Materials Education SYMPOSIA 2017

9th International Symposium Report

University of Cambridge, UK, April 6-7, 2017

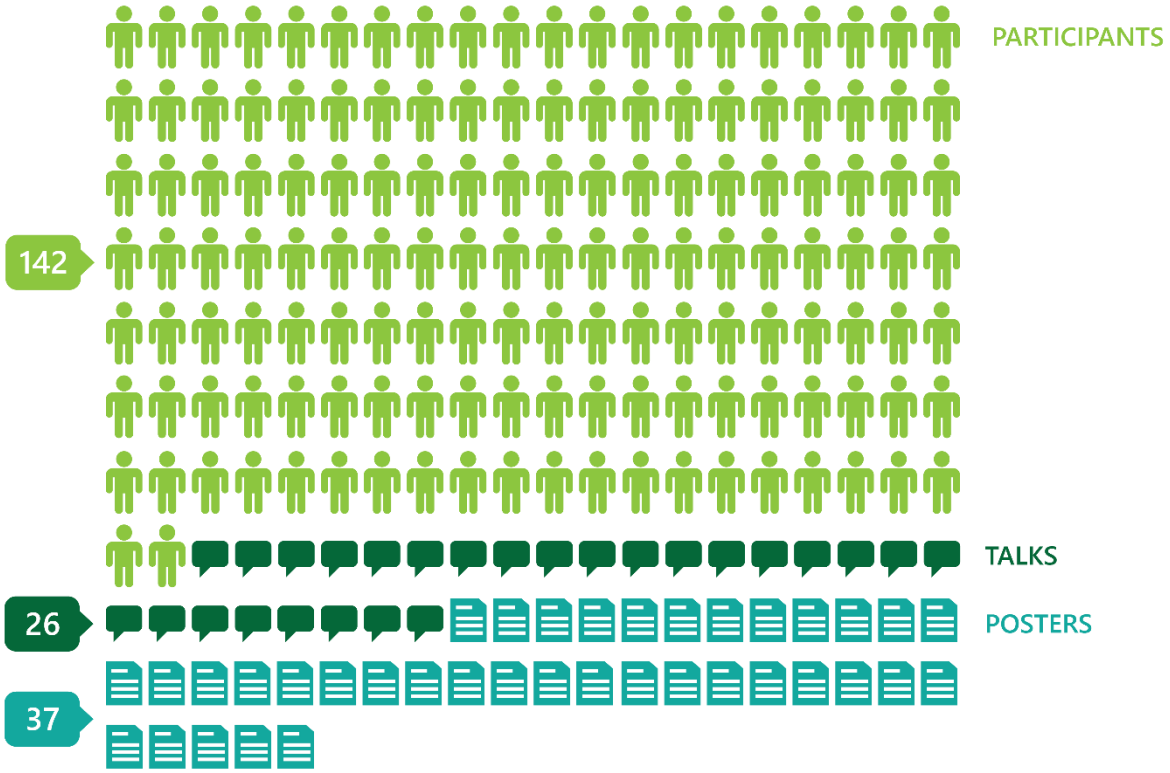
www.materials-education.com

The 9th International Materials Education Symposium (IMES) was the biggest to date, with 142 participants from 22 countries playing a full part in two days of stimulating discussion.

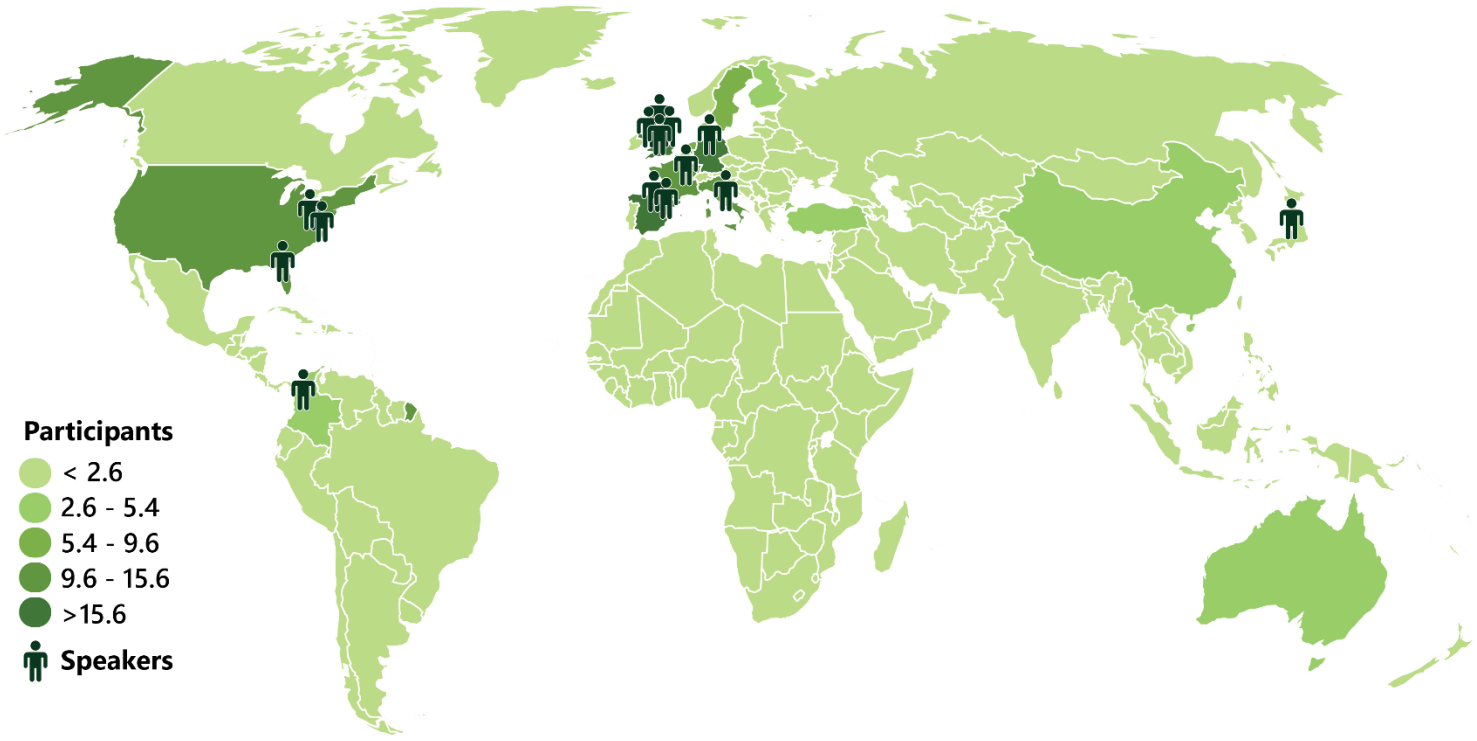
The Symposia have three main aims:

- to share ideas, innovations, experiences, successes and failures
- to provoke productive discussion around these issues
- to expand the links that form such a key feature of the Materials Community.

The Symposia in numbers



Origin of the attendees in IMES 2017



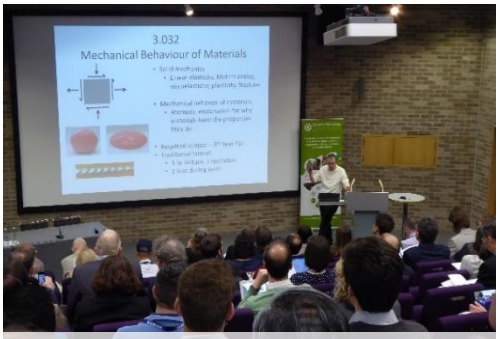
Overview by Mike Ashby

(University of Cambridge and Granta Design)
Chair of the Symposia Academic Advisory Committee

Welcome Address

These Symposia on Materials Education continue to grow in size, diversity and quality. The 9th International Materials Education Symposium, was held at Clare College, Cambridge. It was the biggest and, to my mind, the most diverse and far-reaching thus far. I won't attempt to describe all the talks but rather try to convey a sense of the breadth and range of the talks and the discussion. Here are some examples.

The term MOOC (Massive Open On-line Course) was coined in 2008, but the concept first gained real traction in 2011 with Stanford and MIT offering to distribute course material free of charge over the internet. Early MOOCs tended to be little more than course notes on-line but it quickly became apparent that a more professional approach, requiring substantial investment, was needed to provide an effective educational environment. This environment began to take shape in 2012 with the emergence of the platforms such as Udacity, Coursera and MITx. Since then MOOCs have evolved into a sophisticated educational structure that is changing the shape of teaching both inside and outside the universities in which they originate. Just how sophisticated emerged from the talks by **Lorna Gibson** and **Jessica Sandland**, working with MITx, **Mark Miodownik**, working with the BBC, **Mark Endean**, working with the Open University and **Javier Orozco Messana**, working with the Universitat Politecnica de Valencia in Spain.



Lorna Gibson

The afternoon of Day 1 opened with an experiment: a debate with two speakers followed by open-floor discussion on the subject "Undergraduate Materials Teaching: have we got it right?". Why a Debate? The subject we teach is evolving, the context is changing (the MOOC is just one example) and – in most nations – the cost to both the tax-payer and the student is rising. Universities in the old world have established reputations for education, research, employment and influence, but they are also perceived by some to have accumulated huge inertia – an inability to change direction. Is radical change only achievable by creating new universities that start with a clean slate? The case for change was ably expressed by **Angela Dean**, with first-hand experience of the planning for NMiTE (New Model in Technology and Engineering), a new University with novel teaching methods. The established system was defended by **Sybrand van der Zwaag**. The resulting debate was lively, engaging and exciting, stimulating the most active discussion of the Symposium.

The rest of the first afternoon contrasted the differing approaches to materials education in Sweden (**Maria Knutson Wedel**), China and Western Europe (**Sybrand van der Zwaag**), Japan (**Koichi Ohtomi**) and France (**Alexandre Mege-Revil** and **Amina Tandjaoui**). The session ending with a delightfully original way to introduce students to issues of health and safety, using chocolate as the exemplar material (**Joanna Bates**).

The morning of Day 2 focussed on attracting students into Materials (**George Smith**) and providing them with an education that meshed with the needs of industry (**Karen Pantleon**, **Luc Salvo**, **Laura Katharina Thurn**, **Steffan Ritter**, **Paul Eason** and **Jose Ygnacio Pastor**). The emphasis here was on developing products from the design stage through material and process selection, prototyping to final production, in close collaboration with industrial partners. The importance of introducing students to the realities of production engineering and to new technologies such as additive manufacture was emphasized.

Sybrand van der Zwaag and Angela Dean

Materials and Product Design is a recurring theme of past Symposia. The challenge is to bridge the gap in language and thinking-processes between Industrial Design, Engineering Design and Architecture. Talks on these topics are always liberating, detaching the experts on each field from their comfort zone to explore the others' territory. The session started with a central tool of Industrial Design, the Materials Library (**Gerhard Glatzel**), followed by descriptions of current initiatives at one of the great schools of Design for which Italy is famous: the Politecnico di Milano (**Barbara Del Curto**, **Valentina Rognoli** and **Camilo Ayala Garcia**). A recurring question arises here as in other fields of teaching: how much of what we teach will really be used by the student in later life? **Frederic Veer**, a master of the provocative talk, described a course to address this concern. Three distinct disciplines met during this final afternoon so is was appropriate that the final talk of the day (**Max Fickel**) proposed a blueprint for a Transdisciplinary Research Network, a kind of knowledge-exchange in Materials, Engineering and Design – a concept that resonated with many of the participants in this very stimulating meeting.

If you would like to find out more, you will find the full abstracts and presentations on the Symposium Archive website accessible through www.materials-education.com

Mike Ashby

Feedback

"I think that the quality of the talks is very high. There is an interesting mix of talks on design projects and how people are teaching courses. It's a very good mix – a session of talks for 90 minutes and good breaks with time to talk to people, to mingle and chat. People are very friendly, there are lots of opportunities for informal discussion. I have met some good new contacts that I will follow up with after the Symposium. I'm hoping that we can get a similar crowd [at NAMES, MIT, August 24-25, 2017] and equally good talks and interactions. MIT will be a good venue for it."

— Lorna Gibson (Massachusetts Institute of Technology)

"This is my first Symposium and it is very enjoyable and friendly. There is an openness that is in contrast to many scientific conferences where people present a cut-and-dried piece of research they have completed. They would often be reluctant to share what they planned to do next and they would be jealously guarding their ideas. Here, there is a genuine sharing of ideas and an exploration of new ways of doing things. People gain satisfaction if others take up their ideas. It's like working together in a large family team."

— George Smith (University of Oxford)

"This is my first Symposium, I expected a lot – and it has delivered. The atmosphere is really nice, meeting lots of people from different countries who work on the same topic. The sharing of experiences is one of the highlights. I have got lots of new ideas and met lots of new people. I'll be back again – and I will bring a colleague."

— Laura Thurn (Aachen University of Applied Sciences)

"After every Symposium, I go home with lots of ideas. Every time I come it is better than expected. Everyone is happy to share their experiences in an informal way. The presenters share not only their success, but also the problems and failures, so you know you are not alone in facing problems, and you learn from other people. I would recommend the Symposium to anyone."

— Barbara Del Curto (Politecnico di Milano)

"I've been to 8 of the 9 Cambridge Symposia and I was furious to miss one! I try to come every year because there is something new every year. It's very informal, friendly, and positive, you meet new people, and learn new approaches. In bigger conferences, you may only have a one-hour session on pedagogy – at the Symposium there are people who are interested in research, teaching and industry. It is in the genes of the Symposium, and it is down to the personality of Mike Ashby."

— Yves Brechet (University Grenoble Alpes)

"This is my third Symposium, and it is always like a breath of fresh air in a very busy period. There is interesting content and the people are very friendly. Most of them are active researchers and they are student-orientated. There is a great atmosphere and it is very good for networking. That's why I keep coming back – I've been here with academic colleagues and this year I am here with a post-doc student."

— Stephane Godet (Université Libre de Bruxelles)

"I've been involved in developing materials education since I was a graduate student. I've always wanted to come here but I was always busy teaching. This is the first year I have been at the Symposium and I was so happy to be invited to speak. The Symposium is so relevant to what I do for many reasons, there are no parallel sessions, people talk about materials but there are highly transferrable conclusions. I've got ideas that I want to go home and implement immediately, and I plan to come again."

— Maria Knutsen Wedel (Chalmers University of Technology)

"It's the only place I know where you are surrounded by people who are from the same subject community and who are wholeheartedly committed to improving the learning experience of their students. There is such dedication to the learning and teaching of materials education. Materials is the archetypal multidisciplinary subject, you have such a range of educators. The Symposium is always so inspiring – you go away with so many ideas of things you can do."

— Mark Endean (Open University)

"It's quite interesting to gather materials educators together as they are usually distributed in lots of areas, like product design, civil engineering, and mechanical engineering, and they are not all together in one materials departments. It's interesting to see examples of the pedagogies that are used, and the wide range of approaches on how materials should be taught, and to see how materials teaching is valued in different countries and institutions."

— Angela Dean (University of Derby)

Courses, posters, networking and social program

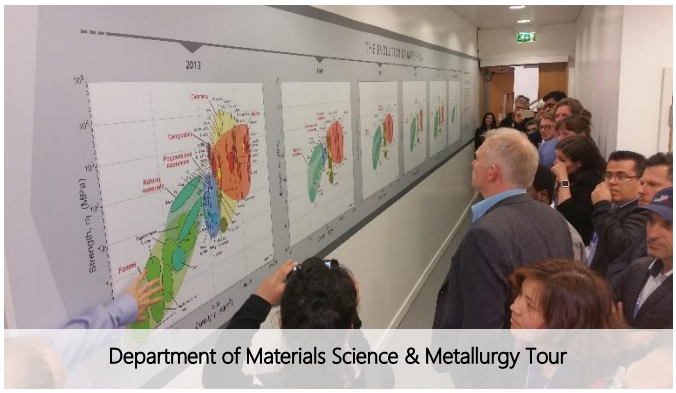
The main Symposium program was preceded by a CES EduPack course (led by **Mike Ashby** and **Claes Fredriksson**) and workshops on enhancing blended learning (led by **Mark Endean** from the Open University), sustainable development (led by **Mike Ashby** and **Tatiana Vakhitova**) and advanced materials selection with CES Selector (led by **Charlie Bream** from Granta Design). 40 Symposium participants joined these, picked up useful hints and tips, and explored aspects of these topics in detail. We are very grateful to **Noel Rutter**, **Jess Gwynne**, and the Department of Materials Science & Metallurgy who provided an excellent venue and support. Feedback from those that participated was very positive and we hope to offer additional workshops next year.

Poster Teaser Session

Lunch in the sun

The 'poster teaser' and one hour poster session was the strongest to date with over 30 posters. As in previous years this proved to be one of the highlights of the Symposium stimulating a great deal of discussion and providing excellent opportunities for networking.

Poster Session



Department of Materials Science & Metallurgy Tour

Participants enjoyed the Social Program, which offered the opportunity to meet friends from the growing Symposium community, or for first-time visitors to make new contacts. The Presenters' Dinner held at Clare College (founded in 1326) and the Symposium Dinner at Gonville and Caius College (founded in 1348), both provided relaxing environments in which to continue discussions.

Symposium Dinner

Final words by Marc Fry (Granta Design)

Secretary of the Symposia Academic Advisory Committee

Thank you to everyone involved in organizing the 9th International Materials Education Symposium and to all participants for making this Symposium a great success. Mike and I would particularly like to thank the International Academic Advisory Committee for their help in selecting a strong program from the many excellent submissions, the session co-chairs (**Maria Knutsen Wedel** and **Sybrand van der Zwaag**, **Lorna Gibson** and **Paul Eason**, **Mark Endean** and **Steffan Ritter**, **Noel Rutter** and **Mark Miodownik**) for creating an open and inclusive environment and **Hannah Melia** for moderating the inaugural Symposium debate.

We would also like to express our appreciation for the continued support of **our colleagues** from **Granta Design**, **ASM International**, the European Society for Engineering Education (**SEFI**), the Federation of European Materials Societies (**FEMS**), the International Federation of Engineering Education Societies (**IFEES**), The Minerals, Metals & Materials Society (**TMS**), and the Departments of **Materials Science & Metallurgy** and **Engineering** of the **University of Cambridge**.

We now look forward to working towards the next Symposia and are delighted to confirm the following dates and locations:

8th North American Materials Education Symposium (NAMES)
August 24-25, 2017, Massachusetts Institute of Technology, USA
Poster abstract deadline: May 31, 2017

10th International Materials Education Symposium (IMES)
April 12-13, 2018, University of Cambridge, UK
Talk abstract deadline: September 30, 2017

9th North American Materials Education Symposium (NAMES)
August 16-17, 2018, University of Michigan, USA
Talk abstract deadline: January 31, 2018

3rd Asian Materials Education Symposium (AMES)
December 13-14, 2018, Singapore University of Technology & Design
Talk abstract deadline: May 31, 2018

Marc Fry

We all look forward to meeting you at future Symposia!