



## Doctoral Vacancy Announcement form

**Research Topic:** *High Performance Computing through Hardware-Software Cooperation*

**Number of Positions:** 1

We invite applications for a PhD position in **High Performance Computing (HPC)** through **hardware–software cooperation**.

As modern High-Performance Computing (HPC) systems evolve toward exascale and beyond, they increasingly rely on heterogeneous architectures, large-scale parallelism, and tightly coupled accelerator-based platforms. In this context, achieving performance scalability under strict power and thermal constraints is a primary architectural and system-level challenge. This PhD project focuses on HPC-driven hardware–software co-design, emphasizing hardware design, processor and accelerator optimization, parallel execution models, runtime systems, and energy-aware workload orchestration. By aligning architectural mechanisms with compiler, runtime, and application-level intelligence, the project aims to deliver scalable, energy-efficient HPC solutions tailored to emerging scientific, data-intensive, and AI-driven workloads.

The successful candidate will conduct research using **state-of-the-art experimental hardware platforms (e.g., the TT-QuietBox Wormhole, NVIDIA GPUs)** and explore innovative architectural and system-level techniques.

The work will involve developing novel mechanisms for:

- Hardware/Software co-design for energy efficiency
- Processor and microarchitectural optimizations
- Heterogeneous computing systems
- Domain-Specific Accelerators (DSAs)
- Parallel programming models and execution frameworks
- AI-driven optimization for energy-efficient execution
- Scalable HPC system design and performance analysis



The project aims to advance next-generation computing systems by enabling intelligent workload adaptation, efficient resource orchestration, and architectural innovations that jointly optimize throughput, latency, and energy consumption.

### **Candidate Profile**

Applicants must hold a **BSc in Computer Science, Computer Engineering, or a related field**. An MSc degree is desirable but not mandatory. The ideal candidate should demonstrate:

- Strong programming skills (C/C++, Python)
- Interest in systems research and low-level performance engineering
- Familiarity with computer architecture, parallel computing, or operating systems
- Motivation to work on experimental hardware platforms
- Prior research experience in relevant domains (considered an advantage)

### **Funding**

Funding opportunities are available through participation in ongoing research programs and/or through teaching assistantships for qualified candidates.

### **Supervision**

Andreas Diavastos

Lecturer

Cyprus University of Technology

Website: <https://carl.cut.ac.cy/>

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## Doctoral Vacancy Announcement form

<b>Research Topic Title:</b>		Resource-Aware Scheduling for Parallel ML Training and Inferencing Across the Compute Continuum
<b>No. of Openings:</b>	1	
<b>Description:</b>	<p>Recent technological advancements have enabled the interconnection of heterogeneous IoT devices, edge devices, and the cloud in a common network. This enables the deployment and execution of machine learning training and inference applications across distributed computing resources, reducing the need for cloud centralization but introducing various scheduling and management challenges. The goal is to develop a novel multi-objective optimization engine that dynamically places and scales AI training and inference tasks across the continuum, accounting for low-level metrics such as latency, energy, bandwidth, and data privacy. For more information and discussion on the topic and research, potential candidates can contact Dr. Herodotos Herodotou at <a href="mailto:herodotos.herodotou@cut.ac.cy">herodotos.herodotou@cut.ac.cy</a>. General information on Dr. Herodotou's research lab can be found at <a href="https://diel.cut.ac.cy/">https://diel.cut.ac.cy/</a></p>	
<b>Funding:</b>	There is a possibility of funding through involvement in a Research Program for qualified applicants or as teaching assistants.	
<b>Required Qualifications:</b>	Undergraduate (BSc) and postgraduate (MSc) degrees in Computer Science or a related field. The ideal candidate should enjoy working on cutting-edge research problems in systems and have strong software development skills. Prior research experience or specialization in related topics will be considered an advantage.	
<b>Research Advisor:</b>		
<b>Name/Surname:</b>	Herodotos Herodotou	
<b>Position:</b>	Associate Professor	
<b>Email:</b>	<a href="mailto:herodotos.herodotou@cut.ac.cy">herodotos.herodotou@cut.ac.cy</a>	



## Doctoral Vacancy Announcement

### Research Topic Title:

Intelligent Networks, Control over Networks, Intelligent Transportation Systems, Autonomous Vehicles, Connected and Automated Mobility, 6G Empowered Robotics, Marine Transport Electrification, Feedback based Molecular Communications.

### No. of Openings: 1

### Description:

We are seeking highly motivated and talented PhD candidates to join our research team at the Department of Electrical Engineering, and Computer Science and Engineering, Cyprus University of Technology. The successful candidates will engage in cutting-edge research within the field of “**Intelligent Networks: Control over Communication Networks**” with a focus on one the following areas:

- **Cooperative Control and Perception for Connected and Automated Mobility (CCAM)** in the presence of Reconfigurable Intelligent Surfaces (RIS). The project will investigate the design of novel **Adaptive Controllers** for connected and automated mobility when this is supported by the Collective Perception Service. Controller Design will involve leveraging classical control theory combined with **Advanced Artificial Intelligence Techniques** to account for the delays and inaccuracies emanating from the underlying vehicular network. Evaluation will be conducted using Matlab, the VEINS/PLEXE simulations platform as well as prototyping on an actual testbed. Extensions of the project results for **6G empowered Robotics** will be investigated.
- **Advanced Network Design** for Next Generation Communication Systems and **6G Empowered Robotics**.
- **Energy Management and Control in Marine Transport Electrification**. The project will leverage a blockchain based energy trading platform under development to support On-Shore Ship Electrification. The port of Limassol will be used as the test case
- **Feedback in Molecular Communications**. The project will support our ongoing research activities on Molecular Communication leveraging a testbed, currently in development in collaboration with renowned Biologists at the University of Cyprus. Emerging applications such as Smart Pills, Targeted Drug Delivery and the Internet of Bio Things will be considered.

The selected candidates will have the opportunity to collaborate, within funded research projects, with esteemed researchers at the International level and upon availability it may involve mobility to Partner Institutions in Europe.



### **Required Qualifications:**

- A Bachelor's or Master's degree from a recognized university in Electrical Engineering or Computer Engineering or Computer Science.
- Strong background on Control/Communications Systems.
- Programming experience in high-level programming languages.
- Excellent communication skills in English (written and spoken).
- Self-motivation, teamwork skills, and a commitment to high-quality research.
- Familiarity with Intelligent Transportation Systems/Molecular Communications/Power Systems will be an advantage.

### **Funding:**

Financial support opportunities, particularly for exceptional candidates, exist through contributions to the deliverables of a number of currently funded projects from the Research and Innovation Foundation (RIF) as well as deliverables of the advisor's starting grant, and involvement in teaching activities. Indicative financial support at the time of writing this announcement is 18,000€ per annum for approximately three years.

### **Research Advisor:**

Name/Surname: Dr Marios Lestas  
Position: Assistant Professor  
Email: [marios.lestas@cut.ac.cy](mailto:marios.lestas@cut.ac.cy)

## Doctoral Vacancy Announcement form

<b>Research Topic Title:</b>		Intelligent fault diagnosis for distributed systems and networks
<b>No. of Openings:</b>	1	
<b>Description:</b>	<p>The emergence of 5G, IoT, WSN and Industry 4.0 technologies has made possible the collection of large amounts of real-time data about a monitored environment. There is currently a need to develop fault tolerant methods and architectures for distributed systems and networks. The proposed research will focus on innovative fault diagnosis approaches that can learn characteristics or system dynamics of the monitored environment and adapt their behavior in order to handle missing or inconsistent data and achieve fault tolerant monitoring.</p>	
<b>Funding:</b>	N/A	
<b>Required Qualifications:</b>	<p>Undergraduate (BSc) and postgraduate (MSc) degrees in Electrical Engineering or Computer Science or related field. Prior research experience or specialization in related topics will be considered an advantage.</p>	
<b>Research Advisor:</b>		
<b>Name/Surname:</b>	Michalis Michaelides	
<b>Position:</b>	Associate Professor	
<b>Email:</b>	<a href="mailto:michalis.michaelides@cut.ac.cy">michalis.michaelides@cut.ac.cy</a>	

## Doctoral Vacancy Announcement form

<b>Research Topic Title:</b>		Internet of Things (IoT) for Smart Environment Monitoring
<b>No. of Openings:</b>	1	
<b>Description:</b>	<p>Due to the recent advances in IoT and 5G technologies, the application of wireless sensor networks (WSNs) offers the opportunity to monitor the environment in real-time at an unprecedented temporal and spatial resolution. Environmental monitoring applications can cover a variety of different topics both for indoor and outdoor monitoring. Indoor monitoring applications typically involve sensing temperature, humidity, light, sound, and air quality in a building's interior. Other important indoor applications may include fire and contaminant detection. Outdoor monitoring applications may include weather forecasting; air and water pollution monitoring; detection of earthquakes, volcano eruptions, flooding, or released chemical hazards; habitat monitoring, smart agriculture; and traffic monitoring. This research will focus on the design of intelligent algorithms and approaches for converting the collected environmental data into meaningful information to enable decision support in smart environment applications.</p>	
<b>Funding:</b>	N/A	
<b>Required Qualifications:</b>	Undergraduate (BSc) and postgraduate (MSc) degrees in Electrical Engineering or Computer Science or related field. Prior research experience or specialization in related topics will be considered an advantage.	
<b>Research Advisor:</b>		
<b>Name/Surname:</b>	Michalis Michaelides	
<b>Position:</b>	Associate Professor	
<b>Email:</b>	<a href="mailto:michalis.michaelides@cut.ac.cy">michalis.michaelides@cut.ac.cy</a>	



## Doctoral Vacancy Announcement form

### Research Topic Title:

Advanced Power Semiconductor Devices and Power Electronic Systems for Renewable Energy, Electric Mobility, and Smart Grid Applications

### No. of Openings: 1

### Description:

We are seeking highly motivated and talented PhD candidates to join our research team at Cyprus University of Technology. The successful candidates will engage in cutting-edge research within the field of power semiconductor devices and power electronic systems, with a focus on the following areas:

- Wide-Bandgap (WBG) and Ultra-Wide Bandgap (UWBG) Semiconductor Technologies (SiC, GaN) for high-efficiency power conversion.
- Advanced TCAD Modelling and Simulation for the design and optimisation of semiconductor devices tailored for smart grids, renewable energy systems, electric vehicles, and next-generation power systems.
- Failure Mechanisms and Reliability Analysis of power electronic devices, with comparisons to IGBT technologies.
- Energy Storage and Battery Technologies, including degradation mechanisms, aging models, and condition monitoring.
- High-Efficiency Power Conversion Systems for renewable energy integration, electric vehicle powertrains, and grid-connected applications.
- Smart Grid Applications including AC/DC and DC/DC power conversion for distributed energy resources and microgrids.
- Electrified Mobility Solutions, focusing on powertrain efficiency, fast charging technologies, and electric vehicle infrastructure.

This research directly contributes to impactful advancements in:

- Renewable Energy Systems: High-efficiency power conversion for solar and wind energy integration.
- Electric Mobility: Powertrain optimisation and energy management for electric vehicles, including electric aircraft and maritime applications.
- Smart Grids and Energy Distribution: Enhancing grid stability and energy efficiency through advanced power electronics.
- Sustainable Power Systems: Contributing to zero-carbon emission solutions for future energy



systems.

The selected candidates will have the opportunity to collaborate within international research projects, including the FLAGCHIP Horizon Europe initiative, and contribute to impactful advancements in power electronics and energy systems. Financial support opportunities, particularly for exceptional candidates, exist through contributions to project deliverables or involvement in teaching activities. These opportunities can be discussed during the interview stage.

### **Required Qualifications:**

- A Bachelor's and Master's degree in Electrical Engineering, Power Electronics, Semiconductor Physics, or related fields.
- Strong background in power semiconductor devices, power electronics, or energy systems.
- Proficiency in simulation tools such as Silvaco TCAD, LTSpice, or Matlab is highly desirable.
- Excellent communication skills in English (written and spoken).
- Self-motivation, teamwork skills, and a commitment to high-quality research.

### **Funding:**

Financial support opportunities, particularly for exceptional candidates, exist through contributions to the deliverables of the funded research projects and involvement in teaching activities. Details can be discussed during the interview stage.

### **Research Advisor:**

Name/Surname: Dr Neophytos Lophitis

Position: Assistant Professor of Electrical Energy Systems

Email: [neophytos.lophitis@cut.ac.cy](mailto:neophytos.lophitis@cut.ac.cy)



## Doctoral Vacancy Announcement form

**Research Topic Title:** Security and Privacy in the Modern Web

**No. of Openings:** 1

### Description:

The modern web has evolved into a complex and dynamic ecosystem encompassing browsers and their ever-expanding set of features and APIs, complex client-side applications, third-party services, and content delivery infrastructures, among others. While these technologies and services enable powerful web applications and richer user experiences, they also often introduce new security and privacy risks that have yet to be sufficiently explored and understood.

This PhD position focuses on advancing our understanding of emerging web technologies and the continuously evolving set of mechanisms, standards, and features that shape the modern web and the security and privacy risks they introduce. The research will follow a systematic approach that combines exploration and empirical analysis, large-scale measurement studies, system instrumentation, and controlled experimentation to identify previously unknown weaknesses and attack vectors, and to devise and analyze potential exploitation techniques. The overarching goal of this research is to design and develop techniques and mechanisms that strengthen web security and protect user privacy. The exact research focus will be determined collaboratively and may explore topics such as web fingerprinting and user tracking, authentication mechanisms, browser APIs and features, or cross-site interactions and isolation mechanisms, among others.

### Required Qualifications:

- Bachelor's (BSc) and Master's (MSc) degrees in Computer Science or a related field.
- Strong programming skills and experience with software or web development.
- Strong background and/or interest in web security, systems security, or privacy.
- Familiarity with modern web technologies and platforms will be considered an advantage.
- Excellent analytical and problem-solving skills, and strong motivation to conduct high-quality, independent research.



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**Funding:** The position is funded for three years. Additional financial support may be available through teaching assistance activities and/or participation in research projects.

**Contact:** For more information and discussion on the research topic, potential candidates can contact directly:

**Name/Surname:** Dr. Panagiotis Ilia

**Position:** Lecturer

**Email:** panagiotis.ilia@cut.ac.cy



## Doctoral Vacancy Announcement form

**Research Topic Title:** Security and Trustworthiness of Autonomous AI Agents

**No. of Openings:** 1

**Description:**

Recent advances in large language models and generative AI have enabled the development of autonomous reasoning-based intelligent agents capable of browsing the web, executing code, invoking external tools, and, in general, acting autonomously within complex environments, as well as interacting with other intelligent agents and forming multi-agent systems. Consequently, these intelligent agents are rapidly being integrated into everyday digital tools and platforms such as web browsers, email clients, development environments, and web applications, raising critical concerns about their security and trustworthiness.

As a fundamentally new class of systems, and given their rapid and widespread deployment and adoption, their security and trustworthiness remain largely unexplored. While early research has begun to surface attack techniques such as prompt injection and context poisoning, these are merely the first glimpse of a much deeper and largely uncharted threat landscape. Such agents introduce fundamentally new attack surfaces and may also resurface or reinvent attack vectors that traditional defenses had previously contained. On one hand, they can be manipulated or deceived to act against the interests of their users or operators. On the other hand, they can themselves be weaponized as attack instruments within the systems and infrastructures they are embedded in.

This PhD position aims to study the technical and behavioral dimensions of intelligent AI agents and advance the understanding of the security risks and adversarial dynamics introduced by such systems. The research will investigate both the vulnerabilities of such systems to adversarial attacks and the possibility that compromised or malicious agents may themselves carry out such attacks within the systems and infrastructures in which they operate. The project may involve the systematic exploration of potential vulnerabilities in agent-based systems, the development of experimental frameworks for studying adversarial interactions, and large-scale empirical analysis of emerging attack techniques and defensive mechanisms. The overarching goal is to identify fundamental limitations and weaknesses in agent-based systems and to develop principles, techniques, and mechanisms that improve their security and trustworthiness.



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**Required Qualifications:**

- Bachelor's (BSc) and Master's (MSc) degrees in Computer Science or a related field.
- Strong programming skills and experience with software development.
- Background and strong interest in systems security, artificial intelligence, or web security.
- Familiarity with LLMs and modern AI frameworks, including prior experimentation with LLM-based systems, will be considered an advantage.
- Excellent analytical and problem-solving skills, and strong motivation to conduct high-quality, independent research.

**Funding:** The position is funded for three years. Additional financial support may be available through teaching assistance activities and/or participation in research projects.

**Contact:** For more information and discussion on the research topic, potential candidates can contact directly:

**Name/Surname:** Dr. Panagiotis Ilia

**Position:** Lecturer

**Email:** panagiotis.ilia@cut.ac.cy



## Doctoral Vacancy Announcement form

### Research Topic Title:

*Monitoring and Self-Adaptation Capabilities for Uncertainty-Informed Resilient Cyber-Physical Systems*

### No. of Openings: 2

### Description

Cyber-Physical Systems (CPS), including autonomous robots, unmanned aerial vehicles, and smart infrastructures, increasingly rely on artificial intelligence (AI) to make complex decisions in dynamic and uncertain environments. Despite their growing autonomy, such systems often face critical challenges related to uncertainty, adaptability, and reliability, especially when deployed in safety-critical contexts.

This PhD project aims to advance the foundations of uncertainty-aware monitoring and self-adaptation in autonomous and intelligent systems. The successful candidate will develop mathematically grounded and data-driven techniques to ensure the resilience, trustworthiness, and robustness of next-generation CPS operating in the presence of uncertainty.

### Research Aims

The overarching goal of this project is to develop monitoring and self-adaptation capabilities that treat uncertainty as a first-class concern in the design and operation of autonomous systems. Specifically, the PhD researcher will:

- Conduct research on rigorous and mathematically based techniques for empowering monitoring and self-adaptation in autonomous systems, explicitly accounting for uncertainty.
- Develop learning-enabled monitors that can be revised and refined based on runtime data, improving the fidelity of system models and enabling robust self-adaptation.
- Design and implement techniques for uncertainty quantification of AI components used in robotic and CPS applications.
- Investigate approaches for managing uncertainty in AI-based decision-making, enabling effective and efficient risk-informed adaptation of the target systems.



## Potential Research Themes

This project offers scope for research across several interrelated areas, including but not limited to:

- Formal and probabilistic verification for autonomous and adaptive systems under uncertainty.
- Stochastic and hybrid modeling techniques incorporating partial observability and non-determinism.
- Learning-based refinement of monitors and models from runtime and operational data.
- Uncertainty quantification for AI components in robotic and cyber-physical systems.
- Uncertainty-aware decision-making frameworks enabling reasoning about epistemic and aleatoric uncertainty.
- Development of software toolsets for uncertainty analysis, risk evaluation, and adaptive control in real-world CPS applications.

## Expected Results

By the completion of the PhD, the candidate is expected to deliver:

- Novel techniques for monitoring and decision-making under uncertainty, integrating heterogeneous stochastic models that handle partial observability and non-determinism.
- Methods for learning and refinement of monitors that improve structural and behavioural representations based on operational data.
- A toolset for uncertainty analysis and quantification, adaptable to various operating contexts.
- Uncertainty-based decision-making techniques enabling principled reasoning about different forms of uncertainty.

## Required Qualifications

- A Bachelor's and Master's degree in Computer Science, Electrical/Computer Engineering, Mathematics, or related fields.
- Strong background in Artificial Intelligence, Machine Learning, or Applied Mathematics.
- Experience with Deep Learning frameworks (e.g., PyTorch, TensorFlow) or formal verification tools is highly desirable.
- Demonstrated interest in autonomous systems, reliability, and safety-critical AI.
- Excellent communication skills in English (written and spoken).
- High degree of self-motivation, ability to work independently and collaboratively, and a commitment to high-quality research.



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## **Funding**

Financial support opportunities, particularly for exceptional candidates, are available through:

- Contributions to the deliverables of the ASTIR Horizon Europe project,
- Deliverables associated with the advisor's starting grant, and
- Participation in teaching and departmental activities.
- Indicative financial support at the time of this announcement is approximately €13,000 per annum, plus €3,000 per annum for tuition fee support, for a duration of three years.

## **Research Advisor**

Name: Dr Simos Gerasimou

Position: Assistant Professor

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## Doctoral Vacancy Announcement form

### Research Topic Title:

Intelligent and Adaptive Trustworthiness Assessment of AI

### No. of Openings: 2

### Description

Deep Learning (DL) has achieved unprecedented success in recent years, reaching—and in some cases surpassing—human-level performance across a range of challenging tasks. These breakthroughs have led to the widespread deployment of DL models in safety- and security-critical domains, including drug discovery, flight control systems, and autonomous driving.

However, despite these remarkable advances, significant challenges remain. Current DL systems often display unstable and unreliable behaviour when exposed to small perturbations in input data, and their performance can degrade sharply under data distribution shifts that differ from those encountered during training. These vulnerabilities raise major concerns regarding the robustness, reliability, and trustworthiness of DL models in real-world operational environments.

### Research Aim:

Inspired by work in engineering and assessing conventional software systems, a diverse set of techniques for assessing the trustworthiness of AI models has been proposed. These range from methods for testing and verifying these models to principled methodologies for data augmentation and uncertainty quantification at runtime. This PhD project will investigate novel approaches to improve the robustness and generalisation of Deep Learning models under conditions of uncertainty, distributional shift, and adversarial interference. The research will combine theoretical analysis with experimental validation to develop next-generation DL systems capable of maintaining consistent performance across diverse and unpredictable environments.

### Potential Research Themes include:

- Developing principled frameworks for robust training and uncertainty quantification in DNNs.
- Exploring domain adaptation and generalisation techniques for shifting data distributions.
- Investigating adversarial robustness and defence mechanisms for safety-critical DL systems.
- Evaluating and benchmarking DL robustness in real-world case studies (e.g., healthcare, aviation, autonomous vehicles).

The selected candidates will have the opportunity to collaborate within international research projects, including the ASTIR Horizon Europe initiative, and contribute to impactful advancements at the



intersection of AI and software engineering. Financial support opportunities, particularly for exceptional candidates, exist through contributions to project deliverables or involvement in teaching activities. These opportunities can be discussed during the interview stage.

## Required Qualifications

- A Bachelor's and Master's degree in Computer Science, Mathematics or related fields.
- Strong background in AI and/or software engineering and/or applied mathematics.
- Proficiency in Deep Learning frameworks such as Pytorch and Tensorflow are highly desirable.
- A keen interest in the reliability and safety of AI systems are highly desirable.
- Excellent communication skills in English (written and spoken).
- Self-motivation, teamwork and a commitment to high-quality research.

## Funding

Financial support opportunities, particularly for exceptional candidates, exist through contributions to the deliverables of the ASTIR Horizon Europe project, deliverables of the advisor's starting grant, and involvement in teaching activities. Indicative financial support at the time of writing this announcement is 13,000€ per annum and 3,000€ for fee support, for approximately three years.

## Research Advisor

Name/Surname: Dr Simos Gerasimou

Position: Assistant Professor

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