

PROGRAMME

International Engineering Conference

“Attracting more students and educating well-trained engineers: sensible ways to advance the field of engineering education”

An international event organised by

Project nexus – concepts and good practice for studying and teaching

29/30 October 2012
Eventpassage
Berlin

Sponsored by:



Topics and objectives of the conference

The introduction of modular bachelor's and master's degree courses as part of European academic reform is, in the area of engineering studies, almost complete. In the process, engineering studies departments and faculties have been successful in carrying the high quality of the traditional degree courses over into the new programmes of study. Nevertheless, further academic development remains a challenge: Aligning teaching with the particular prior knowledge of the students, improving their academic success, and adjusting degree programmes to encompass the appropriate professional competencies. This transformation in engineering education will be discussed at the conference, along with various other issues, from both German and international perspectives i.a. in the workshops listed below:

- How are introductory phases of academic programmes successfully designed?
- How can subject-specific fundamentals be integrated and built upon (mathematics)?
- How can the risk that a student will drop out be identified in advance and prevented?
- How can students be actively involved in their courses?
- How can students be given more freedom in their studies and be motivated to learn independently?

Other topics that will be picked up in presentations and an expert discussion include:

- Changes in engineering education in Germany and Europe
- Using new technology as teaching tools
- The effects of "student engagement"
- Essential elements of engineering education.

The conference will be held in English.

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Monday, 29 October 2012

From 10:00

Registration

11:00-11:30

Greetings

Peter Greisler, Federal Ministry of Education and Research (BMBF)

Dr Knut Nevermann, Senate for Education, Youth and Science, Berlin

11:30-12:00

Presentations followed by Q&As

Stocktaking of engineering education in Germany: has there been a cultural shift?

Professor Dr Hans Jürgen Prömel, Vice-President of the German Rectors' Conference

Chair: Dr Thomas Kathöfer, Secretary-General HRK

12:00-13:00

Lunch break

13:00-13:45

What has changed? An international perspective on teaching and learning in the engineering sciences

Professor Dr Wim Van Petegem, Katholieke Universiteit Leuven, Belgium, President of the European Society for Engineering Education

13:45-14:15

Opencast Matterhorn - an open source lecture recording system

Professor Dr Oliver Vornberger, Osnabrück University

14:15-16:15

Parallel forums

Panel 1

The first semester(s)' experiences

Input 1: Professor Dr Mats Hanson, KTH Royal Institute of Technology, Stockholm, Sweden

Input 2: Professor Dr Manfred Hampe, Technical University Darmstadt

Panel chair: Professor Dr Marco Winzker, Bonn-Rhine-Sieg University of Applied Sciences

Panel 2

Students' prior knowledge of mathematics

Input 1: Professor Dr Duncan Lawson, Coventry University, UK

Input 2: Professor Dr Herold Dehling, Ruhr University Bochum

Panel chair: Professor Dr Burkhard Alpers, Aalen University of Applied Sciences

Panel 3

Student drop-out

Input 1: Dr Jens **Bennedsen**, Aarhus University School of Engineering, Denmark

Input 2: Dr Norbert **Völker**, Verband Deutscher Maschinen- und Anlagenbau - German Engineering Federation

Panel chair: Professor Dr Eva-Maria **Beck-Meuth**, Aschaffenburg University of Applied Sciences

Panel 4

Teaching and learning in dialogue

Input 1: Professor Dr Karl A. **Smith**, University of Minnesota, USA

Input 2: Professor Dr Christian **Kautz**, Hamburg University of Technology

Panel chair: Professor Dr Peter **Riegler**, Ostfalia University of Applied Sciences

Panel 5

Self-study

Input 1: Professor Dr Johann **Haag**, St. Pölten University of Applied Sciences, Austria, and Dr Christiane **Metzger**, Project ZEITLast

Input 2: Professor Dr Daniel **Schilberg**, RWTH Aachen University

Panel chair: Lars **Funk**, The Association of German Engineers

16:15-16:45

Coffee Break

16:45 - 17:30

"Engineering Education: the Need for Transformation and Innovation"

Dr Tony **Marjoram**, consultant, former Senior Programme Specialist and Head of Engineering, Division of Basic and Engineering Sciences at UNESCO, Australia

Chair: Dr Thomas **Kathöfer**, Secretary-General HRK

18:30

Dinner

Tuesday, 30 October 2012

9:00-10:00 **Students' activities as a means for measuring success in teaching and learning**

Professor Dr Alexander C. **McCormick**, Director, National Survey of Student Engagement (NSSE), USA

10:00-11:00 **"Engineering Attractiveness"**

Professor Dr Mervyn **Jones**, Imperial College London, UK

11:00-11:30 **Coffee break**

11:30-12:30 **Expert discussion: engineers of the future**

Knowledge is expanding, interdisciplinary connections are becoming more complex, and engineers face an increasingly diverse world of work. Experts will discuss answers to the crucial question: "What and how much should engineers know and be capable of doing by the time they graduate?"

- Professor Dr **Olivier Bonnaud**, University of Rennes 1 and Supelec, France
- Professor Dr Mervyn **Jones**, Imperial College London, UK
- Dr Frank Stefan **Becker**, Corporate Communications and Government Affairs, Siemens AG
- Dr Tony **Marjoram**, consultant, former Senior Programme Specialist and Head of Engineering, Division of Basic and Engineering Sciences at UNESCO, Australia
- Edith **Hansmeier**, Cologne University of Applied Sciences
- Nuno Helder **Silva**, Board of European Students of Technology, Stockholm, Sweden

Moderator: Jan-Martin **Wiarda**

13:00-13:15 **Closing remarks**

Professor Dr Joachim Metzner, Vice-President of the German Rectors' Conference

13:15 **End of the conference and lunchtime snack**

Panel abstracts

Abstract for Panel 1:

The first semester(s)' experience

During the first semester(s), the main issue is how students' individual expectations match up to those of the institution. In particular, universities nowadays are expected to design their introductory periods to ensure that students will succeed in their studies. During the panel workshop, we will discuss the many questions resulting from this:

- Is the composition of the student body attending university today more diverse (students from disadvantaged backgrounds, immigrants, international students, students with families, students with prior work experience, etc.) than before and how should engineering departments reflect this diversity?
- Are students entering university today less educated or less well prepared than in the past? (Do secondary schools today adequately prepare a student to study engineering? Are there new skills that beginning students possess today that previous students did not?)
- How can introductory periods be successfully designed? What can teaching staff offer and what must students contribute?
- What measures go beyond typical teaching duties, and who is responsible for them?

Abstract for Panel 2:

Students' prior knowledge (in mathematics)

A student's prior knowledge of mathematics in particular is a critically important prerequisite for studying engineering sciences. A student's ultimate academic success is decided by whether or not they begin their engineering studies with enough previous knowledge of mathematics. Despite this, incoming students increasingly appear to arrive at university with insufficient prior knowledge of math. In this panel, we will discuss the following questions:

- Are students entering university with less knowledge of mathematics than before or are the expectations greater than before?
- How much mathematical skill must an engineer have?
- How can students be motivated to take on supplementary courses?
- Which courses teach mathematics most effectively and when should such courses be offered?

Abstract for Panel 3:

Student drop-out

Student drop-out rates in the engineering sciences are high. The explanations for this are complex and solutions are hard to find. To maintain expertise in this field, Europe and Germany still need large numbers of talented graduates in the engineering sciences. Participants in this panel will focus on the following questions:

- Does the high drop-out rate in the engineering sciences contribute to maintaining the high quality of an engineering education?
- Why are engineering students dropping out?
- Which measures prevent a student from dropping out?
- What role can teaching staff play in preventing students from dropping out?

Abstract for Panel 4:

Teaching and learning in dialogue

For a long time, the lecture was held to be the most important format for teaching, and it offers the best way to teach large groups of students. Ever since research has shown that direct frontal presentation of teaching material contributes very little to a student's in-depth acquisition of that material, the conventional lecture format has come under criticism. In this panel, we will discuss the following questions:

- Why should students attend lectures and actively participate in them?
- Do lectures provide a format for teaching in which students can actively participate, and reflect and build upon existing knowledge? Or should the conventional lecture format be done away with?
- How can courses be designed to establish a dialogue between teacher and student?
- What learning methods could be applied in the process of establishing this dialogue, and how can new media contribute to this goal?

Abstract for Panel 5:

Self-study

Since the Bologna Process, the time for self-study has been incorporated into the calculation of credit points for each module. This means that students should be engaging with the materials and methods of their disciplines outside classroom hours and that teaching staff should assist in planning this learning. Learning outcomes should therefore be set for self-study, and students should receive guidance to that end as well as obtain feedback on their progress. Some questions arising from this, which we will discuss in the workshop, include:

- Is there a culture of autonomous and independently-organised learning in engineering studies? What characterizes this culture?
- How can classes and self-study be usefully interwoven, organised and structured in terms of content?
- What is expected of students outside of classroom-based learning activities and to what extent is self-study useful?
- What role do teaching staff play in self-study?

Registration

Please use the online registration: www.hrk-nexus.de/international-engineering-conference. **Latest booking possibility** for this free of charge conference is **19 October 2012**.

Participation is limited. Registrations will be accepted in the order of their arrival.

Please do not organise your trip until you have received your confirmation.

Contact persons:

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Location plan:

<http://www.eventpassage.com/de/anfahrt-lage.html>



Hotel recommendations:

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+49 (0)30 31517360
69 € per Room / Night

[Berlin Astoria am Kurfürstendamm](#)

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