About the Logo of NEMO

The logo of NEMO conference was designed by James and Brian Rautio, and it was inspired by the entry foyer floor of Maxwell’s home in Glenlair. This floor seems to have been inspired by Maxwell’s model of the \textit{luminiferous æther}.

A close-up of Glenlair’s restored entry foyer floor seems to have been inspired by Maxwell’s model of the luminiferous æther.

The NEMO2017 logo is in turn inspired by the floor of Glenlair’s foyer, perhaps a secret message from Maxwell to today’s engineers and scientists.
Welcome message from the Conference General Chairs

It is our great pleasure to welcome you to Sevilla for the NEMO2017 conference!
You are attending the fourth edition of the IEEE MTT-S International Conference on Numerical Electromagnetic and Multiphysics Modeling and Optimization. NEMO2017 is organized by the IEEE Microwave Theory and Techniques Society with the technical co-sponsorship of the European Microwave Association.

The idea of NEMO conference originated from the need to give special attention to the topics related to computational electromagnetics, advanced numerical techniques and optimization algorithms and strategies. These topics are becoming more and more important with the increased complexity of microwave systems, the use of new materials and technologies, and the request for availability of fast and accurate design tools. This conference aims to bring together experts and practitioners of computational electromagnetics and multiphysics for RF, microwave, and terahertz applications. NEMO conferences are expected to be ideal venues to share new ideas on numerical techniques for electromagnetic / multiphysics modeling, propose efficient design algorithms and tools, and anticipate the modeling needs of future technologies and applications. The conference is organized annually, rotating between Europe, North America, and Asia.

NEMO2017 is held in Sevilla, Spain, a historical and beautiful town located in the southern part of the country (Andalusia). The city (700,000 inhabitants and 2,200 years of history) is located on the banks of Guadalquivir River, and has the third largest Old Town in Europe. The ancient minaret named “La Giralda”, the Gothic Cathedral (one of the largest temples of Christendom) and the Alcázar Palace are worldwide renowned monuments (UNESCO World Heritage Sites). On the other hand, the University of Seville is one of the oldest universities in Spain and Europe, founded under the name of Colegio Santa María de Jesús in 1505, and since early it was a fundamental intellectual center in southern Spain. It is also one of the largest universities in the country. The conference is held in the beautiful “Pavilion of Mexico”, one of the emblematic buildings of the Ibero-American Exposition of 1929 that was rehabilitated in the nineties of the past century as a multipurpose building of the University of Seville.

During the three days of the conference a variety of social events will be organized, including the Welcome Reception, to be held in one of the patios of the Rectorado Building (the "Old Tobacco Factory", which was the largest industrial building in the world at the XVIII century and also the setting for the renowned opera “Carmen” by Bizet) and the Gala Dinner in the very nice restaurant Abades Triana located at the Triana bank of Guadalquivir river.

We wish you to have a wonderful time in Seville for NEMO2017 conference and for the additional time you may like to spend in the city or visiting the historical treasures and naturalistic beauties of Spain.

Francisco Mesa
Conference General Co-Chair

Francisco Medina
Conference General Co-Chair
Organizing Committee

NEMO2017 CONFERENCE CHAIRS
Francisco Mesa, University of Sevilla, Spain  Conference General Co-Chair
Francisco Medina, University of Sevilla, Spain  Conference General Co-Chair

NEMO2017 TECHNICAL PROGRAM CHAIRS
Rafael R. Boix, University of Sevilla, Spain  Technical Program Chair
Raúl Rodríguez-Berral, University of Sevilla, Spain  Technical Program Co-Chair

NEMO2017 CONFERENCE AWARD CHAIR
Almudena Suárez, University of Cantabria, Spain

NEMO2017 CONFERENCE LIAISON CHAIR
Maurizio Bozzi, University of Pavia, Italy

LOCAL ORGANIZING COMMITTEE
Armando Fernández-Prieto, University of Sevilla, Spain  Conference Finance Chair
Jesús Martel, University of Sevilla, Spain  Local Arrangement Chair
Alejandro Martínez-Ros, University of Sevilla, Spain  Conference Secretary

NEMO EXECUTIVE COMMITTEE
Qi-Jun Zhang (Chair), Carleton University, Canada
Wolfgang Hoefer, University of Victoria, Canada
James Rautio, Sonnet Software, USA
Maurizio Bozzi, University of Pavia, Italy
Thomas J. Brazil, University College Dublin, Ireland
George Ponchak, NASA Glenn Research Center, USA
Welcome message from the Technical Program Chairs

Dear attendees,

welcome to the fourth edition of the the IEEE MTT-S International Conference on Numerical Electromagnetic and Multiphysics Modeling and Optimization!

As TPC chairs, first and foremost we want to thank the more than 450 authors who submitted their papers from 34 different countries. Furthermore, we must recognize and thank the work of the 60 TPC members, whose advice has permitted to select a total of 126 high quality papers and to setup an exciting conference program.

The NEMO conference will take place along three full days including 8 special convened sessions, 12 regular sessions, and 1 interactive forum. The presentations, covering most of the relevant topics in computational electromagnetics and its applications, mostly in antenna an microwave engineering, as well as other important subjects of interest for the conference participant (including active and nonlinear components, medical applications and so on) will be run in two parallel sessions in the “Pabellón de México” (Mexico Pavilion), a building of the Universidad de Sevilla located in one of the ends of the beautiful Maria Luisa Gardens. We are also proud of counting with the participation of three internationally recognized researchers who will deliver the three plenary keynote talks included in the conference program: Prof. Juan R. Mosig (Ecole Polytechnique Federale de Lausanne), Prof. David R. Jackson (The University of Houston) and Prof. Francisco Javier García de Abajo (ICFO, Barcelona).

During the conference, an international committee will select the best paper presented by a student, which will be awarded a prize during the conference gala dinner.

Finally, the authors of accepted papers will be invited to submit an extended version of their papers, which will be selected upon a regular revision process for publication on a mini special issue of the IEEE Transactions on Microwave Theory and Techniques.

Enjoy the NEMO2017 technical program and enjoy Seville!

Rafael R. Boix
Technical Program Chair

Raúl Rodríguez-Berral
Technical Program Co-Chair
Technical Program Committee

Rafael R. Boix, University of Sevilla, Spain - TPC chair
Raúl Rodríguez-Berral, University of Sevilla, Spain - TPC co-chair
Paolo Arcioni, University of Pavia, Italy
Fritz Arndt, University of Bremen, Germany
Joaquín Bernal, University of Sevilla, Spain
Vicente E. Boria, Universidad Politécnica de Valencia, Spain
Thomas J. Brazil, University College Dublin, Ireland
Amelia Rubio-Bretones, University of Granada, Spain
Paolo Arcioni, University of Pavia, Italy
Alessandra Costanzo, University of Bologna, Italy
Christophe Craeye, Université Catholique de Louvain, Belgium
Valentín de la Rubia, Universidad Politécnica de Madrid, Spain
Armando Fernández-Prieto, University of Sevilla, Spain
Miguel Ferrando-Bataller, Universidad Politécnica de Valencia, Spain
Christophe Fumeaux, The University of Adelaide, Australia
Salvador González-García, University of Granada, Spain
Luis Emilio García-Castillo, Universidad Carlos III de Madrid, Spain
Maria García-Vigueras, IETR-INS A Rennes, France
Anthony Ghiotto, University of Bordeaux, France
José M. Gil Gil, Universidad Politécnica de Madrid, Spain
Benito Gimeno, University of Valencia, Spain
Jiro Hirokawa, Tokyo Institute of Technology, Japan
Wolfgang Hoefer, Institute of High Performance Computing, Singapore
Wei Hong, Southeast University, P. R. China
Tzuy-Sheng (Jason) Horng, National Sun Yat-Sen University, Taiwan
Ting-Yi Huang, National Taiwan University, Taiwan
David R. Jackson, University of Houston, USA
Dan Jiao, Purdue University, USA
Slawomir Koziel, Reykjavik University, Iceland
Luis Landesa, University of Extremadura, Spain
Er-Ping Li, Zhejiang University, P. R. China
Sergio Llorente-Romano, Universidad Carlos III de Madrid, Spain
Vicente Losada, University of Sevilla, Spain
Jesús Martel, University of Sevilla, Spain
Alejandro Martínez-Ros, University of Sevilla, Spain
Michel Mattes, Technical University of Denmark, Denmark
Francisco Medina, University of Sevilla, Spain
Francisco Mesa, University of Sevilla, Spain
Mauro Mongiard, University of Perugia, Italy
Luca Pierantoni, University of Pavia, Italy
Luca Pierantoni, Università Politecnica delle Marche, Italy
Eva Rajo-Iglesias, Universidad Carlos III de Madrid, Spain
Brian Rautio, Sonnet Software Inc., USA
Javier Reina-Tosina, University of Sevilla, Spain
Juan M. Rius, Universitat Politècnica de Catalunya, Spain
Laura Roa, University of Sevilla, Spain
Hendrik Rogier, Ghent University, Belgium
Jesús Rubio, University of Extremadura, Spain
Jorge Ruiz-Cruz, Universidad Autónoma de Madrid, Spain

Sevilla, Spain, May 17-19, 2017
Magdalena Salazar-Palma, Universidad Carlos III de Madrid, Spain
Atsushi Sanada, Osaka University, Japan
Manuel Sierra-Castañer, Universidad Politécnica de Madrid, Spain
Richard Snyder, RS Microwave, USA
Almudena Suárez, University of Cantabria, Spain
José Manuel Taboada, University of Extremadura, Spain
Cristiano Tomassoni, University of Perugia, Italy
Guido Valerio, Sorbonne Universités UPMC, France
Giuseppe Vecchi, Politecnico di Torino, Italy
Ke-Li Wu, The Chinese University of Hong Kong, China
Jong-Gwan Yook, Yonsei University, Korea
Juan Zapata, Universidad Politécnica de Madrid, Spain
WELCOME RECEPTION

Royal Tobacco Factory
(Headquarters of the University of Sevilla, Rectorate)
C/ San Fernando, Seville.

Wednesday, May 17, 2017, 08:30 pm-10:00 pm

The Welcome Reception will be held on Wednesday, May 17, 2017, from 08:30 pm to 10:00 pm at the central “patio” of the main building of the University of Sevilla (Royal Tobacco Factory, “Real Fábrica de Tabaco”), located in San Fernando Street. This event will be an opportunity to meet colleagues and friends at the end of the first day of NEMO2017 conference. All conference participants are welcome!

GALA DINNER

Restaurante Abades Triana, Calle Betis, no. 69, Sevilla.

Thursday, May 18, 2017, 08:30 pm-11:30 pm

The Gala Dinner of NEMO2017 conference will take place on Thursday, May 18, 2017, starting at 08:30pm, in the Restaurant Abades Triana, located at the banks of Guadalquivir River, in the district of Triana, just in front of “Torre del Oro” (Gold Tower), Maestranza Opera House and nice views of the old city. After a welcome appetizer on the terrace looking at the river, the Gala Dinner will propose specialties of Spanish cuisine. The winner of the Best Student Paper Award will be announced during the Gala Dinner, and the NEMO2018 conference will be presented. All conference registrants will receive an invitation ticket for the Gala Dinner. Extra tickets for guests have also been offered, and a few additional tickets will be available at the conference registration desk.
Opening Session (Room A)

Wednesday, May 17, 08:45-9:30

Welcome from the Conference General Chairs
Francisco Mesa & Francisco Medina
University of Seville, Spain

Welcome from the Research Vicerrector of the University of Seville
Julián Martínez Fernández
University of Seville, Spain

Welcome from the Technical Program Chair
Rafael R. Boix
University of Seville, Spain

Address from the MTT-S Representative
Maurizio Bozzi
University of Pavia, Italy
Keynote Speech 1 (Room A)

New Antenna Technologies and their Computational Electromagnetic Challenges

Juan R. Mosig

École Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland

Wednesday, May 17, 09:30-10:30

Abstract – The recent (April 2017) publication of a Special Issue of the Proceedings of IEEE on the subject of “Additive Manufacturing of Radio-Frequency Components” is a good example of how new technologies are deeply changing the way RF-components and antennas are designed. This fact is to be combined with a strong drive towards increasingly higher frequencies in order not only to enhance the communication capacities but also to achieve miniaturized and integrated antenna subsystems. On one side, the Ka-band has been selected as the preferred frequency band to implement the fifth generation (5G) of mobile systems and wireless broadband services (US Federal Communications Commission announcement in July 2016). On the other hand, frequencies above the Ka-band (V and W bands) are already being explored for commercial and scientific applications and the THz submillimeter band (0.3-3 THz) is becoming the last frontier, where classic antenna designs can still be used before entering the realm of photonics. But taking into account the involved wavelengths (100 microns at 3 THz) and the fact that many metals start to show plasmonic behavior at these frequencies, scaling a low frequency design is no longer a trivial task. So the aim is nowadays to produce compact and inexpensive antennas, that can work directly in Ka-band frequencies or that are scalable to these frequencies and above. The antennas should also offer the possibility of easy integration in complete antenna subsystems that could use the same or related technologies. In this talk, we review some antenna designs, from Ku-band to Terahertz, fulfilling this aim and using innovative technologies. These include the recent extensions of the Surface Integrated Waveguide (SIW) technologies, the stereolithographic (SLA) version of Additive Manufacturing (AM), the use of dielectric elastomer materials and graphene/metasurface-based designs. In every case, the change of paradigm will be highlighted, to anticipate the challenges and the modeling/analysis needs introduced by these new designs and technologies.

Juan R. Mosig (S’76–M’87–SM’94–F’99) was born in Cádiz, Spain. He received the degree in electrical engineering from the Universidad Politécnica de Madrid, Madrid, Spain, in 1973, and the Ph.D. degree in electrical engineering from the École Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland, in 1983. Since 1991, he has been a Professor with the Laboratory of Electromagnetics and Acoustics (LEMA), EPFL, and has been its Director since 2000. He has held scientific appointments with the Rochester Institute of Technology, Rochester, NY, USA; the Syracuse University, Syracuse, NY, USA; the University of Colorado at Boulder, CO, USA; University of Rennes, Rennes, France; University of Nice, Nice, France; and the Technical University of Denmark, Lyngby, Denmark. He has authored four chapters in books on microstrip antennas and circuits and over 170 reviewed papers. His research interests include electromagnetic theory, numerical methods, and planar antennas. Dr. Mosig has been the Swiss Delegate for European COST Antenna Actions since 1985 and the Chair for the two last Actions 284 and IC0603 ASSIST from 2003 to 2011. From 2004 to 2007, he was Vice-Coordinator of the FP6 Network of Excellence ACE, that enabled the EuCAP Conference series. He has also served as Member of the Board in the Coordination Actions ARTIC (FP6) and CARE (FP7) and Transnational Delegate in the IEEE APS AdCom. He is a Founding Member and Chair of the European Association on Antennas and Propagation (EurAAP) and also chairs the EuCAP Conferences series and its Steering Committee. He also founded (2006) and conducted the series of INTELECT International Workshops on Computational Electromagnetics. He was the recipient of the 2015 IEEE Antennas and Propagation Society Sergei A. Schelkunoff Transactions Prize Paper Award.

Sevilla, Spain, May 17-19, 2017
### Session WA2 (Room A)

**Microwave Filters**

**Wednesday, May 17, 11:00-13:00**

**Chair:** Vicente E. Boria, *Universitat Politècnica de Valencia, Valencia, Spain.*

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<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Presenters</th>
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<tbody>
<tr>
<td>11:00-11:20</td>
<td><strong>Scattering Matrix Subtraction Technique for Mode-Matching Analysis of Substrate Integrated Waveguide Junctions</strong></td>
<td>J. Bornemann, S. Salem Hesari&lt;br&gt;<em>University of Victoria, Victoria, BC, Canada</em></td>
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<tr>
<td>11:20-11:40</td>
<td><strong>A Wideband Dual-band BPF Based on SISL</strong></td>
<td>Y. Chu, K. Ma, S. Mou&lt;br&gt;<em>University of Electronic Science and Technology of China, Chengdu, China</em></td>
</tr>
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<td>11:40-12:00</td>
<td><strong>Planar Dual-Mode Dual-Band Dual-Ring Resonator Bandpass Filter</strong></td>
<td>J.-T. Kuo, Y.-T. Lu, H.-M. Lin&lt;br&gt;<em>Chang Gung University, Taoyuan, Taiwan</em></td>
</tr>
<tr>
<td>12:00-12:20</td>
<td><strong>Miniaturized Micromachined Dual Mode Cross Slot 5 Pole Filter</strong></td>
<td>R. Hajj, M. Chatras, P. Blondy&lt;br&gt;¹CCNE Department, Lebanese University, Saida, Lebanon; ²MINACOM, XLIM, Limoges, France</td>
</tr>
<tr>
<td>12:20-12:40</td>
<td><strong>Optimized Wideband Differential-Mode Bandpass Filters with Broad Stopband and Common-Mode Suppression based on Multi-Section Stepped Impedance Resonators and Interdigital Capacitors</strong></td>
<td>M. Sans, J. Selga, P. Vélez, J. Bonache, F. Martin, A. Rodriguez, V. E. Boria&lt;br&gt;¹GEMMA/CIMITEC, Departament d‘Enginyeria Electrònica, Universitat Autònoma de Barcelona, Bellaterra, Spain; ²Departamento de Comunicaciones-iTEAM, Universitat Politècnica de Valencia, Valencia, Spain</td>
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<tr>
<td>12:40-13:00</td>
<td><strong>Design Procedure for Coaxial Combline Filters based on Segmentation and Space Mapping Strategies</strong></td>
<td>A. Muller, P. Soto, V. E. Boria&lt;br&gt;<em>Microwave Applications Group, iTEAM, Universitat Politècnica de Valencia, Valencia, Spain.</em></td>
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</table>
Session WB2 (Room B)

Medical Applications & Non-Destructive Testing

Wednesday, May 17, 11:00-13:00

Chair: Laura Roa, University of Sevilla, CIBER-BBN, Seville, Spain

11:00-11:20  Wave Propagation with Human Body Communications in BANs  
WB2-1  D. Ahmed, Jens Kirchner, G. Fischer  
Institute for Electronics Engineering, Friedrich-Alexander-University-Erlangen-Nuremberg (FAU), Germany

11:20-11:40  Intrabody Communication for Brain Stimulation: Influence of Frequency and Electrode Configuration  
WB2-2  M. A. Callejón, J. Reina-Tosina, L. Fernández-Jiménez, L. M. Roa  
Biomedical Engineering Group, University of Seville, CIBER-BBN, Seville, Spain

11:40-12:00  A New Left-Handed Metamaterial Lens Applicator for Superficial Tumor Hyperthermia  
WB2-3  Y. Tao, G. Wang  
Department of Engineering Science, University of Science and Technology of China, Hefei, China

12:00-12:20  Experimental Study on Spatial Scan Terahertz Imaging in Non-destructive Testing of Printed Circuit Board  
WB2-4  F. Yang, S. Xie, J. Yao  
State Key Laboratory of Power Transmission Equipment, System Security & New Technology, School of Electrical Engineering, Chongqing University, Chongqing, China

12:20-12:40  Dielectric Properties Characterization: a Simple Inverse Problem Approach  
WB2-5  L. A. C. Fonseca, 1H. E. Hernández-Figueroa, 2G. T. Santos-Souza, 2L. L. Bravo-Roger  
1School of Electrical Engineering, University of Campinas, Campinas, Brazil; 2School of Technology, University of Campinas, Limeira, Brazil
Chair: Miguel Ferrando-Bataller, Universidad Politécnica de Valencia, Valencia, Spain

15:00-15:20 A Study on Phase Improvement of Focusing Dielectric Lens Horn Antenna Using Dielectric Slab
WA3-1
R. Suga, Y. Abe, R. Kato, O. Hashimoto, A. Kezuka
Department of Electrical Engineering and Electronics, Aoyama Gakuin University, Kanagawa, Japan; Electronic Navigation Research Institute, MPAT, National R & D Agency, Chofu-Shi, Japan

15:20-15:40 Design of an Unidirectional UWB Cavity Backed Antenna
WA3-2
C. R. Peñafiel-Ojeda, M. Cabledo-Fabrè, E. Antonino-Daviu, M. Ferrando-Bataller
Instituto de Telecomunicaciones y Aplicaciones Multimedia (ITEAM), Universidad Politénica de Valencia, Valencia, Spain; Universidad Nacional de Chimborazo (UNACH), Riobamba, Ecuador

15:40-16:00 Open-Circuit to Embedded Pattern Approach with Harmonic Optimization in ESPAR
WA3-3
H. A. Kayani, C. Craeye, K. Alkhalifeh
ICTEAM Institute, Université Catholique de Louvain, Louvain-la-Neuve, Belgium

16:00-16:20 Cosecant Squared Pattern Synthesis of Linear Antenna Arrays based on an Adaptive Least Square Algorithm
WA3-4
M. Bodehou, T. Gilles
ICTEAM Institute, Université Catholique de Louvain, Louvain-la-Neuve, Belgium; AGC GLASS Europe Technovation Centre, Gosselies, Belgium

16:20-16:40 Metamaterial Lens Design using Characteristics Modes
WA3-5
D. Santillán-Haro, E. Antonino-Daviu, D. Sánchez-Escudero, M. Ferrando-Bataller
Instituto de Telecomunicaciones y Aplicaciones Multimedia (ITEAM), Universidad Politénica de Valencia, Valencia, Spain; Universidad Nacional de Chimborazo (UNACH), Riobamba, Ecuador

16:40-17:00 UWB-MIMO Doublet with Split Decoupling Structure and Defected Grounds
WA3-6
T. Shabbir, R. Saleem, M. Bilal, M. F. Shafique
Department of Telecommunication Engineering, University of Engineering and Technology, Taxila, Pakistan; Center for Advanced Studies in Telecommunication (CAST), COMSATS Institute of Information Technology, Islamabad, Pakistan
Session WB3 (Room B)

RF & Microwave Passive Circuits-1

Wednesday, May 17, 15:00-17:00

Chair: Slawomir Koziel, Reykjavik University, Reykjavik, Iceland

15:00-15:20 Fruit Fly Optimization Algorithm for Passive Waveguide Devices

WB3-1 L. Polo-López, J. Córcoles, J. Ruiz-Cruz

Escuela Politécnica Superior, Universidad Autónoma de Madrid, Madrid, Spain

15:20-15:40 Multi-Objective Design of Miniaturized Impedance Transformers by Domain Segmentation

WB3-2

1,S. Koziel, 1,2A. Bekasiewicz, 1Q. S. Cheng, 3Q. Zhang

1Engineering Optimization & Modeling Center, Reykjavik University, Reykjavik, Iceland; 2Faculty of Electronics, Telecommunications and Informatics, Gdansk University of Technology, Gdansk, Poland; 3Department of Electrical and Electronic Engineering, Southern University of Science and Technology, Shenzen, China

15:40-16:00 1D/2D Hybrid Mesh PEEC Solver for the Analysis of Multilayer Planar Circuits

WB3-3

1S. Ahyoune, 1J. Sieiro, 1M. N. Vidal, 1J. M. López-Villegas, 2F. Ramos

1Grup de Radiofreqüència - Universitat de Barcelona, Barcelona, Spain; 2FAE-Francisco Albero S.A.U., L’Hospitalet de Llobregat, Spain

16:00-16:20 Accelerated Multi-Objective Design of Integrated Spiral Inductors Using Pareto Front Extrapolation

WB3-4 S. Koziel, P. Kurgan

School of Science and Engineering, Reykjavik University, Reykjavik, Iceland

16:20-16:40 Approach to Scalable Modeling for Planar Inductor Using EM Simulation and a Few Samples Measurement

WB3-5 A. S. Salnikov, A. E. Goryainov, I. M. Dobush, A. A. Kalentyev, D. V. Garays

Tomsk State University of Control Systems and Radioelectronics, Tomsk, Russian Federation

16:40-17:00 An Electromagnetic Band Gap Structure to Stop the Leakage from Microwave Cavities

WB3-6 A. A. Nour, A. Bostani

Department of Electrical Engineering, American University of the Middle East (AUM), Egaila, Kuwait
Session WA4 (Room A)

Electromagnetic Characterization of RF & Integrated Circuits

Wednesday, May 17, 17:30-19:10

**Chair:** Zhen Peng, *University of New Mexico, Albuquerque, New Mexico, USA*

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<th>Time</th>
<th>Title</th>
<th>Authors</th>
<th>Affiliations</th>
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<tbody>
<tr>
<td>17:30-18:10</td>
<td><strong>EM-CAD for Complex Electronics Systems: A Journey from Order to Chaos</strong> (invited paper)</td>
<td>Z. Peng, S. Lin</td>
<td><em>Departament of Electrical and Computer Engineering, University of New Mexico, Albuquerque, New Mexico, USA</em></td>
</tr>
<tr>
<td>18:10-18:30</td>
<td><strong>A Strategy to Efficiently Include Electromagnetic Simulations in Optimization-based RF Circuit Design Methodologies</strong></td>
<td>F. Passos, E. Roca, R. Castro-López, F. V. Fernández, J. Sieiro, J. M. López-Villegas</td>
<td><em>1Instituto de Microelectrónica de Sevilla, CNM-CSIC, Universidad de Sevilla, Seville, Spain; 2Department of Electronics, University of Barcelona, Barcelona, Spain</em></td>
</tr>
<tr>
<td>18:50-19:10</td>
<td><strong>Pin-Capacitor Spacing as A Design Guide to Power Delivery Networks</strong></td>
<td>I. Erdin, R. Achar</td>
<td><em>1Engineering Design Services, Celestica Inc. Ottawa, Ontario, Canada; 2Electronics Engineering, Carleton University, Ottawa, Ontario, Canada</em></td>
</tr>
</tbody>
</table>
## Session WB4 (Room B)

**Active & Non-Linear Devices**

**Wednesday, May 17, 17:30-19:00**

**Chair:** Alexander Schuchinsky, *University of Liverpool, Liverpool, UK*

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Presenters</th>
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<tbody>
<tr>
<td>17:30-17:50</td>
<td><strong>Dynamics of Resistive Electro-Thermal Nonlinearity</strong></td>
<td>¹A. Schuchinsky, ²M. Steer&lt;br&gt;¹Departament of Electrical Engineering and Electronics, University of Liverpool, Liverpool, UK; ²Electrical and Computer Engineering, NC State University, Raleigh, NC, USA</td>
</tr>
<tr>
<td>17:50-18:10</td>
<td><strong>Noise Factor Optimization of Surface Acoustic Wave Filters</strong></td>
<td>V. D. Kuptsov&lt;br&gt;<em>Institute of Physics, Nanotechnology and Telecommunications, Peter the Great St. Petersburg Polytechnic University, St. Petersburg, Russian Federation</em></td>
</tr>
<tr>
<td>18:10-18:30</td>
<td><strong>Device Physics and EM Simulation Based Modeling Methodology for LDMOS RF Power Transistors</strong></td>
<td>D. Lamey, L. Zhang, H. Rueda, H. Kabir, R. Sweeney, K. Kim&lt;br&gt;<em>RF Power, NXP Semiconductors, Chandler, AZ, USA</em></td>
</tr>
<tr>
<td>18:30-18:50</td>
<td><strong>Multi-Band Behavioral Modeling of Power Amplifier using Carrier Frequency-dependent Time Delay Neural Network Model</strong></td>
<td>¹²Z. Zhao, ¹²W. Na, ¹V.-M.-R. Gongal-Reddy, ¹²Q. Zhang&lt;br&gt;¹School of Electronic Information Engineering, Tianjin University, Tianjin, China; ²Department of Electronics, Carleton University, Ottawa, Canada</td>
</tr>
</tbody>
</table>
Abstract – The analysis of periodic structures is of great importance for a variety of applications in electromagnetics. This includes two-dimensional (2-D) periodic structures and one-dimensional (1-D) periodic structures. Two-dimensional periodic structures (having a 2-D periodicity) arise in applications such as frequency selective surfaces, electromagnetic bandgap structures, metasurfaces, and Fabry-Pérot cavity antennas. One-dimensional periodic structures (having a 1-D periodicity) are met in applications such as filters, periodic leaky-wave antennas, and novel guiding structures such as chains of nanoparticles. This presentation will overview a general analysis technique for analyzing periodic structures in layered media. The method is based on the mixed-potential integral equation (MPIE) method, using the Michalski mixed-potential formulation for layered media.

For 2-D periodic structures, the potentials are represented as 2-D spectral summations of Floquet waves. The extraction of asymptotic quasi-image terms from the spectral sums greatly improves the convergence rate of the sums, and also makes the corresponding regularized potentials smoother and easier to interpolate. The extracted terms correspond to the evaluation of potentials from a 2-D periodic array of sources in a homogeneous media. These are evaluated using the Ewald method for 2-D periodic sources. For complex wave propagation on 2-D periodic structures, an interesting aspect is the choice of proper/improper wavenumbers for the Floquet waves.

For 1-D periodic structures such as periodic leaky-wave antennas, the potentials are represented as a spectral integration and a spectral summation. Quasi-image extraction is again used to accelerate the 1-D periodic Green's function. The corresponding potentials from a 1-D periodic array of sources in a homogeneous medium are evaluated using a 1-D periodic Ewald method. A complex wavenumber leads to different paths of integration in the complex wavenumber plane as well as analytic continuation considerations in the Ewald method.
Keynote Speech 3 (Room A)

Plasmon Resonances at the Atomic Scale: from 2D Materials to Small Molecules
Francisco J. García de Abajo

Institute of Photonic Sciences, ICFO (ICREA Researcher), Barcelona, Spain
Thursday, May 18, 9:30-10:30

Abstract – Plasmons -collective oscillations of electrons in conducting materials- have provided the tools to engineer artificial structures capable of manipulating light over wide spectral and spatial ranges. The emergence of exfoliated 2D materials as excellent plasmonic systems has open new possibilities to explore optical phenomena at atomic scales and their applications in light modulation, sensing, and spectral photometry, as well as in nonlinear and quantum optics. In this talk, we will review recent advances in the fields of graphene and 2D material plasmonics, including examples of the applications mentioned above and extensions toward similar phenomena in small molecules. Special emphasis will be placed on ultrafast phenomena and the opportunities opened by the extraordinary nonlinear and quantum properties of these materials.

Francisco Javier García de Abajo obtained his PhD in condensed matter theory from the University of the Basque Country (Spain) in 1993. After spending three years in Berkeley National Lab., he became staff scientist at CSIC (Spain) and he was promoted to Research Professor in 2008. He is currently leading the Nanophotonics Theory group at ICFO. He has worked in atomic collisions, surface cience, electron microscope spectroscopies, plasmonics, and theoretical nanophotonics. He has coauthored over 300 papers that have accumulated 17,800+ citations (h index of 67; WoK data, Jan. 2017, ). He is a Fellow of both the American Physical Society and the Optical Society of America. Javier García de Abajo's research program on the theory nanoscale photonics ranges from optical characterization with electron-microscope spectroscopies to studies of ultrasensitive single-molecule detection, quantum aspects of light-matter interaction, excitation and characterization of plasmons by electron beams, plasmonic metamaterials, quantum friction, radiative transfer and coherent control, and graphene plasmonics. These topics cover a broad spectrum of research in nanophotonics. This theoretical effort encompasses classical and quantum methods, both analytical and numerical, which are the basis to understand and propose new phenomena with application to biosensing and quantum plasmonics.
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<td><strong>Thursday, May 18, 8:30-19:00</strong></td>
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**Chairs:** Francisco Medina / Francisco Mesa

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<tr>
<td><strong>P1</strong></td>
<td>Standing Wave Method Calibration for Spatial Resolution of Near-field Probes</td>
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<td>Z. Gao, F. Dai</td>
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<td></td>
<td>School of Electronic and Information Engineering, Beihang University, Beijing, China</td>
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</table>

| **P2** | Role of Electron Relaxation Time in the Resonance Behavior of a Graphene Strip Grating in a Slab |
| | T. L. Zinenko |
| | Department of Quasi-Optics, Institute of Radio-Physics and Electronics NASU, Kharkiv, Ukraine |

| **P3** | Homogenization of Structures with Symmetric Cells |
| | 1,2 O. Ouchetto, 3 B. Essakhi, 3 S. Zaamoun |
| | 1LRII, FS-AC, University Hassan II, Casablanca, Morocco; 2University of Paris-Sud, Orsay, France; 3LM, FSJES-AC, University Hassan II, Casablanca, Morocco |

| **P4** | Homogenization of Bi-Isotropic Multilayered Metamaterials |
| | 1,2 O. Ouchetto, 3 B. Essakhi, 3 S. Zaamoun |
| | 1LRII, FS-AC, University Hassan II, Casablanca, Morocco; 2University of Paris-Sud, Orsay, France; 3LM, FSJES-AC, University Hassan II, Casablanca, Morocco |

| **P5** | Enhanced Faraday Effect Via Coupling of the Tunneling Modes in Dual-Tri-Layer Structures Containing Magneto-Optical Metals |
| | L. Dong, Y. Liu, F. Deng, L. Liu, Z. Gao, Y. Shi |
| | Institute of Solid State Physics, Shanxi Datong University, Datong, China |

| **P6** | Green's Formulation for Chirowaveguides |
| | 1M. J. Núñez-Trigueros, 1G. J. Molina-Cuberos, 1J. Margineda, 2A. J. García-Collado, 3A. Gómez |
| | 1Electromagnetism and Electronics Dept., University of Murcia, Murcia, Spain; 2Polytechnic Sciences Dept., Catholic University of San Antonio, Murcia, Spain; 3Communication Engineering Dept., University of Cantabria, Santander, Spain |

| **P7** | Problems with Reliable 3-D Simulations of Microstrip Lines on Anisotropic Substrate |
| | P. I. Dankov |
| | Sofia University, “St. Kliment Ohridski”, Faculty of Physics, Sofia, Bulgaria |

| **P8** | Equivalent Circuit for Double Annular Aperture Frequency Selective Surfaces |
| | 1P. Rodríguez-Ulibarri, 1M. Beruete, 2M. Navarro-Cia, 3R. Rodríguez-Berral, 3F. Mesa, 3F. Medina |
| | 1Antennas Group-TERALAB, Public University of Navarra, Pamplona, Spain; 2School of Physics and Astronomy, University of Birmingham, Birmingham, UK; 3Microwaves Group, University of Seville, Seville, Spain |

Sevilla, Spain, May 17-19, 2017
**P9**

Transmission Control in Compound-grating Structures using Equivalent Circuits

1C. Molero, 1R. Rodríguez-Berral, 1F. Mesa, 2F. Medina
1Department of Applied Physics I, University of Seville, Seville, Spain; 2Department of Electronics and Electromagnetism, University of Seville, Seville, Spain

**P10**

A Uniform Geometrical Theory of Diffraction Formulation for the Diffraction by an Impedance Finite Width Strip

1M. Rashedi, 2A. Torabi
1Ghiaseddin Jamshid Kashani Higher Education Institute, Qazvin, Iran; 2School of Engineering, Faculty of Engineering Science, University of Tehran, Tehran, Iran

**P11**

Modeling of the Vertically Installed Planar Coupled Lines by the Numerical Conformal Transformation Technique

A.N. Sychev, S. M. Struchkov, N. Y. Rudyi, A. S. Salnikov
Department of Computer Systems, Tomsk State University of Control Systems and Radioelectronics (TUSUR), Tomsk, Russia

**P12**

On the Accuracy of LSBRM for Analysis a Shielded Broadside-coupled Suspended Substrate Striplines

1,2A. Bououden, 1M. L. Riabi, 2A. A. Saadi
1Faculté des sciences de la technologie, Université des Frères Mentouri, Constantine, Algérie; 2Centre de développement des Technologies avancées, CDTA, Baba Hassen, Alger, Algérie

**P13**

Interwound and Concentric Ruthroff 1:4 Transmission-Line Transformers Using Coupled Microstrip Lines

M. Z. Cheraiet, M. T. Benhabiles, M. L. Riabi
Laboratory of Electromagnetism and Telecommunications, Université des Frères Mentouri, Constantine, Algeria

**P14**

High Performance Computing Techniques for Fast Solving a NDET Forward Problem

1L. Duca, 2D. Ioan, 1A. Duca
1Computer Science Department, Politehnica University of Bucharest, Bucharest, Romania; 2Electrical Engineering Faculty, Politehnica University of Bucharest, Bucharest, Romania

**P15**

An Approach for the Efficient Optimization-oriented Design of High-Order 3-D Filters

1J. Hinojosa, 2F. D. Quesada-Pereira, 3M. Bozzi, 2A. Álvarez-Melcón
1Department of Electronics and Computer Engineering, Universidad Politécnica de Cartagena, Cartagena, Spain; 2Department of Information and Communications Technology, Universidad Politécnica de Cartagena, Cartagena, Spain; 3Department of Electrical, Computer and Biomedical Engineering, University of Pavia, Italy

**P16**

A Low Profile Dual Band Wideband Patch Antenna

1G. Awadhwal, 1A. A. Nour, 1A. Bostani
1Banaras Hindu University, Varanasi, India; 2Department of Electrical Engineering, American University of the Middle East (AUM), Egaila, Kuwait
Session TA2 (Room A)

Antenna Theory and Design-2

Thursday, May 18, 11:00-13:00

Chair: Carlos del Río, Public University of Navarre, Pamplona, Spain

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<thead>
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<tr>
<td>11:00-11:20</td>
<td>Use of Modified Huygens-Fresnel Model to Compute Sub-wavelength Dielectric Antennas</td>
<td>A.-O. Diallo, R. Czarny, B. Loiseaux, S. Holé (1); A. Laboratoire des Composants et Démonstrateurs Technologiques (2)</td>
</tr>
<tr>
<td>11:40-12:00</td>
<td>Pareto Ranking Bisection Algorithm for Rapid Multi-Objective Design of Antenna Structures</td>
<td>S. Koziel, A. Bekasiewicz, Q. S. Cheng, Q. Zhang (1); A. Engineering Optimization &amp; Modeling Center (2)</td>
</tr>
<tr>
<td>12:00-12:20</td>
<td>A Critical Review of Angular Resolution versus Beamwidth in Antenna Systems</td>
<td>A. Lagunas, O. Domínguez, C. del Río (Group of Antennas, Department of Electrical and Electronic Engineering, Public University of Navarre, Pamplona, Spain)</td>
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<td>12:20-12:40</td>
<td>On Explicit Size Reduction of UWB Antennas through EM-Driven Optimization</td>
<td>S. Koziel (School of Science and Engineering, Reykjavik University, Reykjavik, Iceland)</td>
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<tr>
<td>12:40-13:00</td>
<td>Effect of Near Fields on Radiation From Photoconductive Antenna</td>
<td>J. Prajapati, M. Bharadwaj, A. Chatterjee, R. Bhattacharjee (Department of Electronics and Electrical Engineering, Indian Institute of Technology Guwahati, Guwahati, Assam, India)</td>
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</table>
Session TB2 (Room B)

Computational Electromagnetic for Device Characterization

Thursday, May 18, 11:00-13:00

Chair: Grigoris P. Zouros, NTUA, Athens, Greece

11:00-11:20 Efficient Complex Roots Computation for Microwave Applications
TB2-1 G. P. Zouros
School of Electrical and Computer Engineering, NTUA, Athens, Greece

TB2-2 Y. Dou, Ke-Li Wu
Department of Electronics and Engineering, The Chinese University of Hong Kong, Hong Kong, China

11:40-12:00 Efficient Formulation of Multimode Equivalent Networks for 2-D Waveguide Steps through Kummer’s Transformation
TB2-3 C. Gómez-Molina, F. Quesada-Pereira, A. Álvarez-Melcón, V. Boria-Esbert, M. Guglielmi
1Dept. of Information Technology and Communications, Technical University of Cartagena, Cartagena, Spain; 2R & D Institute on Telecommunications and Multimedia Applications, Technical University of Valencia, Valencia, Spain

12:00-12:20 Direct computation of parabolic waveguide modes via a bivariate root-finding algorithm
TB2-4 A. Morán-López, J. Córcoles, J. A. Ruiz-Cruz, J. R. Montejo-Garai, J. M. Rebollar
1Escuela Politécnica Superior, Universidad Autónoma de Madrid, Madrid, Spain; 2ETSI de Telecomunicación, Universidad Politécnica de Madrid, Madrid, Spain

12:20-12:40 Basic Ideas and Advantages of the Method of Analytical Regularization in Computational Optics
Laboratory of Micro and Nano Optics, Institute of Radio-Physics and Electronics, NASU, Kharkiv, Ukraine

12:40-13:00 Study of Near-field Coupling in Whispering Gallery Mode Resonators
TB2-6 G. Santamaria-Botello, K. A. Abdalmalak, D. Segovia-Vargas, L. E. García-Muñoz
Signal Theory and Communications Department, Universidad Carlos III de Madrid, Leganés, Madrid, Spain
### Session TA3 (Room A)

#### Integral Equations

**Thursday, May 18, 15:00-17:00**

**Chair:** Juan M. Rius, *Universitat Politècnica de Catalunya (UPC), Barcelona, Spain*

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<tr>
<td>15:00-15:20</td>
<td>Numerical Analysis of Modulated Metasurface Antennas using Fourier-Bessel Basis Functions</td>
<td>M. Bodehou, D. González-Ovejero, C. Kraeye, I. Huynen</td>
</tr>
<tr>
<td>TA3-1</td>
<td>¹Université Catholique de Louvain, ICTEAM Institute, Louvain-la-Neuve, Belgium; ²Institut d’Electronique et de Télécommunications de Rennes, UMR CNRS, Rennes, France</td>
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<td>TA3-2</td>
<td>Electrical and Computer Engineering, University of Manitoba, Canada</td>
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<td>TA3-3</td>
<td>Departamento de Comunicaciones, Universitat Politècnica de Valencia, Valencia, Spain</td>
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<td>16:00-16:20</td>
<td>Improved Accuracy in the Scattering Analysis of Arbitrarily Shaped Ferromagnetic Objects</td>
<td>I. Sekulic, E. Úbeda, J. M. Rius</td>
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<td>TA3-4</td>
<td>Antenna Lab, Signal Theory and Communications Department (TSC), Universitat Politécnica de Catalunya (UPC), Barcelona, Spain</td>
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<td>TA3-5</td>
<td>ASELSAN, Inc., Ankara, Turkey; Department of Electrical and Electronics Engineering, Middle East Technical University, Ankara, Turkey</td>
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<td>16:40-17:00</td>
<td>Complex Resonances of Composite PEC-Gyroelectric Resonators Using SVIE Method</td>
<td>G. D. Kolezas, G. P. Zouros,</td>
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<td>TA3-6</td>
<td>School of Electrical and Computer Engineering, NTUA, Athens, Greece</td>
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Session TB3 (Room B)

Electromagnetic Applications in Microwaves, THz and Optics

Thursday, May 18, 15:00-17:00

Chair: Benito Gimeno, Universidad de Valencia, Spain

15:00-15:20  Electrodynamic characterization of a cavity-type microwave plasma source  
TB3-1  R. Miotk, M. Jasinski, J. Micerczyk.  
1 Institute of Fluid Flow Machinery, Polish Academy of Sciences, Gdansk, Poland; 2 Department of Marine Electronics, Gdynia Maritime University, Gdynia, Poland

15:20-15:40  Diode Switchable Chiral Metamaterial Structure for Polarization Manipulation  
TB3-2  O. Fernández, A. Gómez, A. Vegas, G. J. Molina-Cuberos, I. Barba  
1 Dpto. de Ingeniería de Comunicaciones, Universidad de Cantabria, Santander, Spain; 2 Dpto. de Electromagnetismo y Electrónica, Universidad de Murcia, Murcia, Spain; 3 Dpto. de Electricidad y Electrónica, Universidad de Valladolid, Valladolid, Spain

15:40-16:00  Numerical Modeling and Parameterization of On-chip Colliding Pulse Mode-Locked Lasers  
TB3-3  C. Gordón, V. Morales, G. Carpintero, J. Javaloyes  
1 Facultad de Ingeniería en Sistemas, Electrónica e Industrial, Universidad Técnica de Ambato, Ambato, Ecuador; 2 Department of Electronics Technology, Universidad Carlos III de Madrid, Madrid, Spain; 3 Dpto. de Física, Universitat de les Illes Balears, Palma de Mallorca, Spain

16:00-16:20  Graphene Sheet Modeling with an Efficient Unconditionally-Stable Hybrid Approach  
TB3-4  S. A. Amanatiadis, T. T. Zygiridis, N. V. Kantartzis  
1 Department of Electrical and Computer Engineering, Aristotle University of Thessaloniki, Thessaloniki, Greece; 2 Department of Informatics and Telecommunications Engineering, University of Western Macedonia, Kozani, Greece

16:20-16:40  Simulation of THz Emission based on Plasma Wave Excitation  
TB3-5  A. Z. Kargar, D. Ruic, T. Linn, C. Jungermann  
Chair of Electromagnetic Theory, RWTH Aachen University, Aachen, Germany

16:40-17:00  Efficient Uncertainty Analysis of Waveguide-Mode Resonant Optical Filters  
TB3-6  A. D. Papadopoulos, E. N. Glytsis, T. T. Zygiridis, N. V. Kantartzis, T. D. Tsiboukis  
1 School of Electrical and Computer Engineering, National Technical University of Athens, Greece; 2 Department of Informatics and Telecommunications Engineering, University of Western Macedonia, Kozani, Greece; 3 Department of Electrical and Computer Engineering, Aristotle University of Thessaloniki, Thessaloniki, Greece
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<th>Time</th>
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| 17:30-17:50  | Step-by-Step Resonant Cavity Perturbation with Spurious Mode Filtering | M. M. Taygur, E. Y. Zoral, S. Günel  
*Dokuz Eylül University, Izmir, Turkey*                                                                                           |
| 17:50-18:10  | Efficient Computation and Orthonormalization of Multiple TEM Numerical Modes Arising from FEM for Microwave Computer-Aided-Design | A. Morán-López, J. Córcoles, J. A. Ruiz-Cruz  
*Department of Electronics and Communication Technology, Escuela Politécnica Superior, Universidad Autónoma de Madrid, Spain* |
^{1}University Carlos III of Madrid, Madrid, Spain; ^{2}Xidian University, Xi’an, China |
| 18:30-18:50  | Analysis of Dispersion Error of Higher-Order Curl-Conforming Prismatic Finite Element | ^{1}A. Amor-Martín, ^{2}D. García-Doñoro, ^{1}L. E. García-Castillo  
^{1}University Carlos III of Madrid, Madrid, Spain; ^{2}Xidian University, Xi’an, China |
| 18:50-19:10  | CEM using Hamilton's Principle with Variation of the Space-Time Vector Potential | T. G. Vold  
*Continuum Technology Inc. Anacortes, WA, USA*                                                                                     |
**Session TB4 (Room B)**

**RF & Microwave Passive Circuits-2**

**Thursday, May 18, 17:30-19:10**

Chair: Jordi Selga, *Universitat Autònoma de Barcelona, Bellaterra, Spain*

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<td>EM-Driven Design of Recurrent Slow-Wave Structures</td>
<td>¹P. Kurgan, ¹²S. Koziel, ³Q. S. Cheng</td>
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<td>¹Engineering Optimization &amp; Modeling Center, Reykjavik University, Reykjavik, Iceland;</td>
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<td></td>
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<td>²Faculty of Electronics, Telecommunications and Informatics, Gdansk University of</td>
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<td>Technology, Gdansk, Poland; ³Department of Electrical and Electronic Engineering,</td>
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<td>Southern University of Science and Technology, Shenzhen, China</td>
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<td>17:50-18:10</td>
<td>A New Differential Line Based on a Periodic Microstrip-CPW Hybrid Structure</td>
<td>¹J. Martel, ²A. Fernández-Prieto, ³A. Lujambio, ⁴F. Medina, ⁵R. R. Boix</td>
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<td>¹Department of Applied Physics II, ETSA, University of Seville, Seville, Spain;</td>
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<td>²Department of Electronics and Magnetism, College of Physics, University of Seville,</td>
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<td>Seville, Spain; ³Skylife Engineering, S. L., La Rinconada; ⁴Department of Applied</td>
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<td>Physics I, ETSAII, University of Seville, Seville, Spain</td>
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<td>¹Engineering Optimization &amp; Modeling Center, Reykjavik University, Reykjavik, Iceland;</td>
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<td>Technology, Gdansk, Poland; ³Department of Electrical and Electronic Engineering,</td>
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<td>Southern University of Science and Technology, Shenzhen, China</td>
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<td>18:30-18:50</td>
<td>Application of Electromagnetic Bandgaps Based on Capacitively-Loaded Lines to the</td>
<td>J. Selga, J. Coromina, P. Vélez, J. Bonache, F. Martin</td>
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<td>Reduction of Size and Suppression of Harmonic Bands in Microwave Devices</td>
<td>CIMITEC, Departament d’Enginyeria Electrònica, Universitat Autònoma de Barcelona,</td>
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<td>Bellaterra, Spain</td>
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<td></td>
<td>Microstrip Lines</td>
<td>Laboratory of Electromagnetism and Telecommunications, Université des Frères Mentouri</td>
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<td>Constantine, Algeria</td>
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Special Session FA1 (Room A)

Numerical Methods for Design of Antennas and Passive Devices

Friday, May 19, 8:30-10:30

Organizer: Jorge A. Ruiz-Cruz, Universidad Autónoma de Madrid, Spain
Chair: Jorge A. Ruiz-Cruz, Universidad Autónoma de Madrid, Spain
Co-chair: Juan Córcoles, Universidad Autónoma de Madrid, Spain

08:30-08:50 Slotted Waveguide Antenna Design by Segmented Simulation and Multi-Objective Genetic Algorithm
FA1-1
1E. García-Marín, 1J. Córcoles, 1J. Rubio, 1J. L. Masa-Campos, 1P. Sánchez-Olivares, 2R. Gómez-Alcalá,
1Group of Radio-Frequency (RFCAS), Department of Electronics and Communication Technologies, Universidad Autónoma de Madrid, Madrid, Spain; 2Departamento de Tecnología de los Computadores y de las Comunicaciones, Escuela Politécnica, Universidad de Extremadura, Cáceres, Spain

08:50-09:10 Advanced Techniques for the Design of Reflectarrays Including Crosspolar Optimization
FA1-2
Group of Signal Theory and Communications, Universidad de Oviedo, Gijón, Spain

09:10-09:30 Wideband Analysis of Lossless Multimode Waveguide Junctions
FA1-3
L. Codecasa, G. G. Gentili, M. Politi
Dipartimento di Elettronica, Informazione e Bioingegneria, Politecnico di Milano, Milano, Italy

09:30-09:50 Analysis of Vivaldi Array Antenna for Phased Array Feeds Application
FA1-4
1L. Liu, 1K. Grainge, 2A. Navarrini
1Jodrell Bank Centre for Astrophysics, School of Physics and Astronomy, University of Manchester, Manchester, U. K.; 2INAF (National Institute for Astrophysics), Osservatorio Astronomico di Cagliari, Selargius, Italy

09:50-10:10 A Fast Numerical Technique for the Determination of Electrical Properties of Materials
FA1-5
S. Battistutta, M. Bressan, M. Bozzi, L. Perregrini
Department of Electrical, Computer and Biomedical Engineering, University of Pavia, Pavia, Italy

10:10-10:30 Optical Design of S-band Multifeed for the Sardinia Radio Telescope Primary Focus
FA1-6
A. Navarrini, G. Valente, P. Marongiu, A. Ladu
INAF (National Institute for Astrophysics), Astronomical Observatory of Cagliari, Selargius, Italy
Special Session FB1 (Room B)

Computational Electromagnetics in Spain

Friday, May 19, 8:30-10:30

Organizer: Rafael R. Boix, University of Seville, Spain
Chair: Rafael R. Boix, University of Seville, Spain
Co-chair: Raúl Rodríguez-Berral, University of Seville, Spain

08:30-08:50 On the Higher-order Approximations for Efficient Computational Electromagnetics
FB1-1 J. M. Gil, J. Zapata, J. García, R. Gómez
1Departamento de Señales, Sistemas y Radiocomunicaciones, Universidad Politécnica de Madrid, Madrid, Spain; 2Departamento de Tecnologías de los Computadores y de las Comunicaciones, Universidad de Extremadura, Cáceres, Spain

08:50-09:10 Optimization of the Array Element Positions Based on the Analytical Dependence of the Mutual Coupling in the GSM Finite Array Formulation
FB1-2 J. I. Echeveste, C. Craeye, J. Rubio, M. A. González de Aza, J. Zapata
1ICTEAM Institute, Université Catholique de Louvain, Louvain-la-Neuve, Belgium; 2Departamento de Tecnologías de los Computadores y de las Comunicaciones, Universidad de Extremadura, Cáceres, Spain; 3Departamento de Señales, Sistemas y Radiocomunicaciones, Universidad Politécnica de Madrid, Madrid, Spain

1Val Space Consortium, Spain; 2Universidad de Valencia, Spain; 3Universidad Politécnica de Valencia, Spain; 4European Space Agency, The Netherlands; 5Universidad de Cantabria, Spain; 6Universidad Jaime I, Spain; 7Aurorasat Software and Testing, Spain; 8Consejo Superior de Investigaciones Científicas, CSIC, Spain

09:30-09:50 Frequency Extrapolation of IE-MEI Linear System Coefficients in 2D
FB1-4 J. M. Rius, A. Heldring, E. Ubeda
Antenna Lab, Departament de Teoria del Senyal i Comunicacions, Universitat Politècnica de Catalunya, Barcelona, Spain

09:50-10:10 A Bi-Isotropic Hexachiral Grid in PCB
FB1-5 I. Barba, A. Grande, A. C. López-Cabeceira, J. Represa
Department of Electricity and Electronics, Universidad de Valladolid, Valladolid, Spain

10:10-10:30 Comparative Study Between Resonant Transmission and Extraordinary Transmission in Truncated Periodic Arrays of Slots
FB1-6 M. Camacho, R. R. Boix, F. Medina
1Departament of Physics and Astronomy, College of Engineering, Mathematics and Physical Sciences, University of Exeter, Exeter, U. K.; 2Department of Electronics and Electromagnetism, College of Physics, University of Seville, Seville, Spain
### Special Session FA2 (Room A)

**Advances in Time Domain Numerical Techniques**

**Friday, May 19, 11:00-13:00**

**Organizers:** Luis M. Díaz-Angulo and Amelia Rubio-Bretones, *University of Granada, Spain*

**Chair:** Luis M. Díaz-Angulo, *University of Granada, Spain*

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| 11:00-11:20 | Face Centered Anisotropic Surface Impedance Boundary Conditions in FDTD: Improved performance of staircased mesh for shielding problems | J. F. Dawson, 1I. D. Flintoft, 1S. A. Burke, 1M. P. Robinson, 2M. R. Cabello, 2S. González-Garcia, 3J. Álvarez  
1*Department of Electronics, University of York, York, U.K.*; 2*Department of Electromagnetism and Matter Physics, University of Granada, Granada, Spain*; 3*Airbus Defense and Space, Getafe, Spain* |
| 11:20-11:40 | High Performance FDTD Simulations for Chaotic Electromagnetic Environments | F. Moglie, 1L. Bastianelli, 2G. Gradoni, 1V. M. Primiani  
1*Department of Information Engineering, Università Politecnica delle Marche, Ancona, Italy*; 2*School of Mathematical Sciences and George Green Institute for Electromagnetics Research, University of Nottingham, Nottingham, U.K.* |
| 11:40-12:00 | New Closed Form Coefficients of Polynomial Chaos Expansion for Time Domain Stochastic Analysis of EM Fields | L. P. Górniak, W. Bandurski  
*Department of Electronics and Telecommunications, Poznan University of Technology, Poznan, Poland* |
| 12:00-12:20 | A Novel Subgridding Scheme for Arbitrarily Dispersive Thin-layer Modeling | M. R. Cabello, 1L. D. Angulo, 1A. R. Bretones, 1R. G. Martín, 1S. González-García, 3J. Álvarez  
1*Department of Electromagnetism and Matter Physics, University of Granada, Granada, Spain*; 3*Airbus Defense and Space, Getafe, Spain* |
| 12:20-12:40 | A Degenerate Scheme of MRTD for Open Boundary Problems | Z. Tong, Y. Li, L. Sun, Y. Wang, H. Wang, J. Luo  
*College of Science, National University of Defense Technology, Changsha, Hunan, China* |
| 12:40-13:00 | Coefficient Compression Techniques for Conformal FDTD on CUDA devices | G. Junkin, 2A. Tennant  
1*Department of Telecommunications and Systems Engineering, Universidad Autónoma de Barcelona, Barcelona, Spain*; 2*Department of Electronic and Electrical Engineering, The University of Sheffield, Sheffield, U.K.* |
Special Session FB2 (Room B)

Building Blocks for Fast Finite Element Analysis in Electromagnetics

Friday, May 19, 11:00-13:00

Organizer: Valentín de la Rubia, Polytechnic University of Madrid, Spain, and Michal Mrozowski, Gdansk University of Technology, Poland

Chair: Valentín de la Rubia, Polytechnic University of Madrid, Spain

Co-chair: Michal Mrozowski, Gdansk University of Technology, Poland

11:00-11:20  Loewner Matrix Approach for Circuit Modelling in FEM analysis of Microwave Filters
FB2-1  
1D. Young, 2V. de la Rubia
1Huawei Technologies Sweden AB, Kista, Sweden; 2Departamento de Matemática Aplicada a las TIC, Universidad Politécnica de Madrid, Madrid, Spain

11:20-11:40  Reduced Basis Approximations in Microwave Filters and Diplexers: Inf-Sup Constant Behavior
FB2-2  
1S. García, 1V. de la Rubia, 2M. Mrozowski
1Departamento de Matemática Aplicada a las TIC, ETSI de Telecomunicación, Universidad Politécnica de Madrid, Madrid, Spain; 2Departament of Microwave and Antenna Engineering, Faculty of Electronics, Telecommunications and Informatics, Gdansk University of Technology, Gdansk, Poland

11:40-12:00  GPU Acceleration of Block Krylov Methods for FEM Problems in Electromagnetics
FB2-3  
A. Dziekonski, M. Mrozowski
Faculty of Electronics, Telecommunications and Informatics, Gdansk University of Technology, Gdansk, Poland

12:00-12:20  Data-driven Model Order Reduction for Fast Frequency Sweep in Hybrid BI-FEM Solution in Large Finite Frequency Selective Surfaces
FB2-4  
1V. de la Rubia, 2Z. Peng
1Departamento de Matemática Aplicada a las TIC, ETSI de Telecomunicación, Universidad Politécnica de Madrid, Madrid, Spain; 2Department of Electrical and Computer Engineering, University of New Mexico, Albuquerque, New Mexico, U. S. A.

12:20-12:40  Geometry-Aware Domain Decomposition Methods in High-Fidelity Electromagnetic Design
FB2-5  
Z. Peng
Department of Electrical and Computer Engineering, University of New Mexico, Albuquerque, New Mexico, U. S. A.

12:40-13:00  Local Mesh Deformation for Accelerated Parametric Studies Based on the Finite Element Method
FB2-6  
M. Czarniewska, G. Fotyga, M. Mrozowski
Faculty of Electronics, Telecommunications and Informatics, Gdansk University of Technology, Gdansk, Poland
Special Session FA3 (Room A)

SIW Filters and Interconnections

Friday, May 19, 15:00-16:40

Organizers: Anthony Ghiotto, University of Bordeaux, France, and Maurizio Bozzi, University of Pavia, Italy
Chair: Anthony Ghiotto, University of Bordeaux, France
Co-chair: Maurizio Bozzi, University of Pavia, Italy

15:00-15:20  A Novel Filter Based on a Dual-Mode Air-Filled Substrate Integrated Waveguide Cavity Resonator
FA3-1  C. Tomassoni,  L. Silvestri,  M. Bozzi,  L. Perregrini,  A. Ghiotto
Dept. of Engineering, University of Perugia, Perugia, Italy; Dept. of Electrical, Computer and Biomedical Engineering, University of Pavia, Pavia, Italy; University of Bordeaux, IMS Research Center, Bordeaux, France

15:20-15:40  Modeling of Perforated SIW Structures and Their Application to the Design of Step-Impedance Microwave Filters
FA3-2  A. Coves,  G. Torregrosa,  G. Vicent,  E. Bronchalo,  A. A. San Blas,  M. Bozzi
Departamento de Ingeniería de Comunicaciones, Universidad Miguel Hernández, Elche, Spain; Dept. of Electrical, Computer and Biomedical Engineering, University of Pavia, Pavia, Italy

15:40-16:00  Design of Sum-Difference Power Combiners with Second-Order Filtering Functions
FA3-3  J. Bornemann,  U. Rosenberg,  S. Amari,  S. S. Hesari
Department of Electrical and Computer Engineering, University of Victoria, Victoria, BC, Canada; Mician Global Engineering GbR, Bremen, Germany; Department of Electrical and Computer Engineering, Royal Military College, Kingston, ON, Canada

16:00-16:20  Practical Considerations on the Design and Optimization of Substrate Integrated Coaxial Filters
FA3-4  J. D. Martinez,  S. Sirci,  V. E. Boria,  P. Martín Iglesias,  H. Leblond
I3M Universitat Politècnica de Valencia, Valencia, Spain; iTEAM, Universitat Politècnica de Valencia, Valencia, Spain; European Space Agency (ESA-ESTEC), Noordwijk, The Netherlands; Thales Alenia Space, Toulouse, France

16:20-16:40  Air-Filled SIW Interconnections For High Performance Millimeter-Wave Circuit and System Prototyping and Assembly
FA3-5  T. Martin,  F. Parment,  A. Ghiotto,  T.-P. Vuong,  Ke Wu
University of Bordeaux, INP, CNRS, IMS, Talence, France; Cobham Microwave, Gradignan, France; Centre National d’Etudes Spatiales, Toulouse, France; University of Grenoble-Alpes, IMEP-LAHC, Grenoble, France; Centre de recherche Poly-Grames, École Polytechnique de Montréal, QC, Canada
Special Session FB3 (Room B)

EM Modeling and Design of IC Nanopackages

Friday, May 19, 15:00-16:40

Organizer: Dominique Baillargeat, *University of Limoges, France*
Chair: Dominique Baillargeat, *University of Limoges, France*

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<td>Electro-thermal and Quantum Analysis of CNT-based Interconnections</td>
<td>D. Mencarelli, M. Stocchi, L. Pierantoni</td>
<td><em>Università Politecnica delle Marche, Ancona, Italy</em></td>
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<td>15:20-15:40</td>
<td>RF Nanopackaging Approaches Based on Carbon Nanotubes</td>
<td>D. Baillargeat, B. K. Tay</td>
<td>1 <em>University of Limoges, CNRS, XLIM, Limoges, France;</em> 2 <em>School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore</em></td>
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<td>15:40-16:00</td>
<td>An Overview of 3D Integrated Circuits</td>
<td>V. Kumar, A. Naeemi</td>
<td>1 <em>Library Technology Benchmarking, Intel Corporation, Hillsboro, OR, U. S. A.;</em> 2 <em>Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta, GA, U. S. A.</em></td>
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<td>16:00-16:20</td>
<td>Clock and Power Delivery Challenges in Three-Dimensional Integrated Circuits</td>
<td>Y. Cheng, A. Todri-Sanial</td>
<td>1 <em>School of Electrical and Information Engineering, Beihang University, Beijing, China;</em> 2 <em>Microelectronics Department, CNRS-LIRMM/University of Montpellier, Montpellier, France</em></td>
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<td>16:20-16:40</td>
<td>Comparative Study of Crosstalk Noise Due to Inductive Links on Heterogeneous 3-D ICs</td>
<td>I. A. Papistas, V. F. Pavlidis</td>
<td><em>Advanced Processor Technologies Group, School of Computer Science, The University of Manchester, U. K.</em></td>
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## Special Session FA4 (Room A)

### Stochastic Full-Wave and Circuit Modeling Tools

**Friday, May 19, 17:30-19:10**

**Organizers:** Hendrik Rogier and Dries Vande Ginste, *Ghent University, Belgium*

**Chair:** Hendrik Rogier, *Ghent University, Belgium*

**Co-chair:** Dries Vande Ginste, *Ghent University, Belgium*

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<td>17:30-17:50</td>
<td>Variability Analysis of Via Crosstalk using Polynomial Chaos Expansion</td>
<td>E. Frick, J. B. Preibisch, C. Seifert, M. Lindner, C. Schuster</td>
<td>1Hamburg University of Technology, (TUHH), Institute of Mathematics; 2Hamburg University of Technology, Institute of Electromagnetic Theory</td>
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<tr>
<td>18:10-18:30</td>
<td>Analysis of a Printed Circuit Board with Many Uncertain Variables by Sparse Polynomial Chaos</td>
<td>M. Larbi, I. S. Stievano, F. G. Canavero, P. Besnier</td>
<td>1Dipartimento di Elettronica, Politecnico di Torino, Torino, Italy; 2IETR/CNRS Institut d’Electronique et de Télécommunications de Rennes, INSA, Rennes, France</td>
</tr>
<tr>
<td>18:30-18:50</td>
<td>Overview of Stochastic Design Strategies for Wearable Antennas</td>
<td>J. H. Rogier, M. Rossi, S. Agneessens, D. V. Ginste</td>
<td>Dept. of Information Technology, Ghent University-imec, Ghent, Belgium</td>
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<td>18:50-19:10</td>
<td>Computation of the Absorption of Partially Coherent Fields using Traditional Coherent Solvers</td>
<td>D. Tihon, S. Withington, C. N. Thomas, C. Craeye</td>
<td>1Université Catholique de Louvain (UCL), ICTEAM Institute, Louvain-la-Neuve, Belgium; 2Cambridge University, Cavendish Laboratory, Cambridge, U. K.</td>
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Special Session FB4 (Room B)

Modeling and Design of Microwave Filters

Friday, May 19, 17:30-19:10

Organizers: Cristiano Tomassoni, University of Perugia, Italy and Maurizio Bozzi, University of Pavia, Italy
Chair: Cristiano Tomassoni, University of Perugia, Italy
Co-chair: Maurizio Bozzi, University of Pavia, Italy

17:30-17:50 Exploring The Tunability Range of Classic Circular Waveguide Dual Mode Filters using EM-Based CAD
FB4-1 J. Ossorio, J. J. Vague, V. E. Boria, M. Giuglielmi
Departamento de Comunicaciones-iTEAM, Universitat Politècnica de Valencia, Valencia, Spain

17:50-18:10 Design of Advanced Waveguide Filters for Passive Intermodulation Measurement Setups
FB4-2 1P. Soto, 1C. Carceller, 1J. Ruiz, 1S. Cogollos, 1V. E. Boria, 1M. Giuglielmi, 2D. Smacchia
1Grupo de Aplicaciones de las Microondas, iTEAM, Universitat Politècnica de Valencia, Valencia, Spain; 2ESA/VSC High Power RF Laboratory, Valencia Space Consortium, Valencia, Spain

18:10-18:30 Design, Modelling, and Manufacturing of Extremely Selective Waveguide Filters using a Multi-port Optimization Technique
FB4-3 1S. Bastioli, 1R. V. Snyder
2RS Microwave Company Inc., Butler, NJ, U. S. A.

18:30-18:50 A Dual-mode High-Q Tunable Filter Reconfigured by Cavity Rotation
FB4-4 1H. Ezzeddine, 1A. Périgaud, 1S. Bila, 1N. Delhote, 1O. Tantot, 1S. Verdeyme, 1D. Baillargeat, 2L. Estagnerie, 2J. Puech
1XLIM Université de Limoges/CNRS, Limoges, France; 2CNES DCT/RF/HT, Toulouse, France

18:50-19:10 Analysis of dual-slot coupling for satellite filters
FB4-5 1L. Accatino, 1G. Bertin, 1R. Vallauri, 2G. G. Gentili
1AC Consulting, Rivoli (To), Italy; 2Department of Electronic Engineering, Polytechnic of Milan, Milan, Italy
The history of Seville is unavoidably linked to the river Guadalquivir. The first permanent settlements at its riverside are dated back to the 9th century BC, corresponding to an ancient civilization, named Tartessos, possibly the first people with a trade-based economy in the West of Europe, before than Phoenicians and Carthaginians. As Seville was founded where the river became no longer navigable for seagoing ships, its location has always been strategic in the commercial routes. The city was occupied by the Romans at the end of the 3rd century BC after the second Punic War against the Carthaginians. A contingent of veterans of that war was established near the conquered and devastated Hispalis (the Roman name of Seville) in the site of Italica. This new city eclipsed the ancient city during the first Roman period and reached its apogee between the centuries I and II AC. Famous Roman Emperors Trajano and Adriano were born in Italica. The remains of the amphitheater, theater, houses and streets of Italica are some of the best-preserved in the whole Iberian Peninsula.

The city of Hispalis rose again at the end of the Roman Empire (centuries III and IV AC) and it became the most important city of the south of the Hispania (called the Betica), leading the expansion of the Christianity in all the country. The city kept growing during the occupation of the Visigoths, western branches of the nomadic tribes of Germanic people who came from the North of Europe (centuries V to VII), building new towns and extending the limits of its walls. Two prominent figures of that age, the brother Saints Isidoro and Leandro (you can see them at the city’s emblem) were recognized for their relevance in the conversion of the new invaders to the Christian religion. In the year 711 AC, people from the North of Africa invaded the Iberian Peninsula, which was almost completely occupied with little resistance in a few years. The Muslim Spain was denominated Al-Andalus and Hispalis became Isbylia, the origin of the actual name of Seville. The city experienced part of its splendor time during the six centuries of Moorish occupation owing to the trade of raw materials such as silk and spices from the Far East (you can find traces of that period in the narrow and intricate streets of the Santa Cruz District, in the center of the city). Although in a first stage the capital of Al-Andalus was Córdoba, the unified territory was divided in several kingdoms in the XI century, being the kingdom of Seville the most important both in extension and commercial activity (even with the Christian kingdoms of the North). In the year 1172, the Almohads started the ambitious project of the Central Mosque, in the site now occupied by the magnificent Gothic Cathedral. It retains from the Mosque of the XII century the beautiful courtyard of oranges and the body of the minaret, in that time tapped by a golden sphere. In the XVI century a new top bell body was added, crowned by the statue of a woman, symbol of the Faith, used like wind vane and popularly known as El Giraldillo, which gives its name to the Giralda, one of the most famous bell towers of Christendom.
Other emblematic building that was in continuous evolution from the X to the XV centuries is the **Alcázar**, a fortress-palace used as residence of Muslin and Christian kings, the second more visited monument in the city after the Cathedral. In 1248 the city was re-conquered by the Christian king Fernando III, confirmed like a Saint in 1590. His uncorrupted body is buried in the Cathedral and he is considered patron saint of the city, and for this reason he is represented as the main figure in the city’s emblem. During the XVI century, after the discovery of America, Seville was the center of the trade with the new continent. Many valuable documents of commercial transactions of that age are stored in other historic building, the **Archivo de Indias**, next to the Cathedral. In the XVII century, coinciding with the decadence of the Spanish empire, a period of economic downturn and epidemics, the city reached a stage of cultural flourishing with a new artistic movement, the Baroque, which was extended to the middle of the XVIII century. Great painters like Velázquez and Murillo were born in Seville. Many of their works can be admired in the **Museo de Bellas Artes**, the second art gallery in Spain after the **Museo del Prado** in Madrid. Many of the churches of the city were rebuilt according to the abundance of ornaments of the new style, being the most representative of them the **Iglesia del Salvador**. During the XIX century, as the rest of Spain, Seville experienced a decline stage; the invasion of the Napoleonic troops, the losses of the colonies in America, the internal fights between different political factions gave rise to a depressed country at the first of the XX century. However, the two main weeks in the year, the Spring Festivities (the Holly Week - **Semana Santa** - and the **Feria de Abril**), started to take relevance in those times. Nowadays, Seville receives hundreds of thousands of tourists in these two weeks. In 1929, in order to boost the growth of the city, an Ibero-American Exposition was celebrated. Many buildings were constructed along the Guadalquivir river (currently they are used like consulates and University facilities) and in the site of the **María Luisa Park**, being the **Plaza de España** one of the most beautiful squares of the whole country. After a hard period in the middle of the XX century (the civil war and the following military dictatorship), the implementation of the democratic system in 1977 and the adhesion to the European Union in 1985 lead to all the country and also to Seville towards a positive period of economic growth. In 1992 a new Universal Exposition took place, which expanded the city to a new zone, the **Cartuja**, where several technological companies and Engineering Schools were settled.

It’s worthy to take a rest to enjoy Seville, its people, monuments, and streets. Please, try it!
Map of Sevilla and relevant locations
Conference Venue

The venue of NEMO2017 is in the “Pavilion of Mexico”, one of the emblematic buildings of the Ibero-American Exposition of 1929 that was rehabilitated in the nineties as a multipurpose building of the University of Seville. It is located at the corner of the Paseo de las Delicias with the Eritaña Avenue, just next to the María Luisa Park. The conference Rooms A and B are, respectively, in the ground and the first floor of the building. Also in the first floor a meeting room and a working room for speakers are available. Coffee breaks will take place in the main hall of the ground floor. **Lunches will be served in the restaurant Aquarium**, at the top floor of the Aquarium of Seville (Muelle de las Delicias s/n), at the river bank near the Pavilion (about 300 meters away, five minutes walking distance).

Ground floor (B) and first floor (1). Rooms A and B as well as the Speakers room and Meeting room are shown.
Conference Sponsors

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UNIVERSIDAD DE SEVILLA
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Sevilla, Spain, May 17-19, 2017