



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)



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Funding

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

Supervision

Andreas Diavastos

Lecturer

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Doctoral Vacancy Announcement form

Research Topic Title: MRI based Brain Lesions Segmentation, Mapping and Analysis for diagnosis and monitoring the evolution of multiple sclerosis disease

No. of Openings:1

Description: Magnetic Resonance Imaging (MRI) is one of the main imaging techniques in the diagnosis and monitoring of the multiple sclerosis (MS) disease, providing non-invasive, high-resolution insights into brain structure, neurological disease progression, follow-up, prediction of its course and its function. This PhD will focus on advancing MRI-based brain mapping techniques to improve the diagnosis and longitudinal monitoring of the MS disease. Application will be done for segmenting a series of brain MS images taken at different timepoints as well as at different other brain tumours. The study will focus on anatomical brain maps and will try to characterize the appearance of the abnormalities presented by these disorders and predict the disease progression.

A key objective of the research is the development of quantitative imaging biomarkers that can serve as reliable indicators of disease prognosis, evaluation, progression, and therapeutic response. Using state-of-the-art machine learning algorithms, the project aims to automate the segmentation of lesions and other pathological features, offering clinicians a robust tool for prognosis, early diagnosis, monitor the evolution of the disease to help with treatment planning. The goal will be the development of a system which can eventually be used in daily clinical practice.

The candidate(s) must have good programming skills mainly in Python language.

Required Qualifications: Degree in Computer Science/Engineering Electrical Engineering, or biomedical engineering

Research Advisor:

Name/Surname: Efthyvoulos Kyriacou

Position: Assistant Professor

Email: efthyvoulos.kyriacou@cut.ac.cy



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Doctoral Vacancy Announcement form

Research Topic Title:

Network Management Methods Applied to Quantum Communications

No. of Openings: 1

Description:

Research to explore key management systems (KMS) to connect independent QKD infrastructures at national and international level. The KMS will be applied to end-to-end cross-border quantum-key services across heterogeneous terrestrial and satellite QKD networks. The research will explore key availability, routing, relay, allocation, monitoring and service provisioning, whilst considering issues of security and European standardization.

Required Qualifications:

B.Sc. in Computer Science, Electrical Engineering, or Physics

M.Sc. in Cybersecurity

Funding: EU funding

Research Advisor:

Name/Surname: Kyriacos Kalli

Position: Professor

Email: Kyriacos.kalli@cut.ac.cy



Doctoral Vacancy Announcement form

Research Topic Title:

Circular Power Electronics Converters Design (CPEC): DC1 – Sustainable and Reliable Design of SiC Semiconductor Devices and Gate Drivers

No. of Openings:

1

Description:

The position is part of CPEC – Circular Power Electronics Converters Design, a Horizon Europe Marie Skłodowska-Curie Actions (MSCA) Doctoral Network (Project No. 101312322), which trains 15 Doctoral Candidates through an interdisciplinary, international and intersectoral research and training programme.

DC1 will develop a sustainability-driven co-design methodology linking SiC device physics, gate-driver operation, reliability and environmental impact. The work will focus primarily on SiC power semiconductor devices and their gate drivers for applications such as photovoltaic inverters and traction systems.

The research will include calibrated electrothermal and reliability TCAD modelling of SiC MOSFETs; investigation of device structures, gate-oxide and technology options; mixed-mode device-circuit modelling with realistic gate drivers; analysis of switching conditions and degradation mechanisms; and development of application-specific Eco-Reliability Figures of Merit and design guidelines integrating performance, robustness and sustainability.

The selected candidate will engage in multidisciplinary research, participate in international secondments across academic and industrial settings, and contribute to high-impact publications and international conferences.

Required Qualifications:

Essential:

- A relevant Master's degree, or an equivalent qualification providing access to doctoral studies at the Cyprus University of Technology (CUT), in Electrical/Electronic/Power/Semiconductor Engineering, Applied Physics, Materials Engineering, Control Engineering or a closely related discipline. Applicants completing their Master's may apply provided the qualification is completed before enrolment. Applicants without a Master's degree may be considered where permitted by CUT regulations; if admitted, successful completion of at least 60 ECTS of postgraduate-level coursework will be required.
- Strong academic performance, analytical and research ability, and capacity to work independently and collaboratively in a multidisciplinary and international environment.
- Excellent written and spoken English.
- MSCA eligibility: at recruitment, the candidate must not hold a doctoral degree or have successfully defended a doctoral thesis. Under the MSCA mobility rule, the candidate must not have resided or carried out their main activity (work or studies) in Cyprus for more than



12 months in the 36 months immediately preceding recruitment, subject to applicable MSCA exceptions. The position is open to applicants of any nationality.

- Willingness to participate in international and intersectoral research and training activities.

Advantageous background or demonstrated interest in:

- Semiconductor device physics and SiC or other wide-bandgap power semiconductor devices.
- Semiconductor TCAD modelling, mixed-mode device-circuit simulation, SPICE/compact modelling or electrothermal modelling.
- Power semiconductor reliability, gate drivers, gate-oxide degradation and device characterisation.
- Programming and numerical analysis using MATLAB, Python, LTspice or related environments.
- Lifecycle or environmental-impact assessment.

Funding:

The position is funded by Horizon Europe through the Marie Skłodowska-Curie Actions Doctoral Network CPEC – Circular Power Electronics Converters Design (Project No. 101312322). The successful candidate will be offered a 36-month full-time employment contract with social-security coverage, subject to applicable legislation and Cyprus University of Technology (CUT) regulations.

The EU researcher unit contributions applicable to the position are:

- Living Allowance: €3,284.19/month, corresponding to an indicative gross amount of approximately €2,845.92/month
- Mobility Allowance: €710/month, corresponding to an additional indicative gross amount of approximately €615.25/month
- Family Allowance: €660/month, where applicable under the MSCA rules, corresponding to an additional indicative gross amount of approximately €571.92/month

The indicative gross amounts above are calculated using the current CUT costing methodology and an employer-contribution rate of 15.40%. They are before employee social-security contributions, taxation and other statutory deductions. Final remuneration will be determined according to CUT payroll rules and the statutory rates applicable at the time of appointment.

Research Advisor:

Name/Surname: Dr Neophytos Lophitis

Position: Assistant Professor

Email: neophytos.lophitis@cut.ac.cy

For questions regarding the research topic, please contact Dr Neophytos Lophitis at neophytos.lophitis@cut.ac.cy



Doctoral Vacancy Announcement form

Research Topic Title:

Circular Power Electronics Converters Design (CPEC): DC8 – Second-Life Modular Power Converters and Their Applications

No. of Openings:

1

Description:

The position is part of CPEC – Circular Power Electronics Converters Design, a Horizon Europe Marie Skłodowska-Curie Actions (MSCA) Doctoral Network (Project No. 101312322), which trains 15 Doctoral Candidates through an interdisciplinary, international and intersectoral research and training programme.

DC8 will develop and demonstrate a practical methodology for assessing and repurposing modular SiC-based power converters for second-life applications. The work addresses converters that may be retired because of maintenance cost, system upgrades or reduced performance even though their components retain sufficient remaining useful life for less demanding applications.

The research will investigate first-life retirement conditions and degradation mechanisms; use health-monitoring and lifetime models to assess residual performance and remaining useful life; match retired modules to suitable second-life mission profiles; develop derating, control, reconfiguration and modular-interface strategies; experimentally validate at least one representative second-life application; and quantify environmental and resource benefits through power-electronics lifecycle assessment.

The selected candidate will engage in multidisciplinary research, participate in international secondments across academic and industrial settings, and contribute to high-impact publications and international conferences.

Required Qualifications:**Essential:**

- A relevant Master's degree, or an equivalent qualification providing access to doctoral studies at the Cyprus University of Technology (CUT), in Electrical/Electronic/Power/Semiconductor Engineering, Applied Physics, Materials Engineering, Control Engineering or a closely related discipline. Applicants completing their Master's may apply provided the qualification is completed before enrolment. Applicants without a Master's degree may be considered where permitted by CUT regulations; if admitted, successful completion of at least 60 ECTS of postgraduate-level coursework will be required.
- Strong academic performance, analytical and research ability, and capacity to work independently and collaboratively in a multidisciplinary and international environment.
- Excellent written and spoken English.
- MSCA eligibility: at recruitment, the candidate must not hold a doctoral degree or have successfully defended a doctoral thesis. Under the MSCA mobility rule, the candidate must



not have resided or carried out their main activity (work or studies) in Cyprus for more than 12 months in the 36 months immediately preceding recruitment, subject to applicable MSCA exceptions. The position is open to applicants of any nationality.

- Willingness to participate in international and intersectoral research and training activities.

Advantageous background or demonstrated interest in:

- Power-electronic converter design, modular converters and power semiconductor devices/modules.
- Converter control, reconfiguration and fault-tolerant power electronics.
- Condition monitoring, reliability and remaining-useful-life estimation.
- Electric drives, traction, photovoltaic or stationary energy-storage applications.
- Hardware prototyping, experimental testing, hardware-in-the-loop systems or embedded control.
- MATLAB, Simulink, Python or related tools, and lifecycle assessment or sustainable engineering.

Funding:

The position is funded by Horizon Europe through the Marie Skłodowska-Curie Actions Doctoral Network CPEC – Circular Power Electronics Converters Design (Project No. 101312322). The successful candidate will be offered a 36-month full-time employment contract with social-security coverage, subject to applicable legislation and Cyprus University of Technology (CUT) regulations.

The EU researcher unit contributions applicable to the position are:

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The indicative gross amounts above are calculated using the current CUT costing methodology and an employer-contribution rate of 15.40%. They are before employee social-security contributions, taxation and other statutory deductions. Final remuneration will be determined according to CUT payroll rules and the statutory rates applicable at the time of appointment.

Research Advisor:

Name/Surname: Dr Neophytos Lophitis

Position: Assistant Professor

Email: neophytos.lophitis@cut.ac.cy



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For questions regarding the research topic, please contact Dr Neophytos Lophitis at neophytos.lophitis@cut.ac.cy



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Research Topic Title: Security and Trustworthiness of Autonomous AI Agents

No. of Openings: 2

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.

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.



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- 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 through participation in research projects. Additional financial support may be available through teaching assistance activities.

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



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Research Topic Title: THEORETICAL AND EXPERIMENTAL INVESTIGATION OF GEOTHERMAL SYSTEMS

No. of Openings: 1

Description: Required a theoretical and experimental investigation of geothermal systems.

Required Qualifications: BSc and/or MSc in Electrical Engineering and Computer Engineering or Computer Science or Physics, or any other related subject. Strong mathematical modeling background will be considered an advantage.

Funding: None

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

Name/Surname: Paul Christodoulides

Position: Asst. Professor

Email: paul.christodoulides@cut.ac.cy



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Research Topic Title: PRODUCTION OF HYDROGEN BY FREQUENCIES, HYDROLYSIS AND IMPURITIES OF MATERIALS. THEORETICAL AND EXPERIMENTAL APPROACH

No. of Openings: 1

Description: Required a theoretical and experimental approach for the production of hydrogen by frequencies, hydrolysis and impurities of materials.

Required Qualifications: BSc and/or MSc in Electrical Engineering and Computer Engineering or Computer Science or Physics, or any other related subject.

Funding: None

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

Name/Surname: Paul Christodoulides

Position: Asst. Professor

Email: paul.christodoulides@cut.ac.cy



Doctoral Vacancy Announcement form

Research Topic Title: Next-Generation SAR Tomography for Infrastructure Monitoring and Subsurface Imaging

No. of Openings: 1

Description: Synthetic Aperture Radar (SAR) has traditionally been limited to surface imaging due to the poor penetration of electromagnetic waves through solid media. Recent groundbreaking research has demonstrated that coherent analysis of micro-motions—vibrations induced by natural and anthropogenic sources—can unlock tomographic imaging of structures and subsurface features at depths exceeding 3 kilometers from space. This paradigm shift, pioneered in the 2022-2025 period, establishes a new field: SAR echography tomography.

This PhD project aims to advance this emerging technology by developing next-generation signal processing algorithms for micro-motion extraction, multi-frequency modal analysis, and high-resolution tomographic inversion. The successful candidate will work with real satellite data from COSMO-SkyMed Second Generation, TerraSAR-X, and commercial X-band constellations, implementing and optimizing algorithms for infrastructure health monitoring (bridges, dams, buildings) and geological subsurface imaging (volcanoes, aquifers, cavities). The student will extend existing Python-based processing pipelines, focusing on: (1) super-resolution velocity tomography using compressed sensing and atomic decomposition; (2) multi-dimensional Doppler parameter estimation for crack detection and structural health assessment; (3) polarimetric SAR tomography for material classification; and (4) integration of machine learning for automated feature detection in tomographic volumes.

Required Qualifications: BSc and/or MSc in Electrical Engineering and Computer Engineering or Computer Science or Physics, or any other related subject.

Funding: None

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

Name/Surname: Paul Christodoulides

Position: Asst. Professor

Email: paul.christodoulides@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.

Funding



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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

Email: simos.gerasimou@cut.ac.cy



Doctoral Vacancy Announcement form

Research Topic Title:

Intelligent and Adaptive Trustworthiness Assessment of GenAI

No. of Openings: 2**Description**

Generative AI (GenAI) 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 GenAI 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 GenAI 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 GenAI 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 GenAI 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 GenAI models under conditions of uncertainty, distributional shift, and adversarial interference. The research will combine theoretical analysis with experimental validation to develop next-generation GenAI 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 GenAI.
- Exploring domain adaptation and generalisation techniques for shifting data distributions.
- Investigating adversarial robustness and defence mechanisms for safety-critical GenAI systems.
- Evaluating and benchmarking GenAI 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

Email: simos.gerasimou@cut.ac.cy



Doctoral Candidate Position (DC5)

Power module health monitoring and lifetime estimation for SiC modules

CPEC – Circular Power Electronics Converters Design · Marie Skłodowska-Curie Doctoral Network (Horizon Europe, project 101312322)

About CPEC

CPEC is a Horizon Europe Marie Skłodowska-Curie Doctoral Network that trains 15 doctoral candidates through an interdisciplinary, international and intersectoral research and training programme. It advances circular design principles for power-electronic converters, from sustainable design and lifetime extension to repair, second-life use, recycling and lifecycle assessment. The network is coordinated by the University of Nottingham; the consortium includes, among others, UPM, INSA Lyon, IMDEA Materials and ENSAM, and the industrial partners SuperGrid Institute, STMicroelectronics, Mitsubishi Electric R&D Centre Europe and Hitachi Energy.

The research project

DC5 develops a physics-informed generative machine-learning framework for health-state estimation and remaining-useful-life (RUL) prediction of 1.2–2.0 kV SiC MOSFET modules under realistic, multi-stress photovoltaic-type mission profiles.

Prognostics is posed as a world-modelling problem rather than as regression from health indicators to a number. The latent degradation state is described by monotone jump processes (subordinators) that evolve in an operational time set by the Arrhenius and Coffin–Manson laws through a Foster thermal model, so that device physics enters as Bayesian priors over the dynamics and not as loss penalties. The framework delivers RUL distributions with calibrated tails, generalises across stress profiles and device generations, and answers conditional and counterfactual questions (what is the lifetime if the load is de-rated by ten percent; which profile keeps the device alive to the next inspection with probability 0.99), which feed lifetime-extending control (DC7) and second-life requalification (DC8) within the network.

The work combines stochastic-process theory and Bayesian inference with experimental practice: the candidate will take part in designing and running the accelerated-ageing campaigns at SuperGrid Institute, so that the data are produced around the requirements of the model.

Main activities

- Identify degradation-sensitive electrical and thermal health indicators and measurement protocols that separate true wear-out from reversible temperature- and trapping-induced artefacts.



- Perform controlled ageing studies and develop multi-physics simulation models to calibrate ageing laws (Arrhenius, Coffin–Manson) with quantified uncertainty, under individual and combined stresses.
- Model multi-stress interactions with stochastic degradation processes, separating semiconductor-level from package-level degradation across device generations.
- Develop and validate latent world models with Bayesian inference (variational inference, sequential Monte Carlo), delivering health-state and RUL estimates with calibrated confidence intervals and conditional mission-profile queries.
- Contribute to an openly released multi-physics SiC degradation benchmark and to tools for the trustworthy deployment and monitoring of prognostic models, shared across the CPEC network.

Essential requirements

- **Degree:** A Master's degree (or an equivalent qualification giving access to doctoral studies at CUT) in Electrical Engineering, Computer Science / Artificial Intelligence, Applied Mathematics / Statistics, Physics, Control Engineering or a closely related field. Applicants completing their Master's may apply provided the degree is awarded before enrolment.
- **Mathematical background:** A solid grounding in probability and stochastic processes, and comfort with rigorous mathematical reasoning.
- **Programming:** Strong Python and one deep-learning framework (preferably PyTorch); familiarity with scientific computing.
- **Experimental disposition:** Willingness to undertake hands-on device characterisation and accelerated-ageing experiments, at CUT and during the secondment.
- **Language:** Excellent written and spoken English; Greek is not required.
- **MSCA eligibility:** At recruitment the candidate must not hold a doctoral degree and must not have successfully defended a doctoral thesis. Mobility rule: the candidate must not have resided or carried out their main activity (work, studies) in Cyprus for more than 12 months in the 36 months immediately preceding recruitment (subject to the MSCA exceptions). Open to applicants of any nationality.
- **Admission at CUT:** The successful candidate must meet the doctoral-admission requirements of the Department. Applicants without a Master's degree may be considered where regulations permit; if admitted, they will be required to complete at least 60 ECTS of postgraduate coursework.

Desirable qualifications

- **Probabilistic machine learning:** Demonstrated knowledge of Bayesian inference, state-space or latent-variable models and Monte Carlo methods, through coursework, a thesis or research experience.



- Knowledge of Lévy or jump processes, sequential Monte Carlo / particle methods, variational inference or deep generative models.
- Background in power semiconductor devices or modules, reliability, condition monitoring or prognostics (PHM).
- Experience with power-circuit and thermal simulation tools (for instance LTspice, PLECS, Foster models) or with laboratory device measurements.
- Publications, open-source code or research / industrial experience related to the topic.

We are looking for a dual profile: strong mathematical and probabilistic thinking together with a real willingness to work next to the test bench. Candidates who fully cover one side and show demonstrated willingness for the other are welcome to apply.

Salary, conditions and training

The position carries a 36-month full-time employment contract with social-security coverage, under applicable legislation and CUT regulations, funded by Horizon Europe (MSCA Doctoral Networks). The EU unit contributions are: Living Allowance €3,284.19 per month, Mobility Allowance €710 per month and, where applicable, Family Allowance €495 per month (gross amounts before employer and employee social-insurance contributions, taxation and other statutory deductions; they are not net take-home salary).

The candidate joins CPEC's international network of 15 researchers, with academic and industrial supervision, secondments, project schools and workshops, technical and transferable-skills training, conference participation and access to the consortium's research facilities.

Selection process

Recruitment follows Open, Transparent and Merit-based Recruitment principles, the European Charter for Researchers, MSCA rules, CUT regulations and relevant national legislation. CUT is committed to equal opportunities, gender equality and non-discrimination.

- **Stage 1, eligibility and application assessment:** check of MSCA eligibility, CUT admission requirements and completeness; assessment with a standardised framework covering academic performance, relevant knowledge and experience, technical skills, suitability for the position, motivation, communication skills and research potential.
- **Stage 2, interview:** the highest-ranked eligible candidates are invited to an online, competency-based interview. A reserve list may be kept.

Questions about the research topic: Prof. Sotirios Chatzis, sotirios.chatzis@cut.ac.cy.