

## Faculty of Science and Engineering

**Profile report:** *Tenure-Track Assistant Professor STEM education*

- Discipline: *STEM education*
- Level: *tenure-track assistant professor*
- Fte: *Full time (1,0)*

### 1. Scientific discipline

STEM (Science, Technology, Engineering, Mathematics) education is primarily concerned with the theories, tools, methods, and approaches that facilitate the practice of STEM or the study of STEM through an interdisciplinary approach. As such, the field engages with questions related to STEM literacy, STEM thinking, problem-solving, critical thinking, instructional practices, embodied cognition, multimodality, inclusivity as well as connections between STEM disciplines.

### 2. Vacancy

This position is opened by the Board of the Faculty ([PT/gl/22/00622](#)) and will be embedded in the Center for Learning and Teaching basic unit Institute for Science Education and Communication The position falls within the framework of 'Career Paths in Science 4' ('Bèta's in Banen 4'). Please see link for [criteria and conditions](#).

### 3. Selection committee (BAC)

1. Prof. Lucy Avraamidou (chair), Director of the Centre for Learning and Teaching, Professor of Science Education and Communication
2. Lemke Kraan, programme director of the Science Education and Communication master's programme
3. Marit Bonne, master student and member of the programme board of the Science Education and Communication master's programme
4. Prof. Marcello Seri, Associate Professor of Mathematics, Bernoulli Institute for Mathematics, Computer Science and Artificial Intelligence
5. Prof. Michelle Helms-Lorenz, Associate Professor of Education, Faculty of Behaviour and Social Sciences, University of Groningen
6. Prof. Dimitris Stavrou, Professor of STEM Education, University of Crete, Greece
7. Prof. Christina Siry, Full Professor of Science Education, University of Luxembourg

Advisor: Danielle Eggen, HR advisor, University of Groningen

#### **4. Research area**

The Center for Learning and Teaching (CLT) at the Faculty of Science and Engineering aims to enhance the quality of education across the science disciplines: Science, Technology, Engineering and Mathematics through theory-informed and evidence-based approaches. Mathematics education research cuts across all these disciplines, especially through its focus on problem solving skills, and provides the tools for interdisciplinary approaches to teaching and learning, which is a priority goal of the CLT.

The Institute for Science Education and Communication currently focuses primarily on research in the areas of science education and science communication and it aims to widen its research portfolio through the enhancement of research in mathematics education. The ultimate goal is to shape the nature of teaching and learning in various courses that incorporate mathematical thinking and skills and to promote educational innovation across study programs.

STEM education is primarily concerned with the theories, tools, methods, and approaches that facilitate the practice of STEM and STEM learning and teaching. Research in STEM education might address different interrelated themes: pedagogies, curriculum and assessment, policy and equity, and professional development. As such, the field engages with questions related to the design of STEM learning environments, STEM literacy, STEM thinking, problem-solving, critical thinking, instructional practices, embodied cognition, multimodality, inclusivity, as well as connections between STEM disciplines. Methodologies might include quantitative methodologies (e.g. social network analysis), qualitative methodologies (e.g. life-stories, gesture-based research, conversational analysis) as well as mixed-methods approaches.

#### **5. Embedding institute**

The Institute for Science Education and Communication (ISEC) is an interdisciplinary, superdiverse research group with experts in science, mathematics, and engineering education and communication. The overarching goal of the Institute is to contribute towards the quality of science and engineering education in schools and the university through the design, implementation and evaluation of theory-informed and evidence-based curriculum materials. Areas of research interest and expertise include: community-based and after-school science engagement programs, training of teaching assistants in physics, innovative teaching practices in mathematics, the use of augmented and virtual reality in science, interdisciplinary approaches to teaching, the use of Artificial Intelligence in science education, as well as social, cultural, and gender issues in science.

ISEC is embedded in the newly established Center for Learning and Teaching which aims to enhance the quality of education at the Faculty of Science and Engineering through

course design, teaching innovation, research, and professionalization. The candidate will contribute towards this effort through the research area of mathematics education which might include research on mathematical learning processes, design of learning environments and pedagogical tools, mathematical epistemology, identity, language, embodiment, multimodality and inclusivity. Furthermore, the candidate is expected to enhance existing teaching and research collaborations with instructors in the mathematics bachelor program and especially with assistant professors in mathematics with an education profile, for the purpose of enhancing the quality of mathematics education at FSE.

## **6. Local and (inter)national position**

The Center for Learning and Teaching aims to respond to global calls for reform in Science, Technology, Engineering and Mathematics (STEM) education with a focus on meaningful learning that addresses global socioscientific challenges. ISEC, the research unit of the center, collaborates with research groups in different parts of the world that carry out research at the intersection of STEM, education, and society. Through European funding, the team is involved in various projects relating to STEM education across contexts (e.g., EU-H2020 MAMMOTH, 2019-2023; EU-H2020 OTTER, 2021-2024; EU-Erasmus+ STAGE, 2022-2024). ISEC staff work in international collaborations across continents, but also with other research institutes at the Faculty, different research groups in FSE (mathematics, physics, engineering, artificial intelligence) and the wider University like ScienceLinX, the Aletta Jacobs School of Public Health, local companies and NGOs.

The candidate is expected to build upon these existing networks and create new ones and play a central role in teaching and research specifically related to mathematics education research.

## **7. Expected contributions to research**

The candidate is expected to extend their research experience in the area of mathematics education. The research should lead to publications in top international journals. (Co)-supervision of PhD students is an important part of the envisioned research activities, as well as supervision of bachelor's and master's projects. Nationally as well as internationally, the candidate should maintain strong connections with other research groups in mathematics education. Within Groningen, the candidate is expected to form collaborations with researchers at ISEC and the Bernoulli Institute for Mathematics, Computer Science and Artificial Intelligence, for designing mathematics courses, carrying out impact evaluation research studies as well as with researchers at other institutes for the purpose of establishing interdisciplinary research-based mathematics education projects. For this, funding should be obtained from e.g., Horizon Europe, Erasmus, NWO/NRO and Comenius grants.

## **8. Expected contributions to teaching**

The candidate will teach one course in the Bachelor's program in Mathematics, one course in the master's program Science Education and Communication and engage in supervision of students' scientific projects in the same program. The candidate's research is expected to contribute towards the enhancement of the quality of teaching and learning mathematics in different degree programs and to promote educational innovation within the Faculty.

The Faculty of Science and Engineering (FSE) harbours a kaleidoscope of disciplines and research strengths. We offer 14 Bachelor's and 26 Master's degree programmes, English-taught, allowing international students to follow all course units. These programs range from nanomaterials and bio machinery to astronomy, from mathematics to pharmacy, from neurosciences to computer science, and from molecular and evolutionary biology to marine biology.

The two-year MSc-programme Science Education and Communication caters to students with a BSc in science, mathematics or engineering, and trains them to become either a science teacher in high school or a professional in the broad field of science communication

## **9. Expected contributions to the organization**

The candidate is expected to have an active interest and to provide a positive contribution to the management and organizational tasks of the Center for Learning and Teaching, the Institute for Science Education and Communication and the Faculty by participating in working groups and committees, in the fields of teaching, research and management. The candidate will participate in relevant national and international organizations.