



## Cambridge ESRC DTP Interdisciplinary PhD Studentship:

### Designing Interactive Virtual Classroom Environments to Support Teacher Learning of Proof-related Instruction in Mathematics

The University of Cambridge ESRC Doctoral Training Partnership (**DTP**) is pleased to offer an interdisciplinary studentship available for admission in 2019. The studentship will be a 1-year masters followed by 3-year doctoral programme and will be co-supervised by Dr Andreas Stylianides (Faculty of Education, <http://www.educ.cam.ac.uk>) and Dr Mateja Jamnik (Department of Computer Science & Technology, <https://www.cl.cam.ac.uk>).

The DTP studentship will cover fees and provide £14,777 p.a. in living costs (current rates). DTP students also receive a personal allowance for additional training costs, and can apply for further funding to pursue fieldwork, academic exchange, and collaboration with non-academic partner organisations.

The successful applicant will work on an interdisciplinary project. They will have relevant background or experience in the fields of computer science (or artificial intelligence) and education (mathematics education, technology education, etc.), as well as demonstrable interest in working on the particular project.

#### Project description

The notion of *proof* is central to deep learning in mathematics, and thus many curricula internationally call for proof-related instruction for *all* students at *all* school levels. Yet many teachers, including specialist secondary mathematics teachers, find it difficult to implement effective proof-related instruction. It is arguably more efficient for trainee teachers to learn how to perform proof-related instruction by actually doing it in a real classroom. However, this is not possible: many trainee teachers have their field-based experiences in classrooms where proof is an alien concept and thus have no opportunities to observe let alone actively engage with proof-related instruction.

Headway in addressing this educational problem can be made with the use of computer science and artificial intelligence know-how to design interactive Virtual Classroom Environments (VCEs) that will enable trainee secondary mathematics teachers to actively engage with proof-related instruction, in a way similar to how pilots virtually prepare for real situations (even rare ones) without needing a real aircraft.

Three main research questions to be addressed in the project are:

1. What research and practical knowledge from mathematics education, and what know-how from computer science and artificial intelligence, is relevant to the design of the VCEs?
2. How do trainee secondary mathematics teachers interact with the VCEs, and what are they learning about proof-related instruction from these interactions?
3. Is this learning better than that resulting from typical training in teacher education programmes nowadays, and how?

#### Further information and application procedure

DTP studentships are currently open to UK and EU citizens on a full-time or part-time basis. Full studentships (i.e. including living costs) are open only to those meeting certain residency requirements. More information about DTP studentships, including eligibility requirements, can be found at <https://www.esrcdtp.group.cam.ac.uk/prospectivestudents>.

Informal enquiries can be addressed to Dr Stylianides ([as899@cam.ac.uk](mailto:as899@cam.ac.uk)) or Dr Jamnik ([mateja.jamnik@cl.cam.ac.uk](mailto:mateja.jamnik@cl.cam.ac.uk)).

Everyone interested in this studentship will need to apply to the University via the usual route, specifying they wish to apply for the **PhD in Education** (Graduate Application Form on the Graduate Admissions page: <https://www.graduate.study.cam.ac.uk/how-do-i-apply>). Please ensure you indicate that you wish to be considered for funding in the Funding section of the online application form.

After you have submitted your application form, you will upload your **written statement** via your Self-service account. Please label your statement at the top “Designing Interactive Virtual Classroom Environments to Support Teacher Learning of Proof-related Instruction in Mathematics,” so that it is clear you wish to apply for this source of funding. The statement should be no longer than 1,500 words (excluding references) and should outline (1) your ideas about how you may address the three research questions in the project description and (2) why you think you are well positioned to conduct this research.

The **closing date** for applications will be **5 December 2018**.