

2024



**COMMUNICATIONS SYSTEMS INTEGRATION  
AND MODELING TECHNICAL COMMITTEE**

**CSIM-TC**

***NEWSLETTER***

***November 2024***

**Luca Foschini (Chair)**  
**Jonathan Rodriguez (Vice-chair)**  
**Petros Spachos (Secretary)**

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## 2. About CSIM

The Communications Systems Integration and Modeling technical committee focuses its activities on simulation, analytical tools and measurement of communications links and networks. CSIM has been sponsoring activities on traffic modeling, performance and integration of next generation wireless and wireline networks.

CSIM sponsors its traditional workshop CAMAD, as well as special issues in the IEEE Communications Magazine and in the IEEE Journal on Selected Areas in Communications. CSIM is very active in ICC and in GLOBECOM and was one of the co-founders of MILCOM. CSIM has its roots on the Communications Systems Engineering technical committee and its past chairs are:

2023-now – Luca Foschini

2021-2023 – Nizar Zorba

2018-2021 – Burak Kantarci

2015-2018 – Christos Verikoukis

2013-2015 – Stefano Giordano

2011-2013 – Harry Skianis

2009-2011 – Fabrizio Granelli

2007-2009 – Pascal Lorenz

2005-2007 – Nelson L.S. da Fonseca

2002-2005 – Mike Devetsikiotis

2000-2002 – Mohammad Ilyas

1999-2000 – Hussein Mouftah

1996-1999 – Guy Omydar

1994-1996 – Bill Tranter

**For more information: <http://csim.committees.comsoc.org/>**

### 3. Awards/Distinctions for CSIM members

- Damla Turgut, Pegasus Professor, University of Central Florida, 2024
- Damla Turgut, IEEE ComSoC Distinguished Lecturer, 2021-2025
- Damla Turgut, IEEE ComSoC Women in Engineering (WIE) Distinguished Lecturer, 2024
- Damla Turgut, TPC Co-Chair, IEEE SmartGridComm 2024, September 2024
- Damla Turgut, TPC Co-Chair, IEEE SECON 2024, December 2024

### 4. Past Events

- Damla Turgut, IEEE ComSoC Women in Engineering (WiE) Virtual Distinguished Lecture on “Physical and computational modeling of smart homes”, hosted by IEEE Affinity Group, Region 9, November 6, 2024
- Damla Turgut, IEEE ComSoC Women in Engineering (WiE) Virtual Distinguished Lecture on “Physical and computational modeling of smart homes”, hosted by IEEE WiE Queensland, Australia section, November 4, 2024
- Damla Turgut, Invited Talk on “Communication, computation, and privacy trade-off in machine learning for smart environments,” hosted by TU Wien, October 31, 2024
- Damla Turgut, Invited Talk on “Privacy in smart healthcare,” hosted by University of Versailles Saint-Quentin-en-Yvelines, October 10, 2024
- Damla Turgut, Invited Talk on “Physical and computational modeling of smart homes”, hosted by University of Oslo, September 16, 2024
- Damla Turgut, Invited Talk on “Bringing privacy into the picture: new optimization goals for ML/AI in smart environments,” hosted by Howard University, September 10, 2024
- Damla Turgut, IEEE ComSoC Distinguished Lecture on “I Did Not Sign Up for This: Limited Sharing in Privacy-Aware Smart Environments”, hosted by by IEEE ComSoC Türkiye Chapter and Tubitak, Gebze, Turkey, June 28, 2024
- Damla Turgut, IEEE ComSoC Distinguished Lecture on “I Did Not Sign Up for This: Limited Sharing in Privacy-Aware Smart Environments”, hosted by by IEEE ComSoC Türkiye Chapter and Kadir Has University, Istanbul, Turkey, June 26, 2024
- Damla Turgut, IEEE ComSoC Distinguished Lecture on “I Did Not Sign Up for This: Limited Sharing in Privacy-Aware Smart Environments”, hosted by by IEEE ComSoC Türkiye Chapter and Istanbul Technical University (ITU), Istanbul, Turkey, June 24, 2024
- Damla Turgut, IEEE ComSoC Women in Engineering (WiE) Virtual Distinguished Lecture on “Physical and computational modeling of smart homes”, hosted by IEEE Region 6 IEEE Hawaii Women in Engineering, June 5, 2024
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- Mesodiakaki, Online lecture entitled “Next Generation Systems and Networks” to the MSc students of the Department of Applied Informatics of the University of Macedonia, May 2024.
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- A. Mesodiakaki, "Experience and Lessons Learnt Towards Next-Generation Networks", She STEMs 2024 Symposium, Sep. 2024.

## 5. Ongoing Research Projects/Grants



### **ELIXIRION: rEaLizing healthcare 4.0 eXploiting the 6G netwoRk evolution**

By Agapi Mesodiakaki (Aristotle University of Thessaloniki, Greece), Angelos Antonopoulos (Nearby Computing, Spain)

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Facebook: <https://www.facebook.com/elixirion.mc>

The ELIXIRION project is an ambitious initiative aimed at revolutionizing the healthcare sector by integrating cutting-edge 6G technologies. In response to the rapid advancements in communication networks, the project's primary objective is to harness 6G capabilities to enhance healthcare systems, laying the groundwork for the emerging Healthcare 4.0 paradigm. This initiative aspires to create a more advanced, inclusive, and responsive healthcare system that caters to the needs of individuals and society.

ELIXIRION's core mission is to establish a dynamic, four-year research and training network that serves as the foundation for Healthcare 4.0. This interdisciplinary, highly innovative framework will merge technology and healthcare, providing patients and citizens with ultra-reliable, high-speed, and secure access to healthcare services. Key goals include:

- Supporting a massive number of connections with low-latency, high-speed, and ubiquitous access to medical resources.
- Ensuring healthcare services meet the diverse needs of latency-critical and data-intensive applications, while maintaining high privacy and security standards.
- Developing a sustainable, open market that fosters collaboration among stakeholders and eases the entry of new players.

To achieve these goals, ELIXIRION focuses on several technological challenges:

- Leveraging 6G technologies to deliver ultra-reliable healthcare access with sub-millisecond latency, high capacity, and up to 99.99999% reliability.
- Designing edge-aware algorithms for real-time task execution in mission-critical healthcare applications.
- Implementing AI-enabled end-to-end slicing and zero-touch orchestration for optimal network performance and secure information handling.
- Utilizing blockchain-based systems for secure, incentivized collaboration among healthcare stakeholders.

The ELIXIRION innovations will be showcased by ten doctoral programs have been established, covering a broad spectrum of research areas, such as:

- Integrated terrestrial and non-terrestrial networks for healthcare access.
- Energy efficiency optimization of healthcare networks.
- AI-enabled network management and privacy-preserving healthcare analytics.
- Blockchain-based mechanisms for secure collaborations within Healthcare 4.0.

Furthermore, the project places significant emphasis on creating vibrant EU-based research and training environment, attracting both European and international researchers. For this reason, ELIXIRION actively organizes and participates in various network-wide training activities, including schools, courses, conferences, workshops, Industrial Dissemination Days, and Open Days. These initiatives aim to strengthen academic and industry partnerships while providing doctoral candidates opportunities to share their work and receive feedback from both ELIXIRION members and external industry experts. Upcoming activities include the completion of Schools 1 and 2 in Amsterdam, Netherlands, scheduled for November 2024, related to Healthcare 4.0: Challenges and opportunities and 3GPP architecture and introduction to the 6G enabling technologies towards Healthcare 4.0.

In addition, the project has successfully been showcased at major international events to strengthen its academic and industry collaborations which are all disseminated through social media platforms such as LinkedIn, Twitter, and Facebook and the project's website.

Highlights include:

- A seminar series on information freshness and goal-oriented communications, featuring discussions by leading researchers.
- Participation in Researchers' Night and other outreach events to engage the broader community and inspire future innovations in healthcare technology.



Figure 1. Photos from Researcher's night 2024 in Thessaloniki

- Participation in the Mobile World Congress (MWC) 2024.



Figure 2. Mr. Lazaros Liatsas at MWC 2024, in Barcelona

- Collaboration with esteemed academic institutions and experts, such as the University of Luxembourg and the National and Kapodistrian University of Athens, to further the project's research objectives.



Figure 3. Prof. Symeon Chatzinotas at Fogus premises.

ELIXIRION started on 01/11/2023 and will be completed on 31/10/2027. It has received funding from the HORIZON-MSCA-2022-DN-01 - HORIZON TMA MSCA Doctoral Networks under the European Union's Horizon Europe research and innovation programme under Grant Agreement No. 101120135 with a total budget of € 2,5 million. It brings together a strong consortium of 5 industry and 4 academic stakeholders, as well as one research center. Specifically, the project consortium consists of: 1. Aristotle University of Thessaloniki (project coordinator, Greece); 2. University of Luxembourg (Luxembourg); 3. MCS DATALABS GmbH (Germany); 4. Nearby Computing Center (Spain); 5. Barcelona Supercomputing Center (Spain); 6. Academisch Medisch Centrum bij de Universiteit van Amsterdam (The Netherlands); 7. Fogus Innovations and Services P.C. (Greece); 8. Orange Polska Spółka Akcyjna (Poland); 9. Linköpings Universitet (Sweden); 10. Suite5 Data Intelligence Solutions Limited (Cyprus).



The European Union is taking significant steps to combat climate change by transitioning towards cleaner and more sustainable energy sources, such as renewable energy. This transition involves decentralizing and digitalizing Electrical Power and Energy Systems (EPES), integrating Distributed Renewable Energy Sources (DRES) into the grid. Recent geopolitical events, like the war in Ukraine, have highlighted the vulnerability of existing setups managed by Transmission System Operators (TSOs), Distribution System Operators (DSOs), and aggregators to cyber threats. In response, COCOON is working to deliver a practical cyber-physical systems solution for integrated EPES.

**COCOON is a 36-month project funded by the European Union's Horizon Europe research and innovation program, with a budget of 5.8 million euros. It is coordinated by the University of Cyprus/KIOS CoE, with project coordination led by Prof. Angelos K. Marnierides.** The project has a clear focus, aiming to:

- Enhance information exchange reliability through the development of the COCOON Programmable Node (CPN).
- Implement an Early Warning System (EWS) for cooperative cyber-physical protection and operator training.
- Provide real-time cyber-physical protection.
- Pursue data-driven detection of known and unknown (zero-day) exploits.
- Strengthen resilience among entities involved in grid stability processes through practical threat mitigation mechanisms.

Our consortium comprises 12 partners from 5 countries: Cyprus, Greece, Spain, The Netherlands, and the United Kingdom.

Since our project's inception in September 2023, we've held two physical meetings, the latest being in April 2024. During these meetings, we discussed updates on all work packages and outlined upcoming milestones. We were pleased to share progress on our pilot projects:

### **Pilot 1**

Located in Chalkidiki, Greece, Pilot 1 aims to showcase COCOON's ability to detect and mitigate cyberattacks in scenarios involving remote monitoring and control of Distributed Renewable Energy Sources (DRES) for Ancillary Services (AS) provisioning. So far, we have successfully installed the first tele controlled



photovoltaic plant at HEDNO (Greek distribution system operator) for remote monitoring and control. This pilot will demonstrate how COCOON enhances cybersecurity in managing renewable energy sources.



### **Pilot 2**

In Pilot 2, we've designed and configured a dedicated environment to simulate real-world cyberattacks. This environment will enable us to assess COCOON's monitoring and incident reporting capabilities effectively. We are currently preparing to conduct simulated cyber-attacks to evaluate the system's performance in identifying and responding to threats.

### **Pilot 3**

Focusing on digital substations within smart grids, Pilot 3 aims to enhance cybersecurity in critical infrastructure. We've developed a cyber range and conducted training sessions on cyber-attack detection and mitigation for operators. This pilot will demonstrate COCOON's ability to strengthen cybersecurity measures in digital substations, ensuring the resilience of smart grid infrastructure.





