

ICSE Newsletter

No. 1 (July 2017)

Foundation of ICSE – the first International Centre for STEM Education

ICSE, the **International Centre for STEM Education (STEM: Science, Technology, Engineering, Mathematics)**, has recently been founded by the **University of Education Freiburg in Germany**. The centre aims to promote innovations and continuous improvements in STEM Education in Europe and beyond. Its focus to achieve this is unique: Based within the research community in STEM education, the **centre's research and dissemination activities** are focused on the testing and development of approaches, teacher materials or guides that speak to the needs of the STEM teaching community and which can be readily used in day-to-day classroom settings. Having this focus, ICSE is the **first university-based international centre dedicated to linking research and practice in STEM education**.

As reflected in the name – the international perspective is core to our activities. Prof. Dr. Katja Maaß, Director of ICSE, explains:

Despite internationalisation, in the nationally regulated field of education, we still run the risk that too many insights or approaches remain that influence only regional enclaves. And there is also the risk that what we produce – be it research or teacher materials – is of good quality, but still not of the best possible quality that could have been achieved if one were to cooperate with the best in the field. We owe the best approaches to STEM students in schools across Europe and therefore international collaboration in STEM education is simply a must.



ICSE has therefore also initiated the **foundation of an International Consortium for STEM Education**. The **ICSE Consortium comprises leading institutes from across Europe** that all have a unique focus in their research in STEM education: one that takes aspects of transfer into day-to-day teaching into account from the very beginning of the research and development process.

More information about the International Centre for STEM Education: www.ph-freiburg.de/icse

Save the date:

ICSE and ICSE Consortium Official Inauguration
18 January, 2018 | University of Education Freiburg | Germany

Inauguration ceremony of ICSE and the ICSE Consortium

ICSE, the International Centre for STEM Education and the newly founded ICSE Consortium of leading STEM education research and development institutes are proud to invite you to their official inauguration. It will take place with a **festive ceremony on 18 January, 2018 in Freiburg in Germany.**

International and regional audience from STEM education **research, policy, practice and industry** will be gathering for this celebration. The programme is designed to give the audience insights into the **role and activities of ICSE and the ICSE Consortium, into current trends in innovative schools, and into international research and development projects pursuing new frontiers.** For example, visitors will have the chance to connect to a new community working on the 'extension' of the inquiry-based learning approach so that it can fully incorporate achievement-related diversity and cultural diversity and the learning of fundamental values in multicultural STEM classrooms.

We unfortunately have to limit places, please informally register for participation at:
icse@ph-freiburg.de

Hugh Burkhardt, professor emeritus at Nottingham University and winner of the 'Emma Castelnuovo Award for Excellence in the Practice of Mathematics Education' in 2016 on the foundation of ICSE and the ICSE Consortium:



Most educational research around Germany and the world is diagnostic, studying how things work. It is now increasingly recognised that progress in educational practice depends on having more 'treatment' focused research and development, like in medicine and engineering.

The University of Education Freiburg is one of only a handful of universities around the world that does this 'engineering research in education' in a professional way – and the only one that specialises in R&D on professional development. There is a unique opportunity, by creating a permanent Centre for innovation in STEM education here, to gain recognition over the next five years as a world leader in this critical field.

Connecting STEM Education and learning for inclusive, multicultural societies

One of ICSE's main foci currently generates invariably high interest among our different stakeholders: It is **the aim to make science literacy a reality for *all* students – regardless of gender, cultural or socio-economic background**. This focus takes account of the societal challenges in an increasingly diverse Europe: In many European countries students with migration or low socio-economic backgrounds are underperforming in science and mathematics. They are thus at the risk of exclusion, vulnerable to marginalisation and possible negative consequences, such as extremism, and these are long-term threats to Europe's stable, socially cohesive societies. ICSE's work in this area offers a constructive contribution for tackling these inequalities in STEM education.



What **prospective and practicing teachers dealing with diverse and multicultural classrooms** need is not only **excellent specialist knowledge, but also the ability to cope with language barriers, culturally different preconceptions about science and highly varying performance levels** in their classrooms. Teachers of all subjects also need sensitivity regarding the role that (culturally coined) choices of context have in the teaching and learning of a subject matter. Further,

teachers need the ability to promote social skills and civic competences in order to empower young people – especially students with migration or low socio-economic background. However, at present, **neither initial nor in-service teacher education programmes are adequately preparing teachers for these challenges**. This is especially true for teachers of maths and science, as their curricula are largely subject-oriented and often lack a wider societal perspective, or this perspective has only recently been introduced and not yet widely implemented.

ICSE's **international research and development projects IncluSMe and MaSDiV** (both co-funded by the Erasmus+ programme) aim to improve **teacher preparedness to deal with the affordances of STEM education in diverse and multicultural classrooms**. IncluSMe targets initial teacher education and MaSDiV in-service teacher professional development (PD). Both projects focus on **enriching current STEM education approaches with aspects, for example multicultural perspectives, suited to promoting science and maths literacy for all students, including in particular those from 'different' cultural backgrounds**. Both projects also aim at scaling-up successful measures across Europe so that STEM education can maximise its contribution to civic participation and professional success of the young generation in Europe.

Get more information about our projects IncluSMe and MaSDiV that connect STEM education with the learning for inclusive societies and intercultural learning:
www.ph-freiburg.de/icse

Intercultural learning experiences for prospective science and maths teachers



The IncluSMe project (2016-2019) aims at **equipping prospective STEM teachers with the skills they need to deal with challenges of multicultural classrooms** by linking maths and science education with multicultural perspectives and intercultural learning!

What exactly do we do in the IncluSMe project?

Aside from the development of around **10 different 'mini-modules'** that lecturers will be able to **flexibly include in their teaching in initial science/maths teacher education programmes** (to be published 2018 onwards), IncluSMe will also offer international summer schools for science and mathematics teacher education students!

First-hand experiences and their preparation and reflection are indispensable factors in promoting intercultural learning. Our **carefully designed summer schools** are envisaged as door-openers for promoting the mobility of maths and science teacher education students on a larger scale.

For the participating universities, transnational cooperation and exchange is strengthened through this collaboration and we will thus jointly contribute to **making initial science and mathematics teacher education more open, international, as well as relevant and adapted** to the needs of diverse European societies.

More information about IncluSMe:
<http://inclusme-project.eu>

IncluSMe international summer schools

Two-weeks international summer school 2018 in Prague, Czech Republic for students of natural sciences in initial teacher education programmes

Two-weeks international summer school 2019 in Vilnius, Lithuania for students of mathematics in initial teacher education programmes

The programme offers students the opportunity to perceive and analyse different aspects of science and mathematics education in its relations with diversity. Students take part in lectures, workshops and a cultural learning programme, including visits to 'out-of-university learning places' and school excursions.

Are you interested or do you have interested students? Contact us: icse@ph-freiburg.de

Become part of the European Network of STEM Professional Development Centres

Dealing with an increasingly complex reality in class is a development which has accelerated in the last years and puts high demands on teachers. Thus, the **need for high-quality STEM teacher professional development** and the promotion of approaches that allow teachers to deal with complex classroom realities is vital.

This can also be seen in policy documents and reports, such as the science education report (Science Education for Responsible Citizenship, European Commission 2015). It is also evidenced by the recent trend in Europe to establish specialised PD centres to promote the professional development of STEM teachers. **Since 2014, these centres have been collaborating on a European level through the European Network of STEM Professional Development Centres, STEM PD Net.**



The aim of the network is to **consolidate and strengthen the position of STEM teacher professional development centres** both nationally and internationally, **through mutual learning and the exchange of research and good practices** and through developing ready-to-use guidelines and reference materials for providers of STEM teacher professional

development. This work of the network, which is currently also **supported by Erasmus+ project funds**, will also allow to improve the quality and relevance of STEM teacher PD.

STEM PD Net is currently represented by **30 institutions acting as providers or hubs for teacher professional development in the STEM subjects**. The members come from 12 different European countries and are specialised STEM PD centres and other institutions with similar roles, such as education institutes, industry-supported institutes, ministries of education, or education authorities. Network meetings – free of charge and open to new centres – take place ca. every six months.

Are you interested in transnational exchange to jointly enhance STEM teacher PD in your country and in Europe? We are happy to welcome new members! Join our next meeting!

7th Network Meeting, European STEM Professional Development Centre Network | hosted by INTEF, the Professional Development and Technology Institute of the Spanish Ministry of Education, Culture and Sport | 27-29 November 2017 in Madrid, Spain

European STEM PD Centre Network and project website: <http://stem-pd-net.eu>

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The projects STEM PD Net (2016-2019, grant no. 2016-1-DE03-KA201-023103), IncluSMe (2016-2019, grant no. 2016-1-DE01-KA203-002910) and MaSDiV (2017-2020, grant no. 2016 - 2927 / 003 - 001) are coordinated at the International Centre for STEM Education (ICSE) of the University of Education Freiburg.

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