KIOS Research and Innovation Center of Excellence



Imperial College London

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Forewords



Message from the Rector

6 It is our mission to support our community in taking advantage of the opportunities, whilst being responsive to the new challenges

Dear Reader,

Universities -by nature- interact with their polymorphic community (students, academics, researchers, administrative staff) and with associates within their local community, the country they operate in and partners from all over the world. This broad networking culture has as ultimate goals the exchange of ideas, the continuous pursuit of knowledge and learning, the evolvement of existing research, innovation and the inspiration of young generations and the society in general.

Our world is constantly changing. It is our mission to support our community in taking advantage of the opportunities, whilst being responsive to the new challenges. To inspire and empower our community and the society we operate in, we need to adapt to the world's needs and demands. For achieving the above, we aim to offer competitive foreign-language programmes at the undergraduate level (an action which requires legislative reform), provide distant programs of studies realizing the value of inclusion and accessibility, strengthen our scientific profile through collaboration and participation in networks and projects locally and internationally and prioritize the completion of strategic building infrastructures. Most importantly, we need to foster a culture of directly linking research and teaching to the Sustainable Development Goals.

The Centers of Excellence play a pivotal role in the University of Cyprus by fostering knowledge sharing, demonstrating leadership in innovation, and collaboration in their respective areas of focus. The KIOS Research and Innovation Center of Excellence at the University of Cyprus completed 15 years of research and innovation excellence in the past year. During this period, the Center made significant contributions to society at the local and international level by producing new knowledge and tools to solve real-life societal and technological problems. We are confident that KIOS will continue to grow its research profile and achieve its future ambitions.

I would like to congratulate the KIOS personnel for their exceptional work, interdisciplinary approach, and collaborative spirit in conducting transformative, high-quality, multidisciplinary research and innovation, with impact on society.

Sincerely,

of Also

Tasos Christofides, Rector, University of Cyprus

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66 The achievements presented in this report are a testament to the hard work and commitment of KIOS personnel who work collaboratively and strategically to produce technological advancements and transformative solutions to help societies and economies be more resilient, greener, and safer

Message from the Director

In 2023, the KIOS Research and Innovation Center of Excellence celebrated its 15th anniversary. This anniversary was an opportunity to look back and remember how far the Center has flourished over the years, as well as to ponder the great potential for the future. Since it was established in 2008, the Center has experienced significant growth and has received national and international recognition as a leading research and innovation center in the area of Information and Communication Technologies. KIOS has become a point of reference for excellence in research and innovation.

This annual activity report provides some of the key achievements of 2023. Our research activities continued to expand in terms of producing high-impact publications in the most prestigious journals and conference proceedings and attracting competitive research funding from European and national funding sources. KIOS researchers continue to receive various prestigious awards, research grants, and distinctions. The Center currently has two active ERC Grants (an ERC Synergy Grant and an ERC Consolidator Grant). In addition, we are strengthening our international collaboration activities with key academic and industrial partners around the world, and establishing new research collaboration agreements.

The KIOS Innovation Hub has also demonstrated significant expansion, as new collaborations with the government, industry, and the private sector have been initiated. We now have established research collaboration with all the key players in the Cyprus critical infrastructure domain, namely in the Power and Energy sector, Transportation, Water Systems, Emergency Response, Communications and Healthcare. These collaborative projects have resulted in tangible outcomes, which are currently in use for the benefit of society.

The achievements presented in this report are a testament to the hard work and commitment of KIOS personnel who work collaboratively and strategically to produce technological advancements and transformative solutions to help societies and economies be more resilient, greener, and safer. I would also like to take the opportunity to thank the University of Cyprus leadership for their long-term support and involvement.

We hope that you will find this report informative. For further information about the Center, please visit the KIOS website: www.kios.ucy.ac.cy.

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Prof. Marios M. Polycarpou, Director, KIOS Research and Innovation Center of Excellence Professor of Electrical and Computer Engineering, University of Cyprus Visiting Professor, Imperial College London, U.K. Member of the Cyprus Academy of Sciences, Letters, and Arts 0 0 0 1 0 0 0 0 0 1 1 0 1 0

In brief



The KIOS Research Center was established in 2008 at the University of Cyprus and was subsequently selected by the EU to advance into a Research and Innovation Center of Excellence in 2017.

The mission of the KIOS Research and Innovation Center of Excellence (KIOS CoE) is to conduct multidisciplinary research and innovation in the area of Information and Communication Technologies (ICT) with emphasis on the monitoring, control, management and security of critical infrastructures. These infrastructures include large-scale, complex systems such as power and energy systems, water systems, transportation systems, telecommunication networks, healthcare systems, and emergency management and response systems.

The Center's vision is to provide an inspiring environment for conducting excellent, cutting-edge research at a global scale, producing new knowledge and advanced engineering and management tools that can be applied to solve timely and reallife problems in the considered Critical Infrastructure Systems, bringing multiple benefits to society at large.

Research in high-tech areas important to Cyprus and the global economy

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SCIENTIFIC FOUNDATIONS	
	Control Theory, Automation and Robotics
	• Artificial Intelligence, Machine Learning and Analytics
	 Information Technology, Systems and Engineering
	Software/Hardware System Design & Integration
	Cyber-Physical Security
APPLICATION AREAS	·
	• Power & Energy Systems
	Water Systems & Environmental Monitoring
	Intelligent Transportation Systems
	Telecommunication Systems & Networks
	Healthcare Systems
	 Emergency Management & Response
RESEARCH OUTCOMES 💿	<u> </u>
	Intelligent Monitoring & Control
	 Resilience, Adaptation & Reconfiguration
	Security, Safety & Trustworthiness
	• Embedded Real-time Algorithms
	• Big Data Analysis & Management
	Performance & Energy Optimization

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KIOS CoE team, May 2023

We celebrated 15 years of Research and Innovation Excellence

In 2023, the KIOS Research and Innovation Center of Excellence at the University of Cyprus celebrated 15 years of research and innovation excellence. For over a decade, KIOS has been at the forefront of groundbreaking research and innovation, technological advancements, and transformative solutions in Information and Communication Technologies (ICT), bringing major socio-economic and environmental benefits at the local and global level.

This anniversary provides a great opportunity to reflect on KIOS' journey and achievements as well as on its unwavering commitment to shaping a sustainable and technologically advanced future by producing new knowledge and tools to solve real-life societal and technological problems.

KIOS Beginnings (2008-2011)

KIOS was officially established as a Research Center for Intelligent Systems and Networks in 2008 by a group of visionary academics of the Department of Electrical and Computer Engineering at the University of Cyprus. In a short period of time, a flurry of research activities was underway at the Center. The Center was awarded a prestigious "Strategic Infrastructure Grant" funded by the Cyprus Research Promotion Foundation as well as other EU and nationally funded research projects. Moreover, it established academic and industrial partnerships with key players in the areas of intelligent systems and networks and coordinated, for the first time in Cyprus, the European Union COST Action "IntelliCIS". In three years since its inception, the small team of KIOS with 14 researchers, evolved into a team of 65 exceptional researchers from Cyprus and the EU. **6 6** For over a decade, KIOS has been at the forefront of groundbreaking research and innovation in ICT, bringing major socio-economic and environmental benefits at the local and global level **6 6** KIOS research activity is strongly in line with the UN Sustainable Goals, the EU strategies and policies on green and digital transition

The Road to Research and Innovation Excellence (2012-2016)

During the period 2012-2016, KIOS has had many research successes, receiving national and international recognition. One of the key successes was the prestigious ERC Advanced Grant (2012), awarded to the KIOS Director, by the European Research Council (ERC), for the research project "Fault-Adaptive Monitoring and Control of Complex Distributed Dynamical Systems". After that, other successes followed, such as the ERC Proof-of-Concept Grant (2015) for the research project "SmartTap", as well as many more research projects funded by the EU and Cyprus. In addition, KIOS established partnerships with water authorities, energy authorities, and the Cyprus Police, aiming to promote technology transfer from academia to industry and other governmental organizations.

Notably, the most significant achievement of this period that helped the Center grow and develop was the Teaming Grant (2016) from the European Commission. KIOS, after an extremely competitive process, was selected to receive funding from the European Commission, the Government of Cyprus, and the University of Cyprus to advance into a European Center of Excellence and Innovation. To achieve this, KIOS established a strategic partnership with Imperial College London, one of the world's leading Universities, tasked with sharing its best-practices and expertise.

The Upgrade to a European Research and Innovation Center of Excellence (2017-2023)

The KIOS Research and Innovation Center of Excellence (KIOS CoE) was officially launched in 2017. In the following 5 years, KIOS CoE experienced a significant growth, achieving inter alia the development of a critical mass of top-quality researchers who undertake pioneering and groundbreaking research projects, the creation of the KIOS Innovation Hub, aiming to provide research and innovation services to organizations involved in the operation of critical infrastructures, and the development of large-scale physical and virtual research infrastructures to test technologies under realistic operating conditions. Meanwhile, KIOS CoE received another ERC Proof-of-Concept Grant for the research project "Domognostics" (2018), an ERC Synergy Grant (2020) for the research project "Water-Futures", and an ERC Consolidator Grant (2023) for the project "URANUS". By the end of 2022, the KIOS team evolved into a diverse, multidisciplinary team of 189 highly qualified personnel from Cyprus, EU, the Middle East and North Africa (MENA) region, and beyond.





KIOS Center of Excellence Launch Event, 2017

Current State

Today, KIOS CoE is the leading Center of Excellence in Cyprus and a key player in the region on ICT, carrying out top-level research and innovation in critical infrastructure systems. This research activity is strongly in line with the UN Sustainable Goals, the EU strategies and policies on green and digital transition, the National Recovery & Resilience Plans, as well as with the implementation of the Critical Entities Resilience Directives.

The Center employs young, talented researchers specializing in a wide range of fundamental areas, such as Artificial Intelligence, Machine Learning, Computational Intelligence, Internet of Things, Cybersecurity, Robotics, Networks, etc., and is involved in several research and innovation projects funded by various European and national funding agencies, as well as in projects funded by the industry. Furthermore, it collaborates with many organizations in Cyprus and abroad to transform new knowledge into tangible results, to make critical infrastuctures smarter, greener, more efficient, and secure, for the benefit of society at large.



6 In the last 15 years, KIOS' research has yielded innovative solutions that have the potential to transform societies and economies and improve the lives of citizens worldwide

Impact on Society and Beyond

In the last 15 years, KIOS' research has yielded innovative solutions that have the potential to transform societies and economies and improve the lives of citizens worldwide. These solutions can improve the integration of renewable energy sources in smart grids and buildings; can reduce energy consumption, water losses, and greenhouse gas emissions; can successfully manage traffic congestion within large scale urban areas; can help first responders to manage emergency operations efficiently and effectively; and can support health authorities in making data-driven evidence-based decisions for public health matters. These advancements are crucial for achieving a greener and more sustainable future.

In terms of economic impact, the Center has created employment opportunities to over 450 professionals in various areas of expertise and professional experience in research and innovation and contributed to the promotion of the knowledgebased economy in Cyprus through the design of new products and services.

Finally, KIOS CoE has played a key role in raising Cyprus' scientific profile and promoting it as a vibrant hub for research and innovation nationally and internationally.

Looking Ahead

As the KIOS CoE embarks on its next phase, it remains committed to its vision of being a global leader in research, innovation, and technological advancements that help societies and economies to be more resilient, greener, and safer. The Center's interdisciplinary approach and collaborative spirit will continue to drive groundbreaking research, forging new paths to tackle complex problems and shape a better future for generations to come.

42% 56%

KIOS CoE Publications 2023



Scientific Dissemination

Research Activities

Scientific dissemination is an important and integral part of the KIOS CoE, since it fosters the transfer of knowledge and results within the international scientific community.

In 2023, the KIOS Faculty and the wider KIOS research team have published 138 journal and conference papers and 3 other publications.

Peer-reviewed journal publications

Academic journals serve as one of the principal forums for researchers to disseminate their research work within the scientific community. The KIOS CoE researchers continue to target high-quality and high-impact journals, whose topics of interest cover the research activities of the Center.

In 2023, the KIOS research team has published 59 peer-reviewed papers in academic journals, with 83% published in the top 25% journals (Q1) in their respective subject area, according to Scopus CiteScore indicator.

Conference proceedings

Conference proceedings facilitate fast scientific dissemination, allowing researchers to present their research at conferences, workshops, and symposia, aiming at the fast and wide adoption of their research ideas by their peers in the scientific community. In 2023, the KIOS research team has published 79 peer-reviewed papers in scientific conference proceedings.

KIOS CoE Open Science Activities

zenodo



The KIOS CoE recognizes the significance of openly disseminating scientific results and for this reason it has launched the KIOS Open Knowledge Initiative in 2017, consisting of the following tools:

- 1) the KIOS Open Knowledge Portal¹, an online repository hosted on Zenodo that stores and manages all research papers, open research data, and open-source code produced at the KIOS CoE. The majority of the Center's journal and conference publications are available to the scientific community following the "green" open access model through this Portal.
- 2) the Dataset and Software Repository on GitHub² for making the software code and associated datasets available to the research community.
- 3) the Reproducible Research Platform on Code Ocean³ for encouraging reproducible research, i.e., code/data accompanying scientific publications.

Another KIOS Open Science initiative was the launch of the "Open Science Annual Award", as a way to celebrate Open Science, to recognize and reward researchers for employing Open Access tools, and to further promote the adoption of Open Science practices within the Center. For the year 2023, the award was given to the KIOS Research Lecturer, Dr. Christos Kyrkou.

- 2. https://github.com/KIOS-Research
- 3. https://codeocean.com/explore/capsules?query=kios

^{1.} https://zenodo.org/communities/kios-coe/

In 2023, the Center was also awarded the YERUN (Young European Research Universities Network) Open Science Award and the Full Open Science Label (FOS) by the YUFE (Young Universities for the Future of Europe) Alliance, for following the best practices in Open Science since 2017.

New Research Collaborations

To strengthen international research collaborations, the KIOS CoE signed collaboration agreements with Nanjing University of Aeronautics and Astronautics in China (October 2023) and the Centre for Research and Technology Hellas in Greece (June 2023). These collaborations give the opportunity for collaborative research activities, organization of conferences, seminars, or lectures in areas of common interest as well as staff mobility and training.

Scientific Conference Organization

During 2023, the Center successfully organized the 31st Mediterranean Conference on Control and Automation (MED2023), in Limassol. The conference attracted 207 participants, including academics, researchers, and industrial players from the Mediterranean Region, working in control and automation.

The organization of scientific conferences helps to increase the reputation of both KIOS CoE as a center that promotes excellence in research, and Cyprus as a country that is an ideal destination for hosting high-quality scientific events.

KIOS CoE Participation in EU Level Networks

In 2023, the KIOS research team participated in several EU level networks, platforms, and strategic partnerships, aiming to increase the visibility of the Center and to exploit future collaborations. This enables the KIOS CoE team to reach potential partners and increase access to proposal consortiums.

A sample of networks in which KIOS researchers participated:

- \cdot UNIMED Subnetwork on Safety and Security of Critical Infrastructures
- ERTICO
- TN-ITS Map Update Exchange
- Crowdhelix Network
- The European Water Platform WssTP (WATER EUROPE)
- Union Civil Protection Knowledge Network
- Disaster Risk Management Knowledge Network
- AI Connect Network
- Connecting Education and Research Communities for an Innovative Resource Aware Society (CERCIRAS) COST ACTION



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Research News

Machine Learning for Emergency Management: A Survey and Future Outlook

Emergency situations, encompassing both natural and human-made disasters and their cascading effects, pose significant threats to society. Machine learning (ML) algorithms prove highly effective in handling the vast volumes of spatiotemporal data generated during such events. This survey article explores pertinent work in the field, initially focusing on commonalities in emergency management applications and key challenges faced by ML algorithms. A categorization of works across all phases and operations is then presented, highlighting the predominant algorithms.

C. Kyrkou, P. Kolios, T. Theocharides, and M. Polycarpou, "Machine Learning for Emergency Management: A Survey and Future Outlook," *Proceedings of the IEEE*, vol. 111, no. 1, pp. 19-41, Jan. 2023.

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Bayesian Traffic State Estimation Using Extended Floating Car Data

Traffic state estimation is a challenging task due to the collection of sparse and noisy measurements from specific points of the traffic network. In this work we propose a Bayesian Traffic State Estimation (BTSE) methodology for estimating the traffic density based on extended floating car data. We present results for the estimation performance of the methods showing that the Bayesian methodology consistently results in lower mean absolute percentage error than the compared literature method.

V. Kyriacou, Y. Englezou, C.G. Panayiotou, and S. Timotheou, "Bayesian Traffic State Estimation Using Extended Floating Car Data", *IEEE Transactions on Intelligent Transportation Systems*, Vol. 24, no. 2, pp. 1518 – 1532, Feb. 2023





Integrated Guidance and Gimbal Control for Coverage Planning with Visibility Constraints

Coverage path planning with unmanned aerial vehicles (UAVs) is a core task for many services and applications including search and rescue, precision agriculture, infrastructure inspection and surveillance. This work proposes an integrated guidance and gimbal control coverage path planning (CPP) approach, in which the mobility and gimbal inputs of an autonomous UAV agent are jointly controlled and optimized to achieve full coverage of a given object of interest, according to a specified set of optimality criteria.

S. Papaioannou, P. Kolios, T. Theocharides, C.G. Panayiotou, and M.M. Polycarpou, "Integrated Guidance and Gimbal Control for Coverage Planning with Visibility Constraints", *IEEE Transactions on Aerospace and Electronic Systems*, vol. 59, no. 2, pp. 1276-1291, Apr. 2023.

Survey on Machine Learning for Traffic-Driven Service Provisioning in Optical Networks

This survey provides a comprehensive review of the state of the art on machine learning (ML)-based techniques at the optical layer for traffic-driven service provisioning. The evolution of service provisioning in optical networks is initially presented, followed by an overview of the ML techniques utilized for traffic-driven service provisioning. ML-aided service provisioning approaches are presented in detail, including predictive and prescriptive service provisioning frameworks in proactive and adaptive networks.

T. Panayiotou, M. Michalopoulou, and G. Ellinas, "Survey on Machine Learning for Traffic-

Driven Service Provisioning in Optical Networks", *IEEE Commun. Surveys & Tutorials*, vol. 25, no. 2, pp. 1412-1443, 2023.

Model-Based Fault Diagnosis Scheme for Current and Voltage Sensors in Grid Side Converters

This article proposes a model-based fault diagnosis scheme for sensors located in the dc and ac sides of the grid-tied converter, taking into account the effects of fault propagation due to the physical interconnection between the ac and the dc sides. The performance of the proposed fault diagnosis scheme is validated through both simulation and experimental results, demonstrating its effectiveness in timely detecting and isolating sensor faults.

F. Mehmood. P.M. Papadopoulos, L. Hadjidemetriou, A. Charalambous, and M.M. Polycarpou, "Model-Based Fault Diagnosis Scheme for Current and Voltage Sensors in Grid Side Converters", *IEEE Transactions on Power Electronics*, vol. 38, no. 4, pp. 5360-5375, Apr. 2023.

Optimizing Vehicle Re-Ordering Events in Coordinated Autonomous Intersection Crossings Under CAVs' Location Uncertainty

This work proposes a novel framework where, accounting for CAVs' location uncertainty, an intersection manager (IM) controls CAVs approaching a road crossing so as to maximize the number of admitted vehicles, while ensuring a guaranteed (tunable) level of safety. The proposed framework is able to improve both the number of admitted CAVs to the intersection and the CAVs' average speeds as compared to relevant state-of-the-art solutions.

C. Vitale, P. Kolios, and G. Ellinas, "Optimizing Vehicle Re-Ordering Events in Coordinated Autonomous Intersection Crossings Under CAVs' Location Uncertainty", *IEEE Transactions on Intelligent Vehicles*, vol. 8, no. 5, pp. 3473-3488, May 2023.

Privacy of Distributed Optimality Schemes in Power Networks

The increasing participation of local generation and controllable demand units within the power network motivates the use of distributed schemes for their control. Simultaneously, it raises two issues; achieving an optimal power allocation among these units, and securing the privacy of the generation/demand profiles. This study considers the problem of designing distributed optimality schemes that preserve the privacy of the generation and controllable demand units within the secondary frequency control timeframe.

A. Kasis, K. Khan, M.M. Polycarpou, S. Timotheou, "Privacy of Distributed Optimality Schemes in Power Networks", *IEEE Transactions on Smart Grid*, vol. 14, no. 5, pp. 4021-4034, Sept. 2023.

Convexification approaches for regional route guidance and demand management with generalized MFDs

In this work, we integrate demand management with route guidance within a Model Predictive Control framework using regional traffic dynamics with generalized Macroscopic Fundamental Diagram (MFD) shapes. The proposed approaches offer a trade-off between execution speed and solution quality, as the linear approximation approach runs faster while the successive convexification approach yields better quality and accuracy solutions.

C. Menelaou, S. Timotheou, P. Kolios, and C.G. Panayiotou, "Convexification approaches for regional route guidance and demand management with generalized MFDs", *Transportation Research Part C: Emerging Technologies*, vol. 154, Sept. 2023.

IEEE TRANSACTIONS ON
POWER
ELECTRONICS

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IEEE TRANSACTIONS ON INTELLIGENT VEHICLES





ACTIVITY REPORT 2023





Distributed Estimation and Control for Jamming an Aerial Target with Multiple Agents

This work proposes a distributed estimation and control approach in which a team of aerial agents equipped with radio jamming devices collaborate to intercept and concurrently track-and-jam a malicious target, while at the same time minimizing the induced jamming interference amongst the team.

S. Papaioannou, P. Kolios, and G. Ellinas, "Distributed Estimation and Control for Jamming an Aerial Target with Multiple Agents", *IEEE Transactions on Mobile Computing*, vol. 22, no. 12, pp. 7203-7217, Dec. 2023.

INDUSTRIAL ELECTRONICS

A Sensorless Asymmetric and Harmonic Load Compensation Method by Photovoltaic Inverters Based on Event-Triggered Impedance Estimation

This work proposes a controller for grid-tied photovoltaic (PV) inverters, enhanced with advanced functionalities, to compensate current asymmetries and harmonics in low-voltage distribution grids. The effectiveness of the proposed method is experimentally validated in a laboratory-scale low voltage distribution grid with prototype inverters, in which PV inverters estimate and compensate current imbalance and harmonics of nearby loads.

A. Charalambous, L. Hadjidemetriou, M. Polycarpou, "A sensorless asymmetric and harmonic load compensation method by photovoltaic inverters based on event-triggered impedance estimation," *IEEE Tran. Industrial Electronics*, vol. 70, no. 10, pp. 10089-10100, Oct. 2023.



Distributed Search Planning in 3-D Environments with a Dynamically Varying Number of Agents

In this work, a novel distributed search-planning framework is proposed, where a dynamically varying team of autonomous agents cooperate in order to search multiple objects of interest in three-dimension (3-D). The proposed distributed search-planning framework takes into account the agent dynamical and sensing model, and the dynamically varying number of agents, and utilizes model predictive control (MPC) to generate cooperative search trajectories over a finite rolling planning horizon.

S. Papaioannou, P. Kolios, T. Theocharides, C.G. Panayiotou and M.M. Polycarpou. "Distributed Search Planning in 3-D Environments with a Dynamically Varying Number of Agents." *IEEE Transactions on Systems, Man, and Cybernetics: Systems*, vol. 53, pp. 4117-4130, 2023.



Designing Diversified Renewable Energy Systems to Balance Multisector Performance

Renewable energy system development and improved operation can mitigate climate change. In many regions, hydropower is called to counterbalance the temporal variability of intermittent renewables like solar and wind. We develop and apply an artificial intelligence-assisted multisector design framework in Ghana, which shows how hydropower's flexibility alone could enable expanding intermittent renewables by 38% but would increase sub-daily Volta River flow variability by up to 22 times compared to historical baseload hydropower operations.

J.M. Gonzalez, J.E. Tomlinson, et al. "Designing diversified renewable energy systems to balance multisector performance", *Nat. Sustain.* vol. 6, pp. 415–427, 2023.

KIOS CoE Personnel

The human capital is the most important asset of an organization. Thus, the KIOS CoE places particular emphasis on recruiting high-caliber researchers who will contribute significantly to the development of the Center.

The KIOS CoE places also particular emphasis on promoting diversity, equal opportunities, and gender balance at all levels of its research and innovation teams.

Towards this end, the Center aims to increase gender balance among its research personnel by offering all researchers an attractive working environment. In addition, the KIOS CoE has developed recruitment initiatives to attract highly- qualified personnel from Europe and the Middle East - North Africa (MENA) region.

At the end of 2023, 181 researchers were employed by the KIOS CoE including fulltime and part-time employees. This number includes Faculty, Affiliated Faculty, Research Faculty, Postdoctoral Researchers, PhD Students, Research and Software Engineers, Interns, and Administrative Personnel. At the KIOS CoE spoke at Imperial College London 13 Researchers were employed. Finally, the KIOS Alumni network comprises 248 people.

181 RESEARCHERS EMPLOYED by KIOS CoE at the end of 2023

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Personnel Growth Per Year

Gender

70%

Male Female

30%



















Awards

2023 IEEE Frank Rosenblatt Technical Field Award

The KIOS CoE Director, Prof. Marios Polycarpou, received the prestigious 2023 IEEE Frank Rosenblatt Technical Field Award for his pioneering contributions to the theory and application of neural networks and learning systems in monitoring and control. His work on neural networks-based adaptive control methods has transformed the field and opened new ways for designing neural control schemes with learning capabilities for uncertain dynamical systems. Prof. Polycarpou is the first researcher from Cyprus, who receives this outstanding distinction.

ERC Consolidator Grant for the research project "URANUS"

The KIOS CoE Assistant Professor Stelios Timotheou, was awarded an ERC Consolidator Grant for the research project "URANUS" (Real-Time Urban Mobility Management via Intelligent UAV-based Sensing). "URANUS" proposes real-time, dynamic, and intelligent sensing of vehicular and pedestrian traffic via Unmanned Aerial Vehicles and the use of the collected information for urban mobility management.

ETEK Engineering Award

Dr. Lysandros Tziovani, Research Associate at the KIOS CoE, has received the Engineering Award 2023 by the Cyprus Scientific and Technical Chamber for developing an innovative software tool "Optimal Unit Commitment and Economic Dispatch", for the Power System of Cyprus. This tool is widely used by the Cyprus Transmission System Operator and the Cyprus Energy Regulatory Authority to increase the penetration of Renewable Energy Sources and reduce the operational cost of the power system of Cyprus.

First Prize at the International Cooperative Aerial Robots Inspection Challenge

The KIOS research team has won the First Prize in the competition "Cooperative Aerial Robots Inspection Challenge", that took place during the 62nd IEEE Conference on Decision and Control, in Singapore. The team, consisting of Angelos Zacharia, Research Engineer I, Andreas Anastasiou, PhD Candidate, Dr. Savvas Papaioannou, Research Associate, Research Assist. Prof. Panayiotis Kolios, as well as Professors Christos Panayiotou and Marios Polycarpou, proposed an innovative cooperative strategy that effectively coordinates the operation of multiple robots to address the infrastructure inspection problem.

Best Paper Runner-Up Award

The KIOS research team, consisting of Maria Karatzia, Research Engineer I, Panayiotis Kolios, Research Assistant Professor and Prof. Georgios Ellinas, received the Best Paper Runner-Up Award for their paper entitled "Implementing Mission-Critical UAV Swarm Coordination through the integration of LoRa and ROS Frameworks", that was presented at the 8th International Conference on ICT for Disaster Management, in Italy. Their work proposes a wireless communication system using an integrated LoRa-ROS (long range communication - robot operating system) implementation of the two popular protocols for communication and coordination, respectively.

Competitive R&I Funded Projects

Over the last 15 years, the Center participated in more than 140 collaborative research and innovation projects funded mostly by various competitive EU programmes, such as Horizon Europe, Horizon H2020, DG ECHO, DG HOME, etc., securing funding of more than 60 million euros. These projects included 3 ERC Grants (Synergy, Advanced, and Consolidator), and 2 ERC Proof-of-Concept Grants which are the most competitive and prestigious European research programmes. Overall, these projects involve multidisciplinary international consortia, addressing important global challenges for critical infrastructure systems such as power and energy systems, water and transportation networks, telecommunication networks, healthcare systems as well as emergency management and response systems.



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Funding sources for Research and Innovation projects for 2023 —



	ACRONYM	FULL TITLE	FUNDING SOURCE	KIOS ROLE
1	KIOS CoE*	The KIOS CoE project focuses on the significant development of KIOS into a world-class research and innovation Center of Excellence. The project which is part of the EU's strategic program "Spreading Excellence and Widening Participation', is being implement in collaboration with Imperial College London.	EU - H2020 TEAMING*	Coordinator
2	Water-Futures	Development of a new theoretical framework for the allocation and development decisions on drinking water infrastructure systems, so that they are socially equitable, economically efficient and environmentally resilient.	EU - H2020 - ERC Synergy Grant	Coordinator
3	URANUS	Proposing real-time, dynamic, and intelligent sensing of vehicular and pedestrian traffic via Unmanned Aerial Vehicles (UAVs), and the use of the collected information for urban mobility management.	EU - H2020 - ERC Consolidator Grant	Coordinator
4	COCOON	Delivering a practical cyberphysical systems solution for converged Electrical Power and Energy Systems by bridging secure networked systems research and innovation with power systems engineering.	Horizon Europe	Coordinator
5	Inverge	Establishment of a new research framework for a novel inverter-centric approach to enable the sustainable evolution of power systems and enhance the efficiency, power quality, and utilization of future power grid.	Cyprus RIF ¹ - Culture Award	Coordinator
6	ΘΗΣΕΑΣ	Development of an electronic situational awareness and decision support system to improve the Cyprus National Guard's operational capabilities.	Cyprus Ministry of Defence	Coordinator
7	PathoCERT	Development of technologies for detecting and managing pathogen contamination events during emergency response situations.	EU - H2020	Coordinator
8	GLIMPSE	Development of novel AI-based algorithms and cooperative control techniques to address fundamental challenges in the use of a fleet of drones in search and rescue missions.	Cyprus RIF	Coordinator
9	GLADIATOR	Next-generation theranostics of brain pathologies with autonomous externally controllable nanonetworks: a trans-disciplinary approach with bio - nanodevice interfaces.	EU - H2020 FET OPEN	Coordinator
10	GLADIATOR Complementary	Complementary infrastructure to support the development of a working prototype of a complete, autonomous and clinically applicable, nanonetwork-based, Molecular Communications platform.	Cyprus RIF	Coordinator
11	Screening for Barrett's Esophagus Progressors with Multimodality Tethered Capsule Image-Guided Biopsy	Usage of advanced machine learning methods and a novel tethered capsule with Optical Coherence Tomography to detect suspicious esophagus areas.	National Institutes of Health, USA	Partner

* Complementary funding for the KIOS CoE is provided by the Government of the Republic of Cyprus through the Deputy Ministry of Research, Innovation, and Digital Policy, by the University of Cyprus and Imperial College London.

(1) Cyprus RIF - Cyprus Research & Innovation Foundation

12	ReCHARGED	Development of a practical visualisation platform for optimisation and streamlining of climate resilience and whole-life carbon emission assessments for interdependent Transport, Energy, Systems, Lifelines, and Assets.	Horizon Europe - MSCA	Partner
13	R2D2	Improvement of the resilience and reliability of current Electrical Power and Energy Systems in Europe, against a growing number of threats and vulnerabilities.	Horizon Europe	Partner
14	LEMUR	Doctoral Network (DN) program, which offers innovative training and research to shape key Artificial Intelligent (AI) technologies of the present and the future with strong technological, scientific, economical, and societal impact.	MSCA Network	Partner
15	SIEQUA-CERT	Development of a web-based actionable decision support system, that combines real-time monitoring of Indoor Environment Quality and a quantifiable impact metric on occupants' health.	Cyprus RIF-Codevelop	Partner
16	Collaris	Development of a sustainable European network of scientific, engineering, and end-user expertise related to unmanned aerial systems (UAS) in civil protection and disaster response.	EU Civil Protection Knowledge Network Partnership	Partner
17	IntoDBP	Development, testing, and validating of innovative tools and strategies to improve water quality management for safe human use and a healthy environment.	EU-H2020	Partner
18	EU-WISH**	Support activities to strengthen and improve national capacities for wastewater public health surveillance by enhancing knowledge exchange and sharing best practices based on scientific evidence.	Horizon Europe	Affiliate Partner
19	ACTING	Development of a network of advanced interconnected domain oriented cyber ranges for training and exercises.	European Defence Fund	Partner
20	HVDC-WISE	Design and validate grid architecture concepts to foster the development of large High Voltage Direct Current (HVDC)-based transmission grid infrastructures.	Horizon Europe	Partner
21	TRANSIT	Provide training, skilling and education for current and future generations to enable the energy transition.	Horizon Europe	Partner
22	ARIDLL	Development of a cooperation partnership and a professional community of practitioners in Augmented Reality (AR) instructional design to promote language learning.	EU-ERASMUS+	Partner
23	DIMPE	Fostering internationalization by offering quality practices and introducing a digitalization framework in Higher Education Institutions that offer or are planning to introduce multilingual programs.	EU-ERASMUS+	Partner
24	SESAME	Development of a new generation of Multi-Robot Systems (MRS), utilizing AI/ML among other approaches, to design dependable and secure multi-robot systems for key European sectors including Healthcare, Manufacturing, Agri-food, and Infrastructure Inspection.	EU-H2020	Partner

** In the EU-WISH project, the Cyprus Ministry of Health is participating as a partner and University of Cyprus as an affiliated partner.

25	EnerMan	Create an energy sustainability management framework collecting data from the factory and holistically process them to create dedicated energy sustainability metrics.	EU-H2020	Partner
26	ELECTRON	Development of a new-generation platform for Electrical Power and Energy Systems, capable of empowering the resilience of energy systems against cyber, privacy, and data attacks.	EU - H2020	Partner
27	DigiWATER	Development of an intelligent "Digital Water Twin" software to monitor the quality of water in distribution networks.	CYRPUS RIF - ENTERPRISES	Partner
28	Smart5Grid	Development of 5G solutions for building innovative and high performance smart grids able to feature online monitoring data and enable efficient, fast, and secure operation.	EU - H2020	Partner
29	OneNet	Development of new generation of grid services able to fully exploit demand response, storage and distributed generation.	EU-H2020	Partner
30	WiseStorage	Development of an innovative web-based solution to optimize the operation of Battery Energy Storage Systems (BESS) installed in buildings and maximize the prosumers' profit.	NextGenerationEU - Pre-Seed	Partner
31	KIOS CoE - HUAWEI	Development of an information fusion radio location algorithm with Tango-aided floor plan and signal mapping.	HUAWEI Technologies Ltd	Partner
32	REVERSE Mentoring	Guidance and training of adult educators in the implementation of quality education and training for the upskilling and reskilling of adult learners to overcome skills mismatches within the EU labor market.	EU-ERASMUS	Partner
33	Pvgnosis	Development and demonstration of technical novel solutions to advance the operation, maintenance, and lifetime of photovoltaic plants.	Cyprus RIF and EU -SOLAR ERANET ²	Partner
34	DIMPAH	Aggregate, connect, and make widely available, novel open education resources on selected digital methods.	EU - ERASMUS	Partner
35	CybPhys	Upgrade bachelor/master-level curricula and study programs in Belarusian and Ukrainian universities in the area of cyber-physical systems modelling and simulation.	EU - ERASMUS+	Partner
36	RONDA	Help transport stakeholders better assess the condition of the roadway network and its vulnerabilities, mitigate associated risks, and manage transport networks.	Cyprus RIF	Partner

(2) Horizon 2020/FP 7 SOLARERA.NET Cofund and the Cyprus Research and Innovation Foundation

A Sampling of Projects' Outcomes

SESAME: Innovative Technologies Tested for Enhanced Search and Rescue Operations

Within the context of the EU Horizon2020 SESAME (Secure and Safe Multi-Robot Systems) project, cutting-edge technologies were developed to address several challenges posed by Multi-Robot Systems, such as uncertainty, variability and the interplay between safety and security. These technologies were tested and evaluated during a large-scale earthquake simulation exercise in Cyprus, which was organized by Cyprus Civil Defence and the KIOS CoE. Technologies included software tools for: 1) detecting hardware issues that can affect the safety and reliability of the system, 2) identifying and preventing cyber-attacks that can have an impact on the drone's functionality, 3) assessing mission reliability during multi-drone operations, 4) enabling direct communication between drones and collaborative localization of the swarm to ensure safe landings in case of cyber-attacks.



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PVgnosis: Intelligent technologies for the diagnosis, maintenance, and operation of photovoltaic plants

PVgnosis project partners developed an Information and Communication Technology platform enhanced with intelligent tools for delivering advanced diagnosis, predictive maintenance, and intelligent visual inspection on installed Photovoltaic (PV) Plants. In this context, computer vision-based methods were developed to detect abnormalities in PV panels using images from unmanned aerial vehicles. In addition, a next-generation prototype inverter was developed based on sophisticated control and management schemes for enhancing the PV grid integration capabilities, advancing the inverter's reliability, and provisioning support services to modern power grids.



COLLARIS: Activities to develop a collaborative network on Unmanned Aerial Systems

COLLARIS project partners worked on enhancing unmanned aerial vehicles (UAV) operational procedures, navigating air traffic management challenges, and advancing data analysis, sharing, and end-user competencies. Partners successfully hosted two thematic workshops and conducted two trials, gathering disaster management experts to deeply explore current UAV usage and identify future enhancements to bridge the gap between the rapid UAV technological progress and its practical application. Additionally, COLLARIS team has laid the groundwork to provide a platform for information exchange, experimentation, and training, involving civil protection authorities, first responders, and researchers as part of the Union Civil Protection Knowledge Network.



37 ACTIVE PROJECTS with the INDUSTRY in 2023

KIOS Innovation Hub: Collaboration with Industry

The KIOS Innovation Hub was created in 2017 with the aim to enable the technology transfer of the core research competencies of KIOS CoE in the area of ICT to organizations involved in the monitoring, control, security and management of critical infrastructure systems (CIS).

Its vision is to promote collaboration between academia, industry, operators of critical infrastructure systems, regulators, as well as governmental organizations with the ultimate goal to create an ecosystem that spans the entire innovation cycle from conception of an idea to its commercialization.

From 2017 to 2023 the Center was involved in more than 71 projects funded by industry, securing funding of more than 5.5 million euros. Through these projects the Center has developed smart solutions to support Cyprus' green and digital transition.

Innovation Hub Partners





Industrial Collaboration Outcomes

Intelligent Technologies for Facilitating the Green and Digital Transition of Buildings in Cyprus

The KIOS research team, in collaboration with the Cyprus Chamber of Commerce and Industry (CCCI) and the Cyprus Energy Agency (CEA), have developed intelligent technologies to facilitate the green and digital transition of buildings in Cyprus. These include a holistic evaluation tool that can be used to assess the overall green and digital readiness level of buildings and an Internet of Things (IoT) platform, allowing all the new technologies installed in the buildings to be digitally integrated while enabling advanced features for the occupants to monitor and control buildings' energy and air-quality. These actions have contributed toward the green and digital transformation of the building sector reducing the carbon dioxide footprint of this sector.

School Network Planning Platform

The Ministry of Education, Sport, and Youth (MESY), in its endeavor to digitally transform internal procedures, is closely collaborating with KIOS for the development and implementation of an integrated platform with the acronym 'SNP' (School Network Planning). SNP comprises a GIS-based platform where MESY officers can conveniently visualize, through an interactive map, the locations and related school information for the current academic year. This information includes student flows from their home addresses to their schools and the current educational district coverage around each school. Additionally, the platform provides MESY officers with the ability to automate the procedure for determining the educational districts each year using mathematical optimization. The platform also assists MESY officers to predict the demand for new schools over a 5-year horizon based on historical data. This forward-looking approach ensures effective planning and resource allocation within the educational system.

Zenon Decision Support Platform

In collaboration with the Larnaca Sewerage and Drainage Board (LSDB), the KIOS research team completed the first phase of the "Zenon" Decision Support Platform as part of the research collaboration between the two organizations. The purpose of this platform is to enhance the decision-making process of the LSDB to address their main challenges such as the risk of overflowing under extreme rainfall events, seawater infiltration, efficient operation of the pumping stations and increased wastewater flow due to illegal deposition. The first phase included the development of the network's hydraulic models, the user interface and the integration of specific modules that assist the operators to evaluate the system's performance under various scenarios.







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Influenza Sentinel Surveillance System

In 2023, the KIOS team in collaboration with the Cyprus Ministry of Health have completed the Influenza Sentinel Surveillance System, marking a pivotal step towards enabling decision support through digitization of epidemiological information across the country. During the year, Sentinel Doctors have been adding data, enabling the Ministry of Health to access and assess real-time information. The next step of this collaboration is the digitization of national notifiable diseases surveillance and the development of additional modelling and analytics tools.



Spectacle Platform

The KIOS research team has developed for the Cyprus Telecommunications Authority (CYTA) an automated solution through intelligent algorithms and mathematical modelling to provide efficient scheduling and planning of several projects, which can lead to significant gains in terms of operational expenditures and revenue stream of the organization. Using the developed tool, a number of "what if" scenarios can be also executed, that can provide valuable information to the organization's management team in terms of hiring needs, skill requirements, personnel training, recruitment strategies, etc.

Launch of the European Digital Innovation Hub in Cyprus: The start of a new digital era!

The KIOS CoE participated in the launch event of the European Digital Innovation Hub in Cyprus (DiGiNN), which took place on 26th of October 2023, at the Cyprus Institute premises in Nicosia. The event included greetings followed by an open discussion entitled "Cyprus in the Digital Age: Opportunities and Challenges".

DiGiNN is a strategic partnership of leading Cypriot organizations in the fields of high technology, research and entrepreneurship, digital technology champions, as well as national industrial representation bodies. Its goal is to accelerate the digital transformation of small and medium-sized enterprises and the public sector, as well as to promote digital literacy in Cyprus.

The KIOS CoE is leading the activities focused on "Test before Invest" which include, inter alia, access to the labs and experimental research facilities for testing existing or newly developed technologies, awareness raising, digital maturity assessment, demonstration activities, integration, adaptation and customization of various technologies, knowledge, and technology transfer. These activities will enable users to test and evaluate a specific technology and reach an informed decision regarding whether to invest in its adoption.



KIOS CoE Deputy Director, Prof. Panayiotou participated in the open discussion, together with Cyprus Chief Scientist Mr. Demetris Skourides, Mayor of Nicosia and President of the Board of Directors of CYENS, Mr. Constantinos Yiorkadjis, Secretary General of Cyprus Chamber of Commerce and Industry, Mr. Marios Tsiakkis, and Director of Advisory Services of PwC Cyprus, Mr. Minos Georgakis.

KIOS CoE Research Infrastructures

The KIOS CoE, together with Imperial College London, develop physical and virtual research infrastructures for conducting rigorous and transparent testing on methodologies, tools, and new technologies related to the monitoring, control, management, and security of large scale and complex critical infrastructure systems (CIS). These environments allow researchers to examine the reliability, safety, security, and resilience of a wide range of cyber-physical systems and add value to their research and innovation activities. Furthermore, these infrastructures can be utilized by the Center's collaborators and partners to advance the technological readiness levels of new concepts and tools, as well as promote the efforts towards the co-creation of new products and services.

Power Systems

The Power Systems Research Infrastructure targets high penetration of renewable energy sources to reduce greenhouse gas emissions. It aims towards modeling, simulation, emulation, and experimental validation of energy systems, with capabilities in the development of smart technology for the efficient and reliable integration of renewable resources both at the building and grid level. A real-time simulator is used to develop digital twins of actual power systems (i.e., the entire Cyprus power system) and investigate the interaction with smart grid controllers and actual power devices in a hardware in the loop framework. Three different energy storage pilots and a wide deployment of synchrophasor measurement units in Cyprus power substations are integrated to facilitate the development of intelligent monitoring and control solutions for smart grids. Further capabilities include the development of real-time control algorithms for power electronic converters to advance the grid integration of renewable energy sources, as well as testing of cyber security solutions in active distribution grids and in digital substations.



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Smart Water Systems

The Water Security Research Infrastructure is a small-scale representation of an urban water transport system, and is composed of a network of tanks, pumps, valves, as well as hydraulic and quality sensors. A key feature is the ability to reconfigure the topol-ogy and to emulate realistic water demands through its controller. This infrastructure can be used as a benchmark to generate datasets that can be used by researchers to demonstrate results in the area of real-time monitoring, control, management, and cyber-physical security of water distribution networks. In addition, it is complemented with a virtual city water distribution system, corresponding to 10,000 consumers, to be able to demonstrate, in a realistic environment, the impact of these technologies, for instance, in reducing water losses, improving security, and reducing greenhouse gas emissions.



Intelligent Transportation Systems

The Transportation Research Infrastructure is a small-scale physical plant that tests and evaluates Connected Autonomous Vehicle (CAV) technologies under real-life traffic conditions. The CAVs will play a significant role in future transportation systems and will provide enormous societal and environmental benefits in terms of reducing traffic accidents and greenhouse emissions.

The Transportation Research Infrastructure comprises various sensors installed to collect real-time measurements that allows the development and evaluation of novel management and control schemes related to CAVs within a low-cost, controlled, and safe environment.



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Emergency Response, Sensors, and Robotics

The KIOS CoE develops state-of-the-art tools and methodologies for emergency response management, as well as monitoring and inspection of critical infrastructures through the utilization of Unmanned Aerial Vehicle (UAVs), sensors, and robotics technologies.

These technologies are used for the development of intelligent functionalities including automated path-planning, real-time image analysis, and object detection and coordination architectures for multi-drone systems that ensure scalable and robust operations. The key benefits of such systems include the enhancement of public safety, improvement of CIS efficiency, safety of operations and hazards avoidance, as well as reduction of person-hours and costs.



KIOS Virtual City

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, transportation, and health systems) and can be used to assess the cascading effects of natural or man-made disasters (e.g., flood-ing, power blackouts) which can seriously impact people's everyday lives, affecting their safety and well-being.

The Virtual City emulates the actual operation of critical infrastructure systems (CIS) 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 policy makers, CIS operators, and other stakeholders to assist them towards their decision making with respect to the management of a smart city environment. It is accessible through the KIOS Control Room with custom interfaces and it is also available as a research tool to be downloaded by researchers.



Education & Training Activities

Education and training activities are essential for building and maintaining scientific excellence at the Center. During 2023, the Center organized the 5th Graduate Training School on Intelligent Systems and Control, Distinguished Lecture Series, Workshops, and Seminars.

5th KIOS Graduate Training School

The KIOS CoE in collaboration with Imperial College London, organized the 5th KIOS Graduate Training School on "Intelligent Systems and Control", from August 29th to September 1st 2023, at the University of Cyprus Campus.

Three world-recognized experts in their fields, Prof. Cesare Alippi (Politecnico di Milano, Italy and Università della Svizzera italiana, Switzerland), Prof. Claudio De Persis (University of Groningen, Netherlands) and Prof. Xin Yao (Southern University of Science and Technology Shenzhen, China and University of Birmingham, UK), lectured at the school. Prof. Alippi talked about "Graph Neural Networks", Prof. De Persis about "Data-driven Control and Prof. Yao about "Evolutionary Learning and Optimization".

More than 100 participants (researchers, PhD/MSc students and young professionals) from Cyprus and abroad participated in the school and had the opportunity to enrich their knowledge in Neural Networks, Data-driven Control, Optimization, and related areas.

6 6 The school aims at providing intensive training to researchers, young professionals, and graduate students on topics related to intelligent systems and control

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Prof. Cesare Alippi

Prof. Claudio De Persis



Prof. Xin Yao

ACTIVITY REPORT 2023

DISTINGUISHED SCIENTISTS shared their knowledge and expertise with researchers

in 2023

KIOS CoE Distinguished Lecture Series

During 2023, the KIOS CoE hosted four internationally recognized scientists who gave talks on cutting-edge research and innovation advances in their respective fields.

• Dr. Dimitrios Tzovaras, Chairman of the Board of Directors of the Centre for Research and Technology Hellas gave a talk on "Deep Learning as a key enabling technology for Industry 4.0" (photo 1).

• Professor Fei-Yue Wang, Director of the State Key Laboratory for Management and Control of Complex Systems at the Institute of Automation of the Chinese Academy of Sciences, in China, talked about "Parallel Intelligence and Industry 5.0: The DAO and DeSci for RFID and Smart Sensing" (photo 3).

- Professor Bin Jiang, from Nanjing University of Aeronautics and Astronautics, in China, presented the topic "Adaptive fault diagnosis and Reconfiguration control with flight control applications" (photo 2).
- Professor Zoran Obradovic, from Temple University, in Philadelphia, United States, talked about "Events Detection, Classification, Prediction and Discovery of Precursor in Power Networks from Scarce and Imprecise Labels" (photo 4).



Personnel Learning, Training and Development

In 2023 the KIOS personnel had the opportunity to attend workshops, seminars, and talks covering a variety of topics such as Teamwork & Collaboration, Proposal Writing, IP Awareness, Communicating Effectively at Work, Writing Django apps, Introduction to Linux, FastAPI, JavaScript, etc.

Communication and Dissemination Activities

The KIOS CoE places special emphasis on communication and dissemination activities to make its research activities and results accessible to its stakeholders, partners, and the general public.

During 2023, the KIOS CoE has implemented numerous dissemination and communication activities such as high-profile visits, networking events with the industry, demonstrations/workshops/training sessions to engage stakeholders and endusers, outreach activities, online presence, and media publicity.

High Profile Visits

In 2023, the KIOS CoE gained significant national and international visibility through high-profile visits from national policy and decision makers, international experts, and enterprise and innovation experts.



Examples include: 1) The visit by a delegation from the Ministry of Climate Crisis and Civil Protection of Greece (photo 1), 2) the visit by a delegation from Athens Water Supply & Sewerage Company, 3) the visit by H.E. Ambassador and First Secretary of the Embassy of Japan in Cyprus and 4) visits by delegations from the Cyprus Ministry of Transport, Communications and Works, the Ministry of Energy, Commerce, and Industry, the Ministry of Interior as well as the Deputy Ministry of Research, Innovation and Digital Policy.

Networking Events with the Industry

During 2023, the Center organized press conferences, workshops, demonstrations, and training sessions to engage its industrial partners. Examples include the signing of a new collaboration agreement with the Public Works Department (photo 2), the workshop organized in collaboration with Larnaca's Municipality and Water Utilities, on how to use data-driven solutions to elevate water and wastewater management in the city of Larnaca, and the demonstration of technologies to experts from the Ministry of Defense and the National Guard of Cyprus, within the context of THESEAS research project.

In addition, the KIOS CoE organized a successful workshop on GIS technologies and digital maps, which attracted more than 90 people from several organizations of the public and private sector in Cyprus.



6 6 KIOS CoE gained significant national and international visibility through high-profile visits, events and outreach activities

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Outreach Activities

Great Exhibition Road Festival

Researchers from KIOS CoE at the University of Cyprus and Imperial College London participated for the first time in the Great Exhibition Road Festival, on 17-18 June 2023, in London, UK. Researchers presented a game based on the KIOS Virtual City, a specially designed virtual platform, which mimics the actual operation of power, water, telecommunications and transportation systems in a city.

Cyprus Forum

The KIOS Research Lecturer Andreas Kasis participated in a panel discussion at the Cyprus Forum 2023, which was held on 29 -30 September 2023, in Nicosia. The discussion was focused on the role of STEM (Science, Technology, Engineering and Mathematics), circular economy, and EU-funded initiatives in shaping a sustainable future at national and EU levels.

Researcher's Night

The KIOS CoE participated in the European Researcher's Night 2023, which took place on 29 September 2023, in Nicosia. Visitors to the KIOS booth had the opportunity, among others, to learn about renewable energy technologies, smart water systems and how Artificial Intelligence improves drones for emergency response.



2nd Leveraging Digital Economy Conference

The KIOS CoE Director, Prof. Polycarpou, participated in the 2nd Leveraging Digital Economy Conference, organized by Cyprus Chamber of Commerce and Industry on 29 March 2023, and gave a talk on the "use of AI for achieving resilient critical infrastructures and smarter cities". The Conference attracted management level executives, high-profile officials, and entrepreneurs from all sectors of the economy.

School visits



During 2023, young students visited KIOS premises and learned about the research and technology being undertaken at the Center. In addition, KIOS Researchers have given lectures to pupils at schools in various areas of Cyprus.

Online Presence

The KIOS CoE uses several online communication mediums to disseminate the Center's research results, news and events, achievements, etc. Examples include the KIOS CoE website, newsletter, as well as our social media pages (Facebook, Twitter, LinkedIn, Instagram, and YouTube).

Media Publicity

The research activity undertaken at the KIOS CoE has been widely published in the printed and electronic media. This includes a number of articles in newspapers and websites with large readership numbers.



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The KIOS Center of Excellence has received funding from the Government of the Republic of Cyprus through the Deputy Ministry of Research, Innovation and Digital Policy.

Complementary funding for the KIOS CoE is also provided by the University of Cyprus and Imperial College London.