

Annual Conference 2017

Common Denominators: connections within and beyond mathematics.

Speaker Titles, Abstracts, Bios and Timings

<p>Fiona Allan</p> <p>8/4/2017 Saturday 15.50-17.00</p>	<p><i>Making GCSE resit classes work</i></p> <p><u>Abstract:</u> awaited</p> <p><u>Bio:</u> awaited</p>	POST16
<p>Robert Barbour</p> <p>8/4/2017 Saturday 10.20-11.35</p>	<p><i>Recruiting, retaining and supporting a mathematics teaching workforce.</i></p> <p>Recruitment, retention and professional development are, I would argue, the most important issues that we face as mathematics educators. What can be done? I have no magic wand, but I believe that there are signposts that will point us in the right direction.</p> <p><u>Bio:</u> Robert chaired the ACME report on Initial Teacher Education in mathematics and also the ACME expert panel on the mathematics teacher's professional journey.</p>	All
<p>Mick Blaylock</p> <p>9/4/2017 Sunday 10.15-11.25</p>	<p><i>Spreadsheets in action with students 14-19</i></p> <p>Spreadsheet challenges will be set giving delegates opportunity to use formulae in spreadsheets for generating number grids, investigating series, mathematical modelling, including optimisation problems, statistical concepts and calculus. Issues relating to spreadsheet algebra including iteration, absolute and relative references will also be considered alongside technology considerations, e.g. tablets and Geogebra. Bring your own device (laptop, tablet, etc.) with spreadsheet loaded.</p> <p><u>Bio:</u> As head of the Core Maths Support Programme Mick Blaylock worked with schools, colleges, exam boards and the DfE to introduce Core Maths qualifications. Previously taught in five different institutions and was an A level principal examiner. Appointed HMI in 2001, NS Regional Director in 2006, now an education consultant.</p>	Secondary POST16 ICT
<p>Mick Blaylock</p> <p>9/4/2017 Sunday 13.40-14.50</p>	<p><i>Perspectives on post-16 provision for 2017</i></p> <p>This session will consider what high quality mathematics education might look like from September 2017 in light of the Adrian Smith report and the current context of changes to GCSE content and grades, compulsory GCSE resits, the introduction of Core Maths and new A levels in Mathematics and Further Mathematics.</p> <p><u>Bio:</u> As head of the Core Maths Support Programme Mick Blaylock worked with schools, colleges, exam boards and the DfE to introduce Core Maths qualifications. Previously taught in five different institutions and was an A level principal examiner. Appointed HMI in 2001, NS Regional Director in 2006, now an education consultant.</p>	POST16
<p>Nicola Bretscher</p> <p>9/4/2017 Sunday 10.15-11.25</p>	<p><i>Practical Approaches to developing reasoning in geometry</i></p> <p>This session will focus on circle theorems. We will try out two practical approaches to building up pupils' mathematical reasoning, from year 7 upwards, leading into the proofs of the circle theorems, and debate ways of making this topic accessible to the full range of students.</p> <p><u>Bio:</u> Nicola Bretscher is a lecturer in mathematics education at the UCL Institute of Education. She completed her doctorate at King's College London in which she investigated the knowledge teachers' draw upon when using technology to teach mathematics. Prior to her PhD research, Nicola spent six years as a mathematics teacher and latterly as Head of Department in London schools.</p>	Secondary

Stephen Britton	<i>Beginning to use Desmos in the classroom</i> This session will introduce the graphing application Desmos. We will look at a variety of activities that can be used in the classroom and how to use Desmos to enhance learning. No previous experience of Desmos is necessary, but if possible, BYO device, with Desmos installed from www.desmos.com . Wifi access will mean you can create your own account to save work, etc. <u>Bio:</u> Stephen has been teaching for the past three years, having previously been a lecturer in Trinity College Dublin. He is passionate about the potential of technology to revolutionise mathematics education.	ALL ICT
Julia Brown	<i>Primary Maths Challenge at transition</i> This session will explore how the existing Primary Mathematics Challenge materials can be used in your classrooms to promote reasoning and enthuse your pupils. <u>Bio:</u> Julia Brown is maths lead for the Bucks, Berks and Oxon Maths Hub and Chair of The MA Professional Development Committee. She has organised a number of events for primary teachers and led a number of engagement sessions for primary pupils in recent years.	Primary Y7/8
Joyce Brown	<i>The mathematics of bellringing</i> This session takes a look at the mathematics of change ringing, with an opportunity to have a go with a set of hand bells. With 4 different bells, there are 24 different “changes” that can be rung, but there are particular rules about the order of ringing these, which lead to symmetry, Fibonacci numbers, Pascal’s triangle and networks. Group Theory is involved, but this talk will not be at that level; the mathematics is accessible to all, and has been given to both primary and secondary masterclasses. <u>Bio:</u> Joyce is a maths teacher from Durham, where she teaches at an 11-18 school. She gives talks regularly to maths masterclasses and is also involved in teacher training.	Gen
Margaret Brown	<i>MATHSWORLDDuk: A national Maths Exploration?</i> This session will start with a report of the initial steps of MATHSWORLDDuk towards establishing a Maths Exploratorium, and plans for the future. It will include information about related developments overseas. There will be time to discuss what sort of activities and displays might be engaging, inspiring, educational and fun! <u>Bio:</u>	ALL
Chris Budd	<i>Using climate change to motivate teaching.</i> <u>Abstract:</u> <u>Bio:</u>	General
Ruth Bull	<i>Fluency through games</i> What does it mean to be fluent in maths? Come along and engage in some games and investigations that would promote fluency in the Primary maths curriculum and consider how they may be adapted and extended to ensure progression. The session is aimed at those working in a primary environment. <u>Bio:</u> Ruth has been teaching in the primary classroom for the last 20 years and continues to enjoy finding and developing new ways to engage children in their mathematics.	Primary

Douglas Butler 8/4/2017 Saturday 10.20-11.35	<i>Autograph for new KS3 and KS4 specifications</i> This session will concentrate on Autograph's simpler interface, particularly its constant controller and slow plot features. Well tried lesson plans will be explored for handling data and the tricky topic of the histogram and unequal classes, Geometrical transformations, and new Higher topics such as gradients of chords and tangents will be covered, along with new Foundation topics concerning cubic and reciprocal graphs. All attendees will be provided with a complimentary copy of the new Autograph v4 for this session. Please bring a laptop (PC or Mac). <u>Bio:</u> Douglas taught secondary mathematics, was Head of Mathematics at Oundle School (Peterborough), one-time Chairman of MEI, organiser of the popular TSM workshops and co-author of Autograph.	Secondary General ICT
Douglas Butler 9/4/2017 Sunday 11.45-12.55	<i>Autograph for new AS, Core Maths and A Level Specifications</i> This session will introduce the Autograph user interface through several post-16 lesson plans including calculus, data handling, problem solving, complex numbers, differential equations, vectors and parametric motion in Mechanics, and hypothesis testing in Statistics. All attendees will be provided with a complimentary copy of the new Autograph v4 for this session. Please bring a laptop (PC or Mac). <u>Bio:</u> as before.	Post16 ICT
Douglas Butler 8/4/2017 Saturday 14.15-15.30	<i>Chasing Problem Solving Ideas on the Web</i> This session will first show some STEM-related objects found in Google Earth, including communicating with submarines from a hexagon, then the problem of the ideal angle to throw the shot put (it is not 45°!), a fresh look at complex numbers, what Pythagorean triples look like in 3D, how Hawk-Eye works, and how 3D objects are created in CGI movies. <u>Bio:</u> as before.	Secondary Post16 General ICT
Sue Childs 9/4/2017 Sunday 11.45-12.55	<i>Student Journals to support deep conceptual thinking</i> <u>Abstract:</u> awaited <u>Bio:</u> awaited	
Katie Crozier 9/4/2017 Sunday 11.45-12.55	<i>Numberlink Boards</i> Teaching multiplication with deep conceptual understanding. This workshop will explore how deep conceptual understanding and visualisation of multiplication can be developed through exposing structure and making connections. Part of the workshop will explore the use of the Numberlink Board™, developed through action research in the Y4 classroom, to teach multiplication facts with understanding. Suitable for teachers of Y2-Y7. <u>Bio:</u> Katie Crozier is a lead practitioner in maths and teaches in two primary schools in Cambridgeshire. Katie has just completed her MA and wrote her thesis on deep conceptual understanding and visualisation of multiplication in the Y4 classroom. She has been trained as a Mastery Specialist Teacher by the NCETM and works with the Cambridge Maths Hub to support schools in developing a mastery teaching approach in maths.	Primary
Mark Dawes 8/4/2017 Saturday 12.00-13.15	<i>Geogebra 1: getting started</i> Geogebra is free dynamic geometry and graphing software that can be downloaded or used online as an exciting teaching and learning tool. This session will explore not only which buttons to click to get started with the software but also some useful ways to get started in the classroom. It would be useful to bring a device with Geogebra already downloaded from e.g. www.geogebra.org/download .	ICT

	<p><u>Bio:</u> Mark is a secondary mathematics teacher at Comberton Village College, former head of department and part-time teacher trainer. His particular professional interests are in teaching and learning problem solving and the effective use of ICT.</p>	
<p>Mark Dawes</p> <p>9/4/2017 Sunday 13.40-14.50</p>	<p>Further Geogebra</p> <p>Geogebra can be used to support pupils in making conjectures. It is less common for it to be used to support the development and understanding of proof. This session will explore ways to do that, alongside enhancing participants' own use of Geogebra. It would be useful to bring a device with Geogebra already downloaded from e.g. www.geogebra.org/download.</p> <p><u>Bio:</u> as before.</p>	ICT
<p>Stella Dudzic</p> <p>9/4/2017 Sunday 13.40-14.50</p>	<p>Mechanics: a close look at two topics</p> <p>We shall look at how dimensional analysis can be used to suggest a model for different situations. We shall consider how Newton's laws and energy principles apply when a particle moves in a circle. What about centrifugal forces? Do they exist? Aimed at experienced M1 mechanics teachers who want to extend into teaching Further Maths.</p> <p><u>Bio:</u> Stella Dudzic is the MEI Programme Leader for Curriculum and Resources and a Fellow of the International Society for Design and Development in Education. Stella taught for 22 years in secondary schools, including 9 years as head of department, before joining MEI in 2006. Stella's work in curriculum development includes developing qualifications and associated teaching and learning resources.</p>	Post16
<p>Stella Dudzic</p> <p>9/4/2017 Sunday 10.15-11.25</p>	<p>Statistics in Further Mathematics</p> <p>We shall look at simulation of distributions, using a spreadsheet, in statistics. It's a powerful technique in its own right and a topic in MEI Further Mathematics. It can also be used as a teaching tool in Maths and Further Maths, including when working with the large data set. We shall also look at using Geogebra, and perhaps other software, to produce confidence intervals. Aimed at anyone interested in learning about this Further Maths topic, or considering teaching statistics units in the new MEI specification.</p> <p><u>Bio:</u> as before.</p>	Post16 FM
<p>Colin Foster</p> <p>Co-presenter: Jeremy Hodgson</p> <p>8/4/2017 Saturday 15.50-17.00</p>	<p>Investigating Mathematical Attainment and Progress (IMAP)</p> <p>What strategies and interventions can help low-attaining secondary students in their learning of number, multiplicative reasoning and algebra? In this session we will outline the findings from the IMAP project, which has explored this question through a large-scale test, student interviews and review of the literature.</p> <p><u>Bio:</u> Jeremy Hodgen and Colin Foster work at the Centre for Research in Mathematics Education in the School of Education at the University of Nottingham. The IMAP project is funded by the Nuffield Foundation and aims to inform policy and practice directed at narrowing the achievement gap in mathematics.</p>	Secondary
<p>Colin Foster</p> <p>8/4/2017 Saturday 12.00-13.15</p>	<p>Mathematical fluency without exercises</p> <p>Fluency with important mathematical processes is critical to students' progress. But can fluency only be developed by practising tedious, repetitive exercises? In this session, we will try some tasks that aim to address fluency within richer and more mathematically interesting scenarios. We will discuss their use in the classroom. Participants will have a chance to reflect on and share how the findings relate to their own KS3 classrooms.</p> <p><u>Bio:</u> Colin is an Assistant Professor at the Centre for Research in Mathematics Education in the School of Education at the University of Nottingham. He is</p>	Secondary

	interested in the design of rich, open mathematical tasks and ways in which teachers and learners can adapt and use them in the classroom.	
Tabitha Gould Co-presenter: Lizzie Kimber 9/4/2017 Sunday 10.15-11.25	<i>Underground Mathematics</i> Underground Mathematics develops free resources for teaching A level mathematics and is aiming to make studying mathematics at this level a richer, more coherent and more stimulating experience for students and teachers. This session is an opportunity to work together on some of our rich mathematical tasks and think about how they could be used in the classroom. <u>Bio:</u> As part of the Underground Mathematics team Tabitha takes a leading role in the provision of professional development for teachers. She taught secondary mathematics for six years, during which time she supported effective implementation of mixed ability mathematics teaching. Tabitha also works for NRICH and studied Natural Sciences at the University of Cambridge.	Secondary Post16
Kathryn Greenhalgh Co-presenter: Charlotte Thornton 8/4/2017 Saturday 14.15-15.30	<i>Developing reasoning</i> The session will lead you through the MathsHubs national project 'Developing Reasoning in KS3'. It will provide you with activities to develop reasoning skills for all pupils and discuss how to facilitate training for this in a maths department. <u>Bio:</u> Kathryn Greenhalgh has been a maths teacher since 1994 and is the Senior Maths Director for OGAT leading the maths in 17 secondary academies and working closely with the 5 primary academies. Across the 17 academies, attainment was over 77% A*-C last year and the progress contribution positive. She also leads Yorkshire and the Humber MathsHub and co-leads the MathsHub's national project 'Developing Reasoning at KS3' involving more than 60 lead schools and over 250 work group schools.	Secondary
Graham Griffiths 8/4/2017 Saturday 14.15-15.30	<i>Beyond GCSE resits: provision for post-16s without a C+</i> The raising of participation age and requirement to study mathematics post 16 has presented the post 16 sector with a serious challenge. The session will review the current situation (GCSE, Functional Mathematics, Free Standing Mathematics Qualifications), discuss approaches to teaching and consider ways forward. <u>Bio:</u> Graham Griffiths is a teacher trainer and the current lead for the Post-16 PGCE Mathematics with numeracy at the UCL Institute of Education having previously worked in Further Education. Graham has been involved in a number of national projects, developing and delivering professional development programmes for the post-16 sector.	Post16
Rose Griffiths Co-presenter: Sue Gifford 8/4/2017 Saturday 14.15-15.30	<i>Making Numbers: using manipulatives to support developing number sense</i> Manipulatives can play a key role in supporting children in understanding tricky ideas about numbers. An issue for teachers is to develop ways to use them so that they become tools to support numerical thinking and help to reveal children's understanding. The team will share some of the findings and resources developed by the recent Nuffield funded research project. Audience: KS1, 2 & 3 teachers, teacher educators, researchers and consultants <u>Bio:</u> Rose Griffiths has taught mathematics across a wide age range, including in primary, secondary and special schools. She has written extensively for children, teachers, parents and carers, and has a particular interest in work with vulnerable children, including those in public care.	Primary
William Hornby 8/4/2017 Saturday 15.50-17.00	<i>A Level Mathematics 2017: Exploratory data analysis using a Large Data Set.</i> The new A Level Maths for first teaching September 2017 includes a requirement for working with large data sets in the classroom. This interactive and hands-on session looks at how to use some of the techniques of exploratory data analysis to investigate underlying patterns, suggest hypotheses and provide motivation	Secondary Post16

	<p>for further data collection. The session will also be of interest to teachers of Core Maths and GCSE or A Level Statistics.</p> <p><u>Bio:</u> Will Hornby is a Mathematics Subject Specialist at OCR and Subject Development Lead for A Level Mathematics and Further Mathematics. He also works as an Associate Lecturer for the Open University. Before joining OCR he taught students from key stage 3 to undergraduate, worked as a Senior Assessor for OCR and CIE and was a professional choral singer.</p>	
<p>Rachael Horsman</p> <p>9/4/2017 Sunday 13.40-14.50</p>	<p><i>Ideas for developing geometrical thinking</i></p> <p>During the session we'll work through some lovely problems in geometry that lend themselves well to the primary classroom: ways to introduce and develop geometrical thinking and put knowledge into use, lots of practical ideas, ways to engage your imagination, historical and cultural links, and joining parts of the curriculum you may not have joined before.</p> <p><u>Bio:</u> Rachael taught for 13 years in primary and secondary schools. She worked as an AST, SLE and on the senior leadership team. Rachael has led teacher training and CPD for 10 years including internationally. Rachael is now Maths Lead at Cambridge Mathematics, a University of Cambridge curriculum development project.</p>	Secondary
<p>Rachael Horsman</p> <p>8/4/2017 Saturday 10.20-11.35</p>	<p><i>Activities for developing geometrical thinking in Primary</i></p> <p>During the session we'll work through some lovely problems in geometry that lend themselves well to the primary classroom: ways to introduce and develop geometrical thinking and put knowledge into use, lots of practical ideas, ways to engage your imagination, historical and cultural links, and joining parts of the curriculum you may not have joined before.</p> <p><u>Bio:</u> Rachael taught for 13 years in primary and secondary schools. She worked as an AST, SLE and on the senior leadership team. Rachael has led teacher training and CPD for 10 years including internationally. Rachael is now Maths Lead at Cambridge Mathematics, a University of Cambridge curriculum development project.</p>	Primary
<p>Stephen Kean</p> <p>9/4/2017 Sunday 13.40-14.50</p>	<p><i>Making the most of handheld technology</i></p> <p>Graphic calculators can be an invaluable asset to assist students engage with mathematical concepts. This session will introduce activities that foster student understanding from GCSE and the new specification A-level criteria. It will address many of the mandatory technology requirements.</p> <p><u>Bio:</u> Stephen comes from a background in secondary mathematics teaching. Throughout his career he has utilised technology to help engage students in deeper conceptual understanding of mathematics through heuristic exploration.</p>	Secondary POST16 TL ICT
<p>Jo Lees</p> <p>8/4/2017 Saturday 14.15-15.30</p>	<p><i>KS2 Tests: learning points</i></p> <p>KS2 tests - the need to develop reasoning and what this could look like in the classroom. The session will be on developing problem solving reasoning in the KS2 mixed ability classroom. We will look at some of the 2016 SATs questions and explore how we might facilitate the development of reasoning in pupils through insightful questioning.</p> <p><u>Bio:</u> Jo has a BSc in mathematics and an MA in mathematics education. She has been a teacher and leader in KS2, KS3 and KS4, although she was primary trained. Jo is a past committee member of ACME, currently still serving on the outer circle, and is also a member of the CPD committee for the MA. Jo's role for the past nine years has been in school improvement as she leads the Hampshire Maths Advisory team.</p>	Primary

Gerry Liversha 9/4/2017 Sunday 10.15-11.25	<i>How to use proof to achieve mastery in teaching.</i> Here is a maxim to inspire all teachers: - 'It is better to solve one problem in five different ways than to solve five problems using the same method.' In this session I will apply this dictum to the problem of proving that the $\sqrt{2}$ is irrational. <u>Bio:</u> Gerry is the editor of The Mathematical Gazette.	Secondary Post16 All
Richard Lissaman 9/4/2017 Sunday 11.45-12.55	<i>Ideas for teaching matrices, transformations and vectors in FM</i> In the new Further Mathematics A level there is a closer link between matrices and transformations as well as with the geometry of lines and planes. How can we use graphing software to get these ideas across? Attendees would benefit from bringing a tablet/laptop with Geogebra and/or Autograph installed. <u>Bio:</u> Richard Lissaman works for Mathematics in Education and Industry www.mei.org.uk . His role involves supporting students and teachers with problem-solving including STEP, AEA and MAT and coordinating MEI's online resources. He is a textbook author, and has experience of teaching both in HE and schools/colleges.	Post16
Richard Lissaman 9/4/2017 Sunday 13.40-14.50	<i>Sets, logic and Boolean algebra: a new topic in Pure FM</i> The Fibonacci sequence is a well-known sequence defined by a recurrence relation - subsequent terms are defined as a function of those already known. We'll look at methods for solving various recurrence relations – i.e. finding terms as a function of their position in the sequence - and some real world applications. <u>Bio:</u> as before.	Post 16
Richard Lissaman 9/4/2017 Sunday 15.00-16.10	<i>Using Technology to Investigate Differential Equations</i> A great way to start teaching differential equations is to use tangent fields; Geogebra and Autograph generate these. In the MEI Further Pure with Technology unit, technological approaches to analytical and numerical solutions of DEs are considered. Attendees would benefit from bringing a tablet/laptop with Geogebra and/or Autograph installed. <u>Bio:</u> as before.	ICT
Ems Lord 9/4/2017 Sunday 10.15-11.25	<i>Welcome to the Wild Side!</i> In this session you will be introduced to NRICH's latest website; Wild Maths focuses on creative maths, offering opportunities to explore activities both within and beyond the classroom. Delegates will be challenged by a selection of our favourite Wild Maths activities. We'll tour the new website together and reflect on ways you can maximise its potential in your own settings. Audience: trainee teachers, MaSTs and SLs, KS2 to KS5 teachers, FE and HEI lecturers, Maths Hub leaders. <u>Bio:</u> Ems Lord is the Director of NRICH, the home of rich mathematics. She leads a team of primary and secondary specialists who produce maths resources from Early Years up to university entrance level. Before joining NRICH Ems led one of the largest Mathematics Specialist Teacher (MaST) programmes in the country. Ems has taught across the age ranges, including a fascinating period teaching in a hospital school, and has shared her experiences with trainee BEd and PGCE students as a senior lecturer.	All
Kevin Lord 8/4/2017 Saturday	<i>Solving problems with card and paper.</i> This will be a hands on session using business cards and sheets of A4 paper to stimulate ideas for problems and help with their solution. There will be a variety of problems involving geometry and algebra in the session, which are suitable for GCSE students, and possibly KS3 students – and their teachers.	Secondary

10.20-11.35	<p>Bio: Kevin Lord is Programme Leader for the Further Mathematics Support Programme, coordinating support for establishing A level Further Mathematics provision. He taught mathematics in secondary schools for over 20 years, including 5 years as head of department and 8 years as an assistant head, before joining MEI in 2011.</p>	
<p>Darren Macey Co-presenter: Lucy Rycroft-Smith 9/4/2017 Sunday 11.45-12.55</p>	<p><i>The n camel stack problem</i> Ever wondered what the probability of 5 thoroughbred racing camels crossing the finish line at the same time is? Of course not, but we did when we played the board game "Camel Up". Our session introduces the insidious "n camel stack" problem and how to use simulation to explore probability.</p> <p>Bios: Darren Macey is an ex-secondary maths teacher currently working as a framework developer for Cambridge Mathematics. As a teenager he inferred that the study of statistics was pointless and is now attempting to atone for this most grievous of sins and becoming a very tedious dinner party guest as a consequence.</p> <p>Lucy Rycroft-Smith has worked in primary, secondary, and FE. She has managed a secondary maths department, delivered CPD, lectured in mathematics, and now writes for the TES and Guardian and manages communications at Cambridge Maths. She has also written award-winning resources and is the co-editor of the UK Flip the System book.</p>	<p>Secondary POST16 ALL</p>
<p>Simon Mazumder 8/4/2017 Saturday 12.00-13.15</p>	<p><i>Is Problem Solving Difficult?</i> This session will involve participants using a variety of problems in different contexts; examples will illustrate a heuristic approach to using simple mathematical skills and concepts to solve complex problems, across primary and secondary phases.</p> <p>Bio: Simon was HOD and is currently NW1 Maths Hub lead as well as a SLE and CML.</p>	<p>Secondary</p>
<p>Adam McBride 8/4/2017 Saturday 10.20-11.35</p>	<p><i>The Simpsons Rule</i> The presentation will expand on some items referred to in Simon Singh's book "The Simpsons and their Mathematical Secrets". Among other things, we shall meet Homer's version of topology, a "counterexample " to Fermat's Last Theorem, and a connection between 43, 67 and 163.</p> <p>Bio: Adam McBride is Emeritus Professor of Mathematics at the University of Strathclyde. He was both President and Chair of Council of The Mathematical Association. He has given countless lectures and masterclasses to pupils aged 11 upwards. He was awarded an OBE for services to the understanding of mathematics in schools.</p>	<p>Secondary Post16 General</p>
<p>Nick Mclvor 8/4/2017 Saturday 14.15-15.30</p>	<p><i>Core Maths on the ground: what works?</i> Core Maths is a central plank of the government's strategy to increase post-16 maths participation and many who have taught the course are passionate about its capacity to engage and support their students. What makes it so great and what lessons have been learned since its arrival in September 2014?</p> <p>Bio: Nick was one of 30 leading practitioners who supported the first schools teaching Core Maths from 2014-16. He is now back at Marylebone CE School where works as a teacher, SLE, Research Lead and joint Level 3 co-ordinator for the London NW Maths Hub.</p>	<p>Post16</p>
<p>Mel Muldowney 8/4/2017 Saturday</p>	<p><i>Activities to help develop resilience at KS3/4</i> We've all taught students who struggle to see how they can start to tackle a problem - all too often these students fail to start working through it if they feel that they "can't" get an answer. This workshop will look at a variety of "use in</p>	<p>Secondary</p>

15.50-17.00	<p>the classroom tomorrow" low-threshold activities to help students understand the importance of being resilient in the maths classroom.</p> <p><u>Bio:</u> Mel Muldowney is Associate Subject Leader at Alcester Academy and was previously 2.i.c. in Maths at Trinity High School. Trinity was named Most Improved School in England in 2013. Alcester Academy has now seen massive gains in results too - winning the TES Maths Team of the Year 2016. Together with her partners in crime she runs JustMaths - home of the popular 'Super 60'.</p>	
Peter Neumann 8/4/2017 Saturday 14.15-15.30	<p><i>A prehistory of Lagrange's theorem: The number of values of a function.</i></p> <p>A fundamental fact of modern group theory, that the order of a subgroup of a finite group divides the order of the group, is called Lagrange's Theorem. There is nothing like that in Lagrange's writings. My theme is the insight of Lagrange (1770/71) that took a century to evolve into this modern theorem.</p> <p><u>Bio:</u> Dr Neumann, a former president of the MA, is a retired university teacher who still enjoys working with undergraduate students. He also offers a range of masterclasses for Y7 to Y12, and does an enrichment session once a week for Y6 children in a local primary school.</p>	Secondary Post16 General
Simon Norton 8/4/2017 Saturday 12.00-13.15	<p><i>Singapore maths for mastery</i></p> <p>The participants will explore the key learning principles behind the success of Singapore maths, such as the concrete - pictorial - abstract approach. They will come away with the skills and practical strategies such as bar modelling, to begin the implementation of mastery teaching which focuses on developing children's' problem solving, fluency and reasoning</p> <p><u>Bio:</u> Simon Norton is a Lead Trainer at Maths – No Problem! He has a wide range of educational experience, having taught in both the primary and secondary sectors and working as part of the leadership team in a large international school. He is passionate about learning and the teacher's role in developing young minds.</p>	Primary
Jennie Pennant 9/4/2017 Sunday 10.15-11.35	<p><i>Every lesson a PS lesson</i></p> <p>In this session Jennie will look at strategies and activities that enable problem solving to become a reality in every lesson. She will also look at the problem solving skills the children need to develop explicitly to become fluent problem solvers</p> <p><u>Bio:</u> Jennie is an independent mathematics leadership coach and consultant, having been the Professional Development Primary lead at NRICH, the Professional Development Manager at BEAM and a member of the ACME committee. She has wide experience in writing, teaching and advising on mathematics both in the UK and abroad and has taught in both primary and secondary schools.</p>	Primary
Lisa Pollard 8/4/2017 Saturday 10.20-11.35	<p><i>Mathematics at Level 3: challenges and opportunities</i></p> <p>We will investigate what options are available to students at Post-16 in Mathematics. The session will prompt discussion for level 3 maths options including Core Maths, AS and A level Maths and Further Maths. We will look at entry requirements, pathways and how are we preparing our students to continue with Maths into Post-16.</p> <p><u>Bio:</u> Lisa Pollard leads the Boolean Maths Hub. Her value base revolves around the belief that everyone & anyone can be a mathematician. Lisa has worked with and supported schools & academies across the South West in Mathematics on a variety of themes including: embedding problem solving, mathematical reasoning, teaching for mastery, raising attainment at GCSE & Post 16 and systems change. Lisa leads the Maths team at the Cabot Learning Federation (CLF), was a Core Maths Lead & visited Shanghai as an SLE in January 2014.</p>	Secondary Post16

<p>Alison Borthwick and Cherri Moseley</p> <p>9/4/2017 Sunday 13.40-14.50</p>	<p><i>Nurturing Number Sense</i></p> <p><u>Abstract:</u> What is number sense and how do you help children develop it? We will explore just what number sense is and try out some active and fun activities suitable for use across the primary age range.</p> <p><u>Bios:</u> Alison Borthwick is a mathematics adviser and co-author of <i>Connecting Primary Mathematics and Science</i> and <i>Curious Learners in Primary Maths, Science, Computing and DT</i>. Alison is the current chair of the primary ATM and MA group and is also a STEM ambassador.</p> <p>Cherri Moseley is a freelance primary mathematics consultant and author. She is a Mathematics Specialist teacher and an accredited NCETM Professional Development Lead (Primary). Cherri is also an advisor to leading educational publishers, Rising Stars and works in partnership with Cambridge University Press, Collins, Oxford University Press and Pearsons.</p>	
<p>Chris Pritchard</p> <p>8/4/2017 Saturday 12.00-1.15</p>	<p><i>Round Peg in a Square Hole</i></p> <p>A Round Peg in a Square Hole: Adventures in the Mathematics of Area was published by the MA in 2016. But the search for interesting material for teaching area to 12-16 year-olds goes on. Learn about Pick's Theorem, tangrams, sangaku and perhaps much more in this session.</p> <p><u>Bio:</u> Dr Chris Pritchard is the MA Secretary, Chair of the Scottish Mathematical Council and co-editor of Mathematics in School.</p>	<p>Secondary POST16 General</p>
<p>Keith Proffitt</p> <p>9/4/2017 Sunday 10.15-11.25</p>	<p><i>Groups: a topic in Further Mathematics</i></p> <p>Groups is a great topic for introducing underlying structures and connections in mathematics. It is a playground for formal proof, starting with four simple axioms. And it has real-world applications in the study of molecules, information theory and solving Rubik's cube. We shall look at ways of teaching some aspects of the topic, including with some practical activities and, if time, with technology. Aimed at anyone interested in learning about this Further Maths topic, or considering teaching the Extra Pure unit in the new MEI specification.</p> <p><u>Bio:</u> Keith taught in secondary schools for 25 years, including 13 as Head of Mathematics. He worked for OCR for 5 years, as Qualifications Manager for the MEI A level specifications. He now works for MEI, developing the new A levels, writing resources and leading professional development.</p>	<p>Post16 FM</p>
<p>Keith Proffitt</p> <p>9/4/2017 Sunday 11.45-12.55</p>	<p><i>Modelling with algorithms: the second half</i></p> <p>The MEI replacement for Decision Maths starts off with the usual network algorithms. Later in the course, some of these are re-formulated as linear programming problems (LP). These can be solved using technology, so more realistic problems can be tackled. We shall look at LPs, and how to use the technology. Aimed at anyone who is confident with Decision 1 topics, and wants to learn about or consider teaching the LP and technology aspect of Modelling with Algorithms.</p> <p><u>Bio:</u> Keith taught in secondary schools for 25 years, including 13 as Head of Mathematics. He worked for OCR for 5 years, as Qualifications Manager for the MEI A level specifications. He now works for MEI, developing the new A levels, writing resources and leading professional development.</p>	<p>Post16 FM</p>
<p>Keith Proffitt</p> <p>9/4/2017 Sunday 15.00-16.10</p>	<p><i>Your school's FM offer: decisions</i></p> <p>This session will consider the issues involved in planning to teach MEI Further Mathematics. What resources, CPD and support are available? What order should the topics be taught in?</p> <p><u>Bio:</u> as before.</p>	<p>POST16 FM</p>
<p>Peter Ransom</p>	<p><i>Developing ratio and proportion</i></p> <p>A short historical introduction followed by some general work using intriguing problems. Paired work using a novel way of checking answers (a specially</p>	<p>Secondary</p>

8/4/2017 Saturday 10.20-11.35	<p>written crossnumber involving ratios and proportion). We then make an old mathematical instrument based on ratio and some geometry. Finally some enrichment materials on ratio and proportion from Workman's Tutorial arithmetic.</p> <p><u>Bio:</u> Peter taught mathematics in state secondary schools for 30+ years. He chairs the MA Council and now freelances, working with students, teachers and publishers at home and abroad. He is a conference and committee junkie with a very understanding family.</p>	
Tom Roper 8/4/2017 Saturday 10.20-11.35	<p><i>Mechanics and human motion</i></p> <p>How strong are gymnasts? What do they and ballet dancers have in common? What is it like to be a skater? Why is the Fosbury Flop so successful? How fast can you walk? Mechanics answers all these questions and more! Audience participation required and where the speaker is physically capable, some demonstrations of a restrained nature.</p> <p><u>Bio:</u> Tom taught for 17 years in schools and colleges before moving to Leeds University to work in the School of Education training secondary school mathematics teachers. Whilst working in schools he was a part of the Leeds Mechanics in Action Project, developing material for use in schools, and continued to work for the project when at Leeds. The session grew out of a request to teach mechanics to people training to be coaches of gymnastics who generally had little or no background in mathematics.</p>	Post16
Tom Roper 9/4/2017 Sunday 13.40-14.50	<p><i>Taxi cab geometry</i></p> <p>In Euclidean geometry we measure distance using the theorem of Pythagoras, but if we change the way we measure, what else changes? What do our familiar shapes look like? The session presents a chance to explore the world of taxi cab geometry. Only ruler and pencil required!</p> <p><u>Bio:</u> Tom taught for 17 years in schools and colleges before moving to Leeds University to work in the School of Education training secondary school mathematics teachers. Whilst working in schools he was a part of the Leeds Mechanics in Action Project, developing material for use in schools, and continued to work for the project when at Leeds. The session grew out of a request to teach mechanics to people training to be coaches of gymnastics who generally had little or no background in mathematics.</p>	All
Liz Russell 8/4/2017 Saturday 14.15-15.30	<p><i>Resources to use with feeder schools to support transition</i></p> <p>Take part in a variety of activities which have all been tried and tested with Y6 students as part of South Hunsley School's transition programme. Activities include challenges for Open evenings, problem solving, Team Challenge and an activity that students start in Y6 and complete during the first 2 weeks in Y7.</p> <p><u>Bio:</u> Liz teaches in a large academy (over 2000 students) with 7 feeder Primary schools. Part of her job is to visit and offer maths sessions to all year 6 in the catchment and to support their staff with any maths issues. She is an SLE and has been an ambassador for the NCETM.</p>	Secondary
Lucy Rycroft-Smith 9/4/2017 Sunday 10.15-11.25	<p><i>Using board games in the classroom 7-16</i></p> <p>Ever wondered what has been happening in the world of board games since Monopoly and Cluedo? A revolution, that's what. Allow me to introduce you to some amazing and immensely practical games: zoological estimation, football times tables, werewolf logic, zombie arithmetic, courtly deduction, robot coding and much more.</p> <p><u>Bio:</u> Lucy Rycroft-Smith has worked in primary, secondary, and FE. She has managed a secondary maths department, delivered CPD, lectured in mathematics, and now writes for the TES and Guardian and manages communications at Cambridge Maths. She has also written award-winning resources and is the co-editor of the UK Flip the System book.</p>	Primary Secondary

Chris Sangwin 9/4/2017 Sunday 11.45-12.55	<i>The pendulum, plain and puzzling</i> The pendulum is a paradigm for mathematics which has evolved to match the concerns of each age:- 'Divine Order' in the seventeenth century to "Chaos" in the twentieth. The techniques used to study it have similarly evolved from the geometrical physics of Huygens, through the analytical mechanics onto contemporary numerical experiments. The pendulum continues to yield surprises, such as the pendulum theorem of Acheson (1993). This talk reviews the simple mechanics of a variety of pendulums, both plain and puzzling. <u>Bio:</u> Chris Sangwin is Professor of Mathematics Education at Edinburgh University. His learning and teaching interests include (i) automatic assessment of mathematics using computer algebra, and (ii) problem solving using Moore method and similar student-centred approaches. In 2006 he was awarded a National Teaching Fellowship.	General
Pete Sides 8/4/2017 Saturday 15.50-17.00	<i>Problem Solving skills at KS2 & 3</i> South Yorkshire Maths Hub is conducting a workgroup using Bars to translate worded problems into models to improve students' Problem Solving skills at KS2 & 3. This workshop will give participants a flavour of the different problem solving lessons trialled with learners and try out some of the problems for yourselves. There will be an update on how schools feel this is impacting on their learners so far. There will also be an opportunity to trial / see in action the Bar Logik practice app and reflect on how this has been impacting on South Yorkshire schools and how it might support your learners' mathematical reasoning skills. (Bring your own wifi-enabled device for a trial) <u>Bio:</u> Maths Hub lead for South Yorkshire and co-author of the Secondary Teaching for Mastery national programme Pete works alongside Primary colleagues supporting schools to engage with Teaching for Mastery. He has a particular interest in encouraging teachers to use bar models to explore the structure of mathematical concepts with their pupils.	Primary
Jim Simons 8/4/2017 Saturday 15.50-17.00	<i>Meet the surreal numbers</i> Conway's "surreal numbers" form an amazing and beautiful number field, including both the real numbers and a host of outlandish infinite and infinitesimal numbers. Join me on a journey to the square root of infinity and beyond! My intended audience is people who have studied at least some pure mathematics at university level, but there are no pre-requisites: we start from the empty set. <u>Bio:</u> After completing a PhD (in Banach Space theory if anyone cares), Jim worked as a mathematician at GCHQ for 35 years, and on retirement took up tutoring A level maths. He is a member of the MA's Teaching and Membership committees.	General
Julia Smith 9/4/2017 Sunday 11.45-12.55	<i>Making GCSE Maths resits work</i> This session focuses upon approaches and resources currently used in post-16 yrs education that are guaranteed to have a positive impact upon results. It focuses upon the context and real classroom issues faced by teachers and offers Top Tips to practitioners and managers alike to improve outcomes for learners. <u>Bio:</u> Maths Teacher Trainer and Author for Cambridge University Press and BBC Bitesize; Teacher Training for Secondary ITT and FE across the country; Chair of Governors at Writtle University College; Blogpost makingthegraded2c.wordpress.com; Rabid Tweeter @tessmaths	Post16
Andrew Taylor 8/4/2017 Saturday	<i>Problems, models and data ... the challenges of the new A-level.</i> This session will look at the new mathematics A level for first teaching in September 2017. We will focus in particular on the key changes from the current qualification and begin to discuss the implications for teaching.	Post16

12.00-13.15	<p>Bio: Andrew Taylor is Head of the mathematics curriculum team at AQA. Before joining AQA, he taught mathematics for 17 years and was Head of Faculty in large comprehensive schools in Cambridgeshire and Manchester. Andrew is responsible for ensuring teachers of all AQA maths qualifications are fully informed and supported.</p>	
<p>Sian Thomas</p> <p>8/4/2017 Saturday 10.20-11.35</p>	<p><i>Progression with fractions using Inspire Maths and the Singapore approach to learning</i></p> <p>Join us for an interactive, inspiring session focusing on the challenge of working with fractions. This workshop is for primary school teachers and educators who want to deepen their understanding of progression of fractions through concrete, pictorial and abstract learning.</p> <p>We will unpick some abstract ideas and “taught” methods that lead to many misconceptions.</p> <p>You will be fully involved, focusing on both the teaching and learning of mathematics, deep understanding and the development from earlier mathematical concepts. You will have plenty of opportunities to challenge your own thinking and ask any questions along the way.</p> <p>Bio: Sian has previously managed Barnet's Maths Advanced Learning Centres, delivered the maths specialist teacher programme in conjunction with the IOE and led successful international research trips on Creativity and the Wider Curriculum. An accredited Inspire Maths and Numicon consultant and PD lead for the NCETM Sian believes that all children can “do and see mathematics”, with talk for learning, relevant use of manipulatives and well developed habits of mind essential in supporting this.</p>	Primary
<p>Pietro Tozzi</p> <p>8/4/2017 Saturday 15.50-17.00</p>	<p><i>Teaching Maths into the 21st Century</i></p> <p>This session introduces some teaching and learning strategies which free up the teacher to act as a facilitator and give students more control of their learning, including the use of i-devices and tools for effective differentiation. Pietro will be sharing ideas and resources which will enable students to select the work which enables them to make (and monitor) progress at their own pace and work collaboratively. The session will demonstrate Learning Zones, Collective Memory, Jig-Saw, Problem Solving (including bar models), i-device apps and 'The Champions' (a simple method to correct an assessment).</p> <p>Bio: Pietro Tozzi (Gumley House School, London) has been teaching for 31 years including as Head of Department. He supports and presents at Pearson Collaborative Networks and is currently writing some of the schemes for the reformed A-level Mathematics. Pietro was nominated for a National Teaching Award.</p>	ALL
<p>Sidney Tyrrell</p> <p>8/4/2017 Saturday 12.00-13.15</p>	<p><i>Making sense of statistics</i></p> <p>Statistics often seems to have the power to confuse even the brightest of students. This session looks at different ways of presenting basic statistical concepts from means and medians to hypothesis testing and significance levels using simple but successfully tried and tested visual aids and ideas. Tactile and fun!</p> <p>Bio: Sidney Tyrrell is a National Teaching Fellow and Honorary Teaching Fellow of Coventry University with many years’ experience of teaching statistics to students of different disciplines most of whom initially thought statistics too hard and definitely boring but later changed their minds.</p>	Post16
<p>Fran Watson</p> <p>8/4/2017</p>	<p><i>NRICHing Fractions</i></p> <p>In response to the recent shift in landscape of fractions within the primary curriculum, this session will offer the chance to review and re-energise your thinking. We will work on a variety of rich mathematical tasks from NRICH</p>	Primary

Saturday 12.00-13.15	(nrich.maths.org) and will explore some of the challenges that can arise from the subject knowledge or the setting. Intended audience: Primary teachers, Primary advisers <u>Bio</u> : awaited.	
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The Specials

David Acheson And Ben Sparks 9/4/2017 Saturday 20.45	<i>Saturday Night Special</i> A mixture of maths and live music, in which David and Ben will attempt to explore their common denominators.	All
Liz Meenan 7/4/2017 Friday 17.30-18.45	<i>Opening Plenary</i>	All
Rob Eastaway 9/4/2017 Sunday 15.00-16.10	<i>Closing Plenary: Solving outside the box: creativity in problem solving</i>	ALL
Debbie Morgan 8/4/2017 Saturday 9:00-10:15	<i>Primary Plenary: What is mastery, why does it matter, and what are teachers doing where it's working well?</i> This session will include consideration of variation theory, an effective strategy used throughout primary and secondary teaching in China and considered to be key to mastery of mathematics. Debbie is also working on a C BBC mathematics programme (confidential until BBC media release) but hopefully that will happen before April, so she may be able to include a little preview of the animation. We are attempting a sophisticated idea which brings rigour to the mathematics, but also fun, songs are very catchy. So hopefully something for all!	All
Jennie Golding 9/4/2017 Sunday 09.00-10.10	<i>President's Address</i> <i>Is it Mathematics or is it School Mathematics?</i> How does the 'mathematics' experienced in classrooms relate to the mathematics studied in universities, or used outside academia? What relationship should it, and could it, have, and how do we get there? Some challenges and some opportunities. <u>Bio</u> : From an Oxford mathematics first degree and research, Jennie spent 35 years teaching maths to 3-93 year olds. She is passionate about developing the potential of teachers and of the range of young people so that they can enjoy confident and effective engagement with mathematics.	All