**FESB, University of Split, Tuesday, June 26**

<table>
<thead>
<tr>
<th>TIME/HALL</th>
<th>A103</th>
<th>A104</th>
<th>A105</th>
</tr>
</thead>
<tbody>
<tr>
<td>17:00*</td>
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**FESB, University of Split, Wednesday, June 27**

<table>
<thead>
<tr>
<th>TIME/HALL</th>
<th>A103</th>
<th>A104</th>
<th>A105</th>
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</thead>
<tbody>
<tr>
<td>10:00 - 11:30</td>
<td>S1: Engineering Modelling – Electrical Engineering</td>
<td>P1S: Smart Cities</td>
<td>P1E: Energy Efficiency in Buildings</td>
</tr>
<tr>
<td>11:30 - 12:00</td>
<td>Invited talk: Theodoros Theodosiou, “Smart and Adaptive Facades for Energy Efficient Buildings” (Great Hall)</td>
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<tr>
<td>12:00 - 13:00</td>
<td>Lunch</td>
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<tr>
<td>13:30 - 15:00</td>
<td>S2: Smart Cities – Networks IoT1: Internet of Things - Hardware and Systems</td>
<td>GPR Workshop I (Room: A106)</td>
<td>P2E: Energy Modelling and Experiments</td>
</tr>
<tr>
<td>15:00 - 15:30</td>
<td>Coffee Break</td>
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<tr>
<td>15:30 - 17:00</td>
<td>S3: Engineering Modelling – Simulations IoT: RFID</td>
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<td>P3E: Renewable Energy Technologies</td>
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</tbody>
</table>

**FESB, University of Split, Thursday, June 28**

<table>
<thead>
<tr>
<th>TIME/HALL</th>
<th>A102</th>
<th>A104</th>
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<tbody>
<tr>
<td>09:00 - 10:30</td>
<td>Round Table Discussion: Smart and Energy Efficient buildings: Where we are? IoT: Presentations and Exhibition (08:30 - 11:00) S4: Smart Cities – Signal Processing (Room: A103) GPR Workshop II (Room: A104)</td>
<td></td>
<td>S5: E-Health</td>
</tr>
<tr>
<td>10:00 - 11:00</td>
<td>Poster Session</td>
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<tr>
<td>10:30 - 11:00</td>
<td>Coffee Break</td>
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**OPENING CEREMONY**

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<tr>
<th>TIME/HALL</th>
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<tbody>
<tr>
<td>12:30 - 13:00</td>
<td>Lunch</td>
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<tr>
<td>13:30 - 14:00</td>
<td>Invited talk: Gaetano Marrocco, &quot;Recovery/Expanding Human Senses by Bio-integrated Epidermal RFID&quot; (Great Hall)</td>
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<tr>
<td>14:00 - 15:30</td>
<td>Workshop: Meet the Editor (14:00 – 15:00) IoT2: Internet of Things - Software Tutorial: Impact of Exposure to Electromagnetic Radiation (Room: A104) Round Table Discussion: RFID in Practice</td>
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<tr>
<td>15:30 - 16:00</td>
<td>Coffee Break</td>
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<tr>
<td>16:00 - 17:30</td>
<td>S6: Energy – Innovations and Modelling IoT3: Internet of Things – Applications S7: Energy – Smart Grids</td>
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<tr>
<td>18:30</td>
<td>Bus to the City Centre and Guided Tour of Split</td>
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<tr>
<td>20:45</td>
<td>Conference Dinner and Cocktails in “Diocletian palace - Cellar”</td>
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</tbody>
</table>

**FESB, University of Split, Friday, June 29**

<table>
<thead>
<tr>
<th>TIME/HALL</th>
<th>Great Hall</th>
<th>A103</th>
<th>A104</th>
<th>A105</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:00 - 09:30</td>
<td>Invited talk: Muslum Arici, “CFD Analysis of Melting Process in an Enclosure: Effect of Fin and Nanoparticle on the Melting Rate” (Great Hall)</td>
<td>S8: Smart Cities – Software</td>
<td>S9: Energy Efficiency and Energy Systems GPR Workshop III</td>
<td></td>
</tr>
<tr>
<td>09:30 - 11:00</td>
<td>HEP ESCO: Open Days</td>
<td>S8: Smart Cities – Software</td>
<td>S9: Energy Efficiency and Energy Systems</td>
<td></td>
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<tr>
<td>11:00 - 11:30</td>
<td>Coffee Break</td>
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<tr>
<td>11:30 - 13:00</td>
<td>Smart City: Round Table (Great Hall)</td>
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<tr>
<td>13:00</td>
<td>Lunch and Best Paper Award</td>
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</tbody>
</table>

*Registrations: Tuesday (17:00 – 19:00), Wednesday (09:00 – 17:00), Thursday (07:30 – 11:00, 13:00 – 17:30), Friday (08:30 – 13:00).*
SpliTech 2018 will be held in the historical city of Split (Croatia, EU) at the Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture (FESB), University of Split. The basic activities of the Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture in Split involve teaching, research, development, professional work and innovation in the areas of technical sciences, including Electrical Engineering, Electronics, Mechanical Engineering, Naval Architecture, Computer Science, Industrial Engineering and Natural Sciences. With approximately 2500 students and more than 230 employees, FESB has grown into a recognized and highly respectable educational and research institution dealing with the advanced technologies and, consequently, contributing to the development of the economy and society.

In particular, the robustness of FESB research capabilities has been confirmed through numerous successful competitive and other research and technological projects, number of scientific and professional papers published in peer-reviewed journals, and through the continuous cooperation with internationally recognized research and academic institutions.

One of the biggest and best equipped faculties on the campus, FESB is among the first that was built on the University of Split campus, and is among the biggest, not only in size, but in reputation which has been successfully built for more than 50 years. Today, FESB is gathering eminent experts for both teaching and scientific projects attracting more students every year. 235 employees, 148 teaching personnel, 107 with a doctorate degree, 10 classrooms, 9 amphitheatres, 11 computer equipped classrooms, 95 laboratories, 29477 square meters area.

Student life on FESB has always been attracting a great number of students. Graduating from FESB has a particular importance and respect from the business world. A great number of graduated students developed successful careers and help FESB’s reputation. Many individuals were credited for this responsibility, and they were not afraid of walking ahead of their time and showing what is to be expected in the future.

ABOUT SPLIT

Split can be reached:
• by air: directly from Amsterdam, Brussels, Frankfurt, London, Lyon, Manchester, Munich, Paris, Vienna and via Zagreb from all world airports. For more information, visit Airport Split-Kaštel.
• by ship:
  - Split harbor is daily connected with Ancona. Ship connections are also available with Venice, Pescara and Bari.

Weather in Split:
In June the weather in Split is very nice, with an average temperature of about 26°C (79°F) and the sea temperature is on average 24°C (75°F).

VENUE
<table>
<thead>
<tr>
<th>1. GENERAL CHAIRS MESSAGE</th>
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<tr>
<td>2. TECHNICAL PROGRAM CHAIR MESSAGE</td>
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<td>3. COMMITTEES</td>
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<td>4. FINAL PROGRAM OUTLINE</td>
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<td>5. INVITED SPEAKERS</td>
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<td>6. TECHNICAL PROGRAM</td>
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<td>7. PROFESSIONAL PROGRAM</td>
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<td>8. WORKSHOPS</td>
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<tr>
<td>9. UAS4ENVIRO2018 - FINAL PROGRAM OUTLINE</td>
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<tr>
<td>10. UAS4ENVIRO2018 - INVITED SPEAKERS</td>
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<td>11. TUTORIALS</td>
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<td>12. GPR WORKSHOPS</td>
<td>29</td>
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<tr>
<td>13. ROUND TABLES</td>
<td>35</td>
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<tr>
<td>14. IOT: PRESENTATIONS AND EXHIBITION</td>
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<tr>
<td>15. UAS4ENVIRO2018 - TECHNICAL PROGRAM</td>
<td>38</td>
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<tr>
<td>16. MAPS</td>
<td>44</td>
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</tbody>
</table>
Dear participants of the SpliTech Conference,

It is our pleasure to welcome you again to the third SpliTech2018 conference. Multidisciplinary approaches are needed more than ever as well as close cooperation between the industry and academia to be able to solve key issues of the population and its survival. We are proud that we had the opportunity to take important role as general chairs and to ensure quality conference program with popular topics related to eHealth, Smart City/Environment, Energy and Engineering Modelling. Previously addressed topics are crucial in everyday life and SpliTech2018 conference is an important platform that gathers all engineering disciplines, professionals and industrial experts. Finally, the discussion of novel ideas, different academic approaches and industry related issues will be ensured through the SpliTech platform.

Special thanks go to the keynotes, invited speakers, technical program committee, session chairs, reviewers and finally authors. In the end, we would like to thank the entire organization team for their efforts and devoted time!

The 3rd International Multidisciplinary Conference on Smart and Sustainable Technologies (SpliTech2018), co-sponsored by the IEEE Communications Society, will be held in beautiful historic city of Split. Therefore, we wish to welcome you to the beautiful city of Split and we are sure that you will enjoy your time during the conference!

Sandro Nižetić,
on the behalf of General Chairs
3rd International Conference on Smart and Sustainable Technologies 2018 will be held at the Univesity of Split, FESB, Croatia, June 26 – 29 2018.

We are proud to announce that Third edition of SpliTech brought unexpected numbers and an increase in various contributions, reaching over 160 submissions this year, which is a 55% increase compared to the last year’s edition. To guarantee the quality, IEEE ComSoc rules limit the number of contributions that can be accepted within the conference technical program. Among all contributions, 77 of them were accepted, resulting in an acceptance rate of 48%. Contributions are divided into main conference topics related to e-Health, Smart City/Environment, IoT, Energy, and Engineering Modelling for different purposes and are important for building future, green and better world.

Each paper was carefully reviewed by at least three independent reviewers, and I use this opportunity to thank all reviewers and Technical Program Committee Members for tremendous efforts involved in the review process, while being strongly suggestive and thus helping Authors to improve their contributions. We have also ensured distinguished keynote and invited speakers from different tracks in order to ensure top quality of the conference programme. We wish you all a pleasant time in Split, at the host FESB, and successful SpliTech 2018!

Thank you for being a part of this event!

Joel J.P.C. Rodrigues
National Institute of Telecommunications (Inatel)
Brasil
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  University of Split, Croatia

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  University of Split, Croatia

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  Aristotle University of Thessaloniki, Greece

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  University of Split, Croatia
- **Alain Kassab**  
  University of central Florida, USA

---

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Vedrana Cvitanić, University of Split, Croatia  
Stipo Čelar, University of Split, Croatia  
Duje Čoko, University of Split, Croatia  
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Tonko Garma, University of Split, Croatia
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Hrvoje Gotovac, University of Split, Croatia
Sven Gotovac, University of Split, Croatia
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Ivan Marasović, University of Split, Croatia
Snejžana Mardešić, University of Split, Croatia
Gaetano Marrocco, Universita’ di Roma “Tor Vergata”, Italy
Maja Matijašević, University of Zagreb, Croatia
Gianluca Mazzini, University of Ferrara & LepidaSpA, Italy
Željka Milanović, University of Split, Croatia
Predrag Miščević, University of Split, Croatia
Tonči Modrić, University of Split, Croatia
Marina Mongiello, Politecnico di Bari, Italy
Tariq Munee, Edinburgh Napier University, UK
Sandro Nižetić, University of Split, Croatia
Andreas Ochsner, Griffith University, Australia
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Luigi Patrono, University of Salento, Italy
Vesna Pekić, University of Split, Croatia
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Toni Perković, University of Split, Croatia
Matteo Petracco, Scuola Superiore Sant’Anna of Pisa, Italy
Stefano Pieretti, Instituto Superiore di Sanita Rome, Italy
Ivana Podnar Žarko, University of Zagreb, Croatia
Vedran Podobnik, University of Zagreb, Croatia
Dragan Poljak, University of Split, Croatia
Petar Popovski, Aalborg University, Denmark
Vladan Prodanović, University of British Columbia, Canada
Farhad Rachidi, Swiss Federal Institute of Technology, Switzerland
Joško Radić, University of Split, Croatia
Antonio Rizzi, University of Parma, Italy
Joel J.P.C. Rodrigues, University of Beira Interior, Portugal
Maja Rogić Vidaković, University of Split, Croatia
Luis Rojas-Solórzano, Nazarbayev University, Kazakhstan
Michele Ruta, Technical University of Bari, Italy
Petar Sarajčev, University of Split, Croatia
Nicoletta Saulig, University of Rijeka, Croatia
Dainel Rolph Schnieder, University of Zagreb, Croatia
Bernhard Schrefler, University of Padova, Italy
Pritee Sharma, Indian Institute of Technology Indore, India
Benson Shing, University of California San Diego, USA
Cedomir Stefanović, Aalborg University, Denmark
Vincenzo Stornelli, University of L’Aquila, Italy
Silvester Šesnić, University of Split, Croatia
Petar Šolić, University of Split, Croatia
Antonio Tadeu, University of Coimbra, Portugal
Kumar Tamma, University of Minnesota, USA
Luciano Tarricone, University of Salento, Italy
Theodoros Theodosiou, Aristotle University of Thessaloniki, Greece
Giuseppe Marco Tina, University of Catania, Italy
Sergey Tkachenko, Otto-von-Guericke University, Germany
Anica Trp, University of Rijeka, Croatia
Boris Trogrlić, University of Split, Croatia
Robert Turrall, Turrall Consulting, Switzerland
Umit Unver, Yalova University, Turkey
Antonio Vilei, STMicroElectronics Lecce, Italy
Christos Verikoukis, CTTC, Spain
Frane Vlak, University of Split, Croatia
Dejan Vukobratović, University of Novi Sad, Serbia
Katarina Vukojević, University of Split, Croatia
Da Yan, Tsinghua University, China
Jesus Alonso Zarate, CCTC, Spain
Bin Zhao, Tsinghua University, China
Tea Žakula, University of Zagreb, Croatia
Zlatko Živković, University of Split, Croatia

**PROFESSIONAL PROGRAM CHAIR**

**Luigi Patrono**
University of Salento, Italy

**LOCAL ORGANIZING COMMITTEE CHAIRS**

**Petar Šolić**
University of Split, Croatia (conference secretary), splitech@fesb.hr

**Toni Perković**
University of Split, Croatia

Nikolina Batarelo, University of Split, Croatia
Dario Bezmalič, University of Split, Croatia
Duje Čoko, University of Split, Croatia
Andrija Đimbeč, University of Split, Croatia
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Ante Kriletić, University of Split, Croatia
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Tea Marasović, University of Split, Croatia
Sandro Nižetić, University of Split, Croatia
Željko Penga, University of Split, Croatia
Ivan Pivac, University of Split, Croatia
Marina Prvan, University of Split, Croatia
Ivan Tolj, University of Split, Croatia

**WEB CHAIR**

**Željka Milanović**
University of Split, Croatia
4. FINAL PROGRAM OUTLINE

Tuesday, June 26, 2018 (location: Split, FESB)
17.00 - 19.00 Registration

Wednesday, June 27, 2018 (location: Split, FESB)
09.00 Registration
10.00 - 11.30 Technical program, Professional program
11.30 - 12.00 Invited talk
Lunch time
13.00 - 13.30 Invited talk
13.30 - 15.00 Technical program, Professional program, GPR Workshop
15.00 - 15.30 Coffee break
15.30 - 17.00 Technical program, IoT: RFID, Professional program

Thursday, June 28, 2018 (location: Split, FESB)
07.30 Registration
08.30 - 10.30 Technical program, Round Table, GPR Workshop, IoT: Presentations and Exhibition
10.00 - 11.00 Poster Session
10.30 - 11.00 Coffee break
11.00 - 12.30 Opening ceremony, Keynote speeches
Lunch time
13.30 - 14.00 Invited talk
14.00 - 15.00 Workshop, Tutorial, Round table
15.30 - 16.00 Coffee break
16.00 - 17.30 Technical program
18.30 Bus transfer to the City Centre, Guided tour of Split
20.45 Conference dinner and cocktails in “Diocletian palace - Cellar”

Friday, June 29, 2018 (location: Split, FESB)
08.30 Registration
09.00 - 09.30 Invited talk
09.30 - 11.00 HEP ESCO: Open Days, Technical program, GPR Workshop
11.00 - 11.30 Coffee break
11.30 - 13.00 Round Table
Lunch time & Best paper award ceremony
Hermann Hellwagner
Institute of Information Technology, Alpen-Adria-Universität (AAU) Klagenfurt, Austria

Multi-UAV Systems

This keynote speech will give an overview of the research work on multi-UAV systems (or: drone swarms) at AAU Klagenfurt, performed over almost a decade in the research focus area 'Networked and Autonomous Systems'. Several research groups from different AAU and associated institutes have been and are still involved in research on multi-UAV systems in various funded projects, including Horizon 2020; a doctoral school on 'Networked Autonomous Aerial Vehicles (NAV)' started in late 2017. The presentation will initially cover the targeted (civilian-only) application areas of systems of multiple UAVs, ranging from first-responder support to delivery services, as well as the research topics that we addressed. The major components of multi-UAV systems -- UAV platform, sensing, coordination and communication -- will be introduced and some of our contributions will be highlighted. A focus of the talk will be on the significant challenges and on our research work on (air-to-air and air-to-ground) communication in multi-UAV networks. Finally, the objectives and the ongoing current research in the NAV doctoral school on autonomous 3D reconstruction and navigation will be presented.

Dr. Hermann Hellwagner is a full professor of Informatics with the Institute of Information Technology, Alpen-Adria-Universität (AAU), Klagenfurt, Austria, leading the Multimedia Communication Research Group. He has edited several books, and has authored over 250 scientific papers on parallel computer architecture, parallel programming, multimedia communication and adaptation, and multi-UAV systems. His research interests include distributed multimedia systems, multimedia communication, quality of service, information-centric networking, and multi-UAV communication. Dr. Hellwagner is a member of the IEEE, the ACM and the Austrian Computer Society (OCG). He received many research grants from national (Austria, Germany) and European funding agencies and industry. He served as a Vice President of the Austrian Science Fund (FWF, 2013–2016).
Agis M. Papadopoulos

Department of Mechanical Engineering, Aristotle University of Thessaloniki, Greece

Thermal Comfort in Zero Energy Buildings: State of the art and the prospects of personalized assessment

The last decade is marked by an exponential growth of the research interest on thermal comfort assessment, especially as we move towards the goal of Zero Energy Buildings. Office. The extensive research interest in this area can be linked with the appreciation of the impact of comfort on health, well-being and productivity, but also with the establishment of a variety series of European Directives and international guidelines and standards, aiming at the improvement of the buildings’ energy and environmental profile performance, without decreasing the occupants’ comfort. In this line of approach, a variety of models have been established over the years aiming to determine the parameters along with their weight coefficients that affect comfort and its subcategories. Since 1970, and the introduction of Fanger’s model, a series of methodological approaches were implemented and models have been established. Still, the call for Nearly Zero Energy Buildings sets tight restrictions to comfort parameters, whilst on the other hand knowledge gained and new technologies in HVAC allow for a much more analytical determination of conditions. It is within this line of approach, During the last decade a great portion of work has been published based on comfort in office buildings, evaluating the occupants’ perspective. The most popular methodological approach presupposes the gathering of both qualitative and quantitative findings. Hence, the identification of both personal and environmental characteristics is possible. This paper aims to monitor and discuss the historic evolution of milestones regarding comfort, in order to highlight the recent advances in research and to demonstrate the necessity to work towards a personalized assessment of comfort, putting the occupants’ perspective in the epicenter and highlighting the key issues that have still to be tackled in that direction.

Graduated from the German School of Thessaloniki. He obtained his Diploma in Mechanical Engineering from the Aristotle University Thessaloniki in 1989, his Master of Science in Energy Conservation and the Environment from Cranfield University (UK), in 1991, and his Doctorate in Mechanical Engineering, specializing in solar systems, from the Aristotle University Thessaloniki in 1994. Since 1998 he is Professor at the Department of Mechanical Engineering of the Aristotle University Thessaloniki, Greece. Since 2013 he is Director of the Process Equipment Design Laboratory at the same Department. His main research interests lie in the fields of (a) Energy efficiency and integration of RES technologies in the built environment, (b) Development and evaluation of energy conservation technologies and materials and (c) Policies and regulatory issues on energy efficiency and RES. He has supervised or co-supervised 21 PhD Theses, 4 post-Doc dissertations and more than 170 Diploma Theses; he has coordinated more than 60 national and international research projects and authored or co-authored more than 110 papers published in peer reviewed journals, 250 in conference proceedings and 17 chapters in text books and other publications. He is Editor-in-Chief of the International Journal of Sustainable Energy, Vice Editor-in-Chief of the Advances in Building Energy Research journal and Editorial Board Member in several other journals. He has worked as an expert for a series of international consulting projects in Cyprus, Egypt, Georgia, Ukraine and Central Asia. Since 2010 he is Visiting Professor at the International Hellenic University and since 2015 at the TU Hamburg-Harburg, Germany.
The continuously increasing demand for building’s energy efficiency has led to reconsider each building’s system potential for supporting building’s energy requirements. Double skin, smart, adaptive or green facades can all support the energy efficiency of new or renovated buildings, in cases where an integrated and holistic approach can overcome their operational complexity. The presentation will focus on relatively recent advances in the field, discussing the potential and the barriers of such systems.

Dr. Theodoros Theodosiou is an assistant professor in the Civil Engineering Department of Aristotle University of Thessaloniki, Greece. His research interests and activities are related to the energy efficiency of buildings with emphasis on the building envelope, building physics and building’s energy simulation. He has more than 70 relevant publications in scientific journals, conferences and book chapters.

5G is envisioned to support a variety of service categories, boost capacity and improve energy-efficiency. The most innovative aspect of 5G is perhaps the adoption of the "vertical industry" perspective in the standard design, which is reflected in all segments of research, development and standardization. In this talk, we will present initial results on 5G system requirements in terms of an agreed set of scenarios, use cases, services and associated key performance indicators.

Čedomir Stefanović received the Dipl.-Ing., Mr.-Ing., and Dr.-Ing. degrees in electrical engineering from the University of Novi Sad, Serbia. He is currently an associate professor at the Department of Electronic Systems, Aalborg University, Denmark. In 2014, he was awarded an individual postdoc grant by the Danish Council for Independent Research. He was and currently is involved in a number of national and EU projects on IoT and 5G communications. His research interests include communication theory, wireless and smartgrid communications.
Recovery/Expanding Human Senses by Bio-integrated Epidermal RFID

The human skin is a complex and powerful interface between the body processes and the external environment. Skin is provided with receptors to sense material objects and quantify their intrinsic properties like the texture and the temperature. Skin also generates physical signals such as sweat and thermal gradients, that may tell much about the psycho-physical status of a person. But what if the epidermis interface would be augmented with a "second digital skin" suitable to be interconnected to Internet? This talk will address the emerging Epidermal or Skin Radioelectronics, a research trend combining multi-disciplinary expertises such as Material Science, Mechanics, Electronics and Electromagnetics. Recent worldwide published papers demonstrated the feasibility of flexible circuits over thin and bio-compatible conformable membranes for direct placement over the human body. In this scenario, the virtuous synergy of Epidermal Radio-Electronics with the latest research trends in sensor-oriented Radiofrequency Identifications (S-RFID) could boost the applicability of skin technology in the real world, thus providing further stimuli to the rapidly emerging "Internet of the Bodies". Starting from the basics of epidermal antennas and their technology and open challenges, I will show some pioneering medium-range digital radio-skins for measurements and transmission of body parameters like temperature, sweat and respiration rate. Finally, I will introduce the concept of Radiofrequency Finger Augmented Devices (R-FAD) comprising skin sensors for application onto the fingertips and an interconnected on-wrist reading system suitable to artificially replace lost touch senses in impaired people and even to the cognitive remapping of sensorial deafferentations.

Gaetano Marrocco is currently Full Professor of Electromagnetics at the University of Roma Tor Vergata and Chair of the Pervasive Electromagnetics Lab. His research is currently focused to the development of the wireless physical layer of the Medical and Industrial Internet of Things. He pioneered the extension of RFID technology to the batteryless sensing of deformation, temperature, humidity, volatile compounds, implanted bio prosthesis, skin parameters, human motion recognition and restoration of epidermal senses. Associate Editor of IEEE RFID and member of the IEEE AP-S Awards jury. Co-founder and President of the University spin-off RADIO6ENSE which is active in Industry 4.0, Cyber and Physical Security.
CUB Analysis of Melting Process in an Enclosure: Effect of Fin and Nanoparticle on the Melting Rate

Phase change materials (PCM) is one of the most effective methods to store thermal energy in latent heat form at desired working temperatures. Although PCMs have favorable characteristics such as high energy density and nearly isothermal heat storage or retrieval process, the commonly used PCM such as paraffin wax suffer from low thermal conductivity for application where charging (melting) or discharging (solidification) time must be fast enough. In order to enhance heat transfer during melting or solidification, several techniques have traditionally adopted, such as employing microencapsulated PCM, utilizing heat pipes, incorporating highly conductive nanoparticles in the PCM, adding fins to increase the heat transfer area.

Müslüm ARICI is a faculty member in Mechanical Engineering Department of Kocaeli University, Turkey. He completed Diploma Course at von Karman Institute, Belgium in 2007 and received PhD degree from Kocaeli University in 2010. He worked in Fluid Mechanics Group, University of Zaragoza, Spain in 2014 and 2016-2017, as a visiting researcher. His research fields of interest are Numerical Heat Transfer, Computational Fluid Dynamics, Thermal Energy Storage Systems, Renewable Energy, Nanofluids and Energy-Efficient Buildings.
## Wednesday, June 27

### Wednesday, June 27, 10:00 - 11:30

**S1: Engineering Modelling - Electrical Engineering (A103)**  
Chair: Dragan Poljak, University of Split, Croatia

1. **Influence of Environmental Stresses on High Voltage Polymer Rod Type Insulator Performances**  
   Mirza Batalović (Faculty of Electrical Engineering, Bosnia and Herzegovina)

2. **Analysis of Transformer Health Index Using Bayesian Statistical Models**  
   Petar Sarajcev, Damir Jakus, Josip Vasilj and Matej Nikolic (University of Split, Croatia)

3. **Real-Time Loss Calculation of a Hysteresis Controlled Power Converter**  
   Mateo Bašić, Dinko Vukadinović and Ivan Grgić (University of Split, Croatia)

4. **Novel Dynamic Model of Photovoltaic Module**  
   Ivan Grgić, Tihomir Betti, Ivan Marasović, Dinko Vukadinović, Mateo Bašić (University of Split, Croatia)

5. **Simulation of Human Body Exposure to High and Low Frequency Wireless Power Transfer Systems using Simplified Models**  
   Maja Škiljo (University of Split, Croatia)

6. **Simplified Analysis of the Thin Wire Near Field**  
   Dragan Poljak (University of Split, Croatia)

### Wednesday, June 27, 13:30 - 15:00

**S2: Smart Cities - Networks (A103)**  
Chair: Mario Ćagalj, University of Split, Croatia

1. **Computational Modeling and Simulation of Dynamic Communication Network Resource Allocations in Excel**  
   Edward Chandler and Andreas Pappas (ARP & Associates, Inc., USA)

2. **A Genetic Algorithm for Planning WAMS with a Heterogeneous Communication Network**  
   Halil Alper Tokel, Gholamreza Alirezai and Rudolf Mathar (RWTH Aachen University, Germany)

3. **Improving quality of multimedia transmissions via dropping functions**  
   Andrzej Chydzinski (Silesian University of Technology, Poland)

4. **Impact of Shared LTE Network High Typical Traffic Loads on Smart Grid Demand Response Schemes**  
   Juho Markkula and Jussi P Haapola (University of Oulu, Finland)
1. **Unobtrusive Detection of Home Appliance's Usage for Elderly Monitoring**
   Jochen Meis (GeoMOibile, Germany); Luigi Patrono and Piercosimo Rametta (University of Salento, Italy)

2. **A Flexible IoT Energy Monitoring Solution**
   Danielly Avancini and Simion Martins (National Institute of Telecommunications (INATEL), Brazil); Ricardo Rabelo (Federal University of Piaui (UFPI), Brazil); Petar Šolić (University of Split & FESB, Croatia); Joel J. P. C. Rodrigues (National Institute of Telecommunications (Inatel), Brazil & Instituto de Telecomunicações, Portugal)

3. **A multi-source energy harvesting sensory glove electronic architecture**
   Vincenzo Stornelli, Alfiero Leoni and Giuseppe Ferri (University of L'Aquila, Italy); Vito Errico (University of Rome "Tor Vergata", Italy); Mariachiara Ricci and Antonio Pallotti (University of Rome Tor Vergata, Italy); Giovanni Saggio (University of Tor Vergata, Rome, Italy)

4. **A Microservices-based IoT Monitoring System to improve the Safety in Public Buildings**
   Marina Mongiello (Politecnico di Bari, Italy); Francesco Nocera and Angelo Parchitelli (Politecnico of Bari, Italy); Luigi Patrono and Piercosimo Rametta (University of Salento, Italy); Luca Riccardi and Leonardo Avena (Politecnico of Bari, Italy)

5. **Intelligent application for monitoring the pantograph-catenary contact in electric railway transportation**
   Stela Rusu-Anghel (Politehnica University of Timisoara, Romania); Manuela Panoiu and Cristian Abrudean (Polytechnic University of Timisoara, Romania)

6. **A New VCII Based Low-Power Low-Voltage Front-end for Silicon Photomultipliers**
   Leonardo Pantoli (University of Laquila, Italy); Gianluca Barile and Alfiero Leoni (University of L'Aquila, Italy); Leila Safari (Iran University of Science and Tech (IUST), Iran); Vincenzo Stornelli (University of L'Aquila, Italy)

7. **A beam steering transmitter prototype for IoT communications**
   Giulio D’Amato, Gianfranco Avitabile and Giuseppe Coviello (Politecnico di Bari, Italy); Claudio Talarico (Gonzaga University, USA)

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**Wednesday, June 27, 15:30 - 17:00**

**S3: Engineering Modelling – Simulations (A103)**

Chair: Dragan Poljak, University of Split, Croatia

1. **Dynamic analysis of elastic pendulum with slider**
   Damir Sedlar, Ivan Tomac and Petar Latinac (University of Split, Croatia)

2. **Refined RBF-FD solution of linear elasticity problem**
   Jure Slak and Gregor Kosec (Jožef Stefan Institute, Slovenia)

3. **CFD Simulation for the Knock Analysis in the Internal Combustion Engine**
   Gojmir Radica, Dino Dodig, Toni Šantić and Nikola Matulic (University of Split, Croatia)
4. Stochastic sensitivity analysis for dosimetry of head tissues for the three compartment head model
   Anna Susnjara; Mario Cvetković; Hrvoje Dodig; Dragan Poljak (University of Split, Croatia)

5. A Simplified Method for the Assessment of the Electric Field above a Multilayer Radiated by a Base Station Antenna
   Marin Galić; Dragan Poljak; Vicko Doric (University of Split, Croatia)

IoT: RFID (A104)
Chair: Luca Catarinucci, University of Salento, Italy

1. RFID Tag localization with UGV in retail applications
   Andrea Motroni, Alice Buffi and Paolo Nepa (University of Pisa, Italy); Paolo Tripicchio and Matteo Unetti (Scuola Superiore Sant'Anna, Italy)

2. Reduction of Power-Discretization Effects in UHF RFID Tag Performance Estimation Systems based on Off-the-Shelf Programmable Readers
   Riccardo Colella and Luca Catarinucci (University of Salento, Italy)

3. Sensing-oriented RFID tag Response in High Temperature Conditions
   Cecilia Occhiuzzi (RADIO6ENSE srl & University of Roma "Tor Vergata", Italy); Sara Amendola (RADIO6ENSE S.r.l.); Simone Nappi (RADIO6ENSE S.r.l. and University of Roma "Tor Vergata"); Nicola D'Uva (RADIO6ENSE srl, Italy); Gaetano Marrocco (RADIO6ENSE S.r.l. and University of Roma "Tor Vergata")

4. Compact In-metal UHF RFID Tag for Manufactured Metallic Components
   Vittorio Franchina, Andrea Michel and Paolo Nepa (University of Pisa, Italy); Alfredo Salvatore (Sensor ID, Italy)

5. Application of the Pseudo-BAP mode to a 3D-Printed Wearable UHF RFID Tag with Sensing Capabilities
   Riccardo Colella and Luca Catarinucci (University of Salento, Italy)

   Cecilia Occhiuzzi (RADIO6ENSE srl & University of Roma "Tor Vergata", Italy); Maria Cristina Caccami (University of Rome "Tor Vergata", Italy); Sara Amendola (RADIO6ENSE S.r.l.); Gaetano Marrocco (RADIO6ENSE S.r.l. and University of Roma "Tor Vergata")

Thursday, June 28, 09:00 - 10:30
S4: Smart Cities – Signal Processing (A103)
Chair: Matko Šarić, University of Split, Croatia

1. Outdoor People Detection in Low Resolution Thermal Images
   Gianmarco Cerutti, Bojan Milosevic and Elisabetta Farella (Fondazione Bruno Kessler, Italy)

2. Metadata-oriented concept-based image retrieval for forest fire video surveillance system
   Ljiljana Šerić, Maja Braović, Toni Beović and Gordan Vidak (University of Split, Croatia)

3. Region Proposal Approach for Human Body Detection on Aerial Imagery
   Zeljko Marusic (University of Mostar, Bosnia and Herzegovina), Dunja Božić Štulić, Sven Gotovac (University of Split, Croatia), Tončo Marušić (University of Mostar, Bosnia and Herzegovina)
4. **Gas Emission Prediction for Environmental Sustainability via Heterogeneous Data Sources Correlation with Support Vector Regression**  
Sieh Kiong Tiong and Phing Chen Chai (UNITEN, Malaysia); Johnny Koh and Albert Fong (Universiti Tenaga Nasional, Malaysia); Md Fauzan Kamal Mohd Yapandi (TNB Research, Malaysia)

5. **Influence of Data Collection Parameters on Performance of Neural Network-based Obstacle Avoidance**  
Stanko Kruzic, Josip Music, Ivo Stancic and Vladan Papic (University of Split, Croatia)

6. **On the Selection of the Proper Number of Classes in TFD Segmentation for Extraction of Useful Information Content from Noisy Signals**  
Nicoletta Saulig (University of Pula, Croatia); Zeljka Milanovic (University of Split, Croatia); Jonatan Lerga (University of Rijeka, Croatia); Karlo Griparic (University of Zagreb, Croatia)

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**S5: E-Health (Small Hall)**  
Chair: Katarina Vukojević, University of Split, Croatia

1. **Wandering Behaviors Detection for Dementia Patients: a Survey**  
Abbass Hammoud, Michel Deriaz and Dimitri Konstantas (University of Geneva, Switzerland)

2. **Automatic segmentation of relevant sections of the conjunctiva for non-invasive anemia detection**  
Giovanni Dimauro (Università’ di Bari & Dipartimento di Informatica, Italy); Francesco Girardi (UVARP ASL Bari, Italy); Danilo Caivano (Università di Bari, Italy); Luigi Baldari and Giuseppe Colucci (Università degli Studi di Bari, Italy)

3. **Design and Implementation of Nursing Record Assist System based on Hospital Falls and Pressure Ulcer Monitoring Method**  
Yongsu Jeon, Jinwoo Lee, Taegu Kim and Yunju Baek (Pusan National University, Korea)

Maja Braović, Dunja Boži-Štulić, Darko Stipaničev (University of Split, Croatia)

5. **Sensitivity and Noise Evaluation of an Optoelectronic Sensor for Mosquitoes Monitoring**  
Diego Santos and Luiz Teixeira and Antonio M Alberti (National Institute of Telecommunications, Brazil); Vasco Furtado (University of Fortaleza, Brazil); Joel J. P. C. Rodrigues (National Institute of Telecommunications, Brazil & Instituto de Telecomunicações, Portugal)

Pedro Vilela, Joel J. P. C. Rodrigues and Luciano Vilela (National Institute of Telecommunications, Brazil); Mukhtar M. E. Mahmoud (University of Kassala, Sudan); Petar Šolić (University of Split, Croatia)
### Thursday, June 28, 10:00 - 11:00
**PS: Poster Session**  
Chair: Toni Perković, University of Split, Croatia

1. **Environmentally friendly recycling of aluminum waste without remelting**  
   Jure Krolo (University of Split, Croatia)

2. **Multisensor intelligent system for automatic sailing boat control based on deep learning technologies**  
   Dunja Božić-Štulić; Damir Krstinić; Darko Stipaničev (University of Split, Croatia)

3. **Archimedes' screw**  
   Hrvoje Dedić-Jandrek; Petra Bagavac; Toni Ugrina; Mislav Blajić (University of Split, Croatia)

4. **Design of the intelligent assembly line in the Lean Learning factory**  
   Marina Crnjac; Amanda Aljinović (University of Split, Croatia)

5. **How to build Controller Area Network Communication Test Environment using NVIDIA TX2 for Unmanned Aerial Vehicle (technical)**  
   Jeong-Hwan Lee (ETRI, Korea)

### Thursday, June 28, 14:00 - 15:30
**IoT2: Internet of Things - Software (A102)**  
Chair: Luigi Patrono, University of Salento, Italy

1. **Context-aware IOT middleware for home care - "R2V adaptive"**  
   Andrei Vasilateneau (Politehnica University of Bucharest, Romania)

2. **TACTUS: an intuitive and tangible framework for composing IoT Services**  
   Stefano Pino (Engineering Ingegneria Informatica Spa, Italy); Davide Storelli, Enza Giangreco, Marco Alessi, Alessio Camillò and Marco Pinnella (Engineering Ingegneria Informatica S.p.A., Italy)

3. **Accounting for User Diversity in the Design for Sustainable Behaviour in Smart Offices**  
   Ane Irizar-Arrieta, Diego Casado-Mansilla and Aiur Retegi (University of Deusto, Spain)

4. **Make users own their data: a decentralized personal data store prototype based on Ethereum and IPFS**  
   Stefano Pino (Engineering Ingegneria Informatica Spa, Italy); Davide Storelli, Alessio Camillò, Enza Giangreco, Marco Alessi and Marco Matera (Engineering Ingegneria Informatica S.p.A., Italy)

5. **A Performance Analysis of an IoT-aware Elderly Monitoring System**  
   Aitor Almeida (DeustoTech - Deusto Institute of Technology, Spain); Marina Andrić (BELIT, Serbia); Ruben Mulero (Deusto Tech, Spain); Luigi Patrono and Piercosimo Rametta (University of Salento, Italy); Vladimir D. Urošević (Belgrade University Faculty of Organizatinal Sciences & Belit Ltd. Belgrade, Serbia)

6. **A Proposal for Bridging the Message Queuing Telemetry Transport Protocol to HTTP on IoT Solutions**  
   Mauro Cruz (Instituto Nacional de Telecomunicações, Brazil); Joel J. P. C. Rodrigues (National Institute of Telecommunications (Inatel), Brazil & Instituto de Telecomunicações, Portugal); Ellen Paradello (National Institute of Telecommunications (INATEL), Brazil); Pascal Lorenz
Thursday, June 28, 16:00 - 17:30

**S6: Energy – Innovations and Modelling (Great Hall)**
Chair: Muslum Arici, Kocaeli University, Turkey

1. **A concept of the novel regenerative hydraulic suspension: The prototype description**
   Vjekoslav Tvrđić, Srdjan Podrug, Damir Jelaska and Milan Perkušić (University of Split, Croatia)

2. **Influence of guide vane topology on the shape and stability of gravitational vortex**
   Sandro Nizetic and Željko Penga (University of Split, Croatia); Muslum Arici (Kocaeli University, Turkey)

3. **Numerical and analytical research of a perforated plate thermal and fluid flow process**
   Mladen Tomic and Aleksandar Andjelkovic (University of Novi Sad, Serbia); Predrag Živković (University of Niš, Serbia); Miroslav Kljajić (University of Novi Sad, Serbia); Mića Vukić (University of Niš, Serbia)

4. **Development of The Passive Air Mixing Chamber for an Air Handling Unit**
   Hyunjae Chang and Seokyoung Lim (Hongik University, Korea)

5. **A review on the application and usefulness of metal nanosized particles in solid rocket propellants**
   Ilyes Ghedjatti, Shiwei Yuan and Haixing Wang (Beihang University, P.R. China)

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**IoT3: Internet of Things - Applications (A102)**
Chair: Luigi Patrono, University of Salento, Italy

1. **Timing analysis for IoT-based vehicle-pedestrian collision avoidance for NLOS conditions**
   Nadezda Yakusheva (University of Udine & Bauman Moscow State University, Italy); Andrey Proletarsky (BMSTU, Russia); Mikhail Basarab (Bauman Moscow State Technical University, Russia)

2. **Intelligent Street Light System Based on NB-IoT and Energy-saving Algorithm**
   Langcheng Zhao (Beijing University of Posts and Telecommunications, P.R. China); Qihong Gao (Beijing University of Posts And Telecommunications, P.R. China); Ran Wang, Nan Fang, Zhiqiu Jin, Neng Wang and Lianming Xu (Beijing University of Posts and Telecommunications, P.R. China)
3. Rapid Prototyping of a Star Topology Network based on Bluetooth Low Energy Technology
   Lorenzo Invidia (University of Salento, Italy); Silvio Lucio Oliva and Andrea Palmieri (STMicroelectronics, Italy); Luigi Patrano and Piercosimo Rametta (University of Salento, Italy)

4. Real Time System for Measuring the Pantograph Vertically Position Correlated with Temperature and Air Humidity
   Caius Panoiu, Raluca Rob and Stela Rusu-Anghel (Politehnica University of Timisoara, Romania)

5. A Comparative Study of Cycling Mobile Applications
   Miguel A. Wister, Pablo Pancardo and Pablo Payro Campos (Juarez Autonomous University of Tabasco, Mexico)

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S7: Energy – Smart Grids (Small Hall)
Chair: Petar Sarajčev, University of Split, Croatia

   Haixiao Li, Lin Zhou and Qianjin Zhang (Chongqing University, P.R. China)

2. Acquisition of Low-Voltage Grid States in Real-Time
   Michael Schallenburger, Leschek Kopczynski and Philipp Huppertz (University of Applied Sciences Duesseldorf, Germany); Roland Zeise (FH Duesseldorf & University of Applied Sciences, Germany)

3. Autarkic State Control in Electrical Distribution Grids
   Kamil Korotkiewicz, Marcel Ludwig and Felix Dorsemagen (University of Wuppertal, Germany); Markus Zdrallek (Bergische Universität Wuppertal, Germany)

4. Challenges in Modeling Wind Power Generation Based on Available Weather Data
   Oleg Yakimenko and William Anderson, Jr. (Naval Postgraduate School, USA)

5. Comparison of Regression Tool for Regional Electric Load Forecasting
   Nils Jakob Johannesen, Mohan Kolhe and Morten Goodwin (University of Agder, Norway)

   Lara Dorce, Dario Pevec, Hrvoje Vidović, Jurica Babic and Vedran Podobnik (University of Zagreb, Croatia)

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Friday, June 29, 09:30 - 11:00
S8: Smart Cities - Software (A103)
Chair: Nuno Lopes, United Nations University, Portugal

1. Using Arabic Social Media Feeds for Incident and Emergency Management in Smart Cities
   Manar Alkhatib (The British University in Dubai, United Arab Emirates); May El Barachi (University of Wollongong Dubai, United Arab Emirates); Khaled F. Shaalan (The British University in Dubai & Cairo University, United Arab Emirates)
2. Analyzing the transformational Effects of Emerging Technologies on Smart Cities: Blockchain and IoT
Soumaya Ben Dhaou (UNU-EGOV & Operating Unit on Policy-Driven Electronic Governance, Portugal); Nuno Lopes (UNU-EGOV, Portugal)

3. Next Generation data flow and storage solution in ALICE experiment
Zeljko Seremet, Eugen Mudnic and Stipo Celar (University of Split, Croatia)

4. A Hybrid Artificial Bee Colony Algorithm using Multiple Linear Regression on Time Series Datasets
M. Fatih Adak (Sakarya University, Turkey); Mustafa Akpinar (University of Sakarya & Agdas Adapazari Natural Gas Distribution Company, Turkey)

Chair: Gojmir Radica, University of Split, Croatia

1. A Heat Pump System Design for the Green Campus of University of Yalova
Melis Yurtcu, Ozlem Kara and Elif Kucukkaya (University of Yalova, Turkey); Alper Kelesoglu and Umit Unver (Yalova University, Turkey)

2. The current state of research on thermal comfort prediction models
Nikolina Pivac and Sandro Nizetic (University of Split, Croatia); Vlasta Zanki (Director at HEP ESCO, Croatia)

3. Application of mechanistically inspired model on biogas production at the biogas plant
Robert Bedoic (SDEWES Centre, Croatia); Boris Ćosić, Tomislav Puksec and Neven Duic (University of Zagreb, Croatia)

4. A new approach for evaluating biochar quality from biomass thermal processing
Stanislaw Szwaja, Anna Poskart and Monika Zajemska (Czestochowa University of Technology, Poland)

5. Viability of Energy-Saving Illumination in a Commercial Building in Coimbatore, India
Luis Lopez, Selna Saji, Saida Usmonova and Susana Velasquez (IMT Atlantique Nantes, France); Luis Rojas-Solórzano (University, Kazakhstan)

Werner Brenner, Nikola Bednar, Peter Biemayr and Nadja Adamovic (Technische Universität Wien, Austria)
### Wednesday, June 27

**Wednesday, June 27, 10:00 - 11:30**

**P1S: Smart Cities (A104)**  
Chair: Maja Škiljo, University of Split, Croatia

1. **Human-robot interaction using colored LEDs and custom made hand-held device: a service robot design example**  
   Ivan Madunić (Smart Technologies, Croatia); Josip Music (University of Split, Croatia); Višeslav Čelan (University of Split & Odabir, Croatia); Vladan Papic (University of Split, Croatia)

2. **A Model of Parents’ Technology Health-Awareness Towards a Better Management of a Chronic Diseases in Children and Adolescents**  
   Walaa Barifah (Royal Melbourne Institute of Technology & Taif University, Australia)

**P1E: Energy Efficiency in Buildings (A105)**  
Chair: Theodoros Theodosiou, Aristotle University of Thessaloniki, Greece

1. **Co-generation systems and Micro-grids: An option for sustainable urban buildings in the Mediterranean?**  
   Maria Symeonidou (Aristotle University Thessaloniki, Greece); Sandro Nizetic (University of Split, FESB, Croatia); Agis M. Papadopoulos (Aristotle University of Thessaloniki, Greece)

2. **Experimental analysis of a vegetation wall influence on the building envelope thermal conductivity**  
   Budimir Sudimac and Bratislav Ilic (University of Belgrade, Serbia); Vladimir Muncan and Aleksandar Andjelkovic (University of Novi Sad, Serbia)

3. **Thermal bridging problems on advanced cladding systems and smart building facades**  
   Theodoros Theodosiou and Katerina Tsikaloudaki (Aristotle University of Thessaloniki, Greece); Stella Tsoka and Panagiotis Chastas (Aristotle University of Thessa, Greece)

   Igor Mujan (University of Novi Sad - Faculty of Technical Sciences, Serbia); Aleksandar Andjelkovic and Vladimir Muncan (University of Novi Sad, Serbia)

5. **A Heat Pump System Design for the Green Campus of University of Yalova**  
   Melis Yurtcu, Ozlem Kara and Elif Kucukkaya (University of Yalova, Turkey); Alper Kelesoglu and Umit Unver (Yalova University, Turkey)

**Wednesday, June 27, 13:30 - 15:00**

**P2E: Energy Modelling and Experiments (A105)**  
Chair: Branko Klarin, University of Split, Croatia

1. **Evaluation of the water cycle determined with atmospheric energy balance for the purpose of surface fluxes monitoring**  
   Monika Birylo (University of Warmia and Mazury in Olsztyn, Poland)

2. **Laboratory investigation of the market available biomass pellet fuels for residential applications: A Croatian case**
3. Measurement of Proton Concentration in PEM by Hall Effect
Ivan Poljak and Paško Županović (University of Split, Croatia); Frano Barbir (University of Split, FESB, Croatia)

4. Statistical Approach in Analyzing of Advanced Metering Data in Distribution Grid
Ivan Ramljak (JP Elektroprivreda HZHB dd Mostar, Bosnia and Herzegovina); Drago Bago (Elektroprivreda HZHB, Bosnia and Herzegovina)

5. An Energy Efficiency Tool For Steel Forging Industry
Ozlem Kara (University of Yalova, Turkey); Umit Unver (Yalova University, Turkey)

Wednesday, June 27, 15:30 - 17:00
P3E: Renewable Energy Technologies (A105)
Chair: Sandro Nizetic, University of Split, Croatia

1. A comparison among hybrid PV/T, PV and ST plants in a residential building facility
Antonio Gagliano (University of Catania & Italy, Italy); Giuseppe Marco Tina and Stefano Aneli (University of Catania, Italy); Sandro Nizetic (University of Split, FESB, Croatia)

2. Effect of nanoparticle-enhanced phase change material on efficiency of photovoltaic system: A numerical investigation
Muslum Arici and Feyza Bilgin (Kocaeli University, Turkey); Sandro Nizetic (University of Split, FESB, Croatia); Agis M. Papadopoulos (Aristotle University of Thessaloniki, Greece)

3. Efficiency improvement of the photovoltaic energy conversion by application of the fins: An overview
Hrvoje Dedić-Jandrek (University of Split & Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture, Croatia); Sandro Nizetic (University of Split, FESB, Croatia)

Ana Paula Farias Rocha, Griselda Adilene Sanchez Cubedo, Jesselyn Rochelle Malimata and Karim Hassan (IMT Atlantique Nantes, France); Luis Rojas-Solórzano (School of Engineering, Nazarbayev University, Kazakhstan)

5. An Energy Efficiency Tool For Steel Forging Industry
Ozlem Kara (University of Yalova, Turkey); Umit Unver (Yalova University, Turkey)
This year we have launched a new conference feature, i.e. workshop "Meet the Editor". The main idea of the workshops is to help young and less experienced researchers, PhD students, to be able to prepare quality submissions. This year our guest is distinguished professor Agis Papadopoulos from Aristotle University of Thessaloniki. Prof. Papadopoulos is Editor in Chief of International journal of Sustainable Energy issued by Taylor&Francis publishing house, experienced researcher and author. Participants would be able to set direct questions to Editor in chief after the general presentation by Prof. Papadopoulos.

**How to make an impact?**

**How to write high quality paper?**

**How to avoid usual mistakes during the paper preparation process?**

**Ethics in the publishing world...**

**Biography:** Graduated from the German School of Thessaloniki. He obtained his Diploma in Mechanical Engineering from the Aristotle University Thessaloniki in 1989, his Master of Science in Energy Conservation and the Environment from Cranfield University (UK), in 1991, and his Doctorate in Mechanical Engineering, specializing in solar systems, from the Aristotle University Thessaloniki in 1994. Since 1998 he is Professor at the Department of Mechanical Engineering of the Aristotle University Thessaloniki, Greece. Since 2013 he is Director of the Process Equipment Design Laboratory at the same Department. His main research interests lie in the fields of (a) Energy efficiency and integration of RES technologies in the built environment, (b) Development and evaluation of energy conservation technologies and materials and (c) Policies and regulatory issues on energy efficiency and RES. He has supervised or co-supervised 21 PhD Theses, 4 post-Doc dissertations and more than 170 Diploma Theses; he has coordinated more than 60 national and international research projects and authored or co-authored more than 110 papers published in peer reviewed journals, 250 in conference proceedings and 17 chapters in text books and other publications. He is Editor-in-Chief of the International Journal of Sustainable Energy, Vice Editor-in-Chief of the Advances in Building Energy Research journal and Editorial Board Member in several other journals. He has worked as an expert for a series of international consulting projects in Cyprus, Egypt, Georgia, Ukraine and Central Asia. Since 2010 he is Visiting Professor at the International Hellenic University and since 2015 at the TU Hamburg-Harburg, Germany.
Wednesday, June 27, 2018

8:30 – 9:30 Registration
09:30 – 10:40 Opening Session and Keynote speech: Small UAS for Environmental Analysis: Technology, Applications and Issues
Robert J. Moorhead II
10:40 – 12:00 S1 – Methods and Techniques
12:00 – 13:00 Lunch
13:00 – 15:00 S2 – Environmental monitoring
15:00 – 15:30 Coffee break
15:30 – 17:30 S3 – Drones for Geosciences

Thursday, June 28, 2018

8:40 – 10:00 S4 – Agricultural monitoring
S7 – Vegetation monitoring
10:00 – 11:00 Industry session and Coffee break
11:00 – 12:30 Opening ceremony
Keynote speech: Multi-UAV Systems
Hermann Hellwagner
12:30 – 13:30 Lunch
13:30 – 15:30 S5 – Vegetation and Forest monitoring
S8 – Digital Elevation Models and Point Clouds
15:30 – 16:00 Coffee break
16:00 – 17:00 S6 – Urban Areas
S9 – Water and Coastal Monitoring
18:30 Bust transportation to the City Centre and Guided Tour of Split
20:45 Conference Dinner and Cocktails in ‘Diocletian Palace – Cellar’

Friday, June 29, 2018

8:40 – 10:00 S10 – 3D presentation and SfM
11:00 – 11:30 Coffee break
11:30 – 13:00 S11 – Digital Elevation and Digital Surface Models
13:00 Lunch, Farewell Remarks and Departure
Small UAS are touted as cheap, functional, effective, and efficient data collection tools, but are they? When do they work well and when do they not? In this talk I will discuss the technology and provide a stratification of applications, using a plethora of applications to illustrate my points. Applications will include documentation, advertising, entertainment, river flooding analysis, sediment transport, water quality analysis, emergency response, invasive species detection, marsh habitat analysis, sea-level rise, and subsidence. This talk is intended to assist environmental scientists in understanding many critical issues of these small aerial systems.

Dr. Moorhead is a distinguished professor of Electrical and Computer Engineering at Mississippi State University and the director of two research institutes at MSU: The Geosystems Research Institute (GRI) and the Northern Gulf Institute (NGI). Dr. Moorhead is on the Board of Directors of the IEEE Computer Society’s Technical Committee on Visualization and Graphics, having served as Chair, Vice-Chair for Conferences (twice), and Conference Chair over the past 20 years. He has received the Career Achievement Award and the Outstanding Engineering Research Award from the MSU Bagley College of Engineering. He has lead visualization research and development efforts in support of many geospatial problems (physical oceanography, disposal of dredged materials, coastal/severe weather, etc.). After receiving his PhD in 1985 from North Carolina State University, Dr. Moorhead was a Research Staff Member in the Image Technologies Group at IBM’s Research Center in New York before joining MSU in 1989. His research has migrated from image processing to visualization of large computer simulations to most recently using unmanned aerial systems for advancing agriculture performance and understanding the environment.
The studies related to the interaction between electromagnetic fields and human tissues are of increasing interest in biomedicine, both with the aim of extending diagnostic and therapeutic methodologies, such as Magnetic Resonance Imaging (MRI), Transcranial Magnetic Stimulation (TMS), electromagnetic hyperthermia, and as a support to verify the compliance with regulatory limits of exposure for patients and medical personnel. Since direct dosimetric surveys are almost unfeasible in vivo, studies are developed properly combining experiments and advanced computations in order to correlate physical quantities induced within human body with external stimuli. This tutorial will review some aspects related to computational dosimetry in biomedical applications. Namely, attention will be focused on the numerical modeling and the experimental evaluation of the electromagnetic and thermal quantities induced inside human body when exposed to the fields (static, low frequency and radio-frequency) produced by MRI scanners. First, some preliminary concepts related to EM fields and human body coupling mechanisms will be briefly introduced, together with some aspects related to human body and tissue modelling. A review of the main computational methodologies for EM dosimetry will be then given, discussing their main merits and drawbacks. This part will be specialized for the different exposure cases that are present in the MRI context: low frequency gradient coil fields, radiofrequency fields (RF), motion-induced fields and thermal effects. Examples of experimental validations of computational codes performed through a specific laboratory set-up will be given. The second part of the tutorial will be focused on examples of results obtained in the field of MR-safety, considering relevant exposure scenarios. In particular: (a) the analysis of energy deposition in human tissues by RF field, estimation of local Specific Absorption Rate (SAR) and related temperature increase; (b) the evaluation of induced electric fields by Gradient Coil fields and estimation of Peripheral Nerve Stimulation (PNS). Particular attention will be devoted to the case of patients with implanted medical devices, whose number is rapidly growing, in order to determine the conditions which determine the most critical localized energy deposition and the consequent heating. The last part of the tutorial will present the results of an extensive exposure assessment of motion induced fields, i.e., the electric fields induced in a body moving through the stationary magnetic field of a MRI scanner. Results of the analysis will be given based on the last specific Guidelines provided by the International Commission on Non-Ionizing Radiation Protection (ICNIRP).
Exposure of Humans to Electromagnetic Radiation
by Dragan Poljak, University of Split, Croatia

The goal of the Tutorial is to review various aspects of undesired human exposure to non-ionizing radiation generated by artificial sources. The Tutorial includes the basic ideas of electrosmog, coupling mechanisms between humans and electromagnetic fields, biological effects of electromagnetic fields, electromagnetic-thermal dosimetry models and solution methods, international/national safety guidelines, relevant exposure limits and safety measures. First, some theoretical and experimental methods of incident field dosimetry for the determination of external fields due to power lines, transformer substations, radio base station antennas and mobile phones are given. Furthermore, the tutorial aims to review some electromagnetic-thermal dosimetry methods for the assessment of human exposure to low frequency (LF), high frequency (HF) and transient electromagnetic radiation. In particular, the approaches are based on certain integral/differential equation formulations and related numerical solution procedures (primarily based on the use of Boundary Element Method – BEM, and Finite Element method – FEM) for the calculation of induced current densities, internal fields and specific absorption rate (SAR). For HF exposures the related temperature increase in tissues is of interest, as well. Illustrative computational examples pertaining to various realistic exposure scenarios, such as; pregnant woman/foetus exposed to low frequency (LF) fields, the human eye, the human brain and the human head exposed to HF electromagnetic fields will be given. The obtained numerical results for induced current densities, internal fields and SAR are compared against exposure limits proposed by ICNIRP (International Commission on Non Ionizing Radiation Protection). Finally, the last part of the Tutorial deals with deterministic stochastic-modeling to account for the influence of the variability in the morphology and the tissue properties of the organs, (such as the brain and eye) to the electromagnetic-thermal response of the body.

Modeling Aspects and Parameter Uncertainty in Computational Dosimetry
by Mario Cvetković, University of Split, Croatia

The interaction between electromagnetic field (EMF) and humans could be observed in two ways - the first being the unwanted exposure due to various electrical equipment while the second is the biomedical application of EMF in nowadays various therapeutic and diagnostic techniques. The former case is very important due to increased concern among the general population related to the possible harmful effects. As the established biological effect of high frequency (HF) electromagnetic fields is tissue heating, the assessment of this HF exposure is based on determining the specific absorption rate (SAR) that is related to the electric field induced in the tissue. The HF exposure assessment is particularly important in the case of human eye and brain since experimental measurement in healthy humans is very difficult to obtain or if at all possible. On the other hand, the efficient medical treatments using electromagnetic radiation also require the knowledge of the accurate distribution of the EM fields inside the tissues. As measurement of these quantities is rather difficult, the use of computational methods has become necessary to determine internal field distributions, both in the case of unwanted exposure assessment or to assist in the biomedical application of EMF. The computational models employed for this particular type of assessment can be classified as realistic models of the human body or the simplified models, computationally much less demanding but failing to provide accurate results in most of the exposure scenarios. The detailed models of the complete human body are nowadays readily available; however, the detailed human body model puts the significant burden in the computational model preparation at the same time putting strain on the available computational resources. In addition to this, there are cases when only the particular organ or body parts are of research interest, as when the initial assessment is considered. This talk will review some results for the induced electric field, the specific absorption rate, and the temperature increase in the case of human eye and human head exposed to HF radiation when using single organ models and a more detailed anatomical models, respectively. Another important aspect the
computational dosimetry has to consider is related to the uncertainty of the various input parameters such as due to difference in organ size between the individuals, as well as the biological tissue parameters such as permittivity and the electrical conductivity, or the tissue thermal parameters, that will eventually affect the distribution of the induced fields. To approach this problem, the so called stochastic dosimetry is used, combining the use of the deterministic techniques with the statistical methods such as Stochastic Collocation. This approach is demonstrated first on the case of the Transcranial Magnetic Stimulation, by examining the influence of the brain tissue parameters’ uncertainty and the coil positioning variations on the induced electric field and the related electric current density in the human brain model. The same approach is also shown within the dosimetric assessment of human brain exposed to high frequency EM field, where the effects of the variability in the brain morphology and the tissue properties as well as in the sensitivity analysis of thermal parameters investigating their influence on the temperature rise is carried out.

**Biography** Oriano Bottauscio (SM’15) was born in 1961. He received the M.S. degree in electrical engineering from the Politecnico di Torino, Turin, Italy, in 1985. He is currently Research Director at the Istituto Nazionale di Ricerca Metrologica (INRIM) Torino. From 2001 to 2006 he was responsible of the Applied Electromagnetics Department, while since 2015 he is the Head of the Division of Metrology for Quality of Life. From 1996 to 2001, he was a contract Professor in electrical engineering. From 2007 to 2015 he was member of the Board of Professors of the Ph.D. School of Politecnico di Torino in Electrical Engineering. Currently he is Vice-Coordinator of the Ph.D. School in Metrology organized in convention between Politecnico di Torino and INRIM. He authored or coauthored more than 200 scientific papers published in international peer-reviewed journals, with more than 2000 citations. He is also authors of national and international patents. His research activity is devoted to computational electromagnetics, with main reference to bioelectromagnetics, electromagnetic dosimetry related to medical equipment, electromagnetic fields and human exposure, and magnetic field mitigation. Dr. Bottauscio was an Associate Editor (in 2009 and 2011) and Chief Editor (in 2013) of the special issues of the IEEE TRANSACTIONS ON MAGNETICS related to the Soft Magnetic Materials Conference. He was responsible and participate to several national and European research projects. From 2001 to 2005, he was a member of CENELEC TC 106X “Electromagnetic field in human environment”-WG3 “Measurement and calculation procedures in electric, magnetic and electromagnetic fields (0 Hz–300 GHz)” and from 2002 to 2009 a member of the CIGRE Task Force C4.204 “Magnetic Field Mitigation Techniques.” Since 2016, he has been a member of the IEEE TC95, SC6 “EMF Dosimetry Modeling”, Working Group 2.

**Biography** Dragan Poljak was born on 10 October 1965. He received his BSc in 1990, his MSc in 1994 and PhD in electrical engineering in 1996 from the University of Split, Croatia. He is the Full Professor at Department of Electronics, Faculty of electrical engineering, mechanical engineering and naval architecture at the University of Split, and he is also Adjunct Professor at Wessex Institute of Technology. His research interests include frequency and time domain computational methods in electromagnetics, particularly in the numerical modelling of wire antenna structures, and numerical modelling applied to environmental aspects of electromagnetic fields. To date Professor Poljak has published nearly 200 journal and conference papers in the area of computational electromagnetics, seven authored books and one edited book, by WIT Press, Southampton–Boston, and one book by Wiley, New Jersey. Professor Poljak is a member of IEEE, a member of the Editorial Board of the journal Engineering Analysis with Boundary Elements, and co-chairman of many WIT International Conferences. He is also editor of the WIT Press Series Advances in Electrical Engineering and Electromagnetics. He was awarded by several prizes for his carrier achievements, such as National Prize for Science (2004), Croatia section of IEEE annual Award (2016). In 2011 professor Poljak became a member of WIT Board of Directors. From 2011 to 2015 he was the Vice-dean for research at the Faculty of electrical engineering, mechanical engineering and naval architecture. In June 2013 professor Poljak became a member of the board of the Croatian Science Foundation. He is currently involved in 3 COST projects, ITER physics EUROfusion collaboration and one national center for excellence in research for technical sciences. He is a co-chair of Working Group 2 of IEEE/International Committee on Electromagnetic Safety (ICES) Technical Committee 95 SC6 EMF Dosimetry Modeling.

**Biography** Mario Cvetkovic received the B.S. degree in electrical engineering from the University of Split, Croatia in 2005. In 2009 he obtained MPhil degree from the Wessex Institute of Technology, University of Wales, UK. In December 2013 he received Ph.D. from University of Split, Croatia. He is the assistant professor at the Department of Electrical Engineering, Faculty of electrical engineering, mechanical engineering and naval architecture (FESB), University of Split. In December 2010, he held a seminar to graduate and postgraduate students at the Technical University of Ilmenau, Germany, and in September 2014 he held a seminar at the Mälardalen University, Västerås, Sweden. He is a recipient of the "Best Student Paper Award", awarded at the 16th edition of the international conference SoftCOM 2008. At the Scientific Novices Seminar held in 2012, he was awarded with the recognition for his previous scientific achievements. To date he has published more than 50 journal and conference papers and two book chapters (CRC Press and Springer. His research interests are numerical modeling including finite element and moment methods, computational bioelectromagnetics and heat transfer related phenomena. He is a member and is also serving as a secretary of Working Group 2 of IEEE/International Committee on Electromagnetic Safety (ICES) Technical Committee 95 SC6 EMF Dosimetry Modeling.
Ground Penetrating Radar (GPR) is a technology using high frequency electromagnetic waves transmitted into the ground while reflected signals are returned to the receiver. The time required for the pulse to travel to and from the target is measured thus indicating its depth and location. The reflected signals are interpreted by the system and displayed. The applications of GPR technology are manifold, from civil engineering and archeology to phorensics and mine detection. In the period from April 2013 to October 2017, COST (European Cooperation in Science and Technology) Action TU1208 (www.cost.eu, www.GPRadar.eu) was focused on the exchange of scientific-technical knowledge and experience of Ground Penetrating Radar (GPR) techniques in civil engineering, aiming as well at promoting a wider and more effective use of this inspection method throughout the Europe. This COST Action was recognised among the running Actions as a “COST Success Story” with the following statement: “TU1208 ‘Civil engineering applications of Ground Penetrating Radar’ (Chair: Lara Pajewski, Roma Tre University, IT) is an interdisciplinary Action and represents a milestone in GPR research, being the first European network ever existed in this field, in line with the spirit and goals of the ERA.” As a post activity of COST TU1208 and in continuation of the research in GPR area the objective of this workshop is to bring together engineers and scientists from various disciplines and sectors to discuss and exchange best practices in in the area of ground penetrating radar (GPR) on-going research and applications. For the workshop, we are inviting authors to submit papers in the given topics. Accepted papers will be sent for inclusion in IEEE Xplore and other indexing and abstracting databases.

**GPR WORKSHOP I**

Wednesday, June 27
13:30 - 15:00 (A106)

Simona Fontul, Damir Varevac

**GPR in Transport Infrastructures management**

by Simona Fontul, LNEC, Lisbon

The infrastructures development is crucial in many African countries. The use of Ground Penetrating Radar promote a feasible detection and evaluation of existing infrastructures and a tool for the quality control of the new constructions or rehabilitations performed. It is important that the use of this equipment is integrated in the higher education level. The application can be in Civil Engineering, such as buildings, roads, railways, bridges, utilities as well as geology, water contamination etc. The use of this equipment, together with other evaluation methods can contribute to the fulfilment of strategic objectives from the 2030 Agenda for Sustainable Development. Examples of GPR application to improve the evaluation of existing infrastructures are presented. The main
financing opportunities regarding the African counties are referred in this presentation and possible application of GPR in the scenario of good governance and sustainable regional development.

**GPR application in Structural Engineering**

by Damir Varevac, University of Osijek, Croatia

Nondestructive techniques are very important tool for evaluation of the existing structures. This wide group of techniques helps us to determine many properties of structural elements and their material without generating any damage. Some of the most frequently used are based on ultrasound, ambiental vibration and, of course, electromagnetic radiation. Each of these procedures gives us some insight in specific property. Ground Penetrating Radar is a tool that we can use to obtain visual representation of the inaccessible interior of the structure. Detection of the reinforcement steel bars inside the concrete body, cracks and voids are common tasks for GPR, but this technique we can use in many other ways. This paper gives insight into possibilities of usage in concrete, timber and masonry structures and also its limitations.

**Biography**: Simona Fontul, born in Bucharest, Romania, in 1971, graduated in 1994 in Civil Engineering, specialisation on Roads, Railways and Bridges, and obtained a Master of Science degree in Transport Infrastructure Management in 1997, both by Technical University of Cluj-Napoca, Romania. In 2005 she obtained a Ph.D. degree in Civil Engineering, in the field of Urbanism, Planning and Transportation by University of Coimbra, Portugal. She is a researcher in the Transportation Department of National Laboratory for Civil Engineering (LNEC), Lisbon, Portugal, and invited assistant professor at Civil Engineering Department of Nova University of Lisbon, Portugal. She is expert in functional and structural evaluation of transport infrastructures, including Ground Penetrating Radar and other Non-Destructive Testing applications to roads, airfields and railways. She was an active member of COST Action TU1208 representing Portugal. She is vice chair of the Coordination Team for Cooperation with Portuguese-speaking African Countries at LNEC. She is the author of more than 140 publications, including book chapters, articles, papers in conference proceedings, technical reports. She is also a reviewer of papers submitted for publication on international journals.

**Biography**: Damir Varevac was born in Osijek, Croatia, in 1967. He graduated in 1993, with the specialization on Structural engineering. In 1999 he received his Master of Science degree in Structural Analysis of Bridges, and in 2005. obtained PhD degree in the field of Earthquake Engineering. Since 1993. he works at University of Osijek, Faculty of Civil Engineering, at first as teaching and research assistant and now as associate professor and Dean of the Faculty. His research fields are dynamics of bridges, concrete and prestressed structures, in-situ testing of the structures, impact of explosions on engineering structures, nondestructive testing of structures, including Ground penetrating Radar. He is active member of Croatian Standards Insitute and national expert at CEN for the design and retrofit of bridges.

**Paper presentations:**

1. **Antenna Design for Low-Cost Laptop-based Ground Penetrating Radar**
   Maja Škiljo, Toni Konsa, Zoran Blažević and Dragan Poljak (University of Split, Croatia)

2. **Comparison of Electric Field Transmitted into a Lossy Medium Radiated by a GPR Antenna**
   Silvestar Sesnic (University of Split, Croatia)
Ground Penetrating Radar for discovering, protecting and preserving cultural heritage

by Lara Pajewski, Sapienza University, Italy

The European Union (EU) has made 2018 the European Year of Cultural Heritage, to highlight the diversity, shared past and rich cultures that make Europe today. Cultural heritage plays an important role in the history and identity of Europe’s countries and of the continent as a whole. It is a vital part of Europe’s economy and promoting our cultural treasures is the key to boost growth and employment. The promotion of the value of cultural heritage is also a direct response to the deliberate destruction of cultural treasures in the Middle East of late. In this framework, the main purpose of this tutorial is to offer an overview on the most interesting activities fulfilled by the Members of the EU-funded COST Action TU1208 in the 2013-2017 period, concerning the use of Ground Penetrating Radar (GPR) and complementary testing methods in archaeology and for cultural-heritage diagnostics. GPR is a safe, effective and non-destructive technique that uses electromagnetic waves to provide high-resolution images of the subsurface, or to assess the inner status of a structure. In archaeological studies, and more in general in the management of cultural-heritage, GPR is especially useful. It can be successfully employed to discover and map buried archaeological artifacts, to inspect ancient buildings, bridges, columns and statues, to investigate frescoes, mosaics and decorations; and to study the internal conditions of several other objects of historical value. The use of GPR is not limited to the investigation of man-made structures: this technique can also be exploited for the inspection of natural structures of geological, biological or landscape-conservation value, which are part of our cultural heritage as well, such as trunks and roots of veteran trees, glaciers, caverns, fossil beds, sand dunes, and more. In most cases, archaeology exploits the great potential offered by the GPR technique in limited areas and without complementing it with other approaches, whereas the combined application of multiple high-resolution prospection methods at the scale of landscapes and their integrated interpretation are still uncommon. Therefore, after a brief introduction to the topics of the tutorial, two large-scale GPR inspections are mentioned, where extraordinary results were obtained. The tutorial continues with a review of a selection of cutting-edge case studies where GPR, eventually combined with other non-invasive techniques, was used to investigate archaeological sites and other structures of high historical value realised in different ages, ranging from the 13th century BC to the modernist period and including tombs, monuments, cathedrals, buildings, bridges and statues. A few examples of GPR use for the inspection of natural structures of historical value are given, too. A further aim of this tutorial is to underline the huge importance, in all GPR areas of application, of modelling methods for the electromagnetic simulation of complex scenarios. Radagrams usually do not have a direct resemblance to the subsurface or to the objects over which GPR is used: various factors, including the innate design
of the survey equipment and the complexity of electromagnetic propagation and scattering, can disguise complex structures recorded on GPR profiles. In that respect, electromagnetic models significantly aid in the interpretation of experimental data sets, facilitate object localisation, shape-reconstruction and estimation of geophysical parameters; they can also be employed before a survey, to support the choice of the most proper GPR equipment. TU1208 Members have released interesting open source or freeware tools for the electromagnetic modelling of GPR scenarios, which main features are shortly presented during this contribution along with examples of use in the cultural-heritage field. Finally, the tutorial is concluded with a short resume of the main outcomes of the COST Connect workshop on “Cultural Heritage in the Digital Era,” held at the COST premises in October 2017. This was an open space for participants to identify and discuss how they could best contribute to structuring this field of cooperation that has shown high potential to create societal impact in Europe. The event brought together a selection of COST Action representatives, experts from other EU-funded research projects, relevant representatives of the European Institutions, end-users and partners from the private sector.

Electromagnetic Field of the GPR Dipole Antenna – Frequency and Time Domain Analysis

by Dragan Poljak, University of Split, Croatia

The goal of the Lecture is to review the methods for the assessment of the transient field radiated by the ground penetrating radar (GPR) dipole antenna above a lossy ground. The analysis of the field reflected from the interface, and the field transmitted into the lossy ground is carried out in the frequency and time domain, respectively. The frequency domain (FD) formulation is based on the Pocklington integro-differential equation while the direct time domain (TD) approach is based on the Hallen integral equation approach. The corresponding integral equations for the current distribution along the wire are numerically solved by means of the FD and TD variant of the Galerkin-Bubnov scheme of the Indirect Boundary Element Method (GB-IBEM), respectively. Provided that the current distribution along the dipole is known, the related reflected/transmitted electric fields are computed from certain integral formulas by using the FD and TD boundary element procedures, as well. Some illustrative computational examples are presented throughout the lecture.

Biography: Lara Pajewski received the Laurea degree in Electronic Engineering 'cum laude' from Roma Tre University, Rome, Italy, and the PhD in Applied Electromagnetics and Electrophysics Sciences from Sapienza University, Rome, Italy. Since November 2016, she is a Professor of Electromagnetic Fields in Sapienza University, Department of Information Engineering, Electronics and Telecommunications. She was recruited in this position via a special procedure for winners of high-level EU projects (chiamata diretta). From April 2013 to October 2017, Lara Pajewski was the Chair, Grant Holder scientific representative and administrator of COST Action TU1208 “Civil Engineering Applications of Ground Penetrating Radar,” involving more than three hundreds experts from academia and industry, from 28 COST Countries (Austria, Belgium, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Malta, Macedonia, The Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom) and from Albania, Armenia, Australia, Colombia, Egypt, Hong Kong, Jordan, Israel, Philippines, Russia, Rwanda, Ukraine, and United States of America (www.GPRadar.eu). As of September 2017, Lara Pajewski is the President of TU1208 GPR Association, a no-profit international association founded as a follow up of COST Action TU1208 (www.GPRadar.eu/tu1208), and the Editor-in-chief of Ground Penetrating Radar (www.GPRadar.eu/journal), the first peer-reviewed scientific journal dedicated to the Ground Penetrating Radar (GPR) technique. Moreover, in November 2017 she was elected as the next President of the European Geosciences Union (EGU) division “Geosciences Instrumentation and Data System” (GI). Lara Pajewski is the Chair of the forthcoming 10th International Workshop on Advanced Ground Penetrating Radar“ (Rome, Italy, 3-5 July 2019). Her main research interests are in GPR technology, methodology and applications; integration of GPR with complementary inspection methods; development of full-wave techniques for the electromagnetic modelling of complex scenarios. At
Sapienza University, Lara Pajewski holds the “Antennas” course for the Laurea in Information Engineering (Bachelor's Degree) and the “Ground Penetrating Radar” course for the Laurea Magistrale in Electronic Engineering (Master Degree).

**Biography**: Dragan Poljak was born on 10 October 1965. He received his BSc in 1990, his MSc in 1994 and PhD in electrical engineering in 1996 from the University of Split, Croatia. He is the Full Professor at Department of Electronics, Faculty of electrical engineering, mechanical engineering and naval architecture at the University of Split, and he is also Adjunct Professor at Wessex Institute of Technology. His research interests include frequency and time domain computational methods in electromagnetics, particularly in the numerical modelling of wire antenna structures, and numerical modelling applied to environmental aspects of electromagnetic fields. To date Professor Poljak has published nearly 200 journal and conference papers in the area of computational electromagnetics, seven authored books and one edited book, by WIT Press, Southampton-Boston, and one book by Wiley, New Jersey. Professor Poljak is a member of IEEE, a member of the Editorial Board of the journal Engineering Analysis with Boundary Elements, and co-chairman of many WIT International Conferences. He is also editor of the WIT Press Series Advances in Electrical Engineering and Electromagnetics. He was awarded by several prizes for his carrier achievements, such as National Prize for Science (2004), Croatia section of IEEE annual Award (2016). In 2011 professor Poljak became a member of WIT Bord of Directors. From 2011 to 2015 he was the Vice-dean for research at the Faculty of electrical engineering, mechanical engineering and naval architecture. In June 2013 professor Poljak became a member of the board of the Croatian Science Foundation. He is currently involved in 3 COST projects, ITER physics EUROfusion collaboration and one national center for excellence in research for technical sciences. He is a co-chair of Working Group 2 of IEEE/International Committee on Electromagnetic Safety (ICES) Technical Committee 95 SC6 EMF Dosimetry Modeling.

**Paper presentations:**

1. **Frequency Domain and Time Domain Analysis of the Transient Field Radiated by GPR Antenna**
   Dragan Poljak, Silvestar Sesnic and Anna Susnjara (University of Split, Croatia); Darko Paric (Croatian Academic and Research Network, Croatia); Vicko Doric (University of Split, FESB, Croatia); Sinisa Antonijevic (University of Split, Croatia)

2. **Electric Field Radiated By a Dipole Antenna and Transmitted Into a Two-Layered Lossy Half Space**
   Anna Susnjara (University of Split, Croatia); Vicko Doric (University of Split, FESB, Croatia); Dragan Poljak (University of Split, Croatia)
A Brief Overview of Horizon 2020
by Aleksandra Banić, University of Split, Croatia

The largest and most ambitious EU research and innovation programme ever, will present the structure and cycle of calls as well as the typical proposal structure. Highlighting its most challenging parts and focusing on the general evaluation criteria, interpretation of the proposal requirements will follow the path through the operational procedure of composing the sound proposal. Participants are invited to send questions till June 1, 2018 to abanic@unist.hr in case of interest in specifics regarding the topic.

Collaborative Innovation Myth on Micro Scale Test
by Goran Pavlov, University of Split, Croatia

Innovation cannot be collaborative, it is the private property of individuals. The research process, however, depends on collaboration. These two are mixed but very different. Collaboration can be measured and guaranteed while innovation cannot. The presentation covers the basic concepts of collaborative open innovation network organizations and talks about key stakeholder roles: research organizations, R&D companies, large enterprises, investors and other supporting organizations in innovation to market process. The half-hour talk will provide insights on networking possibilities through IRI innovation clusters backed up with real R&D project success stories, as well as most the common collaboration pitfalls.

Biography: Aleksandra Banić, MEcon, acting as a Head of the Office for Projects and Technology Transfer at the University of Split, has eighteen years’ experience, out of which nine in the science and higher education sector. Up to nowadays, has been involved in more than 20 EU funded projects in different programmes and funds. Her role in projects varies from project administrative assistant and expert assistant to project coordinator. In the last six years, she acts as an institutional LCP and active member of EURAXESS network. Her experience is enriched with organisation of and participation in various and numerous, Croatian and international staff trainings, workshops and conferences among which she organised and led several staff trainings in the domain of organisation and management of project support offices at universities. Future interests include further specialisation in administration, management, communication of EU funded projects and public relations of science institutions, which is the area of her research at the Faculty of Economics, University of Split.

Biography: Goran Pavlov is a project manager and business consultant with extensive experience in project fundraising for the business sector, public research sector and NGOs. The topics of his technical expertise are: Electronics, Energetics and Information Technology. As one of the founders and lead coordinator of the national open innovation cluster "IRI Cluster", his main professional focus is set on innovation in science and technology, best practice implementation, R&D project fund raising, intellectual property and business development.
There is a constant demand to restrain energy consumption in buildings and to improve energy efficiency in general in the building sector. The role of the buildings in the energy transition is one of the key issues as buildings are responsible for significant energy consumption as well as carbon dioxide emissions. Novel technologies are crucial as well as implementation of the smart IT solutions in order to be able to get closer the nearly or even zero energy buildings. This workshop within the SplitTech2018 will bring together representatives of academia, companies, designers and key actors of the complex and intertwined chain related to the energy efficiency related projects. The novel solutions and products will be presented and discussed issues, current and upcoming challenges that are in front of us and that are crucial to achieve gather and important goal related to the energy efficient buildings and sustainable future.

**Biography:** Sandro Nižetić is Associate Professor at the Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture (FESB) at University of Split (Croatia). He obtained his PhD at University of Split at 2009 and was the youngest PhD in the history of the Faculty and received state prize for the research for 2016. He has experience in theoretical and applied thermodynamics, HVAC systems, energy efficiency in buildings, rational usage of energy, utilization of renewable energy sources, and more than fifteen years of the teaching experience. He is head of the laboratory for thermodynamics and energy efficiency (LTEF-Laboratory) at University of Split. He served as the vice dean for the research at faculty of FESB and also as the deputy minister in the Croatian government. From 2005 he is an ASHRAE member and also ASHRAE student branch advisor at University of Split. From 2009 to 2013 he was UNDP (United Nations Development Programme) project coordinator in Croatia on projects related to the implementation of Energy Efficiency measures in public buildings. He was also the head of the research project from 2008 to 2013 related to the development of a novel energy concept (solar power plant with short diffuser). He has visited several research and educational institutions worldwide as visiting researcher or as visiting lecturer and he is author or co-author of 35 peer-reviewed research papers and more than 30 conference papers as well as several techno-economic professional case studies for the industry. He has organized and chaired several international conferences (IEEES9-2017, ICH2P-2018, ICRCI-2018, SplitTech2016, SplitTech2017 and SplitTech2018). He served as a guest Editor in SI of International Journal of Energy Research (Taylor&Francis), International Journal of Hydrogen Energy (Elsevier), Thermal Science (Vinca Institute) and International Journal of Exergy (Inderscience). He is editorial board member in several international journals: Journal of Cleaner Production (Elsevier), Clean Technologies and Environmental Policy (Springer), International Journal of Sustainable Energy (Taylor&Francis, UK), International Journal of Engineering Modelling (UNIST) and International Journal of Energy Production and Management (WIT press, UK).
RFID IN PRACTICE

Radio Frequency Identification (RFID) technology, based on wireless communication between readers and cost effective tags, became the most popular tool for indoor tracking and identification. This technology is still advancing in terms of performances, through improving achievable reading ranges and increasing the probability to be detected while being found in the interrogation range and/or being attached on various materials. The goal of this discussion is to gather experiences of professionals and academia in order to define further investigation goals and experiments to be done in order to determine on how much is RFID advancing through years.

Biography: Petar Šolić (solic@fesb.hr) received his M.S. and Ph.D. degrees, both in computer science, from the University of Split in 2008 and 2014, respectively. He is currently employed at the Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture (FESB), University of Split, Croatia, as an assistant professor in the Department of Communication and Information Technologies. His research interests include information technologies, and RFID technology and its application. In 2016 he was awarded with National prize for science.

SMART CITY: CONCEPTS, REALIZATION AND EXPERIENCES

Every city presents a unique system in which various actors from the city government to public utility companies and citizens are taking numbers of activities, thus creating a complex of interactions and interdependencies. Taking into account the priority activities of the city, as well as the environmental and social context including history and their specific characteristics, there is a need to establish a methodology that would help us finding a path towards smart and sustainable city. The creation of smart and sustainable city does not present a purely technological process that usually promotes industrial sector throughout the implementation of i.e., smart lighting, in fact it is a complex process of business transformation and adaptation of large number of stakeholders involved in the
development of urban and regional strategies. Thus, the model would include not only the city government and county, but also the presence of local universities, research centers, trade associations, public agencies, civil associations and local economy. Understanding the city as an open ecosystem, in which the promotion of mutual cooperation, accelerators, technology incubators and urban laboratories would enable the improvement of collective intelligence that would strengthen the creative energy of the city. Therefore, within the context of SmartCity roundtable to be held during SpilTech conference, we invite stakeholders of the city, the county, the local economy and regulatory bodies to give their opinion on the development and sustainability of smart sustainable city. Throughout the discussion of current situation of the ICT maturity the stakeholders should define all what is necessary to achieve the vision of smart and sustainable city. Stakeholders should also provide answers to specific questions: What is the future smart city? What are the general objectives of the initiative and what is the main idea to achieve the specific objectives?

**Biography:** Toni Perković is currently employed as Assistant professor at University Department for Forensic Sciences, University of Split, Croatia. He received the Dipl. Ing. degree in telecommunications and electrical engineering from the University of Split, Croatia, in 2007, and the PhD degree in Computer Science from the University of Split, Croatia, in 2013. His research interests include the location privacy, security and privacy in Internet of Things, the usability, design and analysis of security protocols for wireless (sensor) networks, the usability and design of the secure authentication protocols.

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**Nuno Lopes (Invited talk)**

*United Nations University Operating Unit on Policy-Driven Electronic Governance, Portugal*

This talk aims to enhance our understanding of what is a smart city, to give an approach on how we could achieve it, discuss on how we could evaluate them and give some key policy recommendations. To guide our discussions a maturity model, a definition and framework for smart cities will be present. Before starting with the discussion will be present the global challenges of United Nations Agenda 2030 and analyzed the urbanization trends till 2100.

**Biography:** Nuno Lopes is a researcher at the United Nations University Operating Unit on Policy-Driven Electronic Governance (UNU-EGOV) and a professor in a part-time basis at the University of Minho. Currently, he holds two Postdoctoral positions. One on Computer Science at the University of Coimbra and another on Electronic Governance at the United Nations University. At the United Nations University, he is the coordinator of the research line on Smart Cities. During his working life, he has been involved in several national, European and international projects, such as Electronic Governance for Context-Specific Public Service Delivery, Knowledge Society Policy Handbook, Policy Monitoring on Digital Technology for Inclusive Education, Intelligent Computing for Internet and Services, Internet of Things for Disabled People, Smart Defence and Smart Cities for Sustainable Development. Nuno is Editor-in-Chief of the EAI Transaction on Smart Cities since 2018, Editor of the Springer Book on “Smart Governance for Cities: Perspectives and Experiences”, and, jointly with Rehema Baguma, Editor of the IGI Global Book on “Developing Knowledge Societies for Distinct Country Contexts”. He is co-author of the UNU Report on Smart Sustainable Cities for Developing Countries and of UNESCO Handbook on Knowledge Societies.
- experience, challenges and evolution -

The main goal of this workshop is to present and discuss recent advances in the area of the Internet of Things, where Radio Frequencies (RF) technologies and embedded systems are becoming research topics more and more interesting for both academia and industry. This symposium will provide an opportunity for scientists, engineers and researchers to discuss new applications, design problems, ideas, solutions, research and development results, experiences and work-in-progress activities in this important technological area. In particular, several ICT companies will be invited in order to report a real vision of the industry on challenges and solutions in the IoT sector. Meeting corners and exhibition session will be organized in cooperation with some companies such as STMicroelectronics, SensorID, SELMET, SofThings, Amplifico, RIMAC, Ericsson, Spica, Plurato, Engineering, Allnet.Italia, RadioSense, Flow Design Team, Geo sustavi, Statim, Canosa.
### Day 1 - Wednesday 27 June 2018, 10:40 – 12:00

**Wednesday, June 27**

**S1 - Methods and Techniques**

Session Chair: Anita Simic Milas, Bowling Green State University, USA

1. **Deep Convolutional Feature Fusion Based Target Recognition in UAV imagery for Wilderness Search and Rescue**  
   Tea Marasović and Vladan Papić

2. **UAV-based Thermal Infrared Imagery in Agriculture and Forestry: a Review**  
   Luís Pádua, Nuno Silva, Telmo Adão, Emanuel Peres and Joaquim João Sousa

3. **Integrating Geospatial Technologies for Monitoring Shoreline Changes: The Furadouro Case Study**  
   Gil R. Gonçalves, Sara Santos, Diogo Duarte and José Gomes

4. **Hyperspectral Mapping of Danish Streams from Unmanned Aerial Systems**  
   Christian Koeppl, Peter Bauer-Gottwein, Ursula McKnight and Monica Garcia

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**Wednesday, June 27, 13:00 – 15:00**

**S2 - Environmental monitoring**

Session Chairs: Robert J. Moorhead II, Mississippi State University, USA; Vitezslav Moudry, Czech University of Life Sciences Prague, Czech Republic

1. **Multi-camera Imaging System for Environmental Mapping**  
   Damian Wierzbicki

2. **A New Low Cost UAV Concept for R&D and Environmental Applications**  
   Nuno Silva, Luís Pádua, Raul Morais, Emanuel Peres and Joaquim J. Sousa

3. **Biogenic Landforms Mapping with the use of UAV**  
   Andrey Medvedev and Dmitry Ponomarenko

4. **The use of UAS for Environmental Assessment: the Case Study of Pesqueria River, Northeast Mexico**  
   Fabiola Yepez-Rincon, Victor Guerra-Cobian, Adrian Ferrino-Fierro, Ricardo Cavazos-Gonzalez and Carlos Abrego-Gongora

5. **Monitoring of abandoned and Fallow Lands based on Ultra-high Resolution Data**  
   Andrey Medvedev, Arseny Kudikov and Natalia Telnova

6. **The Use of Small UAS for the Characterization of Illegal Micro-dumps: a case study**  
   Cesario Vincenzo Angelino, Francesko Tufano, Narco De Mizio and Giuseppe

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**Wednesday, June 27, 15:30 – 17:30**

**S3 - Drones for Geosciences**

Session Chair: Vladan Papić, University of Split, Croatia

1. **Investigating the Pedagogical use of Unmanned Aerial Vehicles in Geoscience Fieldwork Education: some preliminary**  
   Anthony Cliffe, Fran Tracy and Tim Stott
Barrier Properties of Humic Acids  
Martina Klucakova

Understanding Geomorphic Response to Flood Events: Filling the Data Gaps  
Leonardo Camelo

Case study, using UAS in student project at remote location  
Matjaz Nekrep Perc

New Effective and Economical Airborne and Spaceborne methods for Batymetry Determination (seafloor mapping)  
Tea Duplančić Leder and Nenad Leder

Archeology with a little help from lidar and UAS  
Matjaž Nekrep Perc and Rok Kamnik

DAY 2 – Thursday 28 June 2018
Thursday, June 28 (8:40-10:00)

S4 – Agricultural monitoring

1. Investigating the Pedagogical use of Unmanned Aerial Vehicles in Geoscience Fieldwork Education: some preliminary  
Anthony Cliffe, Fran Tracy and Tim Stott

2. Mapping Biophysical and Biochemical Characteristics of Salt-affected Tomato Plants using RGB and Multi-spectral UAV  
Kasper Johansen, Yoann Malbeteau, Bruno Solorio, Samir Al-Mashharawi, Matthew McCabe, Matteo Ziliani, Yoseline Angellopez, Mitchell

3. Estimating the Effect of Nitrogen Fertilization on Growth and Yield of Sugarcane using UAV Lidar and Multispectral Imaging Technologies  
Iurii Shendryk, Jeremy Sofonia, Danielle Skocaj, Catherine Ticehurst and Peter Thorburn

4. Vineyard Mapping in Steep Slope Terrains using High-resolution Aerial Imagery  
Luís Pádua, Paulo Salgado, Telmo Adão, Emanuel Peres and Joaquim João Sousa

5. Mapping Chlorophyll Content of Corn under Different Treatments using UAV  
Anita Simic Milas

S7 – Vegetation monitoring

Session Chair: Robert J. Moorhead II, Mississippi State University, USA

1. Enhanced Fire Behaviour Prediction in Spinifex Grasslands of Arid Australia using UAS and Landsat imagery  
Katherine Zdunic, Paul Rampant and Neil Burrows

2. Different Approaches in Estimation of Forest Inventory Values by UAV based on Arc GIS Analyses  
Martin Slavík, Alžběta Grznarova, Karel Kuzelka and Peter Surovy

3. Tree Species Discrimination using RGB Vegetation Indices Derived from UAV Images  
Sima Sadeghi and Hormoz Sohrabi

4. A bird’s eye view: enhancing habitat mapping for heathland birds with UAV technologies
Thursday, June 28 (13:30-15:30)

S5 - Vegetation and Forest monitoring
Session Chair: Vladan Papić, University of Split, Croatia

1. **Trend Change Identification Approach for Forest Regeneration Inspection**
   Karel Kuzelka, Peter Surový, Martin Slavík and Kateřina Sirotková

2. **Mosaicking Workflow Enhancement for Vegetation Monitoring using UAVs**
   Petr Dvorak, Tomas Bartalos, Josef Brůna, Michaela Vítková and Jana Mullerová

3. **Pitfalls of Terrain and Vegetation Structure mapping on a Post-mining site**
   Vitezslav Moudry, Rudolf Urban, Jan Komárek, Jiri Prosek and Milic Solsky

4. **Verification of Positional Accuracy of UAV Utilizing RTK in Forest Environment**
   Jozef Výboštok, Martin Mokroš, Ján Merganič, Julián Tomaštík and Peter Valent

5. **Individual Tree Phenotyping using sUAS-borne LiDAR and RGB Sensors**
   David Pont, Heidi Dungey, Michael Watt, Grahame Stovold and Ben Morrow

6. **Importance of Radiometric Calibration of UAV Collected Images for Vegetation Change Detection**
   Edgar Sepp and Marko Kohv

S8 - Digital Elevation Models and Point Clouds
Session Chair: Mirjana Bonković, University of Split, Croatia

1. **Surveying the Middle Reaches of Krumeggerbach (Austria) using UAS Imagery**
   Gernot Seier, Matthias Wecht and Wolfgang Sulzer

2. **UAV Survey and Modelling of Doblar Accumulation Basin**
   Klemen Kozmus Trajkovski, Gašper Štebe and Dušan Petrovič

3. **Methodology for Automatic Classification of Point Clouds, obtained with Different Airborne Sensors in UAV**
   William Barragan, Karime Escobar Rey and Gabriel Sanchez

4. **The UAV-based Photogrammetry for Estimation of Plot-level Structural Parameters of Pedunculate Oak Forests**
   Ivan Balenović, Luka Jurjević, Anita Šimić Milas, Mateo Gašparović, Ante Seletković and Hrvoje Marjanović

5. **How to Achieve Usefull “rapid 3D” Digital Elevation Model for Search and Rescue Mission Strategy Planning**
   Mirjana Bonkovic, Marin Stefan Vidović, Ana Kuzmanic Skelin and Vladan Papic

6. **Testing the UAV-based Point Clouds of Different Densities for Tree- and Plot-level Forest Measurements**
   Luka Jurjević, Ivan Balenović, Mateo Gašparović, Anita Šimić Milas and Hrvoje Marjanović
Thursday, June 28 (16:00-17:00)

**S6 – Urban Areas**

*Session Chair: Marjan Sikora, University of Split, Croatia*

1. **Testing Phantom Pro-4 for Urban Mapping at Parcel Scale**  
   Mariana Silva, Ricardo Eger, Yuzi Rosenfeldt and Carlos Loch

2. **The use of UAS as a Complementary Tool for Urban Green Areas 3D Cartography: the Case Study Escobedo, Northeast Mexico**  
   Fabiola Yepez-Rincon and Adrian Ferriño-Fierro

3. **Classifying UAV images using Support Vector Machine for Urban Vegetation Mapping**  
   Zahra Azizi

**S9 – Water and Coastal Monitoring**

*Session Chair: Anita Simic Milas, Bowling Green State University, USA*

1. **Determination of Vegetation Community Characteristics of Freshwater Tidal Flats along the Elbe River with UAS**  
   Goerres Grenzdoerffer and Florian Beyer

2. **Experimental Study of Freshwater Microalgae Concentration Mapping Using False Color Digital Aerial Photo**  
   Wikan Jaya Prihantarto, Sigit Heru Murti, Muhammad Kamal, Frita Kusuma Wardhani, Ikhwanudin Rofi’I and Maulana Yudinugroho

3. **Multisensor Data to derive Peatland Vegetation Communities using a Fixed-Wing UAS**  
   Florian Beyer and Goerres Grenzdoerffer

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**DAY 3 – Friday 29 June 2018**

**Friday, June 29 (8:40-10:00)**

**S10 – 3D presentation and SfM**

*Session Chair: Marjan Sikora, University of Split, Croatia*

1. **Development and Performance Assessment of a Low Cost UAV Laser Scanner System (LasUAV) for Forest Monitoring**  
   Chiara Torresan, Andrea Berton, Federico Carotenuto, Ugo Chiavetta, Simone Ercoli, Marco Fabbri, Franco Miglietta, Marcello Miozzo, Alberto Simonti, Massimo Torelli, Alessandro Zaldei and Beniamino Gioli

2. **Large-scale Forest Management Inventory of Multi-layered Forests in Russia using UAV Structure from Motion**  
   Eugene Lopatin and Evgenii Kuzminskii

3. **Building, Testing, and Analyzing Detailed 3D Models of Individual Trees**  
   C. Lane Scher, Emily Griffoul and Charles H. Cannon

4. **Application of Wavelet Analysis in 3D Power lines reconstruction from UAV data**  
   Anna Fryskowska

5. **Ground classification of UAV image-based point clouds through different algorithms: open source vs commercial software**  
   Petr Klápště, Rudolf Urban and Vítězslav Moudrý
6. Optimum UAV Image Selection for Rapid and Accurate 3D Reconstruction
Mohammadreza Homaei, Mohammad Saadatseresht and Ali Babaei

Friday, June 29 (11:30-13:00)
S11 - Digital Elevation and Digital Surface Models
Session Chair: Anita Simic Milas, Bowling Green State University, USA

1. The applicability of unmanned aerial systems in mountain environments
   Gernot Seier, Wolfgang Sulzer and Viktor Kaufmann
2. Accuracy analysis DSM generation with and without GCPS based on aerial images
   Sharareh Akbarian and Milad Mirzaie
3. Accuracy assessment and application of UAV-derived digital elevation models in a high mountain environment
   Johann Müller, Andreas Vieli and Isabelle Gärtner-Roer
16. MAPS

Level I

Level II