

Einstein-First: Modernising School Science

Every student has the right to share our best understanding of the physical universe

PhD, EdD or Master's by Research positions

**University of Western Australia, Curtin University, Flinders University,
University of Southern Queensland, Australian National University**

*Opportunity for PhD, EdD or Master's by Research in an exciting education
project designed to measure the impact of teacher upskilling in Einsteinian Science
on STEM subject choices and career outcomes*

Overview

Einstein-First aims to bring the revelations of modern scientific discoveries to everyone through radical restructuring of the science education curriculum from primary to middle school. Currently, programs are running in 55 primary and secondary schools, taught by teachers who have been upskilled in Einstein-First professional development programs.

This project aims to evaluate and optimise Einsteinian physics professional development and obtain evidence that the modern program introduced by Einstein-First improves student knowledge of contemporary physics and attitudes to science, leading to increased numbers of students choosing STEM career pathways.

There is worldwide recognition of the need to modernise science education to align it with the modern “Einsteinian” conception of space, time, matter, light, and gravity. In previous years, the Einstein-First team developed and trialled an eight-year Einsteinian physics curriculum spanning from Year 3 to Year 10, called *Eight Steps to Einstein's Universe*, combined with an innovative approach to mathematics education called *Maths for Einstein's Universe*. See www.einsteinianphysics.com. The primary segment culminates in *climate science* (Year 6) and *climate to cosmology* (Years 9-10).

In the newly funded five year Australian Research Council Linkage project, the team plans to a) evaluate and further develop teacher professional development and upskilling programs of modern physics including our new micro-credential courses, b) assess their effectiveness in equipping teachers with the conceptual knowledge, understanding and confidence to deliver Einsteinian science,

and c) evaluate the impact of Einstein-First on students' knowledge of these modern concepts and attitudes toward learning science, and potential effects on their STEM career choices.

We are seeking PhD and Master's students with a background in modern physics (including quantum physics and relativity), strong interest in science communication, experience in science teaching and aptitude in quantitative and qualitative data analysis.

Research projects will involve

- (i) **Evaluation and optimisation of our professional development programs:** The postgrad student will examine factors that influence the impact of professional development and its dissemination to other teachers in Einsteinian physics that take place through micro-credential courses using selected assessment instruments. The postgrad student will research teachers' views of the professional development in Einsteinian physics that takes place through micro-credential courses and whether these influence their teaching efficacy and attitudes towards teaching science using selected assessment instruments.
- (ii) **Evaluation of Primary or Secondary students' conceptual understanding of and attitudes towards modern physics concepts:** The postgraduate student will analyse how Year 3 to Year 10 students respond to learning Einsteinian physics when it is delivered by a teacher who is upskilled in this area. The postgraduate student will also assess the impact of modern science concepts on the students' attitudes towards physics.
- (iii) **Tracking subject choices beyond Year 10 of students who undertake Einstein-First programs:** The postgraduate student will track primary and secondary students to evaluate how their attitudes change as they advance through year levels. The postgraduate student will also assess students' choice of subjects to determine whether teaching Einsteinian physics impacts their career choices in STEM, using the validated STEM Career Interest Survey Tool. Additionally, the postgraduate student will identify barriers to girls' participation in physics and STEM and examine how teachers upskilled in Einsteinian physics can attract more girls, including those from minority groups and diverse cultural backgrounds, into physics.

In joining this project, you will be helping to create a revolutionary new school curriculum consistent with our modern understanding of the universe that is relevant to the modern technologies that have revolutionized our lives, and one that is focussed on innovations needed to face the challenges of the future.

Research will be taking place in Western Australia, Canberra, Queensland, South Australia and Northern Territory at linked schools. Postgraduate positions can be supported at The University of

Western Australia (UWA), Curtin University, Flinders University, University of Southern Queensland and The Australian National University. Students will need to identify a topic relevant to the types of projects outlined above and separately enrol in Master's or Doctoral programs at one of these institutions according to discussions with team members. The project is managed by UWA at our Einstein-First facility. Postgraduate students enrolled in other universities will have the opportunity to work with the team at UWA while undertaking research led from their home university.

Requirements: Australian permanent residents need to satisfy entrance requirements for postgraduate enrolment which ideally will include ability to secure a scholarship at UWA or the other participating universities. Part-time Master's, EdD or PhD positions will be available to teachers who wish to conduct research in conjunction with their classroom teaching.

Non-Australian residents are liable for high cost international student fees. Only exceptional students (top 5% category) with several international publications have the chance of securing an IPRS scholarship. Students outside of the top 10% category have little chance unless their research experience and publications are exceptionally well aligned with the project.

Application instructions

Candidates should submit:

- a letter of interest explaining why you are interested in this project and how you will contribute using your previous knowledge
- Detailed CV
- contact information for two academic referees

Please send all the required documents to Jyoti Kaur at Tejinder.kaur@uwa.edu.au

For more information

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