BECAUSE OF THE COVID PANDEMIC IN EUROPE, STILL IMPACTING F2F PARTICIPATION WE HAVE DECIDED TO MOVE THE EVENT TOTALLY ONLINE AS YOUR HEALTH AND SAFETY ARE OUR MAIN CONCERN

The ESM'2021 final programme also gives you info on how to virtually attend the event. A personalised email with login info will be forwarded to all registered participants by IUL
## Contents

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General Information

1. Conference Location

The ESM’2021 Conference is being held virtually at

![IUL logo]

The online registration will be open from Wednesday morning October the 27th onwards, where registration will start at 08.15 a.m. and will end at 5.00 p.m. On Thursday October 28th registration will be from 9.00 a.m. - 5.00 p.m. with Friday October 29th registration only from 9.00 a.m.- 9.30. a.m. Online registration info can be found further in this programme and specific info will be sent by personalized email to all registered participants by IUL.

<table>
<thead>
<tr>
<th>ESM’2021 VIRTUAL PARTICIPATION AND PRESENTATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>As stated on page 3 because of COVID pandemic is still around in Europe influencing international travel, we are forced to move the event totally online. It was not our intention but reality has caught up with us.</td>
</tr>
<tr>
<td>Therefore we are opening up a virtual environment for the ESM'2021 presentations using the following software:</td>
</tr>
<tr>
<td><strong>ZOOM:</strong> <a href="https://zoom.us/">https://zoom.us/</a></td>
</tr>
<tr>
<td>A first trial is envisaged on Friday the 22nd of October from 14h00 to 16h00</td>
</tr>
</tbody>
</table>

2. Login

Each registrant will receive a name login upon registration. The login is personal and non-transferrable and can only be your name. Company or generic university logins are NOT allowed. Non-regular logins will be removed from the online meetings.
General Information

3. Tickets
Non applicable

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<table>
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<tr>
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<tbody>
<tr>
<td>Extra conference dinner</td>
<td>€</td>
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<tr>
<td>Extra lunch ticket</td>
<td>€</td>
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</tbody>
</table>

4. Registration
The ESM’2021 Registration will be open online for information and registration info for those already registered and AT CONFERENCE REGISTRATION CAN ONLY BE DONE ONLINE FOR THOSE STILL WISHING TO REGISTER AS A VIRTUAL PARTICIPANT AT THIS TIME
https://www.eurosis.org/conf/esm/2021/email-registration.html

   Wednesday, October 27....... 8.15 a.m. to 5.00 p. m.
   Thursday, October 28.......... 9.00 a.m. to 5.00 p. m.
   Friday, October 29 ............ 9.00 a.m. to 9.30 a.m.

5. Conference Proceedings
Each electronic paid registrant will be provided with an electronic copy of the Conference Proceedings. Fully paid onsite participants will be provided with a printed copy of the Conference Proceedings. This is NOT applicable to students who are not authors and who have not fully registered.
(Extra electronic or printed copies are available after ESM’2021)

Price: (or equivalent in another currency) for an extra copy

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<tbody>
<tr>
<td>Printed ESM'2021 Proceedings</td>
<td>€ 60 plus 30% shipping costs</td>
</tr>
</tbody>
</table>

6. Meeting Rooms
The ESM’2021 conference will be held in electronic rooms designated ROOM A and ROOM B in this programme.

7. Need Help?
Please contact EUROSIS (philippe.geril@eurosis.org) for your questions

8. Social Event and Lunches
Non-Applicable
The Conference Dinner
Non-Applicable
General Information

9. Room Legend
The parallel meeting rooms will be designated ROOM A and ROOM B.

10. Best Paper Award
During the conference the papers, which were accepted as extended papers will be judged by the committee and conference participants in order to choose the best paper of the ESM'2021 conference.

The best paper author of the conference receives a certificate and a free registration to any EUROSI event held within 2 years after receiving the best paper award. This registration waiver is only VALID FOR 2 YEARS AFTER RECEIPT AND FOR 1 (ONE) PERSON. In case of multiple authors, one (1) author only can use the registration waiver.
**Session Chairs information**

**ALL SESSION CHAIRPERSONS IN THIS PROGRAM ARE PROVISIONAL**

**Session Chairs** are chosen on a voluntary basis by proposals by either authors or local committee members or are appointed by the Track Chairs, General Program Chair or General Conference Chair. They are responsible for their assigned session. They make sure their speakers are available, take care of the timing within the session, chair the discussion after each presentation and introduce each speaker based on the CV’s given to them by the authors. **If a session chair is not available then the first author takes on the responsibility to chair**. In case they chair a session featuring **extended papers**, then they are required to distribute and collect the reviews of that or those papers at the beginning and end of the session. If they have time they should also indicate in their papers the number of session participants.

**THE NUMBERS NEXT TO THE PRESENTATIONS DENOTE THE PAGE-NUMBERS IN THE PROCEEDINGS. IF NO NUMBERS ARE MENTIONED THEN THIS PAPER IS NOT PUBLISHED IN THE PROCEEDINGS**

**THE AUTHORS WHO ARE UNDERLINED ARE NORMALLY THE PRESENTERS**

**ONLY PAPERS IN GREY BOXES ARE THE EXTENDED PAPERS ELIGIBLE FOR THE BEST PAPER AWARD**

**CHECK OUT THE OTHER EUROSIS EVENTS ON OUR WEBSITE:**  
http://www.eurosis.org
# Conference Schedule

**WEDNESDAY, 27th OCTOBER 2021**

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</tr>
<tr>
<td>09.00-09.10</td>
<td>WELCOME BY STEFANO ARMENIA AND BARBARA TURCHETTA – ESM’2021 CONFERENCE CHAIRS - ROOM A</td>
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<tr>
<td>09.10-09.40</td>
<td><strong>KEYNOTE SPEECH BY ADRIEN BÉCUE - ROOM A</strong></td>
</tr>
<tr>
<td>09.40-10.10</td>
<td><strong>KEYNOTE SPEECH BY ISABEL PRACA - ROOM A</strong></td>
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<tr>
<td>10.10-10.30</td>
<td><strong>COFFEE BREAK</strong></td>
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<tr>
<td>10.30-11.00</td>
<td><strong>KEYNOTE SPEECH BY SERGI GARCIA - ROOM A</strong></td>
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<tr>
<td>11.00-11.30</td>
<td><strong>KEYNOTE SPEECH BY JARNO SALONEN - ROOM A</strong></td>
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<tr>
<td>11.30-13.00</td>
<td><strong>PARALLEL SESSIONS</strong></td>
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<tr>
<td></td>
<td><strong>ROOM A</strong></td>
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<tr>
<td></td>
<td>CYBER SIMULATION IN INDUSTRIAL ENVIRONMENTS</td>
</tr>
<tr>
<td></td>
<td><strong>ROOM B</strong></td>
</tr>
<tr>
<td></td>
<td>SOCIAL MEDIA DETECTION SIMULATION</td>
</tr>
<tr>
<td>13.00-14.00</td>
<td><strong>LUNCH BREAK</strong></td>
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<tr>
<td>14.00-15.30</td>
<td><strong>PARALLEL SESSIONS</strong></td>
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<td><strong>ROOM A</strong></td>
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<td>FACTORY LAYOUT OPTIMIZATION</td>
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<td><strong>ROOM B</strong></td>
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<td></td>
<td>EMERGENCY SIMULATION</td>
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<tr>
<td>15.30-16.00</td>
<td><strong>COFFEE BREAK</strong></td>
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<tr>
<td>16.00-17.30</td>
<td><strong>PARALLEL SESSIONS</strong></td>
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<td></td>
<td><strong>ROOM A</strong></td>
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<td></td>
<td>TUTORIAL MATT GLOWATZ</td>
</tr>
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<td><strong>ROOM B</strong></td>
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<tr>
<td></td>
<td>SIMULATION IN BIOLOGY AND MEDICINE I</td>
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<tbody>
<tr>
<td>08.30-17.00</td>
<td>ONLINE REGISTRATION</td>
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<tr>
<td>09.00-10.00</td>
<td>PARALLEL SESSIONS</td>
<td>ROOM A / ROOM B</td>
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<tr>
<td></td>
<td>SIMULATION IN LOGISTICS AND TRAFFIC MANAGEMENT</td>
<td>ROOM A</td>
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<td></td>
<td>SIMULATION IN BIOLOGY AND MEDICINE II</td>
<td>ROOM B</td>
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<td>10.00-10.30</td>
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<td>10.30-12.30</td>
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<td>ROOM A / ROOM B</td>
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<td>ASSEMBLY SYSTEMS SIMULATION</td>
<td>ROOM A</td>
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<td></td>
<td>ELECTRONIC NETWORKS SIMULATION</td>
<td>ROOM B</td>
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<td>12.30-13.30</td>
<td>LUNCH BREAK</td>
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<td>13.30-15.00</td>
<td>PARALLEL SESSIONS</td>
<td>ROOM A / ROOM B</td>
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<td>SIMULATION AND DATA ANALYTICS</td>
<td>ROOM A</td>
</tr>
<tr>
<td>15.00-15.30</td>
<td>COFFEE BREAK</td>
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<td>15.30-17.30</td>
<td>PARALLEL SESSIONS</td>
<td>ROOM A / ROOM B</td>
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<td></td>
<td>TUTORIAL STEFANO ARMENIA</td>
<td>ROOM A</td>
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<td>ANALYTICAL AND NUMERICAL MODELLING TECHNIQUES</td>
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</tr>
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<td>Event</td>
<td>Room A</td>
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<tr>
<td>09.00-09.30</td>
<td>ONLINE REGISTRATION</td>
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<tr>
<td>09.00-10.00</td>
<td>SESSIONS</td>
<td>IOT in Water Resources</td>
</tr>
<tr>
<td>10.00-10.30</td>
<td>COFFEE BREAK</td>
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<tr>
<td>10.30-12.30</td>
<td>PARALLEL SESSIONS</td>
<td>IOT and Smart Industry</td>
</tr>
<tr>
<td>12.30-12.45</td>
<td>CLOSING SESSION AND BEST PAPER AWARD ROOM A</td>
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<td>12.45</td>
<td>END OF CONFERENCE</td>
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</table>
Wednesday, 27th October 2021

Online Registration
08.30 - 17.00

ROOM A
09.00 – 09.10
Opening ESM’2021 and Welcome

Welcome Address
Prof. Stefano Armenia, IUL - Università Telematica degli Studi, Rome, Italy
Prof. Barbara Turchetta, IUL - Università Telematica degli Studi, Rome, Italy

ESM’2021 General Conference Chairs
09.15 – 10.15

ROOM A – 09.15-09.45
KEYNOTE SPEAKER
Chair: Marco Angelini, CIS, Sapienza University of Rome, Rome, Italy

KEY_01
CyberFactory#1 – Attack Simulation on Manufacturing System Digital Twin
Adrien Bécue, Head of Innovation, Airbus Cybersecurity, Elancourt, France
Wednesday, 27th October 2021

ROOM A – 09.45-10.15
KEYNOTE SPEAKER
Chair: Marco Angelini, CIS, Sapienza University of Rome, Rome, Italy

KEY_02
Holistic Correlation of Events from increased Security and Safety of Factories of the Future
Isabel Praça, Professor at ISEP and Researcher at GECAD, Porto, Portugal

10.15 - 10.30
COFFEE BREAK

10.30 – 11.30

ROOM A – 10.30-11.00
KEYNOTE SPEAKER
Chair: Marco Angelini, CIS, Sapienza University of Rome, Rome, Italy

KEY_04
Increasing the FoF Resilience with Modelling and Simulation Tools
Jarno Salonen, Industrial Cybersecurity, VTT Technical Research Centre of Finland, Tampere, Finland

ROOM A – 11.00-11.30
KEYNOTE SPEAKER
Chair: Marco Angelini, CIS, Sapienza University of Rome, Rome, Italy
### Wednesday, 27th October 2021

#### ROOM A – 11.30-13.00

**CYBER SIMULATION IN INDUSTRIAL ENVIRONMENTS**

**Chair:** Isabel Praça, ISEP, Porto, Portugal

<table>
<thead>
<tr>
<th>CYBER_SIM_01</th>
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<tbody>
<tr>
<td><strong>Comparison of Production Dynamics Prediction Methods to increase Context Awareness for Industrial Transport Systems</strong></td>
</tr>
<tr>
<td>Philipp Borchers, Dennis Lisiecki, Patrick Eschemann, Linda Feeken, Mehrnoush Hajnorouzi and Ingo Stierand</td>
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</tbody>
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<tr>
<th>CYBER_SIM_02</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Modelling &amp; Simulation of a Rivet Shaving Process for the Protection of the Aerospace Industry against Cyber Threats</strong></td>
</tr>
<tr>
<td>Martin Praddaude, Nicolas Hogrel, Matthieu Gay, Ulrike Baumann and Adrien Bécue</td>
</tr>
<tr>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CYBER_SIM_04</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Augmented Reality Implementation for Comfortable Adaptation of Disabled Personnel to the Production Workplace</strong></td>
</tr>
<tr>
<td>Oleg Surnin, Pavel Sitnikov, Alexandr Gubinkiy, Alexandr Dorofeev, Tatyana Nikiforova, Arkadiy Krivosheev, Vladimir Zemtsov and Anton Ivaschenko</td>
</tr>
<tr>
<td>64</td>
</tr>
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</table>

#### ROOM B – 11.30-13.00

**SOCIAL MEDIA DETECTION SIMULATION**

**Chair:** Stefano Armenia, IUL, Rome, Italy

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<thead>
<tr>
<th>DEC_SUP_01</th>
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<tbody>
<tr>
<td><strong>Modelling Relations between #sexism, #mansplaining, #chauvinism, #misogyny and #toxicmasculinity Tweets Hashtags. Simulating Detection of Study Constructs based on Created Model</strong></td>
</tr>
<tr>
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14.00 – 15.30

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Chair: Gerrit Janssens, University Hasselt, Hasselt, Belgium

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Patrick Eschemann, Jan Elmar Krauskopf, Jürgen Sauer and Jan Stefan Zernickel.................................................................73

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Géza Szabó, Bálazs Tárnok, Levente Vajda, József Pető and Attila Vidács........86

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Designing an Emergency Information System for Catastrophic Natural Situations
K. Papatheodosiou and C. Angeli.......................................................................235
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Bronislava Halúsková, Jozef Ristvaj, Michaela Jánošíková, Maroš Lacinák and Jozef Jandačka

EMERG_03
Complex Activities Analyzer as a Software Tool for Modelling and Simulation in Crisis Management
Ryszard Antkiewicz, Andrzej Najgebauer, Dariusz Pierzchała and Zbigniew Tarapata

15.30 - 16.00
COFFEE BREAK

16.00 – 17.30
ROOM A – 16.00-17.30
AR LEARNING
Chair: Matt Glowatz, UCD, Dublin, Ireland

TUT_01
AR Learning
Prof. Matt Glowatz, UCD, Quinn School of Business, Dublin, Ireland

- This tutorial focusses on research addressing the opportunities and challenges of creating innovative learning spaces for the 21st century. In particular, we will be discussing
  - The new learner characteristics
  - Opportunities and challenges for the education sector
  - Creating innovative learning spaces for the 21st century
  - Augmented Reality (AR) in education
    - An overview
    - Technologies
    - Opportunities
    - Case Study
Wednesday, 27th October 2021

ROOM B – 16.00-17.30

SIMULATION IN BIOLOGY AND MEDICINE I
Chair: Stefano Armenia, IUL, Rome, Italy

SIM_AI_06
A Gender-Based Artificial Neural Network Model to predict the Vertical Transmissibility to the Head during Whole Body Vibration Training
Naser Nawayseh and Mohammad AlShabi .............................................................. 257

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Mariusz Bodzioch and Marcin Choiński................................................................. 272

SIM_BIO_06
Modelling of Tumour Chemotherapy Resistance: the Norton-Simon Hypothesis versus Log-Kill Response to Treatment
Mariusz Bodzioch and Marcin Choiński................................................................. 277

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END OF DAY I
Thursday, 28th October 2021

Online Registration
08.30 - 17.00

09.00 – 10.00

ROOM A- 09.00-10.00
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SIMULATION IN LOGISTICS AND TRAFFIC MANAGEMENT
Chair: Luigi Geppert, Catholic University of Milan, Milan, Italy

LOGIS_01
Integration of Batch Order Picking and Vehicle Routing
Stef Moons, Katrien Ramaekers, An Caris and Gerrit K. Janssens

SIM_TOOLS_03
Intelligent Traffic Management for Emergency Vehicles with a Simulation Case Study
Laura Bieker-Walz, Michael Behrisch and Ronald Nippold

ROOM B- 09.00-10.00
BIO
SIMULATION IN BIOLOGY AND MEDICINE II
Chair: Adam Galuszka, Silesian Univ. of Technology, Gliwice, Poland

SIM_BIO_01
Flip Bifurcation in a Discrete Two-Dimensional System
Marcin Choiński, Mariusz Bodzioch and Urszula Foryś

AGENT_01_BIO
Covid 19 Simulations in a Virtual Urban Environment along with Maslow’s Needs Modelling for Agents
Eryka Probierz, Kamil Skowroński and Adam Galuszka

10.00 – 10.30
COFFEE BREAK
Thursday, 28th October 2021

10.30 - 13.00

ROOM A- 10.30-12.30
ASSEMBLY SYSTEMS SIMULATION
Chair: Davide Secchi, Univ. of Southern Denmark, Odense, Denmark

SIM_LOGIS_03
Towards the Productive Application of Reinforcement Learning in Logistics: A Case Study on Assembly Line Material Provision Planning
Wladimir Hofmann, Clemens Lennart Schwarz and Fredrik Branding

METH_07_LOGIS
Algorithmic Layout Generation in Discrete-Event Simulation of Assembly Systems
Michael Kranz, Maximilian Duisberg, Florens L. Burgert, Lisann Gerdes and Susanne Mütze-Niewöhner

AGENT_03_ROB
A Multi-Agent System for Autonomous Mobile Robot Coordination
Norberto Sousa, Nuno Oliveira and Isabel Praça

INTEL_01
Simulated Annealing Algorithm to solve Multi-Component Matching Problems in Generalised Selective Assembly
Bauke Chaerle, Dries Bauwens, Dieter Claeys, Sidharta Gautama and El-Houssaine Aghezzaf

ROOM B- 10.30-12.30
ELECTRONIC NETWORKS SIMULATION
Chair: Philippe Geril, ETI, Ostend, Belgium

METH_01
Qualitative and Quantitative Analysis of Avionics Full DupleX Network Models
Oana Hotescu and Pierre de Saqui-Sannes

METH_03
Formal Verification of Reconfigurable Discrete-Event Systems using ISABELLE/HOL Theorem Prover on Cloud Environment
Sohaib Soualah, Yousra Hafidi, Olfa Mosbah, Mohamed Khalgui, Allaoua Chaoui and Laid Kahloul
Thursday, 28th October 2021

SIM_OP_02
Mitigation of LORA Interferences via Dynamic Channel Weights
Rafał Marjasz, Anna Strzoda, Konrad Polys and Krzysztof Grochla

SIM_TOOLS_01
Towards the Implementation of a Real Time Co-Simulation Architecture on Distributed Co-Simulation Protocol
Mikel Segura, Tomaso Poggi and Rafael Barcena

12.30 – 13.30
LUNCH BREAK

13.30 - 15.00

ROOM A – 13.30-15.00
SIMULATION AND DATA ANALYTICS
Chair: Andrea D'Ambrogio, Universita di Roma II, Rome, Italy

SIM_AI_04
Integrating Ontologies and Case Based Reasoning for the Development of Knowledge Intensive Intelligent Systems
Hugo Muñoz-Hernández, Rob Vingerhoeds and Juan José Montero-Jiménez

SIM_DATA_01
On The Problem of Entity Matching and Its Application in Automated Settlement of Receivables
Lukasz Czekaj, Tomasz Biegus, Robert Kitlowski, Stanisław Raczynski, Mateusz Olszewski, Jakub Dziedzic, Paweł Tomasik, Ryszard Kozera, Alexander Prokopenya and Robert Olszewski

CLOUD_01_HPCN
Complex Simulation Workflows in Containerized High-Performance Environment
Vladimír Višňovsky, Viktória Spišaková, Jana Hozzová, Jaroslav Oľha, Dalibor Trapl, Vojtěch Spiwok, Lukáš Hejtmánek and Aleš Křenek
Thursday, 28th October 2021

ROOM B – 13.30-15.00
NO SESSION WILL BE HELD IN ROOM B IN THIS TIME SLOT
Chair: none

15.00 - 15.30
COFFEE BREAK

15.30 – 17.30

ROOM A – 15.30-17.30
SILICO.APP TUTORIAL
Chair: Stefano Armenia, IUL, Rome, Italy

TUT

TUT_02
System Dynamics Modeling & Simulation with SILICO.APP
Prof. Stefano Armenia, IUL - Università Telematica degli Studi, Rome, Italy

ROOM B – 15.00-17.00
ANMT
ANALYTICAL AND NUMERICAL MODELLING TECHNIQUES
Chair: Philippe Geril, ETI, Ostend, Belgium

ANMT_01
The Fast Pies in solving Multi-Connected Potential Boundary Value Problems
Andrzej Kuźelewski, Eugeniusz Zieniuk and Marta Kapturczak ....................... 5

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V.F. Emets and Jan Rogowski................................................................. 13
Thursday, 28th October 2021

SIM_AI_11
Computer-Aided Model Design of Empirical Methods for calculating Partial Atomic Charges
Tomáš Raček and Ondřej Schindler

MC_02
The Increase in Speed of Computers and Statistical Optimization
William Conley

17.30

END OF DAY II
Friday, 29th October 2021

Online Registration
09.00 - 09.30

There will only be presentations in ROOM A on Friday
09.00 – 10.00

ROOM A – 09.00-10.00
IOT IN WATER RESOURCES
Chair: Abderrazak Jemai, INSAT, Tunis, Tunisia

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An improved Smart Irrigation System based on WSN, IoT and Machine Learning Algorithms
Halima Ghribi and Abderrazak Jemai ................................................................. 193

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Chair: Stefano Armenia, IUL, Rome, Italy

Prof. Stefano Armenia, IUL - Università Telematica degli Studi, Rome, Italy
Philippe Geril, EUROSI, Ostend, Belgium

12.45

END OF CONFERENCE
ESM’2022

SEE YOU ALL AT

ESM’2022, ISEP, University of Porto, Portugal,
October 2022
(exact dates to be confirmed shortly)

Track proposals and tutorial proposals can be sent in by
January 15th, 2022

Proposals for future ESM locations can be emailed to
philippe.geril@eurosis.org

Other upcoming EUROSIS conferences
MESM’2021 (more info to follow soon)
SCIFI-IT’2022, April 3-6, 2022, University of Leuven/Ghent Research Centre, Ghent, Belgium
FOODSIM’2022, April 3-6, 2022, University of Leuven/Ghent Research Centre, Ghent, Belgium
ISC’2022, June 1-3, 2022, UCD Dublin, Ireland.
GAME-ON’2022, September 14-16, 2022, Laboratorio de Humanidades Digitais, Universidade Nova de Lisboa, Lisbon (more info to follow soon)

(Other upcoming events)
SCIFI-IT’2023, Royal Military Academy, Brussels, Belgium (TBC)
ISC’2023, May 31-June 2, 2023, University of Malta, Valletta, Malta.
GAME-ON’2023, September 2023, Carlow, Ireland (TBC)
ESM’2023, October, 2023, ISAE-SUPAERO Toulouse, France
SCIFI-IT’2024, April 2024, University of Leuven/Ghent Research Centre, Ghent, Belgium
FOODSIM’2024, April 2024, University of Leuven/Ghent Research Centre, Ghent, Belgium
ESM’2025, October 2025 University of Leuven/Ghent Research Centre, Ghent, Belgium
EUROSIS was borne out of discussions with the European Community to set up a new kind of Society, which would be project-driven instead of driven by pure membership and conferences.

The aim of the Society is to set up and manage topic related Technical Committees which will link directly to European Projects in the field of computer simulation and related areas and to act as a knowledge pool for future European Networks of Excellence, like MOSAIC, HORIZON2020, ERASMUS+ by seeking out the latest innovations in simulation, modelling and AI research.

If you would like to receive more information about EUROSIS, please contact

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