comparison

Dr. Sven Mattisson (Ericsson Mobile Platform)

Design issues and examples: –Advanced RF Mixed Signal RF SiP co-design

Methodology

Dr. Patrick Dos Santos (Cadence Design System)

Focus on tools challenges and design methods. RF SiP

Industrial Testing

Pr. Sule Ozev (Duke University, USA)

## WEDNESDAY WORKSHOPS AND SHORT COURSES

### WSGAAS01

#### Black Box Modelling based on Vectorial Large Signal Network Analysis (NoE TARGET)

Duration: 8:30-17:00 Room: Ambroisie 2

#### Organiser

G. Magerl, Vienna University of Technology, Vienna, Austria

#### Abstract

This intensive, full-day workshop will provide a thorough understanding of the essential background of RF device large signal characterization and black box modelling methods. This workshop will focus both on theoretical and practical issues of up-to-date methods. There will be ample time given for questions and discussions.

#### Programme

8:30 – 9:30	<b>Large Signal Network Analysis</b> Jan Verspecht, Jan Verspecht bvba
9:30 – 10:30	<b>Multiport LSNA</b> Yves Rolain, Free University Brussels
10:30 – 11:00	<b>Coffee break</b>
11:00 – 12:00	<b>Active Load Pull Measurements</b> Markus L. Mayer, Vienna University of Technology
12:00 – 13:30	<b>Lunch</b>
13:30 – 14:30	<b>Table Based Models</b> Monica Fernandez Barciela, University of Vigo, and Paul Tasker, University of Wales, Cardiff
14:30 – 15:30	<b>Direct Model Extraction</b> Dominique Schreurs, Catholic University of Leuven
15:30 – 16:00	<b>Coffee break</b>
16:00 – 17:00	<b>Behavioural TX Modelling</b> Alessandro Cidronali, University of Florence
17:00	<b>End of workshop</b>

### WSGAAS02

#### GaN and SiC technologies : Progress and Challenges

Duration: 8:30-12:10 Room: Azorin

#### Organiser

Sylvain Delage, Alcatel-THALES III-V Lab / TIGER, France

#### Abstract

The objectives of this workshop is aiming to give to attendees an overview of current European and oversea expertise in the field of processing and performances of III-N and SiC field effect transistors for microwave applications. It is complementary to the GAAS 2005 GaN focus session. Major institutes and Company research laboratories are contributing to this workshop that is now existing for 3 years.

#### Programme

AMS Status in GaN-HEMT MMIC Fabrication A. Cetronio, C. Lanzieri, S. Lavanga, M. Peroni, P. Romanini, R. Graffitti, PF. Magrini, M. Calori, A. Bettidi, C. Costrini, L. Marescialli, F. Cesarotti, S. Maccaroni, A.M. Fiorello, R. Buttiglione, F. Ricci., AMS, Italy
GaN power bars for L-Band applications Richard Lossy, Reza Behtash, Nidhi Chaturvedi, Armin Liero, Joachim Würfl, FBH Germany
AlGaN/GaN HEMT: Processing & Characterisation at TIGER laboratory E. Morvan, D. Ducatteau, R. Aubry, B. Grimbert, T. Dean, M. François, M. Laurent, M. Peschang, V. Hoel, J.-C. Pesant, A. Leroy, D. Thénot, M.A. diForte-Poisson, D. Théron, J.-C. Jacquet, M. Rousseau, E. Chartier, G. Dambrine, E. Delos, C. Gaquière, D. Lancereau, D. Floriot, H. Gérard, S. Léger, S. Piotrowicz, C. Dua, J.-C. De Jaeger, S.L. Delage TIGER, Lille, France
GaN HEMT Technology for Integrated and Hybrid Power Amplifier P. Waltereit, R. Kiefer, IAF, Germany
SiC-based microwave devices and circuits Herbert Zirath, Niklas Rorsman, Per-Ake Nilsson and Matthias Südow, Chalmers University, Sweden
GaN HFETs for Wireless Communications Christopher J. Rauh, Nitronex, USA
Some Materials Problems in GaN HEMTs A. Brana, F. Gonzalez Posada, E. Munoz, A. Jimenez, J. Millan, Z. Bougrioua, Univ Politecnica Madrid-ISOM, Univ Alcalá de Henares, CNM-B, CSIC, CNRS-CRHEA
III-Nitride active devices and sensors : Technology and Characteristics D. Pavlidis, W. Sutton, P. Valizadeh, K. Mutombo, O. Yilmoroglu, and E. Cho, Technische Universität Darmstadt, Germany

## WEDNESDAY WORKSHOPS AND SHORT COURSES

### WSGAAS03

#### Submillimeter Wave and Terahertz Devices and Circuits

Duration: 14:00-17:50 Room: Azorin

#### Organisers

M.Schlechtweg, IAF, Germany and S.Marsh, MIDAS Consulting, United Kingdom

#### Abstract

The field of Submillimeter Wave and Terahertz Devices and Circuits is a small but rapidly growing area especially with the expanding interest in security scanning, imaging and biological applications. This workshop starts by looking at the technology for generating signals at these high frequencies and then explores the circuits for receiving, amplifying and detecting them. The session concludes with discussion of the systems applications where this device and circuit technology could be utilised.

#### Programme

Generation of Submillimeter-wave and Terahertz Signals  
Peter Siegel, Caltech, USA

MMIC Amplifiers between 100 and 300 GHz  
Michael Schlechtweg, IAF, Germany

Terahertz Sources and Receivers based on Nonlinear Diodes Tom Crowe, VDI

HBV diode multipliers  
Jan Stake, Chalmers University of Technology, Sweden

Terahertz Antenna Technology  
Ian Crane, Flann Microwave

Safety and Security applications of Terahertz  
Kevin Murphy, Qinetiq, United Kingdom

### SCGAAS01

#### Fundamentals of Power Amplifiers

Duration: 8:30-17:50 Room: Ambroisie 1

#### Organisers

Prof Ali A. Rezaazadeh, University of Manchester, UK  
Prof Franco Giannini, Universita' di Roma 'Tor Vergata', Italy

#### Abstract

The course provides a comprehensive overview of all aspects of fundamental microwave power amplifiers designs. This is an introductory course aimed at graduate engineers who have moved into the field of RF design. The speakers are experts in these areas from well know recognised organisations.

#### Programme

- Power Amplifier Fundamentals** (Tom Brazil, UCD, Ireland)
  - Introduction and basic properties
  - Gain compression and efficiency
  - Distortion and linearity characteristics
  - Memoryless PA non-linearity analysis
- Microwave Transistor Technologies Available**  
(Ali A Rezaazadeh, The University of Manchester, UK)
  - Transistor technologies (BJTs, HBTs, MESFETs and HEMTs)
  - Principal operation and biasing conditions
  - Equivalent circuits
  - dc, RF, noise and power characteristics
- Small and Large Signal models and algorithms**  
(G Leuzzi, Universita' dell'Aquila, Italy)
  - Linear circuit models and extraction techniques
  - Non-linear circuit models
  - Simulation techniques for non-linear circuits
- Design Techniques** (Peter de Hek / Frank Van den Bogaart, TNO, Netherlands)
  - Amplifier topology: transistor gate width selection, number of gate fingers, thermal analysis/design
  - Operating class and load impedance techniques
  - Stability analysis of transistors
  - Design of matching networks
  - Overall HPA design and simulation techniques
  - HPA stability
  - Typical results using above techniques
- High Efficiency Microwave Amplifiers**  
(Fanco Giannini, University of Roma Tor Vergata, Italy)
  - Power balance considerations
  - Traditional Classes of operation (Class E Class F)
  - New Classes of operation (ClassG Class FG )
  - Advanced design criteria

## WEDNESDAY WORKSHOPS AND SHORT COURSES

### WSECWT01

#### UWB Antennas

Duration: 8:30-17:50

Room: Ambroisie 3

#### Organisers

Christophe Delaveaud, CEA LETI, France

#### Abstract

Like all wireless devices, the antennas are an essential part of Ultra-Wideband communication systems. However, depending of the Ultra-Wideband systems, new drastic constraints concerning antenna characteristics can be necessary with a direct influence on the system performances. Most particularly, telecommunication systems based on impulse radio use a new temporal dimension not classically considered in antenna theory and well-known frequency domain antenna parameters are not sufficient for the characterization of the transient radiation behavior. The workshop proposes a thorough overview of antenna issues for Ultra-Wideband communication systems.

To precise the antennas needs in accordance with Ultra-Wideband communication systems, an up-dated overview of systems regulation is firstly proposed.

General antenna requirements are then detailed with a focus on specific needs required by the systems.

New insights in radiation mechanism will be described using time domain analysis and some guidelines for optimized radiating structures will be proposed.

To clearly identify the role of transmit/receive antennas, characterization of Ultra-Wideband communication channel is necessary. Some propagation models and experimental measurements will be described for both SISO and MIMO Ultra-Wideband applications.

Several new antenna parameters will be described to characterize the time behavior of radiating sources. Using these parameters, the influence of antenna properties on the transmission and systems performances will be discussed.

General design considerations for transmit/receive antennas in Ultra-Wideband wireless communication systems will be discussed. A state of the art concerning Ultra-Wideband antennas design is proposed with presentations of optimized radiating sources developed by different European universities or industrial laboratories.

A parallel with short pulse antennas for radar applications, largely developed during the last fifty years, will be presented to outline the specificities of each domain.

#### Programme

(final programme will be available on the website [www.eumw2005.com](http://www.eumw2005.com))

- UWB systems regulation
- UWB systems and associated antennas requirements
- Radiation mechanism in time domain
- Characterization of UWB channel
- Influence of Antennas on UWB transmission
- Characterization of UWB antennas in both frequency and time domain
- State of the art of Antenna design for UWB systems
- Interference assessment and coexistence studies

### SCECWT01

#### UWB for Wireless Communications

Duration: 14:00-17:50

Room: Daguerre

#### Organisers

Dr. H. Nikoogar- Delft University of Technology, Netherlands  
Prof. R. Prasad- Aalborg University, Denmark

#### Abstract

The Ultra Wide Band (UWB) technology has a history dating back to one hundred years ago when G. Marconi sent the first ever wireless transmission from the Isle of Wight to Cornwall on the British mainland using spark-gap transmitters. In the past three decades military developed the UWB technology for ground penetrating radar.

In 1998, the Federal Communication Commissions (FCC) recognized the significance of UWB technology and initiated the regulatory review process of the technology. Consequently, in February 2002 the FCC report appeared, in which UWB technology was authorized for the commercial uses with different applications, operating frequency bands as well as the transmitted power spectral densities. Ultra wide band communication is based on the transmission of very short pulses with relatively low energy. In the near future this technology may see increased use for high-speed short range wireless communications and ranging.

The UWB technique has a fine time resolution which makes it a proper technology for the accurate ranging. Because of the extremely large bandwidth, the UWB waves have a good material penetration capability. However, as UWB systems operate in a very large bandwidth, they need to share the spectrum with other users as well as with the existing communication systems and consequently, interferences may occur. Besides from the interference from other users, the UWB propagation channel will cause disturbances.

The aim of this tutorial workshop is to provide interesting material to the graduate students and researchers working in the field of commercial UWB wireless communications. The workshop will also be useful for the practicing engineers from industry who deal with the wireless systems that are designed and analyzed with the UWB technique.

The following topics will be covered in this tutorial:

- Introduction to UWB
- UWB for Wireless Communications
- Modeling of UWB Wireless Channels
- UWB Interference
- UWB Signal Processing
- Wireless Position Locationing with UWB
- UWB Applications
- Standardization of UWB

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## FRIDAY WORKSHOPS AND SHORT COURSES

### WSEuMC03

#### Practical Applications of Stability Analysis, Bifurcation and Chaos

Duration: 8:30-17:50

Room: Daguerre

##### Organiser

Almudena Suárez, DICOM Univ. of Cantabria, Spain

##### Abstract

The workshop will emphasize on the practical aspects of stability analysis, bifurcation and chaos. The purpose is to show how design problems can be solved through the application of new techniques relying on concepts from nonlinear dynamics and control theory. The stability analysis of large-signal regimes such as those obtained in power amplifiers or frequency multipliers can now be carried out through practical and accurate techniques, combinable with commercial harmonic balance. The techniques enable the prediction, at the simulation stage, of instabilities leading to spurious oscillations or undesired divisions of the carrier frequency. In recent works, the techniques have been applied not only to predict this undesired behaviour, but also to efficiently avoid it, with minimum degradation of the expected performance. Examples of these stabilization procedures in power amplifiers, oscillators and other circuits will be presented in the workshop.

##### Programme

#### Open loop stability analysis of large-signal regimes of microwave circuits

Sebastien Mons, Edouard Ngoya, Université of Limoges, France

#### Large-signal stability analysis through pole-zero identification techniques

Juan Mari Collantes, Universidad del País Vasco, Spain

#### Stability analysis and stabilization of power amplifiers

Sanggeun Jeon, Almudena Suárez, Dave Rutledge, California Institute of Technology, United States

#### Stabilization techniques for microwave oscillators

Sergio Sancho, Franco Ramírez, Universidad de Cantabria, Spain (sanchosm@unican.es)

#### Bifurcation synthesis through conversion-matrix approach

Georgio Leuzzi, University of L'Aquila, Italy

#### Bifurcation control

Almudena Suárez, Ana Collado, Universidad de Cantabria, Spain

#### Chaotic Oscillators and Their Applications to Communications

Christopher Silva, Aerospace Corporation, United States

### WSEuMC04

#### New Trends and Techniques for the Synthesis and CAD of Microwave Filters

Duration: 14:00-17:50

Room: Doppler 2

##### Organiser

Richard Cameron, ComDev Europe Ltd, UK

Stéphane Bila, IRCOM, France

Dominique Baillargeat, IRCOM, France

##### Abstract

The workshop is dedicated to synthesis and computer-aided techniques for the design of microwave filters. Recent workshops have addressed this popular topic and the goal is now to present the actual status and the new trends for the European microwave community. Theoretical and practical issues will be addressed by academic and industrial speakers.

##### Programme

Guiseppa Macchiarella, Politecnico di Milano, Milan, Italy

Ruediger Vahldieck, Klaus Krohne, Swiss Federal Institute of Technology, Zurich, Switzerland

Dieter Wolk, Tesat Spacecom, Backnang, Germany

Jean-Jacques Herren, Alcatel Space, France

Magdalena Salazar-Palma, Universidad Politecnica de Madrid, Madrid, Spain,

Richard Cameron, ComDev Europe Ltd, Aylesbury, UK

Stéphane Bila, Dominique Baillargeat, IRCOM, France

## FRIDAY WORKSHOPS AND SHORT COURSES

### WSEuMC05

#### Ferroelectrically Tuneable Microwave Devices

Duration: 8:30-17:50

Room: Durer

#### Organizers

Spartak Gevorgian and Anatoli Deleniv Chalmers University of Technology, and Ericsson Microwave Systems, Sweden

#### Abstract

Recently, after several decades of mainly academic research, the tuneable microwave devices based on ferroelectrics are considered for industrial applications. The main advantages of the tuneable microwave ferroelectric devices, in comparison with the competing technologies, are the small sizes, high tuning speed, and small drive powers. This full-day workshop/tutorial is devoted to the basics and practical implementations of microwave devices based on bulk, thick film and thin film ferroelectrics. It is targeted at engineers involved in the development of the advanced tuneable/ adaptable/reconfigurable microwave devices and systems as well as experts in the field of ferroelectric devices and consists of two parts.

#### Programme

##### Part A. The Basics of the tuneable ferroelectric devices

1. A Tagantsev, "Ferroelectric materials for tuneable microwave applications" EPFL, Switzerland
2. I. Vendik, and O. G. Vendik, "Commutation Quality Factor of Ferroelectric Materials and a Figure of Merit of Tuneable Ferroelectric Microwave Devices", Electrotechnical University, S. Petersburg, Russia
3. A. Deleniv et al. "Experimental characterisation of tuneable ferroelectrics at low and microwave frequencies"

##### Part B. Microwave ferroelectrics in EU projects

4. S. Gevorgian, (all partners will be included in the list of co-authors) "Project MELODY. Overview", Ericsson AB, Sweden
5. T. Hu, H. Jantunen, D. Iddles, T. Price and T. Button "Ferroelectric LTCCs and components' manufacturing methods", University of Oulu, Finland
6. O. Tageman, et al. "Ferroelectric ceramics plates for millimetre wave beam canning applications" Ericsson AB, Sweden
7. A. Deleniv, P. Filhol, H. Jantunen, and T. Button, "Tuneable devices based on bulk, LTCC, and HTCC ferroelectric ceramics", Chalmers University of Technology, Sweden
8. M. Lancaster, and T. Button, 'Microwave phase shifters using thick film ferroelectrics', The University of Birmingham, UK
9. I. S. Nefedov and S.A. Tretyakov, "Electromagnetic waves in electrically controllable metamaterials based on loaded wire media", Helsinki University of Technology, Finland
10. P. K. Petrov, and N. McN. Alford, "Tuneable filters based on ferroelectric ceramics" South Bank University, London, UK
11. A. Kozyrev et al, "Residual polarization in paraphase BSTO structures and its impact on parameters of microwave devices", Electrotechnical University, S. Petersburg, Russia
12. S. Gevorgian and A. Vorobiev, "Tuneable TFBARs based on BaxSr1-xTiO3 films". Chalmers University of Technology, Sweden

### WSEuMC06

#### Microwave Education for the Future

Duration: 14:00-17:50

Room : Diderot

#### Organizers

Madhu S. Gupta , San Diego State University - U.S.A.  
Jan Zehentner , Czech Technical University - Prague - Czech Republic –

#### Abstract

The purpose of this workshop for microwave educators is to increase their awareness of the major changes taking place in (a) the needs of industrial employers, (b) newly available educational tools and technologies, (c) curricular developments, and (d) impact of globalization on education. Issues such as continuing education needs of engineers in industry, industry-university cooperation in education, web-based instruction, and other methods of distance learning will be examined. In particular, present creative approaches to the problems currently facing microwave educators will be discussed.

#### Programme

1. Wolfgang Hoefer, Victoria, Canada
2. D. Bajan, Toulouse, France
3. Herman Schumacher, Ulm, Germany
4. Thomas Brazil, Dublin, Ireland
5. Robert Weigel, Erlangen-Nurnberg, Germany
6. Heinrich Dembkes, AADS, Germany
7. Werner Weissbach, University of Karlsruhe, Germany

## FRIDAY WORKSHOPS AND SHORT COURSES

### WSEuMC07

#### Emerging Technologies for Filter Applications

Duration: 08:30-12:10 Room: Doppler2

#### Organiser

P. Blondy, IRCOM, France

#### Abstract

Filters are one of the last remaining bottleneck for system integration, since their performance is highly critical in modern communication systems. The aim of this workshop is to provide to the audience an overview of recent advances in filter fabrication technologies, in a compact and focused half day programme. The workshop will cover topics from free space construction of Frequency Selective Surfaces (FSS), 3D EBG as well as MEMS technologies like FBAR, MEMS wideband tunable filters and emerging silicon integrated sub-millimeter wave filters.

#### Programme

Tunable RF-MEMS Filters  
Gabriel Rebeiz, UCSD, USA

Reconfigurable MEMS Filters  
Arnaud Pothier, IRCOM, France

New FSS Structures  
Abbas abbaspour Tamijani, U of Arizona, USA

FBAR at Stmicro  
Pascal Ancey and JF Carpentier, ST micro, France

FBAR and SAW  
Edgar Schmidhammer, EPCOS AG, France

Advances in acoustic filters  
Sylvain Balandras, LPMO, France

Filters on LCP substrates  
John Papapolymerou, GaTech, USA

3D EBG Filters  
Bill Chappell, Purdue, USA

Sub millimeter wave planar filters  
Eric Rius and Henri Happy, LEST and IEMN, France

Filters in MCM-D technology  
Eric Beyne IMEC, France

### WSGAAS/EuMC01

#### Advanced Microsystem for RF and Millimeterwave Communications: NOE AMICOM

Duration: 8:30-17:50 Room: Doppler1

#### Organiser

R. Plana, LAAS-CNRS & University Paul Sabatier, Toulouse, France

#### Abstract

The NOE AMICOM aims to restructure the research activity in Europe in the field of Advanced Microsystem for Millimeterwave Communications. This workshop will propose the last progress that have been made within this NOE in the field of MEMS technology, design and modelling, Reliability devices circuits and systems.

#### Programme

The RF MEMS market 2004 - 2009, RF MEMS keep their promise  
J.Bouchaud, WTC, Germany

RF MEMS switches for mobile communications: from metal-metal to suspended-gate MOS device architectures  
R.Fritschi, EPFL, Switzerland

Diamond Based RF MEMS  
E.Kohn, Ulm Univ, Germany

Static and dynamic electromechanical response of RF-MEMS switches  
Vitaly Leus, Technion, Israel

Reliability characterization and modelling of MEMS based capacitive Switches  
S.Melle, LAAS-CNRS, France

MEMS based microwave power sensing  
A.Oja, VTT, Finland

MEMS-steerable reflectarrays  
P.Farinelli, Perugia Univ, Italy

GaAs Microsystem for millimeterwave range  
A.Muller, IMT, Romania

## FRIDAY WORKSHOPS AND SHORT COURSES

### WSEuRAD01

#### Littoral and EW Aspects

Date: Friday 14:00-17:50 Room: Donatello1

#### Organiser

Arthur Self , Magma, Canada

#### Abstract

The Littoral is now the principal environment for naval forces as opposed to deep water [blue ocean] scenarios. Recent conflicts over the last 10-15 years have shown this to be so and have raised a wide range of EW issues, problems and technology pulls needed in order for multi-national forces to operate effectively. This, in turn, has spurred and supported the development of a number of new technologies and thrusts including: low cross section platforms, multi-function radars, UAVs, USVs, network centric concepts and the like.

This proposed course would bring together and put in context better the uses and rationale behind a number of these developments from the EW perspective with the focus on naval operations.

#### Programme

the littoral: what is it

- the asymmetric threat
- EW requirements definition
- platform & equipment review
- platform protection issues and requirements
- Offboard CM review [rocket, UAV, USV]
- sensor and weapon technology challenges looking forward [sensor/weapon integration; examples of NCW such as CEC]

### SCEuRAD01

#### Polarimetric and Interferometric SAR data processing for remote sensing applications.

Date: Friday 14:00-17:50 Room: Donatello2

#### Organizers

A. Reigber, Technical University of Berlin,  
L. Ferro-Famil, Université de Rennes 1

#### Abstract

New generation air-borne and space-borne sensors have shown that the accelerated advancement of PolSAR and Pol-InSAR techniques is of direct relevance and of priority to local-to-global environmental ground-truth measurement and validation, and monitoring of the terrestrial and planetary covers. POLSAR remote sensing offers an efficient and reliable means of collecting the information required in order to extract the biophysical and geophysical parameters about the Earth's surface and have found successful application in quantitative physical parameter estimation. The objectives of this course are to provide a review of those aspects of radar polarimetry and interferometry required to appreciate their fusion as air and space borne polarimetric radar interferometry and its extension to differential interferometry.

#### Programme

##### Radar polarimetry basics , L. Ferro-Famil

- Wave polarization
- Representation of an object polarimetric properties
- Polarimetric decomposition theorems

##### Pol-SAR processing applications , L. Ferro-Famil

- Classification of complex scenes
- Retrieval of bio- and geo-physical properties
- Urban area remote sensing

##### SAR Interferometry , A. Reigber

- Interferometry basics
- DEM generation chain

##### Polarimetric SAR interferometry , L. Ferro-Famil

- Description of polarimetric coherent scattering
- Pol-InSAR analysis of volumetric media
- Retrieval of bio- and geo-physical properties

##### Space- and air-borne polarimetric differential interferometry, A. Reigber

- Basics of differential interferometry
- The permanent scatterer technique
- Airborne differential interferometry : challenges and results
- Airborne SAR tomography