IEEE CAMAD 2023 Special Session Proposal

Deploying Applications in the 6G Era: The Dawn of Highly-secure, Trustworthy, Scalable and Adaptable ecosystems

Scope

With 5G becoming mainstream after being deployed in several regions of the world, the constant growth of interconnected devices and the demand for high data rate services compel the conceptualization of the next generation of networking which will address the needs of an "always connected" society. The astonishing numbers of interconnected devices supporting smart homes/cities/transportations, e-health applications and consumer services, push toward redesigning the Internet-of-Everything (IoE) paradigm with a user-centric approach, thus extending the 5G-era shift from rate-centric enhanced mobile broadband services to ultra-reliable low-latency communications.

6G Networks should be capable of unleashing the full potential of each application, through the inherent support of contemporary wireless technologies, cutting-edge network architectures, AI/ML-based optimization techniques and over-the-top security features. It is often stated that 6G will facilitate the pivotal shift from present-day's interconnected intelligent nodes to the much broader "connected intelligence", a holistic approach for delivering disruptive services, thus introducing new heights of user satisfaction.

In this respect, this Special Session aims at providing a forum where researchers, engineers, and practitioners may discuss the latest advances on architectures, algorithms, abstractions, and technologies for delivering scalable, secure, trustworthy, robust, flexible, and agile applications. We strongly encourage submission of innovative work on contemporary network and application design.

The following is a non-exhaustive list of topics:

- 6G Network architectures, protocols, application programming interfaces, and programming languages
- Reliability, verification, resiliency, and fault management in 6G Networks
- Cryptography Applications in 6G Networks
- Autonomic management technologies in 6G Networks
- Zero Touch Network & System Management and Orchestration
- Multi-access Edge / Fog / Mist Computing platform design, implementation and evaluation
- Contemporary Cloud Computing Infrastructure for 6G Networking applications
- Application of Artificial Intelligence, Machine Learning, Big Data in 6G Networks
- Architectures for Cloud-native micro-services in 6G Networks
- Software-based integration of computing, storage, and networking elements in 6G Networks
- Leveraging 6G Networking paradigms for IoT platforms and IoT-based services
- Design guidelines for scalable, highly-available and modular elements for 6G Networking applications
- Secure Data Processing/Handling/Anonymization in contemporary networks and underlying infrastructure
- Applications of Federated Learning Models in contemporary networks and underlying infrastructure
- Augmenting Trust, Security and Privacy in contemporary networks and underlying infrastructure
- Security functions and services in contemporary networks and underlying infrastructure
- Contemporary Networking applications in Smart Cities/Environments
- Applying compositional patterns for parallelism, control logic, performance, and reliability of network services
- Self-configuration/optimization/healing techniques in contemporary networking
- Optimal network configuration principles in contemporary networking

• Tools for validating network services and automated deployment and management
• Quality of Experience and Services: Framework, Evaluation and Challenges

Special Session Chairs

Dr. Apostolos Fournaris (fournaris@isi.gr)
Dr. Ilias Politis (ilpolitis@isi.gr)
Dr. Christos Tselios (ctselios@isi.gr)

Bio

Dr. Apostolos Fournaris has received his diploma and PhD in Electrical and Computer Engineering department of University of Patras, Greece, in 2001 and 2008 respectively. He has worked for the Information and Communication Technologies Lab in Sophia Antipolis Hitachi Europe SAS European R-D Centre for two years and he is currently
Principal Researcher in Industrial Systems Institute of Research Center ATHENA. He has also been working as senior postdoctoral researcher in the Electrical and Computer Engineering Department, University of Patras and as an adjunct Assistant Professor in the University of Patras and Technological Educational Institute of Western Greece for more than 10 years. His main research interests are the following (i) IoT, Edge Embedded System/Cyber-Physical system hardware and software security with focus on industrial and critical infrastructures, (ii) Implementation attacks and resistance techniques on hardware or Software implemented security systems, (iii) Cryptographic Engineering, (iv) Design and implementation of efficient Security/Cryptography systems in Hardware/software for performance demanding and/or low resources Digital System applications, (v) Real World Cryptography applications: Bilinear Pairings, Threshold Cryptography, Fully Distributed Certificate Authorities, (vi) Embedded system/Cyber-physical system design for manufacturing fault detection identification (using Machine Learning)

Dr. Apostolos Fournaris has been involved in several EU and nationally funded research projects like CONCORDIA, SMESEC, CIPSEC, RADIO, FLEXINET, VITAL, VITAL++, SECRICOM, TAcle, TRUDEVICE, CRYPTACUS, Cryptoaction, WelCOM, VISETAK, PALM-IS. He has published more than 75 research articles in international conferences and journals, he is the author of 10 book chapters on hardware/software codesign, cryptographic engineering or trusted systems and of several technical reports on security issues. He is a member of IEEE, IEEE Circuits and Systems society, IEEE Computer society, IACR and the Technical Chamber of Greece.

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Dr. Ilias Politis obtained his BSc in Electronic Engineering from Queen Mary College, London, UK in 2000, followed by an MSc in Mobile and Personal Communications from King's College London, UK in 2001, and a PhD in Multimedia Communications from the University of Patras, Greece in 2009. In January 2023, he was appointed as a Research Associate at the Industrial Systems Institute of the Research Center “Athena”, specializing in Intelligent and Secure Cyberphysical Systems.

Prior to this, Dr. Politis held various positions, including Senior Researcher at the Secure Systems Labs of the University of Piraeus, the Wireless Telecommunications Lab of the Electrical and Computer Engineering Department at the University of Patras, and the School of Science & Technology at the Hellenic Open University in Greece. Currently, he serves as a Senior Research and Development Engineer for InQbit Innovations SRL (inqbit.io), overseeing research and innovation activities.

Dr. Politis has actively participated in all stages of numerous HEurope and H2020 projects (TRUSTEE, aerOS, ERATOSTHENES, PHYSICS, 5G-EVOLVED, SECRET, SONNET, EMYNOS) and FP7 framework projects (ROMEO, SALUS, FUTON), as well as various nationally funded research projects. His research primarily focuses on Future Internet, Next Generation and Time-Sensitive Networking, ID management and Access control, and Secure and Trust Networks. He has published over 90 peer-reviewed journals and conference proceedings in these fields.

Dr. Politis received a postdoctoral scholarship through the SIEMENS “Excellence” Program in Telematic Applications, awarded by the State Scholarship Foundation (IKY), Greece for his PhD thesis. He is a member of both IEEE and the Technical Chamber of Greece.

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Dr. Christos Tselios holds a PhD from the Electrical and Electronic Engineering Department, University of Patras. He has been a research fellow at Ericsson EUROLABS in Aachen, Germany (2008) and the Cassiopeia – Department of Computer Science in Aalborg University, Denmark (2011). Before joining the Industrial Systems Institute of ATHENA Research and Innovation Center, he worked as Senior Research Engineer at Citrix Systems Inc. as well as Senior Consultant in Dialog Semiconductors Inc (acquired by Renesas Electronics Corporation). and Think Silicon S.A. (acquired by Applied Materials Inc.). His research interests include but are not limited to 6G/B5G Networks (ML/AI Augmented Networking, Zero-touch Management and Orchestration, Multi-Access Edge and Fog Computing Architectures), Highly Available/Scalable Cloud Computing Applications, Network Security, Internet-of-Things protocols, and Machine-to-Machine communication.

Dr. Tselios is the (co)author of more than 50 research papers in international journals, conferences and edited books and has also participated in several European (both FP7 and H2020) and national (GSRT) projects related to the ICT domain (e.g., PEACE, ROMEO, DIOGENES, SUPERFLUIDITY, GamECAR, MONB5G etc.). While working for Citrix Systems Inc, Christos was the Technical Coordinator of H2020 SMESEC Project (https://www.smesec.eu/), which was concluded in 05/2020 with an excellent score and a TRL7 product. Christos also acts as a regular reviewer for a large number of IEEE/ACM conferences and journals and has been a member of IEEE, IEEE ComSoc, ACM and the Technical Chamber of Greece.