



PhD Program between the Freie Universität Berlin (FUB) and the China Scholarship Council (CSC)

Open PhD Position at Freie Universität Berlin, offered only to Chinese CSC scholarship candidates 2025

Department/Institute: Department of Physics

Subject area: Physics Education Research

Name of Supervisor: Marcus Kubsch

Number of open PhD positions: 1

Type of the PhD Study: Sandwich-Model

<u>Project title:</u> Understanding the usage of AI in contemporary research in the sciences and its implications for science teaching and learning

PhD Project description:

The increasing integration of Artificial Intelligence (AI) in scientific research is revolutionizing how we approach problem-solving, data analysis, and innovation. However, its rapid adoption presents challenges for science teaching and learning. This project aims to explore how AI is used in contemporary scientific research and its implications for education. As AI tools reshape scientific inquiry, it is crucial to prepare future scientists and educators to critically understand and utilize these technologies. This involves addressing gaps in educators' AI literacy and developing teaching strategies that integrate AI's potential while fostering ethical awareness. By analyzing current AI applications in research, this project will identify trends and skills necessary for the next generation of scientists. Simultaneously, it will evaluate how these advancements can be translated into engaging, effective teaching practices that enhance students' learning and critical thinking. This work will contribute to building an education system that equips learners to thrive in a world increasingly shaped by AI.

Language requirements:

• IELTS: 6,5 oder TOEFL: 95 ibt

Academic requirements:

- Bachelor's Degree in a relevant field such as science education, computer science, AI, physics, or another natural science discipline.
- Master's Degree in education, science communication, educational technology, or a STEM field.
- foundational knowledge of artificial intelligence and machine learning principles.
- Familiarity with science research methodologies, including experimental design and data analysis.
- Understanding of pedagogical theories and strategies for teaching and learning in STEM education.
- Experience with quantitative and qualitative research methods.
- Strong academic writing skills for publishing and reporting findings.
- Capacity to critically analyze trends in AI usage within scientific research and their broader educational implications.

Information of the professor or research group leader (website, awards etc.):

https://www.physik.fu-berlin.de/einrichtungen/ag/ag-kubsch/index.html

My work focuses on three main areas: Learning Progression Analytics, uncertainty & research methods.

Learning Progression Analytics is a developing area of work where we use artificial intelligence techniques such as machine learning and natural language processing to build the basis for scaling personalized learning for all learners.

Uncertainty is everywhere is science and developing an adequate understanding of it is challenging. In this area we work on better understanding how people can learn about uncertainty effectively.

Learning about physics and science more generally is complex. Doing research about this is also complex and demands the deliberate, careful use of research methods. I'm particularly interested in overcoming the divide between qualitative and quantitative methods using methodologies inspired by distributed cognition and network epistemologies such as computational grounded theory (CTG).

Marcus Kubsch has been awarded with prizes from NARST and the German society for physics and chemistry education research for his work on AI in the context of science and physics education (research).

Please note:

In a first step, the complete application should be uploaded to the online portal (<u>https://fuberlin.moveon4.de/form/60acfece5d328710e40bdbd5/eng</u>) for evaluation by January 15th, 2025.