Using STEM research conference: using research to improve teaching and learning of STEM subjects

Programme outline
Please note this programme is subject to change with names yet to be confirmed.

Friday 20 May

<table>
<thead>
<tr>
<th>Time</th>
<th>Sessions</th>
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<tr>
<td>10:00</td>
<td><strong>Registration and Coffee</strong> <em>(Atrium)</em></td>
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<tr>
<td>10:30</td>
<td><strong>Introduction and welcome:</strong> Pauline Hoyle</td>
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| 10:40 – 11:20 | **Keynote:** Prof Louise Archer  
Engaging diverse students with science through a 'science capital' approach |
| 11:30-12:45 | **1 - Parallel Sessions/ Symposia**                                        |
| 1(1) Session: | Researching the role of information technologies in education              |
| 1(2) Session: | Testing new approaches to teaching and assessing primary science          |
| 1(3) Session: | Modelling effective evaluation and strategic use of CPD:  
implications for teachers, schools and CPD providers |
| 12:45 – 13:45 | Networking lunch in the atrium  
Posters and resource exhibition open                                       |
| 13:45 - 15:15 | **2 - Parallel Sessions/ Symposia**                                        |
| 2(1) Symposium:  | Teacher Assessment in Primary Science *(TAPS): use of a self-  
evaluation tool for school development                                      |
| 2(2) Symposium:  | Research in partnership: design and technology  
teachers and academics together in the classroom                             |
| 2(3) Symposium:  | Using research to close gender gap in STEM education and career aspirations |
| 2(4) Symposium:  | Teaching for Mastery                                                       |
| 15:30 – 16:10 | **Keynote:** Dr David Spendlove  
How do we use research in a manageable way to help each of us to  
become a better teacher?                                                     |
| 16:15-17:45 | **3 - Parallel Sessions/ Symposia**                                        |
| 3(1) Session:  | Building schools’ capacity for using best evidence and research engagement |
| 3(2) Session:  | Research supporting practical work                                         |
| 3(3) Session:  | Engaging learners with real research: students acting, teaching and  
researching STEM                                                             |
| 3(4) Session:  | Using research to enhance professional learning and practice of STEM teachers |
| 17:45-18:40  | Networking, posters and exhibition continue in the Atrium                  |
| 18:40-21:30  | **Drinks / dinner / after-dinner keynote** Dr Dave Smith                     |
## Saturday 21 May

<table>
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<tr>
<th>Time</th>
<th>Event</th>
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<tr>
<td>8:45 – 9:20</td>
<td>Alumni networking session</td>
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| 9:30 - 10:10 | **Keynote:** Prof Kay Stables  
Embedding Design and Technology projects in rich and challenging contexts |
| 10:15 - 11:45 | 4. Parallel Sessions/ Symposia                                      |
| 4(1) Symposia | Inquiry-based Approaches to Science and Mathematics Education:  
The role of the MaSciL Project in Supporting Professional Development |
| 4(2) Workshop | Working with Contexts (design and technology key stage 1, 2, 3)        |
| 4(3) Session  | Let’s think secondary science (LTSS)                                 |
| 4(4) Session  | School-based research projects                                       |
| 12:00 – 12:40 | **Keynote:** Prof Shirley Simon  
STEM teachers engaging with research                                   |
| 12:40 - 13:30 | Networking Lunch                                                    |
| 13:30 – 14:45 | 5. Parallel Sessions/ Symposia                                      |
| 5(1) Session: | Teaching with variation, China’s secret to success                   |
| 5(2) Session: | Testing new approaches to teaching and assessing primary science     |
| 5(3) Session: | Using Lesson Study to support teachers’ professional development   |
| 5(4) Symposium: | Developing Professional Learning through Engagement with Research  
(reviewing the evidence from SAILS and ASSISTME international projects) |
| 15:00-15:30 | Panel Discussion and Conference outcomes                            |
Detailed Programme

Keynotes:

Friday 20 May

10:30 Prof Louise Archer (King's College London)

**Engaging diverse students with science through a ‘science capital’ approach**

Research shows that most children and young people report enjoying school science but, even from primary school, the majority do not see themselves continuing with science in the future. In this session, I discuss current research evidence on the factors influencing the prevalent view among students that science is ‘interesting but not for me’. I explain the concept of 'science capital' and consider what insights it offers educators. I then discuss a science capital pedagogical approach that we are currently developing and piloting with secondary science teachers, which seems to offer some promising early findings.

15:30 Dr David Spendlove (Manchester Institute of Education, University of Manchester)

**How do we use research in a manageable way to help each of us to become a better teacher?**

Evidence based practice, clinical practice and random controlled trials (RCTs) are general medical terms that are now entering the everyday language of teachers, as education becomes an increasingly competitive and research focused international market. Equally the rise of social networks and open access publishing mean that all teachers can now, and will increasingly be expected to, access, use and debate using research to inform their practice.

However with so much information, some of which is contradictory or seems to make little sense, how can teachers make sense of this new landscape?

This keynote will consider the above in the context of Science, Technology, Engineering and Mathematics education (STEM) and consider how do we use research in a manageable way to help each of us to become a better teacher?

20:00 Dr Dave Smith (University of York) - TBC

Saturday 21 May

9:30 Prof Kay Stables (Technology Education Research Unit, Goldsmiths University of London)

**Embedding Design and Technology projects in rich and challenging contexts**

This presentation will explore the importance of learners engaging in design and technology (D&T) projects that are embedded in rich, motivating and challenging contexts and will consider this in relation to the new National Curriculum for D&T and the draft proposals for GCSE and GCE D&T.

The presentation will review historic and recent research in this area. I will also discuss a shift in the world of professional design that highlights the significance of a
multidisciplinary view of context and that places users at the centre of design and the significance this shift has for learning and teaching in Design and Technology.

12:00 Prof Shirley Simon (UCL Institute of Education)

Science teachers engaging with research

The talk will focus on different ways in which teachers can engage in research, arguing that teachers’ professional learning can be advanced by engagement with research and research outcomes in different ways. Based on evidence from Prof Simon’s collaboration with teachers through funded research projects, higher degree work and professional development it will discuss how different forms of engagement, as suited to individuals and circumstances, can enable teachers to be critically reflective of practice and their own learning. Drawing on examples from research and development projects on teaching argumentation, it will demonstrate the value of being involved or using outcomes from these projects. It will also use a few examples from reflective accounts written by masters and doctoral students to show how their research for these degrees has advanced their professional knowledge. A key feature of Prof Simon’s current work is on the development of action research with teachers in schools, who are investigating aspects of their own practice. These kinds of inquiry can fruitfully enhance the engagement of teachers with research in the current climate, as evidenced by recent activity within the ASE Research Specialist Group.
### Parallel sessions:

**Friday 20 May**

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<th>11:30-12:45</th>
<th><strong>1 - Parallel Sessions / Symposia</strong></th>
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#### 1 (1) Session: Researching the role of information technologies in education

**Presenters:**
- David Barlex ‘Pupils’ understanding of robotics as a disruptive technology’
- Jamie Tinney (Nottingham Trent University) ‘Exploring the adoption of gaming-making technologies in non-STEM classrooms, with children with special educational needs and disabilities’

**School case studies:**
- Robin James (Exeter Road school) ‘Looking for Learning’ research project
- David Hassett & Fergal Moane (Sandringham school) ‘Using I-pads for blended learning’
- Esther Fidler (Honington CEVC primary school) ‘The use of talk in science’

#### 1 (2) Session: Testing new approaches to teaching and assessing primary science

**Presenters:**
- David Bailey and Rosemary Feasey ‘Applying SOLO taxonomy to develop assessment in primary science and improve transition to secondary school’
- Louise Stubberfield (the Wellcome Trust) ‘Using research to shape and market primary science CPD’

**School case studies:**
- Manette Carroll (Bielefeld School, Germany) ‘How formative assessment strategies improve the teaching and learning of science in key stage 2’

#### 1 (3) Session: Using research for effective evaluation and strategic approach to CPD: implications for teachers, schools and CPD providers

**Presenters:**
- Pauline Hoyle and Irina Kudenko (STEM Learning)

**School case studies:**
- Melanie Ellis (Swavesey Village College)
- Gladys Adomako (Castle view School)
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<tr>
<th>Session/ Symposium</th>
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| **Symposium: Teacher Assessment in Primary Science (TAPS): use of a self-evaluation tool for school development** | Friday 20 May 13:45 - 15:15 | Session chair: Sarah Earle, Bath Spa Institute for Education  
School case studies:  
- Pauline Rodger, Holt Primary School  
- Asima Qureshi, Meadowbrook Primary School |
| **Symposium: Research in partnership: design and technology teachers, and academics together in the classroom** | Friday 20 May 13:45 - 15:15 | Session chair: Alison Hardy (Nottingham Trent University)  
Co-presenter: Jamie Tinney (Nottingham Trent University)  
School case studies:  
- Yvette Hail (Djanolgy City Academy)  
- Rebecca Marriott (The Bulwell Academy) |
| **Session: Using research to close gender gap in STEM education and career aspirations** | Friday 20 May 13:45 - 15:15 | Presenters:  
- Prof Averil Macdonald (WISE) ‘STEM: not for people like me?’  
- Dr Irina Kudenko (STEM Learning) ‘Fostering student attitudes and career aspirations towards STEM subjects: lessons from the European project inGenious’  
- Jessica Rowson (IOP) ‘Improving gender balance in physics’  
School Case studies:  
- Joanne Jarvie (Thornton primary school) ‘Primary pupils’ attitude to STEM’  
- David Mayo (Hardenhuish school) |
| **Symposium: Teaching for Mastery** | Friday 20 May 13:45 - 15:15 | Session chair: Dr Deborah Morgan (NCETM)  
Presenter: Dr Mark Boylan (Sheffield Hallam University)  
School Case studies:  
- Gill Holmes (Elworth CofE primary school)  
- Sarah Coldbeck (Mereside Children’s centre)  
- Debra Nemhara (Tudor Court Primary School)  
- Natasha Flood (Fox Primary School) |
### Parallel Sessions

#### 3 (1) Building schools’ capacity to use best evidence and engage with research

**Session:** Building schools’ capacity to use best evidence and engage with research

**Presenters:**
- Jonathan Haslam (IEE) ‘Evidence for the Frontline: More questions than answers’
- Matt Walker (NFER) ‘NFER Self-Review Tool: A free online tool to help you review how research engaged your school is’
- Alex Quigley (ResearchED) ‘RISE, ResearchEd and Research-leads’

**School Case studies:**
- Sushila Hirani (Greenford High School)

#### 3 (2) Research supporting practical work

**Session:** Research supporting practical work

**Presenters:**
- Stella Paes and Catherine Witter (AQA) ‘Teaching A level practical work – AQA research of teacher needs and best evidence’
- Mark Langley (STEM Learning) ‘Progression in practical science’
- Prof Judith Bennett (University of York) TBC

**School case studies:** TBC

#### 3 (3) Engaging learners with real research: students acting, teaching and researching STEM

**Session:** Engaging learners with real research: students acting, teaching and researching STEM

**Presenters:**
- Prof Debbie McGregor (Oxford Brooks University) ‘Drama and science: an unlikely synergy’
- Prof Becky Parker (Institute for Research in Schools) ‘School students as research scientists - experience from space science, particle physics, biomedical science and material science – impacts on students and teachers’
- Adrian Fenton (BSA) ‘Quantifying CREST: the impact of student engagement in the Silver CREST Award on science scores and STEM subject selection’

**School case studies:**
- Dr Samantha Ireland (Queen Elizabeth Grammar School) ‘The impact of Peer teaching on younger students in a practical Global science context’
- Hayley Andrews (The Judd School) DNAvigate project
- Jack White-Foy (Dulwich College) Student-led research through the CREST award: how and why?

#### 3 (4) Using research to enhance professional learning and practice of STEM teachers

**Session:** Using research to enhance professional learning and practice of STEM teachers

**Presenters:**
- Dr Ann Childs and Dr Judith Hillier (Oxford University) ‘Enhancing explanations in science lessons in Secondary Classrooms’
- Rick Tynan (Liverpool John Moores University) ‘Working towards evidence based practice in science teaching and learning’
- Prof Jim Ryder (Leeds University) ‘Developing as a science teacher: Navigating the demands of accountability and autonomy in the workplace’
- Dr Stephen Lee (MEI) ‘Teacher CPD – Which ‘type’ is most appropriate for you? An evaluation of MEI’s wide-ranging CPD provision’
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<td>4 (1)</td>
<td>Symposium: Inquiry-based Approaches to Science and Mathematics Education: the role of the MaSciL Project in Supporting Professional Development</td>
<td>Pete Sorensen (the University of Nottingham)</td>
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<td>4 (2)</td>
<td>Workshop: Working with Contexts (design and technology key stage 1,2 and 3)</td>
<td>Prof Kay Stables (Goldsmiths University of London) - Dr Marion Rutland (University of Roehampton)</td>
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<td>4 (3)</td>
<td>Session: Let’s think secondary science (LTSS)</td>
<td>Alan N Edmiston - David Bailey</td>
<td>Sophie Cornelius (Huish Episcopi Academy) ‘Evidencing the impact of Let’s think approach in key stage 3’ - Chloe Close - Neil Mumford</td>
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<td><strong>Session:</strong> Teaching with variation, China’s secret to success</td>
<td>Presenter: Dr Deborah Morgan (NCETM)</td>
<td>Suszanne Coxon (Parkside primary school)</td>
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<td>Susan Glaves (Roberttown CE Junior and Infant School)</td>
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<td>14:45</td>
<td><strong>Session:</strong> Testing new approaches to teaching and assessing primary science (re-run from Friday)</td>
<td>Presenters: David Bailey and Rosemary Feasey ‘Applying SOLO taxonomy to develop assessment in primary science and improve transition to secondary school’ and Louise Stubberfield (the Wellcome Trust) ‘Using research to shape and market primary science CPD’</td>
<td>Manette Carroll (Bielefeld School, Germany) ‘How formative assessment strategies improve the teaching and learning of science in key stage 2’</td>
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| 14:45 | **Session:** Using Lesson Study to support teachers’ professional development | Presenters: Dr Julie Jordan (Sheffield Hallam University) ‘The enactment of lesson study by science teachers in English schools’ and Dr Rosa Archer (University of Manchester) ‘Lesson study, a trip to Japan’ | Joseph Toman (Heworth Grange Comprehensive School)  
TBC |
| 14:45 | **Symposium:** Developing Professional Learning through Engagement with Research (reviewing the evidence from SAILS and ASSISTME international projects) | Session chair: Dr Chris Harrison (King’s College London) | TBC |