

Advance HE STEM Conference 2019

Delivering Next Generation Higher Education in STEM

30-31 January 2019
Millennium Point, Birmingham UK

Session abstracts

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Day 1, 30 January 2019

Session 1, 10:50-11:30

Session 1.1a: Curiosity and reward: A detective's game. Neuroscience applications to memory enhancement

Dr Paloma Mari-Beffa, Bangor University

Proposition 1

Oral presentation, Auditorium

Research has found that when students are reading with curiosity and interest, they activate brain areas similar to those seen in rats when searching for food. Curiosity therefore is triggered by the expectation of a reward and seems to produce increases in a range of cognitive functions directly influencing academic performance. These include increases in alertness, working memory and long-term memory retention. Here a detective's game model is presented in which rewarding information is withheld, increasing its expectancy, until the student has actively searched for it. The discussion provides information on how to manipulate informational rewards within the university context.

Session 1.1b: Synoptic assessment of Life Sciences at Brunel University London: Ensuring interdisciplinary education by empowering Level 4 students to read primary research papers that span disciplines

Dr David Tree, Brunel University

Proposition 1

Oral presentation, Auditorium

Interdisciplinary study is vital to push fields forward and accelerate discovery. In the Life Sciences BSc at Brunel students draw together elements of teaching from five different academic programmes (Psychology, Biomedical, Environmental, Sports and Computer Sciences) to design their own interdisciplinary degree. To ensure a truly interdisciplinary education there is synoptic study and assessment in every year of the programme. This session will describe the synoptic study at level 4 where students are using team-based learning to develop strategies to read a series of academic journal articles to appreciate the interdisciplinary nature of the study of life sciences.

Session 1.2a: Factors impacting on Petroleum Engineering teaching to meet requirement for the hallmarks of a graduate

Dr Mohamed Galal Hassan Sayed, Portsmouth University

Proposition 2

Oral presentation, Connect Event Space

"Petroleum engineers make the world run." This proud quote is extracted from the Society of Petroleum Engineers' website.

Experience has shown that traditional teaching through lecturing generally results in students acquiring/remembering less than 50% of the information delivered in the lecture. Several factors contribute to such an ineffective teaching/learning method. In this paper examinations and analysis of these factors are discussed to offer some tools to Engineering professors who wish to become better teachers and to university administrators who wish to improve the quality of Petroleum Engineering teaching.

Session 1.2b: The Interdisciplinary Birmingham Engineer: Integrated design projects that embed sustainability concepts to inspire and motivate students while improving their employability

Dr Neil Cooke, University of Birmingham

Proposition 2

Oral presentation, Connect Event Space

To counter threats facing humanity, sustainability should be at the core of every undergraduate curriculum in higher education. At the University of Birmingham Engineering, it is fostered through integrated design projects (IDP). In this talk I discuss the results of our work to embed sustainability concepts and address some underlying questions: Which approach is best suited to expose students to sustainability and what tools should be used? What is the relationship between students' sustainability knowledge and their values? and How does the student adoption of sustainability outcomes evolve over time? I will also cover the IDP's pedagogy, delivery, and reception.

Session 1.3a: Web-based learning and teaching resources for microscopic detection of human parasites

Dr Antonio Peña-Fernández, De Montfort University, Lucrecia Acosta, Universidad Miguel Hernández de Elche and Fernando Izquierdo, Universidad San Pablo CEU

Proposition 3

Oral presentation, Connect 1 + 2

DMU e-Parasitology (<http://parasitology.dmu.ac.uk>) presents novel web-based resources co-developed by EU academics at De Montfort University (DMU) for the teaching and learning of microscopic diagnoses of common and emerging human parasites. The package will be completed early in 2019 and presents a virtual laboratory and microscope, which are equipped with engaging units for learning parasitological staining and fresh preparation techniques for detecting cysts, oocysts, eggs and spores, in conjunction with a library of digitised clinical slides. Units are equipped with short videos of academics performing the different techniques and quizzes and exercises, to provide students with the most practical experience possible.

Session 1.3b: The development of a flexible work-based degree programme to produce graduate Power Engineers that can successfully navigate the rapidly changing geo-political demands on the UK electrical power industry

Dr Tamer Panagiotis Doss, Aston University

Proposition 3

Oral presentation, Connect 1 + 2

Government policy on smart cities has a strong focus on electric vehicles, which has exacerbated the significant skills gap already present in the UK electricity power sector. Aston University has developed in close partnership with industry, the Electrical Power Foundation Degree, which provides students with the relevant theoretical knowledge to support a comprehensive work-based training programme. This session details how our tripartite relationship has evolved between university, industrial and professional partners and students to design a work-based training scheme that adapts to the changing needs of industry and supports the learning diversity of the student cohort.

Session 1.4a: Will a new British Bill of Rights promote a better understanding of equality and diversity?

Mr Raj Babajee, UK Invest

Proposition 4

Oral presentation, Connect 3

This paper aims to investigate whether there is a need for a prospective Bill of Rights, and if a subsequent replacement of the Human Rights Act 1998 will result in better understanding of equality and diversity in education. As a former immigration lawyer, I spent ten years representing refugees at the Immigration Tribunal and High Court. My reliance on the European Convention on Human Rights helped clients develop their cases beyond the mere said Convention.

Session 1.4b: Trust and conflict in group learning: The role of computer-orchestrated learning in supporting neurologically typical and atypical students in Engineering HE provisions

Mr Manish Malik, University of Portsmouth

Proposition 4

Oral presentation, Connect 3

This session presents the findings from a study involving mixed teams of neurologically diverse and atypical students learning together in small teams studying Electronic Engineering in their first year. This multi-case study involves mixed methods relying on established trust and conflict management style surveys administered at various points and also using interviews to understand the why and how of team working with the help of a computer-orchestrated group learning (COGLE) system. The findings will be useful for those facing challenges of supporting a mixed student body and will be a contribution to disability studies as it relies on a social model of disability as opposed to a more common deficit model.

Session 1.5a: Making virtual reality a reality in STEM education

Mrs Rhian Kerton and Dr Marc Holmes, Swansea University

Proposition 5

Oral presentation, Room 495

Over the past few years, the College of Engineering at Swansea University has been looking into the application of virtual and augmented reality to enhance learning and teaching. Early intervention projects have demonstrated real positive impact on the student experience and student learning. Over the next couple of years, the team is scaling this up from specific interventions to more wide scale deployment with the goal of offering all students the opportunity to benefit from this technology during their degree course.

Session 1.5b: The impact of digital capabilities on the quality of STEM teaching

Ms Zarah Bello, University of Hertfordshire

Proposition 5

Oral presentation, Room 495

The demand for improving STEM education is currently an issue of economic concern. This study investigates how capability maturity may be used to enhance teaching and learning in tertiary institutions. This study

proposes a classification for elements of digital capability maturity, with guidance on the effects of these elements. The study suggests adoption of the classification for tertiary institutions embarking on continuous improvement programmes. Concluding with recommendations on how adherence to the proposal can consequently improve teaching and learning in STEM related subjects. Furthermore, learners of mature institutions would be better prepared for success in today's dynamic economy.

Session 1.6a: Interactive Science at the Universidad Tecnológica of Uruguay: A program based on the STEM model

Professor Melody García, Universidad Tecnológica (UTEC)

Proposition 1

Oral presentation, Think Tank Lodge

In this session, we attempt to approach one of the major concerns in higher education: the limited appropriation of knowledge that students have in basic sciences at the beginning of their academic activity. In Uruguay, at the Universidad Tecnológica (UTEC), the Interactive Science Program (iCiencia) was implemented in 2018 as a transversal program to all UTEC students with the aim of improving the knowledge of freshmen in the areas of Biology, Physics, Mathematics and Chemistry, integrating e-learning and blended learning oriented to the STEM teaching model, and to promote the skills of the 21st Century graduate involving information technologies (ICT).

Session 1.6b: How do scientists and Science undergraduates read scientific papers?

Dr Katharine Hubbard, University of Hull

Proposition 1

Oral presentation, Think Tank Lodge

The ability to read, process and evaluate highly technical literature is one of the defining features of higher education. How students engage with this cognitively challenging task is currently under researched, particularly in STEM. Using mixed-methods data, this talk will provide insight into how undergraduates, postgraduates and research scientists approach reading scientific papers. Our key findings indicate that students under value the results section of research papers, and lack the skills and knowledge to critically evaluate papers. We consider how teaching from the literature can be more inclusive, and how we can better support inexperienced readers when encountering challenging materials.

Session 1.7a: Networking space

Think Tank Issigonis

A free space for delegates to use at their leisure for networking, or a quiet space to sit and work

Session 1.7b: Networking space

Think Tank Issigonis

A free space for delegates to use at their leisure for networking, or a quiet space to sit and work

Session 1.8a: Designing experiential assessment and providing meaningful feedback to equip students for leadership and critical thinking

Dr Jenna Macciochi, University of Sussex

Proposition 5

Oral presentation, Think Tank Brindley

Bringing experiential group learning into summative assessment offers a great opportunity for active learning and development of key employment skills such as leadership but implementation can be challenging. I explore what experiential learning means and how it can be a valid pedagogical tool for promoting development of desired key STEM employability skills combined with subject-specific deep learning.

Session 1.8b: Design, delivery and review of a research-led doctoral summer school in offshore engineering. Opportunities and challenges of problem-based, student-led teaching and learning

Dr Philipp Thies, University of Exeter

Proposition 5

Oral presentation, Think Tank Brindley

This presentation will give an overview to the context and design of a residential summer school for doctoral STEM students. The two-week summer school has been designed in order to challenge the students, and engage them in problem-based, research-led learning. The aim is to gain an understanding of the key design challenges and engineering approaches for mooring systems and reliability concerns for offshore renewable energy. The summer school has been held 5 times, since 2014 and the opportunities and challenges with this research-led design will be presented.

Session 2, 11:45-12:45

Session 2.1a: Employability-led assessments

Ms Deborah Sims and Dr Debbie Bartlett, University of Greenwich

Proposition 1

Oral presentation, Auditorium

Students are increasingly aware of the investment they are making in their education and looking for value for money (pay back) and the relevance of their learning to the job market. This was the impetus for re-evaluating the assessment strategy for the MSc in Environmental Conservation, aligning it more closely with the 'Competency Framework' used by the professional body, the Chartered Institute of Ecology and Environmental Conservation, to assess career progression towards chartered status. This presentation will describe how standard assignments, such as exams, have been replaced with industry-relevant ones that students can use to demonstrate their competency to potential employers.

Session 2.1b: Embedding professional skills education in the Computer Science and Electronic Engineering curriculum: Cultural, organisational and managerial aspects

Dr Antonios Kaniadakis, Queen Mary University of London

Proposition 1

Oral presentation, Auditorium

In the midst of a changing skills landscape, Computer Science and Electronic Engineering schools are in the forefront facilitating the transition to the Digital Economy. Alongside new technical subjects, professional skills are necessary in order to deliver graduate attributes that are industry-relevant and fit for the purposes of the changing society. Embedding professional skills education within subject-specific curricula (i.e. Computer Science and Electronic Engineering), however, has proven a rather challenging endeavour. Reasons that touch upon cultural, organisational and managerial aspects are discussed in this presentation. Recommendations of how universities can most effectively address these challenges will also be put forward.

Session 2.1c: Employer engagement to engaged employers: Reflections on programme co-design and co-implementation with employers

Dr Christopher Smith, Glasgow Caledonian University

Proposition 1

Oral presentation, Auditorium

How do you truly engage employers and industry in the co-design and co-delivery of programmes and sustain that participation in order to produce work-ready graduates? I will present case studies of co-designed and co-delivered programmes at undergraduate and postgraduate level at Glasgow Caledonian University and Coventry University and share reflections around key factors for success (inter- and trans-disciplinary approaches to teaching and learning and assessment multi-level strategic partnership, operational and business models and requirements, value and value recognition, change management) and encourage a discussion of what these mean for all Engineering programmes.

Session 2.2a: The use of learning technologies to enhance classroom dialogues

Dr Joanna Richardson, University of Sussex

Proposition 2

Oral presentation, Connect Event Space

In this session I will describe how I use Poll Everywhere to gather real-time student feedback on their own learning, using the "Muddiest Point" metacognitive approach. Running these interactive polls over several lectures creates a classroom dialogue around topics that are interesting or challenging, even in a large cohort in which students are otherwise intimidated from asking questions. Additionally, it can be used to feed forward to later lectures, and ask students questions which test their prior learning. I will also describe the use of Padlet to set clinical case studies for students and provide feedback to stimulate class discussion.

Session 2.2b: Learning with quizzes

Dr Elisa Carrus, London South Bank University

Proposition 2

Oral presentation, Connect Event Space

Does self-testing work? This presentation will outline an investigation of whether self-paced testing in the form of quizzes enhances learning of Research Methods and Statistics in undergraduate Psychology students. Quizzers showed better academic performance than non-quizzers, even though the content of the quiz did not match that required to do well at the coursework and exam. This effect was observed even after taking into account students' pre-existing grades. These results may be an indication of the forward-testing effect in an uncontrolled (non-laboratory) setting.

Session 2.2c: Diagnostic tests and their effectiveness in categorising students

Dr Jonathan Watkins and Dr Richard Mason, University of Birmingham

Proposition 2

Oral presentation, Connect Event Space

University students in Mathematics and Physics are often put in separate groups based upon their results in diagnostic tests. In this paper, a number of courses are examined using techniques from data science to investigate how the scores on the diagnostic test compare with how the students perform over the term. Our results show a discrepancy between the diagnostic test groupings and the grouping of students based on their performance over time. In these courses, cluster analysis identifies three natural clusters of students, which are not identified with the diagnostic test. This research forms the beginning of ongoing work into how to modify diagnostic tests to understand students better, and how to support them optimally.

Session 2.3a: Going paperless: The digital teaching laboratory

Dr Anna Bertram, University of Nottingham

Proposition 3

Oral presentation, Connect 1 + 2

This presentation will describe how practical learning environments at Nottingham are evolving by the integration of portable computers to allow the use of VLEs and software for collaborative working which was not previously possible.

This presentation will be of interest to colleagues who deliver practical courses across all Science subjects.

Session 2.3b: When STEM students are offered a blend of digital and non-digital learning materials, what choices do they make, and why?

Ms Laura Alexander and Dr Alexis Lansbury, The Open University

Proposition 3

Oral presentation, Connect 1 + 2

At the OU we create online/digital resources in various formats for our students, and expect them to be digital natives who can use them effectively, but what evidence do we have that this is the case? This session reports on research carried out to look at how students actually study. Students on three STEM second year modules who have study materials supplied in different formats (from entirely online to mostly book based) were surveyed, and in-depth interviews carried out. The results contained a few surprises which may influence how you design your course material going forward. Come and hear more about our findings.

Session 2.3c: VISION - Visual Interface for Students to Interpret Online Notes and become scientific writers

Dr Alexandra Okada, The Open University

Proposition 3

Oral presentation, Connect 1 + 2

Online annotation is an increasingly important task for students to select the key issues, add their own reflections, and map knowledge for writing essays. There is a growing set of web annotation tools, however, literature is limited on the impact of these technologies for authentic writing, assessment and meaningful learning. This qualitative study examines the use of the LiteMap.net tool by students and tutors in two online STEM courses for personal and collaborative annotation. The results show the impact of LiteMap to increase authorial identity and reduce plagiarism with successful and unsuccessful examples of annotation, mapping and feedback.

Session 2.4a: Championing inclusion: Working with students as partners to effectively inform learning and teaching development

Ms Helen Ordidge, Aston University

Proposition 4

Oral presentation, Connect 3

Within STEM education, the use of students as partners needs a targeted approach to ensure it is fully integrated within curricular development. The School of Engineering and Applied Sciences at Aston University found that student representative schemes could inform on issues but not necessarily implement actions. Evolving opportunities to celebrate our diverse student body with an innovative 'Student Experience Champion' scheme has empowered students as pivotal partners in driving change. This session will explore some of the ways to embrace the student voice, lessons learned along the way and provide delegates with examples to take back to their home institutions.

Session 2.4b: Undergraduate sense of belonging in a Science department

Dr Rebecca Barnes, University of Sheffield

Proposition 4

Oral presentation, Connect 3

We know that sense of belonging is important for student retention and success (see, for example, the work of Vincent Tinto). This study looks at sense of belonging at all levels of the undergraduate degree in a Life Sciences department at a Russell Group university. It uses both quantitative and qualitative methods to identify departmental activities that affect belonging in various demographic groups. We intend to use this evidence to inform curriculum changes, with particular emphasis on the induction process. This talk will present data from the first semester of the project and discuss possible areas for future development.

Session 2.4c: How peer/friendship groups form, and their effect on attainment

Dr David Smith and Dr Melissa Lacey, Sheffield Hallam University

Proposition 4

Oral presentation, Connect 3

Peer groups have a strong influence on student attainment and the wider educational experience. Here we directly investigate the drivers for group formation and how these effect interactions between groups in different learning spaces. Both the lecture theatre and laboratory environment were considered. High and low achieving peer groups were identified and the drivers for their formation were determined. The research highlights the critical role that social ties to play in successful academic outcomes and the positive effects of inclusive practices and alleviating social anxiety during the study.

Session 2.5a: Leadership development: Conceptualising, developing and implementing a HDR Supervision Fellowship Program

Associate Professor William Ashraf, Macquarie University

Proposition 5

Oral presentation, Room 495

Macquarie University (MQ) has ambitious aspirations for Higher Degree Research (HDR), MRes and PhD, through the provision of 'inspirational supervision' and an outstanding mentoring experience. For future STEM leaders, working at the research/teaching nexus – early career researchers/teachers, we have developed an HDR Supervision Fellowship program. The fellowship scheme was inspired by the (i) four dimensions from Vitae's RDF, (ii) individual elements adapted from the UK Professional Standards Framework and (iii) alignment with MQ Academic promotion criteria for HDR supervision. Here we present the key determining factors for HDR Supervision Fellowship Framework regarding its conceptualisation, development, implementation and evaluation.

Session 2.5b: Teaching mathematical thinking to Computer Science students

Dr Kevin Navaie, Lancaster University

Proposition 5

Oral presentation, Room 495

The employability prospects of Computer Sciences graduates is closely correlated with their mathematical thinking skills. For many, however, Mathematics causes anxiety and they avoid engaging with mathematical thinking activities. To address this issue, we propose a problem-based collaborative-learning approach we adopted in Lancaster University during 2015-2017. Extensive analysis of the data collected from +200 students confirms that this approach helped students to overcome their Mathematics anxiety. Our results also indicate a significant improvement of students' independent problem-solving ability as 73% of them applied the learnt mathematical skills in the context of other modules or their final year projects.

Session 2.5c: Developing and supporting an inclusive curriculum and the role of the leader

Ms Sarah Wilson-Medhurst, University of Northampton and SWM Consulting

Proposition 5

Oral presentation, Room 495

The technology sector is a relatively new one where someone's ability should be the only barrier to entry. However, it is still failing able people from minority groups. For example, in the IT profession women are underrepresented by 30 percentage points (British Computer Society, 2017) and this is similarly reflected, for example, in the number of women studying Computing at university. This presentation explores a framework designed to help curriculum leaders benchmark their current curriculum design and leadership practices with respect to inclusivity and for those who support the development of such leaders to review how effective that support is and what more could be done in relation to developing inclusive leaders.

Session 2.6: A recipe for success: Cookery classes for year 1 students transitioning to university

Ms Caroline Gibson, Queen Margaret University, Edinburgh and Ms Susanne O'Neill-Berest, Cyrenians

Proposition 1

Workshop, Think Tank Lodge

Many university students are at risk of making unhealthy food choices leading to inadequate nutrition. Poor nutrition can lead to ill health which can impact on academic ability and successful transition to university. In this workshop we discuss an innovative research project which aimed to:

- address the issue of under familiarity with food utilisation amongst students transitioning to university;
- provide a social meal;
- provide an inclusive learning environment.

We provided fun opportunities for students to cook and share food together. Sessions were co-facilitated by student peer facilitators, so students supported the learning of other students whilst learning themselves.

Session 2.7: How are you filling those leadership gaps: What are the solutions to successful succession planning?

Dr Gillian Knight and Professor Sarah Hainsworth, Aston University

Proposition 5

Workshop, Think Tank Issigonis

Due to the strong emphasis around delivering excellence in STEM research and teaching, developmental conversations do not always focus on whether a person has the motivation or ability to be a successful leader. Leadership succession planning is a challenging area for most universities. Institutions often find themselves with gaps when promoting staff to leadership positions, either from staff unwilling to take on management responsibility and/or lacking sufficient experience. This workshop aims to help determine the key competencies required for different leadership roles within STEM education and how to provide opportunities for academic staff to develop the relevant leadership experiences.

Session 2.8: A HOLOtta fun with star clusters: Learning about star formation using 3D holograms

Dr Anne Buckner, University of Leeds

Proposition 2

Workshop, Think Tank Brindley

"Illusion is the first of all pleasures" – Voltaire

Astronomical topics are intrinsically abstract and typically only 2D telescope images are available as visual aids to explain complex ideas, which can greatly hinder their comprehension by low science capital individuals. For this reason we created an innovative schools' workshop programme which not only projects astronomical objects as giant 3D holograms, but allows the participants to witness them evolve over millions of years in just a few minutes, right in front of their eyes. As part of the workshop, participants make a scaled-down take-home version of our hardware.

Ignite Sessions, Auditorium, 13:30-14:30

Session 3.1a: E-portfolio as a reflective practice tool for professional development

Dr Nagamani Bora, University of Nottingham

Biotechnology is a high- impact science contributing to the bio-economy of a country where it is necessary to produce highly educated and skilled individuals in this discipline. Hence shaping forward-thinking learners with leadership and professional skills is important and forms a vital component of the curriculum in this discipline. E-portfolios can be powerful reflective tools in life-learning skills enhancing personal and professional development. Research also suggests that such individuals achieve higher scores on indices of success. A pilot study conducted at postgraduate level exemplifies how e-portfolios can be used as novel intervention and evaluation tools in shaping future STEM graduates.

Session 3.1b: Active projects for dynamic curricula: Trends, tips and troubles!!!

Dr Gareth Thomson, Aston University

Struggling to know how you will give your students all the knowledge and skills they will need through their career? Project-centred approaches are becoming increasingly on trend to try to develop students' approaches and not just their knowledge – developing 'learn as you do', developing a learning mind-set to carry through their careers. In a five minute blitz, hear about these trends, and our trials and triumphs. Over the past decade we moved to a 50% project curriculum – glad we did it – but it's not always been easy! Give it a go but learn from our mistakes and make the most of our tips.

Session 3.1c: Improving diversity in STEM through targeted online support for PGT offer holders among underrepresented groups

Mr Graham Holland and Mr Adam Scott, University of Manchester

'Managing stats and data with confidence' is an online module aimed at lessening Maths anxiety. It's part of an OfS-funded trial called 'Prepare for Postgrad' designed to see whether the provision of an online PGT Masters pre-enrolment course can improve the transition from offer-holder to enrolment and retention among

home students from Black, Asian and minority ethnic (BAME) backgrounds and areas with the lowest rates of participation in HE (POLAR quintiles 1 and 2). This session gives an overview of the project with a focus on its design and development showcasing the University of Manchester Library's innovative and award-winning approach to blended skills support.

Session 3.2a: Anonymous backchannels to promote student engagement: The good, the bad and the ugly

Dr Andrew McDowell, Dr David Cutting, Dr Paul Sage and Miss Angela Allen, Queen's University Belfast

Promoting learner engagement in large cohorts is a well-known problem. One solution adopted in the lecture space is 'backchannel' software, which provides an online chat facility that operates alongside the delivery of other learning activities. While this provides some protection from the collective gaze of a class, backchannels often display information about a message author, which may discourage them from participating. Accordingly, this session will present the findings of an investigation into the impact of anonymity on backchannel engagement with a large student cohort. Subsequently, despite some misuse, this evaluation found that preserving anonymity is an important feature for many learners and its absence can result in a significant reduction in engagement with a backchannel.

Session 3.2b: Students as partners for sustained cultural change

Dr Vanessa Ho, St George's University of London

What roles do students play in creating an inclusive environment at your university? At St George's University of London which is the UK's only university specialising in Medicine, Biosciences and Healthcare, students are encouraged to partner with staff members to address equality, diversity and inclusion issues. This has nurtured student leaders and led us to an Athena SWAN Institutional Silver Award. In this ignite session, we will share what we have done, evaluate what works, and explore how we can keep the momentum for sustained impact.

Session 3.2c: Game-based technological innovation in teaching and learning Statistics course

Dr Greeni Maheshwari, RMIT University, Vietnam

STEM (Science, Technology, Engineering and Mathematics) courses such as Statistics are effective if taught using Gamification approach. Gamification is an approach of teaching various concepts by using games in a non-game environment in order to enhance deep learning in the subject and to move up in Bloom's taxonomy. Statistics can be taught by introducing various games using dice, marbles, playing cards, real data collection from the students in the class itself. There is also the positive impact of gamification educational tools such as Kahoot, Socrative, GoFormative, Quizlet in the classroom environment. This innovative game-based approach can help other lecturers teaching STEM courses to enable engaging and enjoyable learning Environments.

Session 3.3a: 'Creative Connections': An adaptable resource to help students link ideas between topics

Dr Michael Coffey, Nottingham Trent University

'Creative Connections', a highly adaptable game-based learning (GBL) resource, is presented in this session. It aims to engage users in thinking holistically, linking across topics of study through discussion with peers and tutors to deepen their learning experience. Alternatively, topics may be linked to career competencies and/or graduate attributes via tutor-defined templates. This GBL resource is easy for educators to adapt to their discipline and appropriate level-of-study offering an engaging, innovative, learning option. This presentation describes the resource itself in detail, and how it might be used, including examples of classroom use at Nottingham Trent University.

Session 3.3b: Championing active learning approaches: A vehicle for institutional change

Dr Paul Holland, Swansea University

The benefits of adopting active learning approaches in HE are well documented. Many institutions would like to move from predominantly lecture-based didactic delivery methods to active teaching methods such as team-based learning or design-based learning. However, the costs of building new learning spaces can be prohibitive whilst convincing busy staff to re-think their teaching approach is an unenviable task. This talk describes the journey to Swansea University's first reconfigurable computer lab to active learning studio as an approach to solving both these issues and opening the doors to innovation and new programmes.

Session 4, 14:40-15:40

Session 4.1a: Students soaring: An interdisciplinary approach to flying high

Dr David Cutting, Dr Andrew McDowell and Dr Neil Anderson, Queen's University Belfast

Proposition 1

Oral presentation, Auditorium

Sometimes we're guilty of "silo teaching" – focusing on our specific subject alone. Doing so can be detrimental to student experience and also fails to reflect the realities of industry. Modern engineering is complex and interdisciplinary in nature. This presentation explores ways we can use project work to encourage students to work together in different disciplines and cross-pollinate knowledge, gaining real-world experience at the same time. Using a student-led space rocket programme we facilitated in summer 2018 as an example we explore the lessons learnt, the benefits seen, and encourage one and all to think about interdisciplinary ways of working in the future.

Session 4.1b: Peering up: A collaborative approach for teaching mechanical design to Chemical Engineering students

Ms Marsha Maraj, Imperial College London

Proposition 1

Oral presentation, Auditorium

This work examines the experiences of third year Chemical Engineering students studying the mechanical design of pressure vessels. A project-based learning approach allowed students to work collaboratively in teams. Preliminary findings show that a large percentage of students (>80%) felt that this collaboration strongly improved their understanding of mechanical design and contributed to a high academic self-efficacy across associated learning outcomes. Peer interactions throughout the module also led to enhanced transferable skills (notably team working). These results show that collaborative learning in Engineering education can produce more well-rounded graduate profiles; this is important given that engineers will routinely work in interdisciplinary teams to solve complex problems.

Session 4.1c: A structured approach to immersive, team-based, interdisciplinary learning

Mr Justin Siefker and Professor Eva Sorensen, University College London

Proposition 1

Oral presentation, Auditorium

The need for interdisciplinary learning is self-evident as engineers are increasingly tasked to envision, invent, and construct insightful solutions to Grand Challenges, which require evermore creativity and integration. A favoured approach for preparing engineers is immersing the learning experience with fundamentals applied to interdisciplinary practice, enabling learning through discovery of how theoretical concepts practically apply in complex, interdisciplinary scenarios. Unfortunately, preparing such experiences often necessitates educators completing similar journeys of discovery. We present a structured approach for developing and delivering immersive, team-based, interdisciplinary learning experiences to large cohorts, including preparing educators and teaching assistants.

Session 4.2a: How safe is your playground? Analysing soil in Scottish schools

Dr Debbie Willison, University of Strathclyde

Proposition 2

Oral presentation, Connect Event Space

The University of Strathclyde, in partnership with Scottish secondary schools, completed a year-long project, from August 2017 to September 2018, analysing soil samples taken from playgrounds across the nation. Students, primarily 11-13 years old, gained an understanding of Scotland's environmental heritage and current environmental issues through carrying out their own research and considering this data in a national context. This session will explain how to successfully host a project of this nature and explore suggestions and ideas for delegates to consider in their own context. Benefits and challenges will also be discussed and sources of possible funding will be outlined.

Session 4.2b: Toxicology training to decontaminate environments affected by chemicals

Dr Antonio Peña-Fernández, De Montfort University, Dr Raquel Duarte-Davidson and Dr Stacey Wyke, Public Health England

Proposition 2

Oral presentation, Connect Event Space

Health professionals will be required to have some foundation knowledge in environmental toxicology to combat increasing morbidity/mortality indices due to environmental contamination. However, very little training in these specialised topics is delivered in Human Health Science degrees due to time and curriculum constraints. We have created a short training course that has shown to be effective in providing Pharmacy students with basic skills to tailor a complete protection, decontamination and restoration strategy for environments contaminated by chemicals. The web-based recovery tool to respond to chemical incidents developed by Public Health England would be an effective resource to provide this specific training.

Session 4.2c: Biosocial learning in the STEM subjects in higher education

Dr Martin Lindley, Loughborough University and Professor Deborah Youdell, University of Birmingham

Proposition 2

Oral presentation, Connect Event Space

This session introduces our current work on the intersecting social and biological factors that influence learning. The session will offer attendees an account of the analysis and theory suggesting that learning is a multifactorial complex biosocial phenomenon that needs an interdisciplinary approach to be well understood (Youdell & Lindley 2019). The session will show how questions, techniques and analyses from Molecular Biology, Analytical Chemistry, Epigenetics and Neuroscience, Social Science and Education studies can be integrated to understand learning, and argue that STEM teaching in higher education should be at the forefront of integrating these biosocial insights into their pedagogy.

Session 4.3a: Agile Maths: Using web-based productivity tools

Mr Thomas Davenport, Dr Darren Campbell, Dr Amy Patten and Dr Rebecca Broadbent, Aston University

Proposition 2

Oral presentation, Connect 1 + 2

Students do better when they feel part of a learning community. When cohort numbers exceed your ability to remember everyone's first name you need tools. At Aston we have developed course delivery tools that provide students with instant feedback and a view of their progress. The tools provide staff with course analytics allowing us to see what is going well and what is not.

Session 4.3b: Improving the learner life-cycle with technology

Dr Ross Davies, Dr Marius Miknis and Mrs Clare Johnson, University of South Wales

Proposition 3

Oral presentation, Connect 1 + 2

Traditional approaches to teaching and assessment mean students rely heavily on grades and outcomes. However, in today's work environment, there is generally a less hierarchical structure and employees are expected to be autonomous in their work. Developing these skills during their degree, the University of South Wales is adopting a system where students take ownership of their own learning and performance through reflective practice - skills which they can take into employment with them. These reflections also enable tutors to quickly see whether learners' perceptions of their abilities correlate with the work produced, and to adjust their teaching accordingly.

Session 4.3c: The 'Brilliant Jerk' Test: Applying the principles of deliberately developmental organisations to develop the whole engineer

Mr Graeme Knowles, University of Warwick

Proposition 1

Oral presentation, Connect 1 + 2

In 2013 NextJump fired half their workforce, deeming graduates from top technical and Engineering universities not fit for purpose. They termed these graduates, whose academic development had far outstripped their professional and personal maturity levels, 'Brilliant Jerks'. Since then, NextJump have developed values-based recruitment and CPD aimed at teachability, humility and grit; have grown revenues and market share exponentially, and have been widely recognised as exemplars in organizational culture. This session will share how WMG uses principles borrowed from Design Thinking and Deliberately Developmental Organisations (like NextJump) to develop programmes which give academic, personal and professional development equal focus for engineers.

Session 4.4a: Internationalising the curriculum through creating understanding and practice

Dr Sandra Kirk, Nottingham Trent University

Proposition 4

Oral presentation, Connect 3

Resistance of STEM academics to internationalisation of the curriculum in its widest sense, is marked, and likely to contribute in part to attainment gaps between home/EU and international students, and within the home group between white and BAME students. This session will explore approaches currently used in STEM and in other disciplines with possible transferability to STEM. Attendees will be encouraged to share and reflect on experiences and approaches, particularly those involving creation of understanding and valuing of cultural differences to positively impact curriculum design and delivery.

Session 4.4b: Notes Sui: Presentation liberation with ghosts

Mr Nigel Jones, Cardiff Metropolitan University

Proposition 4

Oral presentation, Connect 3

Notes Sui is a developing tool designed to improve inclusivity in the classroom by simply treating all students the same. It provides access to a PowerPoint presentation during a teaching session in different visual disability friendly colour formats, and languages. The idea behind Notes Sui is simple: the attendees at your teaching session choose the colour format that suits them to display the slides on their personal browsing device, phone, tablet, laptop, etc. The colour formats are: dyslectic friendly, colour-blind friendly, partially sighted friendly, MS friendly, and as intended. For more detail go to <http://www.notessui.com>.

Session 4.4c: Getting them in and getting them through: Selecting, supporting and mentoring non-traditional students for success in HE STEM disciplines

Dr Jinhua Mathias, Mr Ian Moreton and Dr Simon Rees, Durham University

Proposition 4

Oral presentation, Connect 3

For non-traditional students, the pathway to success in HE is strewn with barriers. For many the application process is difficult, and universities' selection processes rely heavily on evidence of previous academic attainment. Those who surmount these initial barriers are thrown into an unfamiliar world whose support structures, both pastoral and academic, are aimed at students direct from A-level study. This paper presents a successful Science Foundation Programme where such barriers are broken down through admissions processes, pre-arrival support, peer-mentoring, and ongoing support into year one. Perceptions from departments have changed from stereotyping non-traditional students as problematic to positive and welcoming.

Session 4.5a: Creating the next generation of construction industry leaders through experiential learning

Dr Tina Papadopoulou, Kingston University

Proposition 5

Oral presentation, Room 495

This project entails an innovative application of Kolb's experiential learning in fieldwork undertaken in an international setting by UK-based postgraduate students. Founded on the premise of "learning by doing" students take part in a simulation that stretches their strategic thinking and problem-solving abilities into unfamiliar contexts abroad. As a team of experts, students work collaboratively to deliver an optimal development solution for a local client. As well as applying the knowledge they assimilated during the course, students are required to demonstrate strong situational leadership, an adaptive and agile leadership style which is particularly effective in complex and unpredictable situations.

Session 4.5b: Impact of learning space on Engineering students' engagement with management modules

Dr Ali Roula, University of South Wales

Proposition 5

Oral presentation, Room 495

This session will report data from a learning and teaching project which looked at the impact of teaching space on student experience and engagement. Teaching on a management module was moved from a large, tiered amphitheatre to a flat room with the seating arrangement changed to allow 4-6 students to work together and facilitate collaborative and discussion-based learning. Attendance on the module improved while students reported a better learning experience. This pilot work suggests that engagement of Engineering students with management modules could be improved with collaborative and discussion-enabling learning environments.

Session 4.6: Building inclusive cultures through constructive conversations

Dr Jan Peters, The Open University

Proposition 5

Workshop, Think Tank Lodge

What if the current demographic of people studying, teaching and working in engineering is as good as it gets? How to ensure underrepresented people achieve their potential and are fully engaged? And how can diversity drive innovation regardless of who is doing the innovating? Constructed conversations using Peters' framework will engage participants in a granular analysis of the choices they can take to shape the ambience and energy in a department and fuel a desire to teach in a holistic and engaging way. At its heart is the view of respecting and valuing colleagues/students as more than a 'brain on a stick'.

Session 4.7: New extended Computer Science curriculum model: USE-VQP-VCP (University, Students and Employers – Vendor Qualification Providers – Value Chain Partnership)

Dr Kulvinder Panesar, York St John University

Proposition 3

Workshop, Think Tank Issigonis

Empirically, Computer Science (CS) and IT-related graduates are failing to secure specialist posts in the first three years after graduation, due to limited skills and specialist experience. This issue contributes to the future skills gap of professionals for our technology-driven world. Consequently, there is a growing vendor qualifications market; creditability of digital wallets and their global acceptance. We propose a new CS curriculum business value model comprising academia; embedded yearly industry qualifications; annual short placements (increased employer engagement); industrial placement; an extended academic year; fees (marginal increase). Benefits include: expediting graduates to achieve their long-term goals; skills gap minimised; and employers recruiting ready professionals.

Session 4.8: Enhancing class interactivity: Lessons on small group teaching

Dr Kathryn Harden-Thew, University of Wollongong

Proposition 1

Workshop, Think Tank Brindley

This workshop aims to assist university teachers to enhance interactivity in their classrooms by incorporating small changes to make big differences for teaching the next generation of learners. It draws on learning theory and active learning pedagogy to provide simple, practical activities easily transferable to any teaching context. In this session, participants will experience first-hand strategies aimed to energise and boost student understanding. University teachers will walk away from this session equipped with a greater knowledge of how students learn, the benefits of active learning and small strategies that can be applied immediately to enhance class interactivity and deepen student engagement.

Session 5, 16:00-17:00

Session 5.1a: Multidisciplinary pairing: A win-win situation

Mrs Claire Howell, Aston University

Proposition 1

Oral presentation, Auditorium

This presentation describes an initiative where an undergraduate Law student is paired with a Design Engineering student. The Law students are tasked with interviewing the Engineering student and identifying any intellectual property rights in the engineer's final year project. The engineers learn not only the importance of intellectual property rights but they also learn the language of the lawyer and how to communicate effectively with them.

Session 5.1b: Teaching Computer Programming skills to biologists

Dr Priyank Shukla, Ulster University

Proposition 1

Oral presentation, Auditorium

This session will discuss an award-winning case study, which covers a combination of active learning, problem-based learning and student-centred approaches, for teaching a Computer Programming intensive module to a Biology background dominant student cohort. The presentation intends to discuss and debate among the audience how combining different pedagogical approaches and cross-disciplinary teaching practices can help in designing interdisciplinary modules more effectively, and also how the proposed approach from the case study can be deployed in their own teaching practice/settings. In general, this session will be relevant to anyone who is involved in teaching interdisciplinary courses; more specifically, to those from Life Sciences and/or Computer Sciences.

Session 5.1c: Teaching science communication to Physics students: What works?

Ms Wendy Sadler, Cardiff University

Proposition 1

Oral presentation, Auditorium

Cardiff University School of Physics and Astronomy has a long history of outreach and engagement activity including an award winning spin-out company specialising in outreach. Using these skills they have developed a novel undergraduate module on science communication and engagement. The course provides students with the vital employability and communication skills required for engaging a wider public with the physical sciences. This session will outline the content of the module and discuss the feedback received from students on the course. We will reveal the mistakes that were made, as well as the successes and skills gained according to feedback from students on the course.

Session 5.2a: Technology and interaction: A new approach to teaching an MSc module on passive design of buildings

Dr Vicki Stevenson, Cardiff University

Proposition 2

Oral presentation, Connect Event Space

When reviewing the MSc module “Passive Design”, the requirements of both local and distance learners were considered as well as the expectations for professionals in practice (particularly to prepare for anticipated requirements). A range of written and AV materials were made available for students to review prior to each themed session - students could choose materials suitable to their learning style. This freed contact time for interactive learning activities and student presentations; allowing students and tutor the opportunity to explore understanding. Students appreciated the early availability of learning materials, as well as the balance and quality of the activities.

Session 5.2b: Pedagogy Involving Capture Technology (PICT): Uses of Panopto beyond the recording of lectures

Dr Chris Willmott, University of Leicester

Proposition 2

Oral presentation, Connect Event Space

Lecture capture technology has become established as a popular and effective tool for recording lectures at many universities, with students able to (re)watch a session at a time of their choosing. The same technology can readily be employed in other non-lecture contexts to generate valuable educational resources. This presentation will share findings from a recent project investigating evolving ways in which capture technology is being used over and above standard lecture recording. These include: flipped teaching, assessed talks, introductions to laboratory equipment, and working through example problems. Some tips for anyone considering this approach will be discussed.

Session 5.2c: Achieving active learning through student participation in online tutorials

Dr Katrine Rogers, The Open University

Proposition 2

Oral presentation, Connect Event Space

Online tutorials are an important part of blended and online courses. This session describes a mixed-methods study investigating the effectiveness of three types of online activities in achieving student participation and engaging students in active learning. These activities include answering mathematical questions by polling; on-screen activities such as drawing and ‘drag and drop’; and using the text chat and microphone. Mathematics students across all undergraduate levels showed high levels of participation in all types of activity, and generally perceived the activities as enjoyable and useful. However, this session also includes a discussion of challenges we still need to overcome.

Session 5.3a: Addressing the needs of diverse students using video, VLEs and automated formative assessment

Dr Chris Armstrong, University of Hull

Proposition 3

Oral presentation, Connect 1 + 2

This talk will look at how we have rebuilt our second year Mathematics support class to move away from lectures and exams, and toward an online module supported by face-to-face workshops, and how this has been evaluated over the last two years. We begin by addressing the content and the aim of the course, how VLE features were used to guide students through a re-vamped module structure, and then look at a case study of how this was experienced by students with personal circumstances such as childcare or part-time work, along with practical advice on how to adapt this structure.

Session 5.3b: From writers’ cramp to typists’ tremors: Moving exams online

Dr David Martin, University of Dundee

Proposition 3

Oral presentation, Connect 1 + 2

In an age of online everything, the handwritten exam is an anachronism. It is inappropriate to assess a student using methods that they only ever use in that assessment, with minimal formative feedback. We describe five years’ experience of the migration from paper-based exams to fully online exam provision. This session includes contributions from academics, administration, technical support and the student voice to identify practice which works, and pitfalls to be avoided.

Session 5.3c: #WhatsApp in Design Education: Facilitating design development, support and feedback, one message at a time

Mr Ahmed Mohammed Patel, Middlesex University

Proposition 3

Oral presentation, Connect 1 + 2

This session proposes a technological intervention beyond the classroom, as an approach to facilitate and support engagement with the iterative design process, and in turn improve the skillset and overall quality of the design work.

Session 5.4a: No more leaky pipelines: Is it time for a new metaphor for women in Engineering?

Dr Sally Organ and Dr Alec Goodyear, The Open University

Proposition 4

Oral presentation, Connect 3

This session reports on the outcomes of a study to understand the motivations, aspirations and experiences of mature female Engineering students at The Open University (OU). These women are often well-qualified in non-STEM disciplines and we will discuss whether the 'leaky pipeline', as a metaphor for retention and progression in STEM, applies to them. We suggest that it is time to stop expecting women to change to fit traditional models of Engineering teaching and offer ways that the curriculum could be changed to increase engagement and success for all Engineering students.

Session 5.4b: A foundation for diversity

Dr Darren Campbell and Dr Amy Patten, Aston University

Proposition 4

Oral presentation, Connect 3

STEM-related learning and employment is well documented as being under-representative for people with certain protected characteristics. Across the sector there has been a strong commitment to equality, inclusion and diversity, with considerable effort being focused on creating opportunities and reducing barriers, which to date seem to have had limited effect on cohort diversity. A foundation year is a positive example of one such opportunity, and in our experience, aids in the provision of a diverse cohort for undergraduate studies. Here we discuss the impact on diversity that 10 years of the Engineering Foundation Year has had at Aston University.

Session 5.4c: Beyond the STEM gender paradox: Tapping into motivational drivers for wider participation

Dr Ali Roula, University of South Wales

Proposition 4

Oral presentation, Connect 3

A key assumption in many discussions and interventions around gender participation in Science, Technology, Engineering and Mathematics (STEM) is that the creation of a more equalised and supportive environment through various encouragement and positive action schemes would result in a greater female participation in STEM. However, data from large studies suggests paradoxically that supportive social environment correlates negatively to female STEM graduation rates. This presentation will review literature and propose recommendation on how to tap onto inherent gender motivational differences to encourage more female participation in STEM.

Session 5.5a: Putting the fun into Science

Dr Pat James, Birmingham City University

Proposition 5

Oral presentation, Room 495

This session will examine how multi-disciplinary healthcare staff at Birmingham City University have been involved in interactive activities at major science fairs. This session reports on hands-on activities which have a sound scientific basis but are delivered in a fun way and at a level that can be adapted to suit participants from varied backgrounds in terms of both age and scientific knowledge.

Session 5.5b: Engaging students with the Human Anatomy curriculum using the flipped classroom

Dr Jonathon O'Brien and Mrs Rachel Stonall, University of Liverpool

Proposition 5

Oral presentation, Room 495

Musculoskeletal and neuroanatomy are core components of the year one curriculum of the Occupational Therapy programme at the University of Liverpool. We assayed an innovative approach to teaching this using the 'flipped classroom'. This involved students viewing online presentations prior to class, followed by small-group practical sessions aimed at consolidation of learning and focusing on 'hands-on' practical anatomy

skills. We will explore the theoretical background of the 'flipped classroom' and present some initial encouraging findings on our students' satisfaction and engagement. We will also make some suggestions about developing this approach and outline some steps for the future.

Session 5.5c: Generating STEAM: Putting Art and Design into STEM

Dr Beverley Cook and Mrs Justine Davidson, Nottingham Trent University

Proposition 5

Oral presentation, Room 495

This session introduces a novel approach to teaching mobile application development and fashion management. Students were asked to work in interprofessional groups to create a proposal and paper prototype of an app aimed at the fashion industry, allowing collaboration of the technical knowledge of Computing students and the business knowledge of Fashion Management students. This presentation will explain the process and technology we used to overcome the issues with teaching large groups of students from different colleges on different campuses. Evaluation of the project from staff and students will be presented, concluding with lessons learned and improvements for the future.

Session 5.6: Working towards a manifesto for inclusive STEM education

Dr Clem Herman, The Open University and Dr Lisa Thomas, University of Manchester

Proposition 4

Workshop, Think Tank Lodge

This workshop will challenge participants to reflect on their own activities, inspiring each other with success stories, as well as tackling difficult issues such as how to de-colonise the curriculum, and dealing with resistance. While our emphasis and starting point is the Computer Science disciplines, we recognise that many initiatives across STEM have similar experiences so we invite participants from other disciplines to come along and share these. As an outcome, we hope to emerge from this session with a manifesto for inclusive STEM education, as well as some inspiring ideas that can be shared across the sector.

Session 5.7: Building an inclusive undergraduate research module in one hour

Ms Michele Underwood and Ms Wangi Pandan Sari, University of Warwick

Proposition 4

Workshop, Think Tank Issigonis

In this interactive workshop, STEM professionals will be encouraged to adopt a holistic and collaborative approach to building an inclusive undergraduate research module. By bridging themes that arise in the context of widening participation with undergraduate research (two increasingly important areas in UK HE) through this workshop, STEM professionals will have a forum for sharing best practice, experimenting with collaborative design and exploring how they can better integrate underrepresented students into their scientific communities. Participants will leave with ideas for initiatives that will build underrepresented students' social and cultural capital and increase their retention, progression and success in STEM.

Session 5.8: Beyond reasonable adjustments: Possibilities and pitfalls of an inclusive curriculum framework in Applied Sciences

Professor Antony Moss and Professor Patrick Callaghan, London South Bank University

Proposition 2

Workshop, Think Tank Brindley

This workshop will focus on the development an inclusive approach to STEM education. Guided by a systematic review of the evidence base, workshop participants will be invited to explore their own approach to enhancing inclusive practice, with practical guidance shared as to what works. The workshop will also interest delegates keen to coach others to better performance in enhancing the student experience through increased inclusivity. The workshop will be highly interactive, with participants invited to share their own experiences, and discuss barriers which they may have encountered in promoting inclusion. The session will involve the use of audience response technology, so it would be useful if participants have access to a smartphone, tablet device or laptop.

Day 2, 31 January 2019

Session 6, 10:00-11:00

Session 6.1a: Putting learning and teaching at the heart of a medical school curriculum

Mrs Julie Taylor, Canterbury Christ Church University

Proposition 1

Oral presentation, Auditorium

Following the announcement that Canterbury Christ Church University and the University of Kent had secured the opportunity to develop the Kent and Medway Medical School (KMMS) we set about identifying the key aspects required to deliver a medical school curriculum. By putting learning and teaching at the heart of the curriculum we have been able to build a dynamic programme that addresses local need in relation to the training of medics but also offers a robust set of learning outcomes that goes beyond the traditional medical curriculum and delivers the art and science of what it means to be a contemporary doctor.

Session 6.1b: Interprofessional education across UK medical schools

Dr Bethany Shelvey and Dr Morkos Iskander, The Royal Liverpool and Broadgreen University Hospital

Proposition 1

Oral presentation, Auditorium

The introduction of interprofessional education (IPE) at undergraduate is supported by multiple research programs (Eddy, Jordan, & Stephenson, 2016; West et al., 2015). A survey of IPE was sent to UK medical schools aiming to establish if there were correlations between factors related to institution, faculty, students and the IPE. The response rate was inclusive of >50% of UK medical students. Quantitative analysis demonstrated strong correlations between earlier introduction of IPE and facilitation by medical education specialists, leading to better evaluation. A snapshot of UK medical school IPE has been captured, identifying best practice, thus enabling recommendations for future implementation.

Session 6.1c: Embedding experiential learning into undergraduate Health programmes

Dr Rahma Elmahdi and Mr Gurnam Johal, Imperial College London

Proposition 1

Oral presentation, Auditorium

In an era of education that sets increasing distance between the student and the populations they work with, experiential learning aims to break down institutional and technological barriers to bring students directly in contact with these populations to test their learning through a praxis-based model. This session aims to provide an introduction and preliminary instruction to educators as to how to embed aspects of experiential or service-based learning into already established medical, epidemiological, global or public health undergraduate curricula by providing a step-by-step guide on strategies for integration and engagement at both the faculty and student level.

Session 6.2a: Open data for Science learning

Dr Mario Orsi, UWE Bristol

Proposition 2

Oral presentation, Connect Event Space

Data analysis skills are crucial in science and technology. Unfortunately however, the necessary underlying Maths and Statistics are typically regarded as difficult and abstract by students, who as a consequence may struggle to engage. This issue is made worse by traditional teaching relying on "uninspiring" material (such as made up data and problems). This presentation will report on an alternative approach built around the use of real, current, and openly available data. The availability of such data, which has increased substantially in recent times, can, and should, be exploited in the classroom to develop more authentic and inclusive teaching and learning activities. These ideas are being implemented into the OpenDataStat.org website.

Session 6.2b: Computing in the classroom: Learning Programming with educational robots

Dr Tessa Berg, Heriot Watt University

Proposition 2

Oral presentation, Connect Event Space

This presentation will discuss a Scottish Computing course that BSc students take as part of their degree in Computing. The course, called 'Computing in the classroom', requires final year Computing students to spend time in high school environments, shadowing the teacher and, with support, producing and teaching their own computational project materials. In this presentation I will highlight the strengths of the course for both students and teachers and discuss the highlights of the recent course introduction of educational robots in schools.

Session 6.2c: Thoughts on hacking student induction

Mr Stephen Murphy, Birmingham City University

Proposition 2

Oral presentation, Connect Event Space

Student induction has long been a difficult balancing act between fun and the need to prepare students for the step change of university life. Academic literature typically shows that this often meets with mixed success. This presentation will describe how an accidental innovation led to the development of a format that mixes fun with learning and will reflect on how it addresses the needs of modern students as part of their induction.

Session 6.3a: How technology can be used in delivering apprenticeship Level 7 programmes

Dr Yvonne Moogan, Leeds University Business School

Proposition 3

Oral presentation, Connect 1 + 2

This presentation will document the importance of digital technologies in changing the online classroom so that a more engaging and dynamic environment is developed. By using a blended approach in the delivery of a level 7 (MSc Senior Leadership) apprenticeship programme, the role of technology is discussed and debated. For example, the challenges in establishing online delivery modes, the issues surrounding its implementation and the impact on staff and students are documented via the journey of getting an apprenticeship programme approved which uses solely 80% online learning are discussed.

Session 6.3b: The Institute of Coding

Professor James Davenport, University of Bath

Proposition 3

Oral presentation, Connect 1 + 2

The Institute of Coding is a major initiative (£20M of government matched funding) to address the national shortage of digital skills as well as respond to the surprising fact that Computing graduates have relatively poor employment rates, and are drawn from a less diverse pool than one would like. As well as university students (both Computing and other disciplines), we are also looking at digital professionals (with degree apprenticeships and short courses, all with substantial industrial involvement) and professionals in other occupations. We are producing a new co-designed industry standard, and researching blockchain-based skill accreditation.

Session 6.3c: Embedding entrepreneurial skills and employability in the academic curriculum

Dr Mircea Scrob and Ms Helen Hook, University of Birmingham

Proposition 3

Oral presentation, Connect 1 + 2

An Entrepreneurial Skills module has been designed to embed technological innovation, creative thinking and basic knowledge of start-ups in the curriculum of final year students at the University of Birmingham. A context of learning conducive for acquiring these skills is promoted by having the participants work in groups to develop a product/service from ideation to pitching to a panel of industry specialists, under the guidance of external experts and with the academic leading on structuring the independent research. Relevant and valid assessments are key for the success of the module and this is achieved by requiring meaningful outputs, including external experts in the evaluation process and linking internships/placements to performance on the module.

Session 6.4a: Developing leadership skills through competition-based group projects

Dr Ian Tuersley and Dr John Thornby, University of Warwick

Proposition 4

Oral presentation, Connect 3

Effective teaching of leadership skills in STEM HE presents numerous challenges. Leadership, by its nature is based around collaborative activities but opportunities for students to work together towards a mutual goal are rare when the focus of many modes of assessment is individual attainment. When they are encountered, the emphasis is usually on equality of contribution rather than recognising any specific team member demonstrating leadership over their peers. This work considers the provision of an environment where leadership is developed - and evidenced - in group activities by engagement in the more authentic, real-world challenges encountered in internationally competed activities.

Session 6.4b: The experiences of students learning Research Methods and Statistics

Dr Alexander Marchant and Dr Eleni Vangeli, London South Bank University

Proposition 4

Oral presentation, Connect 3

Many students self-report as struggling with Statistics, suggesting that Statistics anxiety and lack of confidence are contributing factors (e.g. Field, 2014). Recent research has documented the existence of Statistics anxiety and low confidence in a cohort of first-year Psychology students and found that, when tracked longitudinally, these factors do not change over time, even with exposure to, and the successful learning of Statistics (e.g. Marchant, 2017; Marchant & Vangeli, 2018). This session will present qualitative data to supplement and expand these findings, offering insights into the nature of being a Psychology student learning an important and necessary, but potentially not intrinsically motivating part of their chosen degree subject.

Session 6.4c: Student retention in HE: The perception of the student

Mr Kam Gill, Coventry University

Proposition 4

Oral presentation, Connect 3

This research evaluates and measures factors prominently associated with low student retention in the current UK higher education system. This evaluation informs the development of an intervention programme designed to improve low retention rates on academic programmes, by using pastoral care to improve student engagement.

Session 6.5a: Reactions and resistance to a university interdisciplinary learning initiative in a STEM faculty

Dr Ian Stewart and Kun Wang, University of Manchester

Proposition 1

Oral presentation, Room 495

These are the early findings of research into the response of The Faculty of Science and Engineering (FSE) at The University of Manchester, to the university's intention to increase interdisciplinary learning (IL) through its University College for Interdisciplinary Learning (UCIL). Of all the faculties, the FSE has the lowest uptake of IL and in some schools, there is none, instead: resistance. This research is the first to develop a unified picture of the response of a STEM faculty to the idea of IL with disciplines beyond STEM. Delegates will be able to interactively evaluate the proposed reasons for poor uptake.

Session 6.5b: Developing Engineering skills through deliberate practice and growth mind-set

Dr Sarah Junaid and Mr Paul Warrington, Aston University

Proposition 1

Oral presentation, Room 495

The CDIO framework (Conceive-Design-Implement-Operate) at Aston University has been used to develop professional skills while applying technical theory in team-based D-B-T (Design-Build-Test) projects. However, what is often missing in the Engineering curriculum is developing the psychosocial aspects of learning, priming students to be receptive to intellectual growth and skills development. This study outlines the development of CAD skills taught within a mind-set theory framework and compares performance outcomes to previous cohorts.

Session 6.5c: The scientific iceberg: Including students in our community's practices

Dr Sophie Rutschmann, Imperial College London

Proposition 1

Oral presentation, Room 495

As research scientists, many (if not all) of us have developed the ability to think critically on the job. Our scientific community must therefore constitute an environment supportive of the learning of these complex skills. My research project identified some of these opportunities with the ultimate aim to implement them in our taught programmes and therefore include our students in on our secrets!

Session 6.6: Are we giving undergraduates enough guidance about how to read research papers?

Dr Trevor Day, Royal Literary Fund

Proposition 1

Workshop, Think Tank Lodge

High-level reading ability is a transferable skill, no matter what students do after their undergraduate degree. A recent study concluded that research staff read in a very different manner to undergraduates, and that developing students' reading ability is a gradual process that needs to be actively supported (Hubbard & Dunbar, 2017). Using a sample paper as a focus, this workshop explores what guidance we might give to accelerate students' reading capabilities at different stages in their undergraduate degree.

Session 6.7: Inclusive education: When will the miracle occur?

Dr Trevor Collins and Dr Victoria Pearson, The Open University

Proposition 4

Workshop, Think Tank Issigonis

Despite numerous initiatives addressing the recruitment, progression and attainment of students with disabilities, higher education institutions are still waiting for the miracle of inclusive education. The disability gaps revealed by HESA data have focused attention on these issues and motivated the funding of projects scaling-up effective practices across the sector. In this session, we'll explore your perspectives on how cultural diversity, physical accessibility and social inclusivity effect students with disabilities in your institutions, faculties and departments. We'll share our perspectives from an OfS project, and invite you to develop actions to enhance diversity, accessibility and inclusion within your institutions.

Session 6.8: Learning digital literacies in a STEM context

Professor Timothy Drysdale, University of Edinburgh

Proposition 2

Workshop, Think Tank Brindley

STEM graduates stand to benefit from developing digital literacies such as computational thinking and programming, but non-specialists in Computing are expected to have more motivation to learn if they can see these benefits in the context of their subject. This can be achieved in a single webpage by connecting a graphical programming language to an appropriate controllable 3D model, virtual sensors, and graph plotting. This session gives you the opportunity to explore an example developed for Mechanical Engineering students – making a solar panel follow the sun. Please bring a laptop if you have one available (not essential).

Session 7, 11:15-12:15

Session 7.1a: Creating a Mathematics teaching placement module collaboratively

Dr Kristian Evans, Swansea University

Proposition 1

Oral presentation, Auditorium

This presentation will give an overview of creating and coordinating a teaching placement module in Mathematics. Many of the ideas discussed will naturally extend to other STEM subjects. The speaker created this module in collaboration with the Physics Department at Swansea University, local secondary schools and a former PGCE lecturer. This module has been an excellent opportunity to develop the important employability and transferable skills of students, and it also allowed students to gain a taster of teaching as a career before committing to a PGCE course.

Session 7.1b: Improving numeracy skills and student employability through technology: Three pilot projects by the University of Derby and Vretta

Dr Ovidiu Bagdasar, University of Derby

Proposition 1

Oral presentation, Auditorium

Mathematics is a stumbling block for many. Due to various factors, including mathematical anxiety, peer pressure, or lack of adequate support, even university students often struggle to perform day-to-day mathematics tasks. In this talk we will present the results of a numeracy skills project developed at the University of Derby in collaboration with Vretta. The project aims to assess current levels and improve numeracy skills for Foundation, Computing and Mathematics students at Derby. The successful completion of the numeracy module is rewarded by a Numeracy Skills Certificate, expected to have a positive impact on student engagement, attainment and employability.

Session 7.2a: Adventures in flipping the teaching: A bioethical example

Dr Chris Willmott, University of Leicester

Proposition 2

Oral presentation, Connect Event Space

Flipped classroom teaching, in which delivery of content can be shifted to self-study tasks conducted prior to face-to-face sessions, has been gaining in popularity. Some simplistic accounts give the impression that this is a straightforward panacea. Our experience delivering Bioethics teaching has been more nuanced. Moving factual information into online videos has freed up classroom time for discussion of case studies. However, there remain issues with ensuring appropriate engagement with the flipped materials. This presentation will share some of the insights into flipped teaching 'dos and don'ts' that we've learned during the four year evolution of this module.

Session 7.2b: Novel use of haptic technology (touch/VR) in teaching Cell Biology

Dr Natasha Barrett, University of Reading

Proposition 2

Oral presentation, Connect Event Space

The use of cutting-edge haptics technology (touch/VR) is being explored in education at both university and school. This technology provides a "hands-on" experience that enables student-led visual and tactile exploration of virtual environments. Focusing on the biological perspective we discuss the challenges of quashing misconceptions when developing a virtual cell membrane that allows students to explore membrane transport using an immersive (head-mounted display), multi-finger haptic interface. Initial data indicates that both haptic (touch/VR) and non-haptic (VR alone) students (11-13ys) benefitted from using the system.

Ongoing analysis is exploring what factors may influence the learning gain achieved, such as manual dexterity and spatial awareness.

Session 7.2c: Encouraging mastery in the learning of Biochemistry in first year Pharmacy undergraduates: A flipped classroom approach

Dr David Morgan, Keele University

Proposition 2

Oral presentation, Connect Event Space

Pharmacists need to know a bit of everything, but there are some things they are less keen to learn. Biochemistry is one such area, and I believe this leads to shallow, rote learning, rather than any deep learning which might impact on future studies or professional life. In order to encourage “mastery” rather than “enough fluency to get me through the exam” I have adopted a flipped classroom approach, wherein the content delivery occurs in video-lectures in advance of a more active classroom session. In this session, I will discuss some of the challenges this approach has uncovered.

Session 7.3a: Technological innovation and pedagogical immersive approaches in STEM teaching

Dr Farzana Rahman and Mrs Louise Pennell, University of South Wales

Proposition 3

Oral presentation, Connect 1 + 2

Student engagement and success in higher education (HE) has faced challenges over the last decade. To overcome these challenges, USW’s Engineering faculty is piloting a project by introducing an innovative scenario-based immersive teaching method to improve academic-student engagement, decision making and the overall academic experience of undergraduate students.

Session 7.3b: Facilitating peer-led group research through virtual collaboration spaces

Dr Setareh Chong, Professor James Chong and Dr Richard Walker, University of York

Proposition 3

Oral presentation, Connect 1 + 2

This paper explores the introduction of peer-led group learning to final year undergraduate Biology students undertaking extended projects. Students were encouraged to use a virtual collaborative environment – Slack – as a hub to share ideas / findings and to ask questions. The research used survey and activity logs, combined with focus groups and interviews. We compare the learning outcomes from two cohorts, focusing on the frequency and nature of interactions within Slack among group members and with the facilitator. We discuss the implications of our observations for instructional support to students and the transferability of this model to other disciplines.

Session 7.3c: Interactive environment for learning Programming

Dr Ross Davies and Mr Jack Whitter-Jones, University of South Wales

Proposition 3

Oral presentation, Connect 1 + 2

Programming languages make up a substantial portion of the jobs market. Engaging students in this area can always be improved. Students are constantly distracted away from classroom activities. An immersive and structured environment facilitates out-of-class learning; to aid both progressive and struggling students through live, scalable, modular and autonomous learning experiences that are tailored towards lesson objectives. The use of secure coding demonstrates a capacity in what can be achieved by undertaking the module. This in turn provides a level of foresight for students to aim, achieve and obtain as a core employable skill for the 21st Century jobs market.

Session 7.4a: Changing culture and challenging stereotypes: Let’s build bridges and diversify!

Professor Rebecca Strachan, Mr Opeyemi Dele-Ajayi and Ms Jane Stonehouse, Northumbria University

Proposition 4

Oral presentation, Connect 3

A key player in the UK economy, the construction sector has a skills shortage particularly at graduate level. Young people are not entering the sector and it is one of the least diverse sectors in the UK. The BRIDGE Project aims to address this situation by identifying the factors that underpin this lack of diversity and use these to design, develop and evaluate a set of interventions to bring about positive change. Based on a theory of change, these have focused on admissions and recruitment, challenging the negative image of the sector, improving career information for young people and providing equality and diversity training for staff/employers. Our results show improvements in the gender balance of first year students and a more positive image of the sector by young people.

Session 7.4b: Ensuring an effective HE Engineering provision for contemporary students

Mr Dave Knapton, University of Sunderland

Proposition 4

Oral presentation, Connect 3

This session is delivered in response to the evident skills gaps for Engineering. There are a huge range of initiatives which all aim to inspire, enthuse and engage young people in STEM subjects. The number of 14-16 year olds who are now considering STEM careers as a result is rising and has tipped the 50% mark! The study of which this presentation is a part, explores what the HE sector must do to ensure that the pedagogic style to which such STEM engaged students are accustomed is extrapolated to ensure that engagement is not reversed higher in the educational journey.

Session 7.5a: Flipped classroom: Boom or bust

Dr Lucy Crockford, Harper Adams University

Proposition 1

Oral presentation, Room 495

Moving from level 4 to level 5, following a summer break where students have often had little requirement to articulate complex thoughts, is challenging with the increase in academic rigour and the expectation of development of higher skills. By flipping the classroom I attempted to address the challenge of engaging students in more advanced content and concepts in a STEM subject and development of higher skills such as analytical and evaluative skills. This session will discuss the pitfalls and successes of using innovative and different learning strategies to develop graduate outcomes and the link these strategies have to student success in assessment.

Session 7.5b: How to bring 'the arts' into STEM: Our obligation to teach ethics

Dr Susanne Prankel, University of Worcester

Proposition 1

Oral presentation, Room 495

STEM teaching often involves facts and analytical skills. Yet there must be space for subjectivity and opinions: our duty is also to equip students to address wider implications and discuss controversial and emotive aspects of their subject. Awareness of ethical issues and having to face a diversity of views can seem alien to students trained to focus on objectivity. Interdisciplinary approaches can quickly break down barriers and inspire lateral thinking and encourage the students to consider their subject in a societal context. Approaches borrowed from Drama, Psychology and Music are presented: the aim is awareness, enjoyment and responsibility.

Session 7.5c: Improving feedback participation by distance learners

Dr Tim Young, University College London

Proposition 4

Oral presentation, Room 495

Obtaining sufficient student feedback can be challenging, especially on distance learning courses. We have nearly 100 students, based worldwide, on our distance learning Clinical Neurology course. In previous years the response rate to our Postgraduate Taught Experience Survey (PTES) has been very low: 14% in 2017 against a 32% national response rate (mainly face-to-face courses). A significant number of our students come from ethnic minorities or from Developing Nations. For 2018 I wanted to encourage PTES inclusiveness to clearly hear our diverse student body. I outline how individualised techniques led to an extraordinary 2018 PTES response rate of 68%.

Session 7.6: Enhancing learning through interdisciplinary field courses: Breaking subject-specific barriers, widening perspectives and revolutionising peer-led learning in the Indian Himalayas

Dr Laura Roberts and Dr Osian Elias, Swansea University

Proposition 1

Workshop, Think Tank Lodge

We present findings from an interdisciplinary field course to the Sikkim Himalayas. Twenty students; five Human Geography, Physical Geography, Biology and Zoology, are selected to attend the 20-credit, 16-day module after a rigorous application and interview process. The students work in interdisciplinary teams, each studying one of five themes: hydroelectric power, natural hazards, urbanisation, agriculture and ecotourism in a rapidly developing state of India where environmental constraints challenge economic growth and stability. We discuss how the experience impacts skills development, global perspectives and employability while evaluating the wider applications of the teaching model to other STEMM disciplines.

Session 7.7: People-centred development: A resilient approach to learning and teaching

Dr Maria Salaru, Durham University

Proposition 3

Workshop, Think Tank Issigonis

Boundaries between academia and the rest of the world are fast dissolving, yet facilitating collaborative learning between academics, students, companies or other organisations presents significant challenges. How can academics rise to these new challenges? What has been learned about collaborative learning? This workshop builds on the Erasmus+ PEOPLE project which engages commercial and public organisations in postgraduate student learning to solve real-life industry challenges. Workshop participants will gain insights into the challenges and opportunities of co-creation through the PEOPLE-centred development approach, covering how to: identify and negotiate relationships with potential partners; translate academic concepts for practical purposes; and manage conflicting priorities.

Session 7.8: Partnerships for active engagement for STEM-learning “practically anywhere” with an Internet of Laboratory Things

Professor Nicholas Braithwaite and Dr James Smith, The Open University

Proposition 2

Workshop, Think Tank Brindley

The OpenSTEM Labs enable collaborative practical work in the distance learning context of The Open University. In 2017/18 we facilitated >50,000 student-hours of online practical work, without requiring students to be co-located with the kit or each other. We employed remotely controlled apparatus and online interactions with archive data. Enquiries ranged from explorations of galactic structure to interrogation of a database of observations on lung capacity. The OpenSTEM Labs connect students to real data through authentic and accessible interfaces that enable discovery learning, while providing collaborative skills for Workforce 4.0. We aim to inform potential partners of opportunities to share and contribute to our Internet of Laboratory Things.

Session 8, 12:20-13:20

Session 8.1a: Increasing retention and progression rates for Open University Engineering students through curriculum renewal

Dr Sally Organ, Ms Carol Morris and Dr Alec Goodyear, The Open University

Proposition 1

Oral presentation, Auditorium

This session will discuss how a significant uplift in both retention and progression has been achieved from the first cohort of Open University (OU) students to complete a reconfigured and more integrated first-year equivalent curriculum in general Engineering. The changes are designed to address sector-wide issues - difficulty with mathematical aspects of the subject, reluctance to engage constructively with personal development planning, and a lack of diversity in the student body – as well as OU specific issues arising from our open entry policy, distance learning teaching model and particularly acute time pressures on mature students studying while working.

Session 8.1b: Course design for achieving the graduate attributes of the 21st Century UK engineer

Dr Wasim Ahmad, Dr Rami Ghannam and Professor Muhammad Ali Imran, University of Glasgow

Proposition 1

Oral presentation, Auditorium

Graduate Attributes (GA) are often described as the academic abilities, personal qualities and transferable skills that universities instil in their students as part of their overall learning experience. For the accreditation of Engineering degrees in the UK, the IET requires HE institutions to demonstrate that graduates have developed a set of generic attributes within six broad areas of learning. These include subject-specific technical knowledge as well as economic and ethical skills. Consequently, the aim of this paper is to present our unique approach to designing, developing and delivering a third year Electronic Engineering module that covers the majority of these attributes.

Session 8.2a: A future facing learning strategy: What does this mean from a teaching perspective?

Dr Helen Tidy, Teesside University

Proposition 2

Oral presentation, Connect Event Space

Teesside University's Future Facing Learning (FFL) Strategy includes every full-time 1st year student receiving an iPad to enhance their learning experience and increase their digital literacy. A key aspect of this strategy has been for staff to shift their teaching focus to include FFL and the iPads. I will talk about how I have approached this challenge with a number of small wins rather than a big shift of teaching focus. I will outline some of the “small wins” and then explain how I approached teaching forensic court skills using a combination of visual cues and digital technology.

Session 8.2b: Using Minecraft in HE as a virtual field trip: One academic's journey

Dr Helen Carney, Teesside University

Proposition 2

Oral presentation, Connect Event Space

In this session I will discuss my innovative approach to teaching biodiversity via Minecraft and how I implemented this within my teaching practice. My students were able to develop and experiment with their fieldwork skills in a safe and supported Minecraft environment prior to commencing on a real-life fieldtrip. I will discuss the technical challenges I faced which ultimately led me to form my own Minecraft support group which is due for launch in Spring 2019.

Session 8.2c: The 4th Industrial Revolution: The who, what, how, when and WTF of higher education

Dr Jeffrey Vernon, Imperial College London

Proposition 2

Oral presentation, Connect Event Space

Is the Fourth Industrial Revolution more than old wine in new bottles? Commentators talk about a world of interconnected systems automatically sensing and updating their own state, and driving decisions about enhancement. They emphasise the fusion of the digital and the physical. I can imagine how this might apply to education – but many of us work in places where Blackboard falls over every month or so. My presentation interrogates what the advocates say about 4IR, and how far we can go along with it. Can we do more than roll our eyes at the latest catch-word, or look on helplessly as another technical development moves beyond our grasp?

Session 8.3a: Where's the flipping stats?

Dr Janet Horrocks, Dr Anne Savage, Dr Scott Cameron and Dr Sean Brown, Abertay University

Proposition 3

Oral presentation, Connect 1 + 2

Statistics, data analysis and experimental design are a crucial part of the Bioscience curriculum. At Abertay the curriculum structure precludes the delivery of specific modules in statistics and data analysis. The programme team has thus developed modules at stage 1 and stage 3 which embed the delivery of statistics within the context of experimental and data analysis. The modules are designed so that students cannot selectively avoid engaging with these areas.

Session 8.3b: Implementing Maths support for Health Science students

Dr Linda Thomson and Dr Nicola McIntyre, The Open University

Proposition 3

Oral presentation, Connect 1 + 2

This project investigates new ways of providing Maths support on a 1st year Health Sciences module (SDK100) in an online environment. Previously on SDK100, Maths tuition adopted a "one size fits all" approach and was not easily targeted to students' specific needs. This was problematic because of the diverse Maths backgrounds of the students on this module, including some students with very low Maths confidence levels, and it meant that a lot of students were receiving very general Maths support. This presentation will provide details about our approach to tuition and the main outcomes of our evaluations.

Session 8.3c: TBC

Session 8.4a: Understanding the importance of creating an inclusive timetable in the age of the commuting student

Dr Nigel Page, Mr Mark Bonetsky and Dr Gary Forster-Wilkins, Kingston University

Proposition 4

Oral presentation, Connect 3

With many students now living at home and commuting, this places challenges on universities in developing their inclusive learning communities, whereby student activities can be appropriately scheduled. Furthermore, distinctive commuter patterns are apparent between White and BME students, where BME students tend to live considerably further away from university than White students, presenting additional challenges in securing equitable outcomes. This presentation will review some of the inclusive strategies that we have taken in terms of improving the student experience and engagement and how we have worked closely with our head of timetabling to bring about changes in curriculum delivery.

Session 8.4b: Look to the US? Case study of Suffolk Centre for Female Entrepreneurship

Ms Stefanie Thorne, University of Suffolk

Proposition 4

Oral presentation, Connect 3

This session will focus on an initiative to promote and support gender diversity within innovation and entrepreneurship, which engages with the issues challenging female entrepreneurs and scientists before and beyond the student experience. Based within the Ipswich Waterfront Innovation Centre (IWIC) at the University of Suffolk, the SCFE has looked to the US and the federally funded network of Women's Enterprise centres as a model. The SCFE goes deeper by engaging girls through primary school outreach and science parks/innovation clusters as places of employment.

Session 8.4c: How accessible is the STEM post-16 education provision in UK, and what are the implications for the HE Computing and Engineering programmes' pipeline?

Dr Anne Nortcliffe and Mrs Roz Barley, Canterbury Christ Church University and Mrs Jacqueline Stallard, Sheffield Hallam University

Proposition 4

Oral presentation, Connect 3

Accredited Engineering and Computing programmes minimum entry pre-requisites are determined and restricted by the accrediting bodies. This paper illustrates the challenges of these pre-requisites with the hard data evidence of level 3 education in the two regions of the UK. The data illustrates the how challenging the Level 3 provision in these regions is, and the potential impact on supporting government and institutional aspirations to widen access to address the STEM pipeline shortfall.

Session 8.5a: Embedding employability and transferable skills in the curriculum: A practical, multidisciplinary approach

Dr Maria Valero, University of Bath

Proposition 1

Oral presentation, Room 495

This paper discusses a practical, multidisciplinary approach to help students developing their employability skills, including the practical implementation and initial outcomes of an MSc programme at the University of Bath (UoB). Informed by relevant professional bodies and students' perceived needs, key transferable skills are identified and embedded with technical ones. Students work on a series of tailored activities in which they integrate and apply principles and methodologies from multiple areas (linguistics, information, etc.) different to their technical expertise, as in the work environment. This is facilitated by a multidisciplinary team comprising academics and staff at six centres at the UoB.

Session 8.5b: Experiences supporting Open University apprenticeship students: A case study

Dr Soraya Kouadri Mostefaoui and Mrs Christine Gardner, The Open University

Proposition 1

Oral presentation, Room 495

Given the increased demand for STEM skills in the workplace, the UK government has initiated strategies to address this issue, including the introduction of Degree Apprenticeships and Graduate Apprenticeships in STEM subjects. This session will discuss the fundamental question as to whether the Open University apprenticeship students need different tuition strategies or support, and to identify issues apprenticeship students may face with the actual support strategy. The case study commenced with a study of student experiences on the first two apprenticeship modules in the School of Computing and Communications. Both the students' and tutors' perspectives will be presented and contrasted.

Session 8.5c: Crossing fields: Embedding employability skills through cross-disciplinary collaborative projects

Mr Fred Bates, Leeds Arts University

Proposition 1

Oral presentation, Room 495

The future success of graduates will be based on their ability to respond to an increasingly integrated and collaborative landscape of career opportunities. Increasingly employers are emphasising problem solving, creativity and team work as essential criteria for employment. Developing opportunities for integrated, collaborative and collective learning across disciplinary boundaries encourages innovative – and potentially disruptive – approaches to meeting the complex expectations of students, academics, providers, employers and policy makers. This presentation considers the benefits, opportunities and challenges of integrating creative, cross-disciplinary and collaborative projects in what are often seen as non-creative subject disciplines.

Session 8.6: Designing a better accreditation standard to promote graduates' employability

Dr David Bowers, The Open University

Proposition 1

Workshop, Think Tank Lodge

The Institute of Coding is developing a novel accreditation standard, which addresses employability concerns explored in the Wakeham and Shadbolt reviews, but differs from the content-focused standards prevalent across STEM. This session is essentially practical. Participants will use Skills Framework for the Information Age (SFIA) material, or a relevant skills framework for their own discipline, to construct a plausible accreditation standard for a subject area, evaluating it against the graduate qualities demanded by employers and society. Participants are welcome from all STEM subjects: those without a sector skills framework will work with those using SFIA to understand the principles applied.

Session 8.7: When diversity delivers: Speeding up diversity in academic settings

Ms Alice Chilver, Women's Higher Education Network

Proposition 4

Workshop, Think Tank Issigonis

The diversity of a university's faculty, staff and students has an influence on its strength and productivity. Diversity of gender, age, religion and many other attributes has a huge impact on the richness of the learning environment. Research says that a diverse student and staff body leads to increased productivity and better problem solving. At the same time, diversity, like anything, can come with challenges such as less cohesiveness and increased anxiety. This interactive workshop will help participants develop their own plan to promote diversity in their working environment and enable them to promote inclusion. Suitable for academic and research staff, professional services staff, managers, HR teams and students.

Session 8.8: Creative approaches to reflective practice

Dr Jennifer Leigh, University of Kent

Proposition 1

Workshop, Think Tank Brindley

There is a large body of work that shows Reflective Practice is a vital and underlying component of teaching and learning. Through a reflective practice we can learn from our mistakes, process, and move forward. However, teaching reflective practice is not straightforward. In this workshop delegates will have the chance to explore reflective practice by drawing on arts-based creative approaches; through arts materials and LEGO, in particular. We will consider the role of reflection and reflexivity, how reflective practice might be assessed, and how it can be used to enhance teaching, research, and development within STEM.

Poster presentations, The Platform, 13:40-14:20

Poster A1: Exciting, encouraging and enticing qualified and diverse Maths enthusiasts into the teaching profession

Dr Maria Gross, Azusa Pacific University

Proposition 4

The teacher shortage in Maths challenges countries, including the UK and the US. Traditional universities are insufficient to recruit and prepare enough qualified Maths teachers for US school children. Various alternative teacher pathways have been created but still fall short. This case study explores those pathways including their strengths and challenges and recommends college programming including community engagement to prepare diverse Maths teachers. This poster summarises this research which addressed the question: How can a global community collaborate to excite, encourage and entice more qualified Maths enthusiasts into the teaching profession?

Poster A2: Professional e-Portfolio: Using Padlet to map a learning journey for regulated practice

Dr Philip Bright, European School of Osteopathy

Proposition 3

E-portfolios in healthcare education offer the potential for supporting reflective learning. There are various software tools offering proprietary solutions, but other Web 2.0 options demand exploration. E-Portfolios should offer a format that reflects the regulatory structure of professional behaviours. Subsequent material evidence can then be posited under these behaviour domains. Padlet offers a 'shelf' template structure that can represent these regulatory frameworks. Students on Osteopathy undergraduate programmes are expected to reflect on the Osteopathic Practice Standards that inform the curriculum content. This is exemplified by students presenting key evidence of activity, to demonstrate their development into model professionals through the Padlet 'shelf'.

Poster A3: Improving Maths performance in large student cohorts

Dr Jessica Dale, Nottingham Trent University

Proposition 4

Numeracy skills are fundamental in STEM. These are often assessed and developed in the context of core modules with large intakes, but many students lack confidence in their abilities. This leads to a challenge of engaging varied student cohorts at scale. We have designed a core Biology module with surveys measuring baseline self-perceptions and Maths performance. Together with interactive seminars this provides individualised feedback and yields a dataset linking subjective and objective measures to outcomes. We explore the influence of different factors, such as perceived Maths ability, on performance. Feeding this back into curriculum design, we believe we have developed an adaptable framework that meets the needs of individual students who may otherwise fall behind.

Poster A4: Writing retreat days to support part-time students with dissertation writing

Dr Jean Assender, University of Birmingham

Proposition 4

Writing a dissertation research project is the culmination of every taught postgraduate degree. The "deficit-model" of higher education suggests that academic writing is "common sense" and doesn't need to be explicitly taught but with widening participation, our student population is more socio-culturally diverse and students need help developing their academic voice. Part-time postgraduate students have the additional burden of having to balance the pressures of work, family and academic life. This study looked at the introduction of writing retreat days as an effective mechanism of supporting part-time postgraduate students with their dissertation writing.

Poster A5: Developing interdisciplinary approaches to learning and teaching by the embedding of real-world employer challenges into the curriculum

Dr Nigel Page and Dr Martha Mador, Kingston University

Proposition 1

The ability of scientists to work effectively in interdisciplinary teams is becoming increasingly important in today's evolving world. To prepare our Bioscience students with the necessary graduate attributes, we have introduced strategies that promote/embed enterprise activities into the curriculum through the use of real-world challenges. Key to this strategy is placing students in interdisciplinary teams working on current/pressing issues set by employers (industrial /community partners) to develop outputs with real value to employers. This approach brings fresh innovative thinking for employers whilst giving our students hands-on learning to develop their skills and provide the link between study and employment.

Poster A6: Blended learning through VR technology in teaching Engineering subjects

Dr Zoran Jelic, Swansea University

Proposition 2

The aim of this poster is to present a case study of using virtual reality and augmented reality in the teaching of complex engineering subjects such as rocket propulsion. In Rocket Science, demonstration of rocket propulsion principles in labs pose a significant health and safety risk which can be a burden from the point of course logistics. With advancement of IT technology, hands-on experience as part of blended learning process can be "simulated" using VR/AR, avoiding hazardous conditions, but still providing an immersive and engaging activity for the students. The case study presented here, describes the practicality of producing and using VR/AR content, as well as the student response toward technology-enabled blended learning.

Poster A7: University and school collaboration to promote STEM subjects

Dr Mary-Carmel Kearney, Queen's University Belfast

Proposition 1

It is widely recognised that continued efforts are required to address inequalities in access to STEM disciplines at university. This poster will detail a project undertaken at Queen's University Belfast to engage with local secondary schools to promote STEM subjects amongst students aged between 12 and 14 years. The aim of the project was to introduce students to university research through immersive experiments. Activities were designed to make Science more accessible, interactive and fun, whilst making university less intimidating. Students were guided through experiments with the aim of solving a 'research problem' with this poster focusing on a research group from the School of Pharmacy. Feedback obtained from personnel involved will also be presented.

Poster B1: Integrating continuous reflection into the undergraduate learning experience

Dr Rachel Hope and Dr Richard Maguire, University of York

Proposition 3

By reflecting on past learning experiences, the understanding and relevance of course content can be increased. Students often recognise the benefits of reflection, however, such opportunities are frequently module specific and so many students miss out. We describe a continuous approach to reflection in a formative setting in the Department of Biology at The University of York. A tutorial session introduces the concept of reflection and feeds into a guided reflective journal, based on the VLE, which all students can continue across academic years. This, therefore, allows each individual to apply this understanding of their skills and learning process to subsequent modules and graduate employment.

Poster B2: Assessment strategy to 'future proof' students as computing practitioners

Miss Helen Partou and Ms Lindsay Smith, University of Hertfordshire

Proposition 2

Unavoidable questions occur about the best way to equip Computing students for the inherent professional and technical challenges facing them when building and/or working with computing systems. Here we are reporting on our experiences in addressing such questions with successive cohorts of both graduate and undergraduate students. This comprised simulating working as practitioners in team-based software engineering projects. It illustrates practical-based assessment strategies 'future proofing' students for Industry 4.0 by equipping them with skills transferrable across industry sectors. This entailed adopting a tool-based approach which supports constructivist principles of learning with real-world case studies.

Poster B3: "The game is afoot": Discovering the barriers to widening access and how we can overcome them

Mr Callum Livingstone, University of Dundee

Proposition 4

Widening Access (WA) is 'fashionable', receiving increasing publicity and funding, though there is paradoxically little change to initiatives and research. Initiatives exist to inspire and improve application rates to higher education; however, parallel or intertwined initiatives need to build pupils' non-cognitive skills; the best way to do this requires further assessment. Teacher and parent knowledge is often poor, lacking or inaccurate, though are vital for WA to be successful. Thus, equal focus needs placing on teachers and parents. A cycle of déjà vu exists regarding WA research. However, a holistic and qualitative approach could break this current perpetuating cycle.

Poster B4: Education for STEM

Dr Carol Wood, Mr Andrew Harper and Ms Melanie Smith, University of South Wales

Proposition 1

The new BSc Education for STEM aims to develop passion for education in a range of contexts to prepare students for the world of work so that they can respond to current and future demands of STEM education

with creative and adaptive approaches. It provides students with innovative and forward-thinking pedagogical experiences to develop key employability skills. This course is designed to respond to the skills shortage in STEM and to develop champions of STEM education who will have the values, skills and attributes to transfer this knowledge and passion to a variety of audiences. Thematic teaching brings into play real-life examples allowing the application of theory to be seen in context in the world around us. Students will study related subject knowledge across the STEM disciplines.

Poster B5: Use of digital skills to promote collaborative learning and co-creation

Mr Gareth Day, UCSD

Proposition 1

In recent years, there has been a significant increase in the number, range and complexities of digital technologies available to educators and learners alike. With the increased availability of technologies such as augmented/virtual reality, data visualisation techniques and other more established forms, it has increased the ability for educators to engage in cross-disciplinary practice that promotes the use of new and emerging technologies. This poster will demonstrate the benefits of using digital technology in an inter-disciplinary educational environment to promote the use of digital skills and co-creation.

Poster B6: Designing experiential assessment and providing meaningful feedback to equip students for leadership and critical thinking

Dr Jenna Macciochi, University of Sussex

Proposition 1

Bringing experiential group learning into summative assessment offers a great opportunity for active learning and the development of key employment skills. But implementation can be challenging and the outcomes varied and unpredictable. I explore what experiential learning means and how it can be a valid pedagogical tool for promoting the development of desired key Life Sciences employment skills in combination with subject specific deep learning. I will share current practice and experiences from incorporating experiential assessments into an existing Life Sciences curriculum. I will discuss the learning outcomes, assessment tools and the opportunity experiential assessment presents for the provision of comprehensive and meaningful feedback and the importance of including reflective self-assessment.

Poster C1: Uncertain future and complex workplace scenarios: Embedding employability into the postgraduate curriculum

Dr Latha Ramakrishnan, Imperial College London

Proposition 1

Imperial College London has launched an ambitious Learning and Teaching Strategy aiming to prepare students "for an increasingly diverse and complex future work environment" and develop bold "Imperial Graduate Attributes". The Faculty of Medicine (FoM) offers 28 PG programmes across Biomedicine. The FoM in collaboration with careers services issued a survey to 250 employers offering a range of biomedical careers. The consultation identified important skill sets that the FoM are now working towards incorporating and assessing in the new curriculum: team working; communication skills; independent and critical thinking; reflection; resilience; commercial awareness; stakeholder management; situational judgement; problem solving; persuasion; negotiation; creativity; and adaptability.

Poster C2: Curriculum review of diverse programmes in an enormous faculty with a complex structure: What and how to prioritise?

Dr Latha Ramakrishnan, Imperial College London

Proposition 1

Imperial College London is implementing an ambitious Learning and Teaching Strategy. This curriculum review presented considerable organisational and academic challenges in the Faculty of Medicine that offers 28 diverse biomedical PG programmes across four departments and four campuses. A major difficulty was to identify unique priorities for each of the 28 programmes and consolidate common priorities for the departments and faculty. We simplified the process by pre-digesting the essence of the strategy and identifying educational bottlenecks. The most popular (from 12 pre-designated priorities picked by programme teams) were active learning followed by authentic assessments and feedback and then technology enhanced learning. This has implications for the implementation phase - the transformed pedagogy and student experience in future years.

Poster C3: Construction of STEM educational materials for estimating energy band gap of semiconductor materials

Professor Kenji Yamada, National Institute of Technology, Ishikawa College and Chiung-Wu Su, National Chiayi University

Proposition 1

I have produced STEM educational material and tested this on two Taiwan college students. The content of the educational material is to estimate the energy gap of Si semiconductor. Students can use the digital multi-meter to capture the voltage-current characteristic data of the Si diodes onto a notebook PC. The value of the energy gap can be estimated from a graph produced from the data. The principle of data acquisition will be explained and I will discuss points necessary for STEM educational material creation.

Poster C4: Supporting female students' STEM development through teachers' pedagogical strategies in China

Miss Yile He, University of Glasgow

Proposition 4

China has undergone tremendous development in education in the past 30 years. Notably, there has been an underrepresentation of females in STEM areas. This presentation attempts to investigate how teaching pedagogies support female students in STEM courses. I will discuss how teachers affect students' academic motivation and engagement in STEM courses, through an analysis of classroom observation of students in the third year of high school and interviews with 30 teachers in China.

Poster C5: Enhancing student engagement in learning

Dr Qiuyu Wang, Manchester Metropolitan University

Proposition 1

In situations involving both self and peer assessments, students usually learn more than from purely tutor-assessed work. They can reflect on their own work and judge how well they have performed in relation to the assessment criteria. In this study, undergraduate students undertaking Cellular Science practical classes were given opportunities to reflect on their own work through self-assessment during the classes and by peer-assessment outside of classes, allowing them to identify their strengths and weaknesses, and recognise areas that require improvement. Data from this study will promote research-informed teaching and be a useful guide to tutor activities in subsequent courses.

Poster C6: Teaching mathematical thinking to Computer Science students

Dr Kevin Navaie, Lancaster University

Proposition 5

The employability prospects of Computer Sciences graduates is closely correlated with their mathematical thinking skills. For many, however, Mathematics causes anxiety and they avoid engaging with mathematical thinking activities. To address this issue, we propose a problem-based collaborative-learning approach we adopted in Lancaster University during 2015-2017. Extensive analysis of the data collected from +200 students confirms that this approach helped students to overcome their Mathematics anxiety. Our results also indicate a significant improvement of students' independent problem-solving ability as 73% of them applied the learnt mathematical skills in the context of other modules or their final year projects.

Poster C7: Enhancing class interactivity: Lessons on small teaching

Dr Kathryn Harden-Thew, University of Wollongong

Proposition 1

This presentation aims to assist university teachers to enhance interactivity in their classrooms by incorporating small changes to make big differences for teaching the next generation of learners. It draws on learning theory and active learning pedagogy to provide simple, practical activities easily transferable to any teaching context. In this session, participants will experience first-hand strategies aimed to energise and boost student understanding. University teachers will walk away from this session equipped with a greater knowledge of how students learn, the benefits of active learning and small strategies that can be applied immediately to enhance class interactivity and deepen student engagement.

Session 9, 14:40-15:40

Session 9.1a: Integrating personal and professional skills development into the core Engineering curriculum for distance learning students

Dr Alec Goodyear, Dr Sally Organ and Ms Carol Morris, The Open University

Proposition 1

Oral presentation, Auditorium

The Engineering programme team at The Open University has long experience of supporting students in personal development planning (PDP) and professional skills development. However, an opportunity to

improve student engagement and feedback was recognised following a move from module to qualification focus. Curriculum components were redesigned to further integrate PDP skills throughout core Engineering modules and qualifications, providing students with greater relevance of professional practice in their chosen field of study. We outline our approach to PDP and professional skills teaching that provides students with more opportunities for continuous improvement and to enhance their academic and employability skills.

Session 9.1b: 'Scripts for solutions': Using change management techniques to support tutorial sessions

Mr Craig Bridge, Bishop Grosseteste University

Proposition 1

Oral presentation, Auditorium

This session will outline an approach of tutorials that use techniques from change management and solution-focused questioning to bring about change in learning for students, especially when solutions are hard to find. By identifying areas that are relevant and realistically changeable it is hypothesised that sustained change in learning behaviour may be achieved. This pilot has used rating scales as a measure of possible change alongside learning scripts to help students prepare their thinking for the tutorials. Additionally, the use of feedback to the tutor increases the probability that the sessions are more effective for both.

Session 9.1c: How disciplinary coralling restricts the development of the self and the other

Mr Alex Crombie, Sheffield Hallam University

Proposition 1

Oral presentation, Auditorium

The major paradigm in UK higher education is to corral students studying a particular topic into groups which are both single discipline and single learning stage. This ghettoisation of education can have profound consequences on student development. In Mead's work on social behaviourism, he describes the development of the self as a social process; by restricting students to a near group of peers their daily interactions become skewed, which impinges on their development of the self. This may manifest itself in a lowered level of self-efficacy amongst these students - a strong determinant of success post-graduation.

Session 9.2a: Developing student engagement using blogging as a form of assessment

Dr Nina Morris, University of Edinburgh

Proposition 3

Oral presentation, Connect Event space

There is widespread debate in HE about how best to support students in becoming more active and engaged learners. This paper focuses on the role that assessment, specifically assessed blogs, can play in enhancing student engagement. Drawing on the findings of a project conducted at the University of Edinburgh the paper demonstrates how blog writing can: enable STEM students to personalise their learning (making it more meaningful to them); foster greater in-class participation and engagement with course materials (encouraging students to make connections across course content); and, develop transferable communication skills (both academic and professional).

Session 9.2b: Embedding STEM in Social Science curricula: An experiment in interdisciplinary education

Dr Jillian Terry and Ms Jeni Brown, London School of Economics and Political Science

Proposition 2

Oral presentation, Connect Event Space

In 2018, the teaching team from LSE's flagship interdisciplinary course LSE100 and staff from the Digital Skills Lab worked together on a module to develop students' critical thinking and digital skills, addressing the question "Is there a path to global food security?" Using data visualisation tools to interrogate datasets from public bodies and governmental organisations, students learned how to leverage technology to gain insights into important social science questions, as well as developing commercially valuable technical skills. This session will share feedback and lessons learned from this truly innovative and interdisciplinary approach to developing next generation teaching in STEM.

Session 9.2c: Enhancing the engagement of large student groups through innovation

Dr Neil Pickles, University of Chester

Proposition 2

Oral presentation, Connect Event Space

Student engagement is a significant challenge in large teaching groups, particularly when delivering complex STEM topics. A project to embed technology enhanced learning across a department of Biological Sciences led to large increases in engagement and an improvement in student outcomes. An additional benefit is that these methods encouraged all students to engage and improved inclusive practice and contributions from a

wider diversity of students. In this talk, the use of technology and mentoring other staff to increase engagement in tasks and assessment will be discussed.

Session 9.3a: Does blended learning increase students' engagement and satisfaction?

Dr Kaska Sypek, University of Strathclyde

Proposition 3

Oral presentation, Connect 1 + 2

A recent publication by The World Economic Forum demonstrates the need for 101 days' training or upskilling of employees by 2022. Are we preparing our full-time graduates to be life-long learners? In an undergraduate, full-time course; one week's course material was delivered online (Moodle Lesson) to study students' reactions to the new method of delivery. After three years of post-project surveys it appears that while the majority of respondents liked the lesson when asked if they preferred this kind of delivery in comparison to a traditional lecture only half responded positively to the question.

Session 9.3b: A scalable blended approach to student diversity

Dr Carlos Matos and Mr Nuno Barreiro, Royal Holloway, University of London

Proposition 3

Oral presentation, Connect 1 + 2

In this session we present a system that allows university students to progress at their own pace, providing real-time monitoring and adapting to each student's needs and expectations. Some students require more support and advice, and others need to be challenged in order to remain engaged. Our system gives opportunities to all students to pursue their studies with a successful outcome. Progress monitoring also informs staff on the readiness of students to participate in advanced courses or more challenging projects, for instance with real clients, presenting opportunities that will last for their professional life.

Session 9.3c: Addressing student retention and engagement using new technology

Dr Antonio Peña-Fernández and Mark Evans, De Montfort University and María Ángeles Peña, Universidad de Alcalá

Proposition 3

Oral presentation, Connect 1 + 2

A range of strategies to improve retention and progression of Biomedical Science students at De Montfort University (DMU) implemented in 2016/17 included: an intensive induction week with social/networking events involving academics; an increment in the number of lectures and tutorials on STEM topics; the creation of regular drop-in sessions for each module. These strategies might have translated into a trend in the reduction of the percentage of students that failed in year 1, due to academic circumstances, from 19% in 2014/15 to 9.6% in 2016/17. More actions being developed include creation of a complete website covering fundamental Biology and Chemistry.

Session 9.4a: Self-efficacy: Empowering diversity in STEM recruitment

Dr Philippa Boyd and Associate Professor Maria Vahdati, University of Reading

Proposition 4

Oral presentation, Connect 3

Much effort and many words have gone into the development of outreach materials to encourage young people to study STEM subjects at university. Even more effort and debate has been made to increase the appeal of these materials to both those from BAME groups and women. The aim of this research is to explore whether these materials have their desired effect, which elements are effective in attracting the target groups, and what materials in an increasingly digital age, are relevant in forming career and university choices. This session presents our research and explores implications on addressing equality, diversity and inclusion issues across STEM disciplines.

Session 9.4b: Inclusive Engineering

Professor Kate Sugden, Aston University

Proposition 4

Oral presentation, Connect 3

Diversity and inclusion in Engineering has been a focus which has been growing in importance over the past few years, but remains something that is discussed on the fringes of our work, rather than something that we reference on a daily basis. In order to ensure that we produce the best, most accessible, non-biased, inclusive products and services, we need to ensure that we foster a mind-set of inclusion that allows us to consider our designs in an all-inclusive way, not only looking through the lenses of people with protected characteristics, but also considering a range of other lenses.

Session 9.4c: Scientists are humans

Dr Hannah Dee, Aberystwyth University

Proposition 4

Oral presentation, Connect 3

If we want to build an inclusive STEM we need to consider the experiences of all people in STEM. This has to start with understanding what makes STEM different for those in minority groups. We cannot have inclusive lectures, practicals, tutorials and assignments if we do not understand the experiences of all of our students (and our colleagues). The experience of being the only X in the room is a strange experience: those of us who have not shared this experience need to start to try and understand it. Scientists Are Humans is a project trying to build this understanding.

Session 9.5a: Developing and implementing a reputable evidence base for the statistical learning needs of undergraduate medical students in preparation for clinical practice

Dr Margaret MacDougall, University of Edinburgh

Proposition 1

Oral presentation, Room 495

In this session I shall provide an update on a funded survey-based study which respects the role of medical graduates in identifying those statistical competencies which medical schools ought to provide to ensure thorough preparedness of their graduates for clinical practice. Relatedly, I shall challenge the traditional bias towards limiting medical students to critical appraisal of published data in contradistinction to preparing them for safe clinical decision making through performing their calculations and analyses with their own data. In turn, I shall share ideas on the development and delivery of online modules through self-paced learning for medical students to take the research findings forward.

Session 9.5b: Interdisciplinarity and the art of multitasking in the STEM classroom

Ms Liz Coulter-Smith, University of Northampton

Proposition 1

Oral presentation, Room 495

This session considers explicitly interdisciplinary approaches to teaching STEM subjects. The visual arts and media communications subject areas possess unique practice-based approaches beneficial to teaching STEM subjects. With the above in mind and as employers continue to value graduates' capacity to multitask, insights from the speaker's recent research into media multitasking (MMT) in the classroom will interest participants due to the rise and management of mobile devices in the classroom. This session demonstrates an approach that engages students through the use of two innovative software applications and their impact on over 150 Computing students.

Session 9.5c: Accessing the hive mind: Creating a repository of interactive activities for use in online teaching

Dr Susan Pawley, The Open University

Proposition 1

Oral presentation, Room 495

Research shows the provision of online tutorials help to mitigate the effect of transactional distance and that students' performance can be improved with active learning. During 2018 I ran a series of workshops at the Open University where attendees investigated ways interactive activities are used in their online teaching and considered how the ideas can be adapted to different disciplines. Ever wondered how an activity used for planning an English literature essay can be adapted to teach Computer Programming, or how watching a foreign language video is relevant to mathematical communication? Come along to this session to discover this and more.

Session 9.6: Remote laboratories: Requirements capture for a national pooling infrastructure

Professor Timothy Drysdale and Mrs Victoria Dishon, University of Edinburgh, Dr Andrew Weightman, University of Manchester and Mr Stephen Watts, University of Cardiff

Proposition 1

Workshop, Think Tank Lodge

Rising student numbers are straining physical laboratory estates, leading many institutions to consider building remote laboratories. Their benefits include cost-effectiveness, ease of timetabling, and opportunities to tackle UK higher education sector challenges relating to feedback, assessment, widening participation and recruitment. Existing remote laboratories typically do not interoperate across institutional boundaries, yet a pooling infrastructure would offer enhanced diversity of equipment, higher throughput, increased resilience, and lower overheads in sharing best practice in user interfaces, back-end systems and learning analytics. Come to this session to learn about this state-of-the-art initiative and contribute to defining a national infrastructure that will benefit your institution.

Session 9.7: How (not) to innovate your curriculum: Hacking the problem of communication failure

Dr Jeffrey Vernon, Ms Ania Jones and Dr Latha Ramakrishnan, Imperial College London

Proposition 3

Workshop, Think Tank Issigonis

Imperial College London is undertaking an ambitious university-wide curriculum review, covering every single taught programme up to MRes level. The education leaders are gung-ho wanting transformed pedagogy, innovative approaches, authentic assessment, interactive learning, evidence-based, preparing students, incentives and small grants, scope for research. If you were told, tomorrow, to change the way you design, teach and assess, in time for (say) October 2019, how would you go about it, and what sort of support or development would you expect or need? During this workshop you will pick up tips and tricks; as well as insights into the human aspects of change.

Session 9.8: Jumping fences?: Reframing STEM as a creative design problem

Mr Fred Bates, Leeds Arts University

Proposition 1

Workshop, Think Tank Brindley

A significant challenge to the success of STEM initiatives is the potential polarisation of subject specialisms and the development of siloes of curriculum design. Increasingly employers are emphasising problem solving, creativity and team work as essential criteria for employment. This interactive workshop explores Design Thinking and creative problems as a thread that connects ideas and innovation to individuals, communities, companies and organisations. Its role in developing effective trans-disciplinary and cross-sector STEM initiatives can be significant. To what extent can experiences of specialist design education and creative curriculum development impact on the effective development of STEM initiatives?