

Riga Technical University and University of Cyprus
Project: Development of practically-oriented student-centred
education in the field of modelling of Cyber-Physical Systems
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Third CybPhys Training School for Academics in Partner Countries, UCY



September 23-24, 2021

The CybPhys training school for faculty members in partner countries was held virtually between September 23rd and 24th 2021. To secure the safety and wellbeing of consortium members, the virtual mode of delivery was selected as a response to the COVID-19 global pandemic. The training school was organized by the University of Cyprus and included a wide repertoire of advanced technically-oriented topics offered by highly adept research and teaching faculty and personnel at the KIOS Research and Innovation Center of Excellence (CoE). The aim was to introduce faculty members at the three participating academic institutions in Ukraine, Kryvyi Rih National University, Kharkiv National Automobile and Highway University and Chernihiv Polytechnic National University, to high-caliber interdisciplinary research and initiatives undertaken by KIOS CoE in critical infrastructure in order to offer novel, high tech solutions to critical societal challenges.

The full agenda of the training school, including the abstracts of the presentations and the short bios of the speakers is included in the Annex of this Report.

From traditional power systems to smart grids

Opportunities

- Digitalization of power systems
 - Information and Communication Technology (ICT) and Internet of Things (IoT) framework can play a significant role in smart grid evolution (cyber-security concerns)
 - IoT and ICT: collect measurements, send coordination signals to distributed resources → enable new smart application for smart grids
 - New application in distribution grids for monitoring, control and coordination of resources

The diagram illustrates a smart grid architecture. At the top is the DSO Control Center, connected to a Communication Layer. Below this is the Distribution Grid, which includes Smart Meters and IoT-enabled devices. The grid is powered by various sources: Wind Turbines (DC to AC), Photovoltaics (DC to AC), Storage (DC to AC), and Electric Vehicle Charging - Smart Appliances (AC to DC). The diagram also shows the flow of power and data between these components.

KIOS
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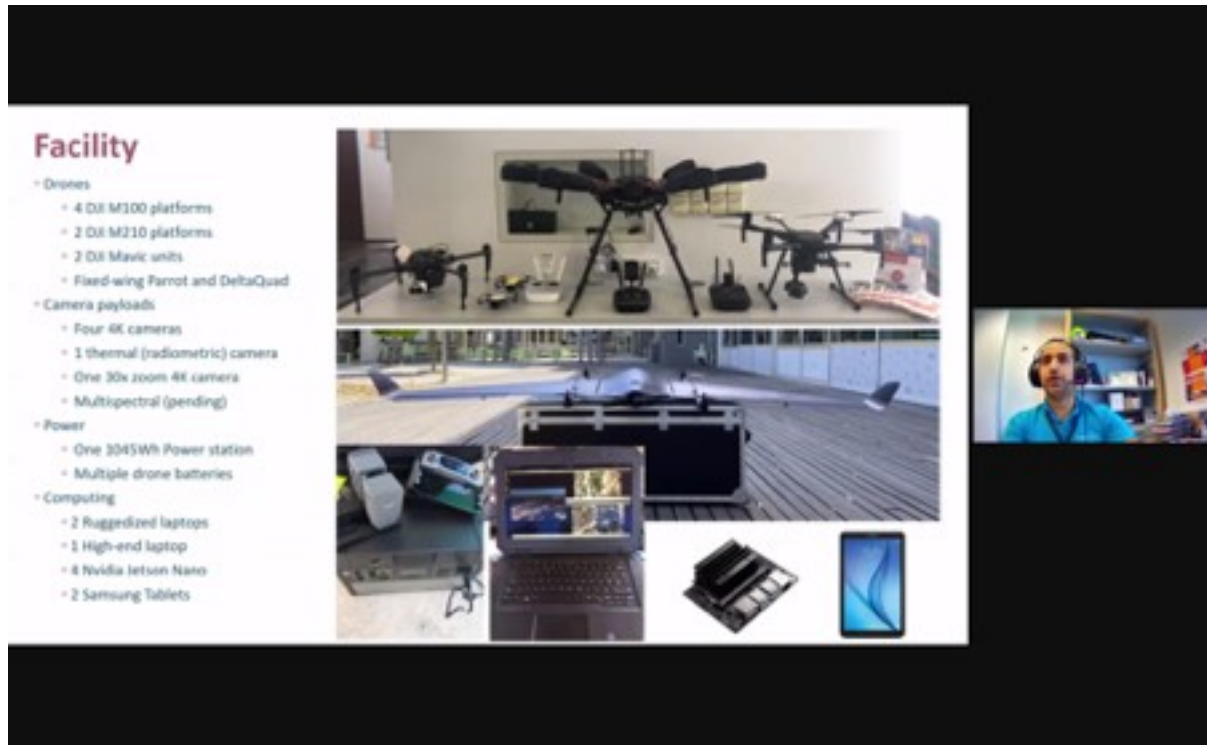
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KIOS
University of Cyprus
Erasmus+ Research and Innovation Action

The KIOS CoE leads and participates in multiple national, European and internationally funded projects related to Cyber-Physical Systems (CPS), including EMPOWER, which aims to develop sustainable and intelligent technologies and tools to contribute to the smart and green evolution of the power grids, and AIDERS, which aims to develop smart algorithms and a mapping platform to assist authorities in emergency situations. During the training school, participating faculty from



the three Ukrainian academic institutions had an opportunity to explore some of these novel technologies, their development and actual deployment in real life situations and their benefits and implications. Exchange of good practices and transfer of know-how, as well as the potential for future collaboration among partners were also explored during this training.



Some of the topics discussed during the full two-day training school included:

- Critical infrastructure from a holistic perspective
 - ◆ The MSc program in Intelligent Critical Infrastructure Systems which is offered in collaboration with Imperial College London
 - ◆ Smart water networks
 - ◆ Educational and research tools for modern power and energy systems
 - ◆ Intelligent transportation systems
 - ◆ Autonomous systems for critical infrastructure safety and security



Critical Infrastructure Systems (CIS)

What are they?

- CIS are assets or systems, essential for the maintenance of vital societal functions

Electric Power Systems

Water Networks

Telecommunications

Transportation Networks

Emergency Response

MSC in Intelligent Critical Infrastructure Systems 5

Admission Process

- One admission period per academic year in **September**

Candidates apply officially by the specified date → Applications are submitted to the ECE Department → ECE Graduate Studies Committee evaluates applications → Recommendations sent to the ECE Department Council for approval

- Requirements for admission:
 - Bachelor's degree** in an Engineering/Science discipline. Pre-requisite courses may apply, especially to non-ECE majors, which can be undertaken from the BSc-level programs of the ECE Department.
 - English proficiency.**

SCHOLARSHIP

- Evaluation criteria:

✓ Academic background	✓ Research background
✓ Recommendation letters	✓ Additional qualifications

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How can we increase energy efficiency?

- Measure energy usage in real-time
- Learn pump model dynamics using machine learning
- Detect anomalies in pump operation

Motivation

- Green, digital, intelligent and secure evolution of power systems

Smart management through digital technologies

Educational Activities in ITS

- Teaching Philosophy**
 - Apply meaningful rather than rote learning
 - Help students link traffic concepts with everyday-life examples
 - Have learning transfer in mind
 - Help students to be able to transfer what they learn in other application contexts
 - Teach state-of-the-art concepts and methods
 - Use different audiovisual means to illustrate concepts
 - Expose students to experts working in ITS
 - Help students learn state-of-practice software tools
 - Traffic simulation, optimization, estimation
 - Link theory to real-world problems

Stelios Timotheou

Shchasiana Arhun

Irina Ciomei

Volodymyr Sistuk

Natalia Morkun

Olga Poliakovska

ANDRII HNATOV

Svitlana Gadetska

Svitlana Kostjuk

Stella Hadjistassou

- KIOS Virtual City Platform for the management of critical infrastructure systems

Virtual Smart City KIOS CoE Testbed

Dr Artemis Kontou
 Dr Philippus Isala

Co-funded by the Erasmus+ Programme of the European Union

Philippus Isala

Irina Ciomei

Natalia Rudenko

ANDRII HNATOV

Olga Poliakovska

Svitlana Gadetska

Svitlana Kostjuk

Iryna Zavishehda

Stella Hadjistassou

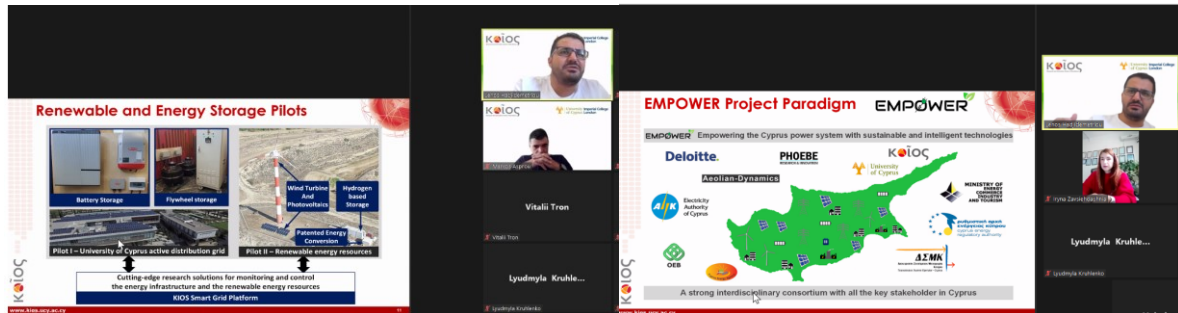
Philippus Isala

Olga Poliakovska

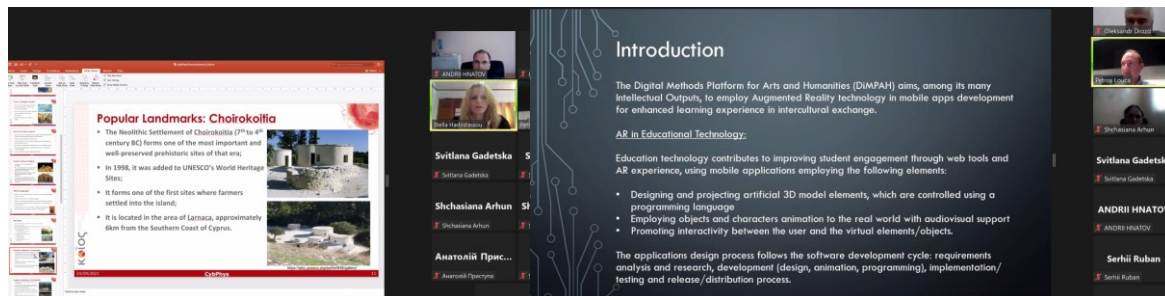
Svitlana Kostjuk

Stella Hadjistassou

- Smart grids: EMPOWER project paradigm
 - KIOS CoE power system laboratory
 - Wide area for monitoring and control
 - Cybersecurity issues



- Virtual Immersion in the rich Cypriot culture using Virtual Reality Technology.



Virtual demonstrations

Virtual demonstrations included the KIOS Virtual City and the KIOS Power System Laboratory. **The KIOS Virtual City** is novel virtual platform that is used to aid in the management and operation of multiple interdependent critical infrastructure systems, such as power, water, telecommunication and transportation. The platform is deployed to evaluate the cascading effects of natural or human-related disasters, including flooding and power blackouts. These effects can disrupt daily life and pose a serious threat on the safety and wellbeing of citizens. The Virtual City emulates the Critical Infrastructure Systems' operations and captures the complexities involved, within urban and suburban settings. It offers a path to evaluating and making critical decisions on the security and efficiency of a city and its environmental footprint and operational costs. The platform can be accessed and deployed by policy makers, CIS operators and other relevant stakeholders to make critical decisions on the effective management and support of smart city environments. The KIOS Virtual City is accessible as a customizable software that can be deployed to meet users' needs. It is also showcased at the KIOS CoE Control Room.



The screenshot shows a video conference interface. The main content is a presentation slide titled "Weakness of conventional SCADA system". The slide features a large blue downward-pointing arrow on the left containing the text: "Enhancement of the situational awareness of the power system operators for timely prevention of severe contingencies". To the right of the arrow is a list of bullet points: "Existing Supervisory Control and Data Acquisition (SCADA) system exhibits potential weaknesses", "Slow reporting rate (2-10 s asynchronously)", "Large measurement uncertainty", and "The performance of the critical components of the SCADA system should be improved in terms of accuracy and real time response". Below the text is an image of a control room with multiple monitors. The KIOS logo and website URL "www.kios.ucy.ac.cy" are visible in the bottom left corner of the slide. On the right side of the interface, a vertical list of participants is shown: Irina Ciornei, Petros Louca, Lenos Hadjidemetr..., and Vitalii Tron. A small video thumbnail for Vitalii Tron is also visible.

The KIOS Power System Laboratory is used to undertake novel research and promote training in critical areas in power systems. The Power System Testbeds, for instance, are used to enhance the penetration of Renewable Energy as a path to eliminate green gas emissions. Some of the testbed's current activities include the modelling, simulation, emulation and experimental validation of energy systems. The Power Systems Testbed can be deployed for the development of smart converters, which can be used for the integration of renewable energy sources at the building and grid level. In addition, real-time control algorithms for power electronic converters are developed to promote the interconnection of renewable energy sources.



Annexes

A1. Agenda

Day 5 - 23rd of September 2021 Hosted by UCY	
9:00 - 9:30 AM	Welcome and introduction of the participants (Dr. Stella Hadjistassou and Dr. Irina Ciornei - UCY)
9:30 AM - 2:00 PM	Critical Infrastructures from a holistic perspective (advanced topics) <ul style="list-style-type: none">• Overview of the MSc in Intelligent Critical Infrastructure Systems in collaboration with Imperial College London - (Assoc. Prof. Maria Michael) 9:30 AM• Smart Water Networks - (Assist. Prof. Demetrios Eliades) 10:15 AM• Coffee break (10-15 min)• Educational and Research Tools for Modern Power and Energy Systems (Dr. Lenos Hadjidemetriou) 11:15 AM• Intelligent Transportation Systems (Assist. Prof. Stelios Timotheou) 12:00 AM• Autonomous Systems for Critical Infrastructure Safety and Security (Assist. Prof. Panayiotis Kolios) 13:00 AM• Q&A
2:00 PM - 3:00 PM	Lunch break
3:00 PM - 4:30 PM	<ul style="list-style-type: none">• KIOS Virtual City platform for the management of critical infrastructure systems (Dr. Philippos Isaia & Dr. Artemis Kountou) 3:00 PM• Q&A



**Day 6 - 24th of September
Hosted by UCY**

9:00 AM - 1:00 PM

Smart Grids: EMPOWER Project paradigm (Dr. Markos Asprou & Dr. Lenos Hadjidemetriu)

- KIOS CoE Power System Laboratory (virtual tour)
- Wide Area Monitoring and Control
- Cyber security issues
- Q&A

1:00 PM - 2:00 PM

Lunch break

Leveraging AR technologies to create culturally and historically rich scenarios for intercultural exchange (Dr. Stella Hadjistassou & Dr. Petros Louca)

2:00 PM - 3:30 PM

- Content creation for virtual tours.
- Demo (Cyprus cultural experience)
- Q&A

3:30 PM - 4:00 PM

Conclusions and photo session (all)



A2. Abstracts and Short Bios

Title of the session: *Intelligent Critical Infrastructure Systems*

Title: *MSc Program in Intelligent Critical Infrastructure Systems (Assoc. Prof. Maria Michael)*

Abstract

This presentation will elaborate on the motivation and objectives of a new internationally unique and multidisciplinary MSc program in Intelligent Critical Infrastructure Systems, offered by the Department of Electrical and Computer Engineering of the University of Cyprus, in collaboration with the KIOS Research and Innovation Center of Excellence (KIOS CoE) and Imperial College London. It will highlight teaching and research methodologies used for the purpose of tackling challenging problems such as monitoring, control, management, and security in critical infrastructure systems. These systems can include electric power and energy systems, water distribution networks, telecommunication networks and transportation systems. Further, it will show how highly innovative and intelligent system methods and tools from emerging Information and Communication Technologies (ICT) are integrated in the learning process of the students.

Short bio



Assoc. Prof. Maria Michael (F) holds a Ph.D. in Engineering Sciences (specialization in Computer Engineering) from Southern Illinois University, USA. She is currently a faculty member of the ECE Department at the University of Cyprus. She is also a co-founding faculty member of the KIOS Center of Excellence, where she currently serves as the Director of the Centre's Education and Training activities. Prior to joining the University of Cyprus, she taught as a Lecturer at the ECE Department at Southern Illinois University, and as an Assistant Professor of Computer Science and Engineering at the University of Notre Dame, USA. At the University of Cyprus, she leads research activities in the areas of test and dependability in integrated and embedded systems. Her current research focuses on hardware security and cyber-security in intelligent embedded systems and industrial control systems, fault diagnosis and edge intelligence in large-scale cyber-physical systems, and dependability/reliability/availability in the hardware backbone of the computing continuum, enabling IoT and cyber-physical systems. She has published her work in more than 85 refereed journals, book chapters and international conferences. Furthermore, Prof. Michael's research has been already funded by several local and international organizations such as EU FP7, EU H2020, EU COST, Intel Corp., and the Cyprus Research Promotion Foundation. She has been serving regularly on the Steering, Organizing and Program Committees of numerous IEEE and ACM conferences, such as DATE, VTS, ETS, DFTS, VLSISoC, IOLTS, etc.



Title: *Smart Water Networks (Assist. Prof. Demetris Eliades)*

Abstract

Smart water networks describe the evolution of drinking water distribution systems towards more autonomous systems which use advanced sensing technologies, models and digital twin technologies, to achieve more efficient operation. The goal of this lecture is to introduce water distribution systems, their key challenges, the ICT technologies that are revolutionizing the water industry, as well as demonstrate examples on how to train engineers using simulation tools.

Short bio



Demetris Eliades (male) holds a BSc/MSc (2004) in Electrical and Computer Engineering from the Aristotle University of Thessaloniki, Greece, an MSc (2005) in Artificial Intelligence from the University of Edinburgh, Scotland, and a PhD (2011) in Electrical Engineering from the University of Cyprus. Since 2019, he is a Research Assistant Professor at the KIOS Research and Innovation Center of Excellence, of the University of Cyprus. His research is focused on monitoring, control and security of smart water networks. He has authored and co-authored articles published in journals and conferences proceedings, in the areas of water systems, building systems, power systems, control and robotics. He is the Technical Coordinator of the H2020 PathoCERT project.

Title: *Educational and research tools for modern power and energy systems (Dr. Lenos Hadjidemetriou)*

Abstract

This presentation will highlight the challenges for the sustainable operation of future power and energy systems and will emphasize the technology advancement that can support the intelligent and secure evolution of power grids. The key educational courses for power engineering students will be analysed and the technology tools and research infrastructure used in the educational process will be presented.

Short bio



Dr. Lenos Hadjidemetriou (male) received the Diploma in Electrical and Computer Engineering in 2010 from the National Technical University of Athens, Athens, Greece, and his Ph.D. degree in Electrical Engineering in 2016 from the University of Cyprus. He is currently a Research Lecturer at the KIOS Research and Innovation Center of Excellence, University of Cyprus, Cyprus. His research interests include renewable energy systems, energy storage systems, control of power electronics, ancillary services, active distribution grids and micro-grids, and cyber-security aspects in smart grids.



Dr. Hadjidemetriou has published more than 75 papers in scientific journals and international conference proceedings. He has extensive experience on technical coordination of research and innovation projects in the area of smart grids and he has developed 3 advanced laboratories in the University of Cyprus premises that are used for educational, research and innovation purposes. Dr. Hadjidemetriou is a member of the Cyprus Technical Chamber of the IEEE. He volunteered as a reviewer to several IEEE transactions and conferences and received the best paper award in the power quality session at IEEE IECON13.

Title: *Intelligent Transportation Systems* (Assist. Prof. Stelios Timotheou)

Abstract

Traffic congestion causes several adverse effects that lower our quality-of-life, harm the environment and negatively impact the economy. Intelligent transportation systems (ITS) promise to alleviate congestion by employing various information and communication technologies such as communication between transportation actors and advanced vehicle control capabilities.

This talk will present the research undertaken at KIOS CoE in the area of ITS focusing on two main aspects. The first regards the development of real-time monitoring and control algorithms for contemporary ITS to maximize efficiency and reliability. The second regards the investigation of challenging problems arising in future ITS. Finally, the talk will discuss ITS-related educational activities in the context of the MSc in Intelligent Critical Infrastructure Systems.

Short bio



Stelios Timotheou (male) is an Assistant Professor at the Department of Electrical and Computer Engineering and a faculty member at the KIOS Research and Innovation Center of Excellence, of the University of Cyprus. He received a Dipl. Ing. from the Electrical and Computer Engineering School of the National Technical University of Athens, and an M.Sc. and Ph.D. from the Electrical and Electronic Engineering Department of Imperial College London. In previous appointments, he was a Research Associate at KIOS, a Visiting Lecturer at the Department of Electrical and Computer Engineering of the University of Cyprus, and a Postdoctoral Researcher at the Computer Laboratory of the University of Cambridge.

His research focuses on analysing data and making informed decisions in challenging environments, with the purpose of enhancing efficiency and delivering new capabilities in situational awareness and decision making. Towards this direction, he develops customised, real-time, distributed and cooperative methodologies and algorithms, drawing on theory from mathematical optimization, machine learning, statistical data processing and computational intelligence. The main application area of his research is intelligent transportation systems (ITS) with emphasis on traffic monitoring, real-time traffic management and control, as well



as control of connected and automated vehicles. He has co-authored more than 100 peer reviewed articles in international journals, conferences and edited books. He currently serves as an Associate Editor for the IEEE Transactions on Intelligent Transportation Systems. Dr. Timotheou is the recipient of the 2017 ‘Cyprus Young Researcher in Physical Sciences & Engineering’ Award, by the Cyprus Research Promotion Foundation.

Title: *Autonomous Systems for Critical Infrastructure Safety and Security* (Assist. Prof. Panayiotis Koliios)

Abstract

This presentation focuses on the development, implementation and testing process of intelligent and autonomous drone-based operations for tasks related to safety and security of Critical Infrastructures including patrolling, tracking and intercepting intruders. This work is motivated by the growing scale and sophistication of threats to sensitive facilities and aims to enable real-time response actions that counteract malicious activities. Novel technology architectures and algorithmic designs are derived, implementation challenges emphasized and field tested with domain experts are presented.

Short bio



Assist. Prof. Panayiotis Koliios (male) received his BEng degree in Telecommunications Engineering from King's College London in 2008. He then joined the Centre for Telecommunications Research at King's College as a PhD student, funded by an EPSRC DTA scholarship. In June 2013 he joined the KIOS CoE of the University of Cyprus, where he is now an Assistant Professor working on both basic and applied research on networked intelligent systems.

Particular emphasis is given to emergency management in which natural disasters, technological faults and man-made attacks could cause disruptions that need to be effectively handled. Tools used include graph theoretic approaches, algorithmic development, mathematical and dynamic programming, as well as combinatorial optimization.

Title: *KIOS Virtual City platform for the management of critical infrastructure systems* (Dr. Artemis Kountou and Dr. Philipos Isaia)

Abstract

The KIOS Virtual City is a specially designed virtual platform to assist with the management and operation of interdependent critical infrastructures systems (e.g. water, power, telecommunications and transportation) and can be used to assess the cascading effects of natural or manmade disasters (e.g. flooding, power blackouts) which can seriously impact people's everyday lives, affecting their safety and well-being. The platform emulates the actual operation of Critical Infrastructure Systems within the urban and sub-urban environment and



offers a virtual decision support facility for assessing the security and efficiency of a city as well as its environmental footprint and operational costs. This platform is ideal for use by researchers, policy makers, CIS operators and other stakeholders to assist them towards their decision making with respect to the management of a smart city environment. In this presentation, the functionalities of the platform will be presented together with two use cases.

Short Bios



Dr. Artemis Kontou works as the Research Infrastructure Manager at KIOS CoE at the University of Cyprus where she manages and leads the development, implementation, and utilization of critical infrastructure systems testbeds. She holds a PhD in Mechanical Engineering from Imperial College London, an MSc in Meteorology and Climatology and a BSc in Applied Mathematics. Before joining KIOS CoE, Artemis has worked as a research associate at Shell University Technology Centre of Imperial College London where she filled two patents. She previously worked on several environmental research and innovation projects related to marine fouling, water management and climate change in organisations such as the Institute for Environment and Sustainability of Joint Research Centre of European Commission, Akzo Nobel and Cyprus University of Technology. Regarding her teaching experiences, Artemis was teaching energy law and transportation and distribution of energy recourses courses of the Management degree at the Cyprus University of Technology. She was also a teaching assistant in applied mathematics at Imperial College London.



Dr. Philippos Isaia is a Senior Software Engineer at KIOS CoE. He received his BSc degree in Computer Science from Loughborough University UK, in 2012. He then joined the Loughborough University Computer Science research department as a PhD student and he was awarded the Doctor of Philosophy degree in Software-Defined Networking (SDN) in 2018. In his doctoral research he worked on improving the performance of SDN using dynamic flow installation and management techniques. In addition, he implemented several data and packet prioritization algorithms working in collaboration with external partners of Loughborough University. He currently works on various projects at KIOS CoE, related to critical infrastructure, performance and simulator synchronization. Furthermore, he works in projects with external partners (KIOS Innovation Hub), such as the Covid-19 Emergency Response Platforms, EAC Risk Management and Marine Police System. His research interests include emerging technologies such as Software-Defined Systems (SDS), as well as software optimization of experiment platforms such as emulators, and web applications implementation and optimization.



Title of the session: Smart Grids-EMPOWER project paradigm

Abstract

This session will start with an introduction to KIOS CoE research infrastructure and projects related to power systems. The activities of the EMPOWER project that targets to the green and digital evolution of the Cyprus power system will be described. In this context, the Wide Area Monitoring and Control system enabled by the digital substation concept will be analyzed, while advanced methods for the grid integration of renewable energy resources will be presented. The cybersecurity issues that are related to the aforementioned subjects will be discussed.

Short Bios



Dr. Markos Asprou received the B.Sc and Ph.D. degree in Electrical Engineering from University of Cyprus in 2009 and 2015 respectively. He has worked as a Research Assistant at KIOS Research and Innovation Center of Excellence of the University of Cyprus from Jun. 2009-Jun. 2015 and as a Research Associate from Jun. 2015-Dec. 2020. Currently, he is a Senior Research Associate at KIOS Center of Excellence. His research expertise includes the monitoring and state estimation of power systems using synchronized measurements, estimation of transmission line, transient stability, wide area control of power systems, flexibility of power systems, and cybersecurity in power systems. He has published more than 50 papers in refereed journals and international conferences. Dr. Asprou is a Member of IEEE and serves as a reviewer in several esteemed scientific journals such as, IEEE Transactions on Power Systems, IEEE Transactions on Instrumentation and Measurement, IEEE Transactions on Power Delivery, IEEE Systems Journal, and Electric Power System Research Journal.



Dr. Lenos Hadjidemetriou received the Diploma in Electrical and Computer Engineering in 2010 from the National Technical University of Athens, Athens, Greece, and his Ph.D. degree in Electrical Engineering in 2016 from the University of Cyprus. He is currently a Research Lecturer at the KIOS Research and Innovation Center of Excellence, University of Cyprus, Cyprus. His research interests include renewable energy systems, energy storage systems, control of power electronics, ancillary services, active distribution grids and micro-grids, and cyber-security aspects in smart grids. Dr. Hadjidemetriou has published more than 75 papers in scientific journals and international conference proceedings. He has extensive experience on technical coordination of research and innovation projects in the area of smart grids and he has developed 3 advanced laboratories in the University of Cyprus premises that are used for educational, research and innovation purposes. Dr. Hadjidemetriou is a member of the Cyprus Technical Chamber of the IEEE. He volunteered as a reviewer to several IEEE transactions and conferences and received the best paper award in the power quality session at IEEE IECON13.



Title of the session: *Leveraging AR technologies to create culturally and historically rich scenarios for intercultural exchange*

Abstract:

The deployment of AR technologies in mobile applications development has added to the potential of enacting rich and immersive game-based learning experience, blending real with virtual environments and at the same time enhancing user interactivity, thus achieving realism, engagement and participation in novel experiences. Projecting virtual elements in the surrounding physical environment, properly designed and enriched with audiovisual elements, and adhering to curricula requirements can increase memory retention, interaction with abstract concepts and guide in the development of a conceptual understanding of these complex and abstract elements. The current applications that are under development and will be demonstrated include a combination of 3D objects and images, character animation and face expressions in three distinct game-based scenarios. The three scenarios are designed to take place in the Neolithic Era: two in the Cypriot village of Choirokoitia and one in Sandby Borg ringfort, which is located in Sweden. The scenarios aim to place the user in the center of the exploration, providing a sense of presence at that era and guiding users in understanding each other's culture and history.

Short Bios



Dr. Stella Hadjistassou is a Research Fellow at the KIOS Research and Innovation Center of Excellence. She has received a Ph.D. in Rhetoric/Composition and Linguistics (with a concentration in CALL), from Arizona State University. At the current stage, her work focuses on XR, mobile-based learning and intercultural telecollaboration. As part of the DiMPAH project, she collaborates with a team of software developers and faculty in applied linguists and digital humanities to design game-based scenarios that leverage AR technologies to engage students across Europe in intercultural telecollaboration. As part of the CybPhys project, Stella collaborates with the KIOS CoE research team to implement Quality Assurance mechanisms for the project.



Petros Louca is the manager of Applications Development Sector at the Information Applications Service of the University of Cyprus. He holds a Bachelor degree in Information Technology from the University of Glamorgan, Wales, UK and a Master of Science degree in Media Production and Distribution from Lancaster University, UK. He has extensive experience in the development of AR applications as part of multiple EU projects that he participated in, including ReDesign and DiMPAH. He is also well immersed in Unity 3D, utilizing among others, AR and photogrammetry technologies. His main interests are creativity and immersive learning experience through the combination of interactive audiovisual compositions and AR/VR technologies. He has published articles and conference proceedings in this field. At the current stage, Petros is developing game-based scenarios that will be implemented during intercultural exchanges.