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[https://warwick.ac.uk/fac/sci/eng/people/emmanouil\\_kakouris](https://warwick.ac.uk/fac/sci/eng/people/emmanouil_kakouris)

Assistant Professor

Dr Emmanouil Kakouris Meng MSc PhD MTCG C.Eng MIEI

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Date: 28<sup>th</sup> October 2024

## **Ph.D. position 1: Artificial intelligence-assisted computational modelling of fracture**

### **Qualification:**

Doctor of Philosophy in Engineering (PhD)

### **Start date:**

30<sup>th</sup> September 2025

### **Funding for:**

4 years

### **Supervisor:**

Dr Emmanouil Kakouris

### **Application deadline:**

The application deadline for this position is **December 15, 2024**. Prospective candidates are strongly encouraged to submit their applications at the earliest opportunity. The application process will be closed upon the identification of a suitable candidate.

### **Project Description:**

This PhD project will focus on the application of advanced computational techniques, particularly in the field of artificial intelligence, to enhance our understanding of material failure and fracture processes. The research will integrate physics-based modelling approaches with AI methodologies to address critical challenges in simulating fracture under dynamic and complex loading conditions. The work will be grounded in continuum mechanics and will utilise cutting-edge numerical methods to develop predictive models that can be validated against experimental data. While traditional approaches to fracture modelling rely on deterministic frameworks, this project aims to introduce AI-assisted strategies that can adapt to the inherent uncertainties and complexities in real-world material behaviour. The successful candidate will contribute to advancing state-of-the-art computational methods, with the potential for significant interdisciplinary collaboration in areas such as mechanics, applied mathematics and computer science.

### **Skills that the student will acquire**

- Continuum mechanics theory.
- Machine learning techniques and their applications in engineering.

- Software development (Python, C/C++, Fortran).

**Scholarship:**

The award will cover the tuition fees at the UK rate £4,786, plus a tax-free stipend of £19,237 per annum for 4 years of full-time study. International candidates are welcome to apply.

**Eligibility:**

Candidates with a first-class or 2.1 honours degree at BSc or MSc in engineering disciplines, applied mathematics, physical science or computational science and a strong interest in computational materials modelling, physics-based simulations and applied mathematics.

**How to apply:**

Candidates should submit a formal application. Details of how to do can be found here <https://warwick.ac.uk/fac/sci/eng/postgraduate/applypgr/>

**Application form 'Course search':**

Department: School of Engineering

Academic Year: 2024/25

Type of Course: Postgraduate Research

- Engineering (MPhil/PhD) (P-H1Q2)

In the application form funding section, enter: Source: **EK-Computational Mechanics**

If you wish to discuss any details of the project informally, please contact Dr Emmanouil Kakouris at [Emmanouil.Kakouris@warwick.ac.uk](mailto:Emmanouil.Kakouris@warwick.ac.uk).

## **Ph.D. position 2: AI-driven decision-support analytics for structural life-cycle assessment**

### **Qualification:**

Doctor of Philosophy in Engineering (PhD)

### **Start date:**

1<sup>st</sup> April 2025 or 30<sup>th</sup> September 2025

### **Funding for:**

3.5 years

### **Supervisor:**

Dr Emmanouil Kakouris

### **Application deadline:**

The application deadline for this position is **December 15, 2024**. Prospective candidates are strongly encouraged to submit their applications at the earliest opportunity. The application process will be closed upon the identification of a suitable candidate.

### **Project Description:**

This PhD project, which will be supervised by Dr. Emmanouil Kakouris in collaboration with Dr. Charalampos Andriotis from the [AiDAPT Lab at TU Delft](#), will focus on advancing AI-driven decision-support analytics for structural life-cycle assessment. It will address significant challenges in optimising sustainability, resilience, and the long-term performance of civil infrastructure. As demands on the built environment continue to rise and infrastructure ages, the need for innovative AI and probabilistic decision-making approaches will become increasingly essential. The research will employ advanced machine learning techniques to predict and optimise structural performance, assess material degradation, and evaluate long-term sustainability under uncertainty. The primary aim will be to develop AI systems that support decision-making throughout the entire life cycle of structures, incorporating real-time data and probabilistic methods to manage risks and uncertainties. Additionally, the project will investigate how AI tools can balance environmental impact with structural resilience, offering adaptive decision-support systems for engineers, policymakers, and infrastructure managers. Positioned at the intersection of civil engineering and AI, this research will provide the candidate with the opportunity to develop cutting-edge solutions to address the sustainability and resilience challenges facing modern infrastructure.

### **Skills that the student will acquire**

- Decision-making theory.
- Probabilistic methods for investigating the uncertainties of the model.
- Software development (Python, Matlab).
- Machine learning techniques and their applications in engineering.
- Life-cycle assessment methodologies and structural analysis principles.

### **Scholarship:**

Should your application for admission be accepted you should be aware that this does not constitute an offer of financial support. Please refer to the [scholarships & funding](#) pages.

**Eligibility:**

Candidates with a first-class or 2.1 honours degree at BSc or MSc in engineering disciplines, applied mathematics, physical science or computational science and a strong interest in artificial intelligence, machine learning and decision making.

**How to apply:**

Candidates should submit a formal application. Details of how to do can be found here <https://warwick.ac.uk/fac/sci/eng/postgraduate/applypgr/>

**Application form 'Course search':**

Department: School of Engineering

Academic Year: 2024/25

Type of Course: Postgraduate Research

- Engineering (MPhil/PhD) (P-H1Q2)

In the application form funding section, enter: Source: **EK-Prescriptive analytics**

If you wish to discuss any details of the project informally, please contact Dr Emmanouil Kakouris at [Emmanouil.Kakouris@warwick.ac.uk](mailto:Emmanouil.Kakouris@warwick.ac.uk).