Workshop: STEM Education Innovation by the Lake 2025

9th – 14th August 2025, University of Cumbria, Ambleside, UK.

Recent years have seen an explosion of new insights from the science of how people learn, with radical implications for university learning and teaching. The research has highlighted how different educational elements are best combined to help students become independent thinkers in the domains of science, technology, engineering, and mathematics (STEM).

This intensive training, by scientists for scientists, will bring together beginners and advanced instructors, as well as emerging education researchers, across a wide range of STEM subjects. It will offer an integrated vision of science education for the 21st century by the combination of the following sessions:

The *Active Futures in STEM Education* sessions will provide with an introduction to the latest research on how students learn. It will take a hands-on approach, applying evidence-based ideas to the instructional activities created by the participants, and giving help and feedback on practical implementation focused on inclusivity and new technologies.

The *Qualitative and Quantitative Methods of STEM Education Research* sessions will teach how to conduct education research on teaching innovations. Participants will learn how to identify, design and develop education research projects, collaborate ethically, and evaluate the effectiveness of instruction.

Workshop topics:

Active Futures in STEM Education

- *Students' Identities* and *Sense of Belonging* for inclusive learning.
- *Knowledge Organisation* as a learning accelerator.
- *Motivation* for learning: where value, expectancy and action meet.
- *Practice and Feedback* that enhance learning.
- Effective *Assessments* of/for/as learning.
- Empowering students through *Self-directed Learning.*

Qualitative and Quantitative Methods of STEM Education Research

- Research questions. Study design. Ethics.
- Interviews. Observations. Data processing.
- Emergent Coding of Qualitative data.
- Descriptive and Inferential analysis.
- Exploratory and Confirmatory Factor analysis.
- Item Response Theory. Rasch analysis.

New Technologies in STEM Education (Invited speakers), *GenAI, Extended Reality* in STEM Education.

Instructors: Andrea Jiménez Dalmaroni, Cardiff University, UK.
Italo Testa, University of Naples "Federico II", Italy.
Ben Zwickl, Rochester Institute of Technology, USA.

Registration by 20th July 2025
www.iop.org/events
Places limited!
Early registration advisable.

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