



Cyber-Physical Electric Power System Security Management

Fully-funded PhD position

Applications are invited for a fully-funded 4 year PhD position within the School of Electrical & Electronic Engineering at University College Dublin (UCD) on *Cyber-Physical Electric Power System Security Management*.

The modern electric power system functions within an expanding spectrum of uncertainties relating to the integration of renewable energy sources, the evolution of electricity markets, the adverse impacts of climate change and the increasing emergence of cyber-physical threats. These uncertainties create the need for advanced decision-support tools, able to suggest suitable control actions that could be used to mitigate the upcoming risks to the system security in a timely manner. Relying on analytical optimization techniques to develop such tools has been the subject of extensive research, revealing not only potential benefits but also considerable complexity and scalability challenges. Over the recent years, the alternative of relying on machine learning techniques is gaining traction. This alternative inevitably comes with its own set of challenges, for instance relating to generalization over alternative grid topologies and interpretability. Combining analytical optimization and machine learning holds a greater potential in counterbalancing the limitations of each alternative.

This PhD project will investigate the synergies between stochastic optimization and machine learning towards the development of advanced decision-support tools for managing the security of the cyber-physical electric power system.

Funding Information

This full-time PhD position is fully funded by the School of Electrical & Electronic Engineering, University College Dublin, for a period up to 4 years. The funding includes a tax-free stipend of €22,000 per annum in addition to student fees covered.



Candidate Profile

The successful candidate should showcase a comprehensive understanding of the fundamentals of electric power system planning and operation, possess good programming skills in at least one language (with a preference for Julia or Python), and a solid mathematical background, particularly in optimization.

Entry Requirements

- ▶ A strong academic foundation, with a minimum 2.1 honours degree in Electrical Engineering, or related disciplines.
- ▶ English Language Proficiency. Non-native English speakers require at least:
 - A minimum score of 90 in the Internet-based TOEFL (iBT), with no less than 21 in writing and at least 19 in every other section, or,
 - An average IELTS score of 6.5 over all components and a minimum of 6.0 in each band on the Academic Version.

Highly Desirable Qualities

- ▶ A Master's degree with research experience.
- ▶ Expertise or familiarity with AI/ML frameworks and/or stochastic optimization.
- ▶ Experience with high-performance computing infrastructures.
- ▶ Contributions to open-source projects, demonstrating proficiency in version control and collaborative coding.
- ▶ Excellent problem-solving skills, self-motivation, and the ability to work well both independently and as part of a team.
- ▶ Demonstrated academic writing skills and the ability to effectively communicate research findings through papers, presentations, and other scholarly communications.
- ▶ Proven willingness to learn and a strong commitment to personal and professional growth, with a track record of acquiring new skills.



About UCD

UCD is one of Europe's leading research-intensive universities; an environment where undergraduate education, masters and PhD training, research, innovation and community engagement form a dynamic spectrum of activity. Since its foundation, the University has made a unique contribution to the creation of modern Ireland, based on successful engagement with Irish society on every level and across every sphere of activity.

The international standing of UCD has grown in recent years; it is currently ranked within the top 1% of higher education institutions world-wide. UCD is also Ireland's most globally engaged university with over 38,000 students drawn from 152 countries, including over 5,000 students based at locations outside of Ireland.

The University's main Dublin campus occupies an extensive parkland estate of 133 hectares and offers world-leading facilities. As Ireland's largest university, with its great strength and diversity of disciplines, UCD embraces its role to contribute to the flourishing of Ireland through the study of people, society, business, economy, culture, languages and the creative arts, as well as through research and innovation.

School of Electrical & Electronic Engineering

The UCD School of Electrical & Electronic Engineering seeks to educate students in a research-intensive and industry-facing environment. The entire faculty of the School bring an excellent mix of educational experience, international research and innovation in industry.

Our emphasis is on the scientific and mathematical fundamentals of the discipline, complemented by creative design skills, as the best preparation for a world of rapid technological change. The School has an excellent international reputation for the quality of its research and in its range of specialist areas it has made a lasting impact on the Irish technology and energy sectors.

We seek to equip our graduates with the knowledge and skills they need to succeed, to work closely with industry, to encourage start-ups and to promote innovation and entrepreneurship in our research and education and to promote the engineering profession and scientific activities both nationally and internationally.



How to Apply

Please submit the following documents to [Dr. Efthymios Karangelos](#) via email in PDF format, using the subject line "*Application for PhD position on Cyber-Physical Electric Power System Security Management*":

- ▶ Resume/Curriculum Vitae.
- ▶ A Cover Letter (at most 3 pages) introducing the applicant's scientific interests, motivation for pursuing this opportunity and perspective on the proposed research agenda.
- ▶ At least two recommendation letters or contact details of two referees.
- ▶ Scanned copies of all academic transcripts and English language certificates.

Complete applications will be considered on a rolling basis until the position is filled.

Equality, Diversity and Inclusion

UCD is committed to creating an environment where diversity is celebrated and everyone is treated fairly regardless of gender, age, race, disability, ethnic origin, religion, sexual orientation, civil status, family status, or membership of the travelling community.

We welcome applications from individuals of all backgrounds, regardless of gender, race, ethnicity, sexual orientation, disability, or socioeconomic status. We believe that a diverse team enhances creativity, innovation, and the overall quality of research. We strongly encourage candidates from underrepresented groups to apply and contribute to our inclusive academic community.