Friday 1st April 13.45 - 15.00
Opening Plenary, Anne Watson
'Finding Meno'

Friday 1st April 15.   30-16.30 SESSION 1

1A **Ruth Bull** **Clare Warren**	***Primary Maths Games*** Come along and play a selection of games for KS1 and KS2, including a mix of traditional games and some newer games freely available on the internet and from other sources. The games involve dice, cards, dominoes and game boards (sheets). Consider how these will support pupils with number skills, fluency, logic and reasoning.	Primary
1B **Liz Russell**	***Build Your Own Roadshow*** I am passionate about students being engaged in solving problems. I make activities and adapt ideas from anywhere and everywhere. All the activities in my road show have been tried and tested with students from year 5 through to year 9. Come and have a go and take away ideas to make your own Road show.	Primary, Secondary
1C **Peter Ransom**	**Problem Solving in Creases** A workshop session where you will be folding paper to make objects that require a lot of problem solving skills linking both geometry and algebra. Tried and tested in the classroom it develops pupils' understanding by working with concrete materials before moving on to the abstractness of algebra.	Secondary, General
1D-2D **Bob Burn** (Double session)	***Historical awareness for teaching*** Every child, pupil, student and teacher who is learning and doing mathematics is making transitions from 'not knowing' to 'knowing'. Some of these transitions relate to transitions which have taken place during the historical development of mathematics, and when this is so, the learning experience can be illuminated both by the historical 'not-knowing' and by the historical transition.	General
1E **John Silvester**	***Something old, something new. (Some maximum/minimum problems illustrated with Geometer's Sketchpad.)*** The Steiner inellipse and circumellipse of a triangle are its inscribed and circumscribed ellipses of greatest and least area, respectively. I shall talk about these, among other things, and the corresponding maximum/minimum area ellipses for a convex quadrilateral.	Post-16, Tertiary, General

1F David Bedford	***How To Solve Peg Solitaire***	General

Delegates will have the chance to play, and hopefully solve, peg solitaire as well as look at some of the mathematics underlying this puzzle. No experience necessary!

1G-2G John Mason (Double session)	***Some Mathematical Questions about Rectangle Removal***	All

Participants will be reminded about the process of starting with a rectangle and repeatedly removing maximal sized squares, keeping track of the number of squares of each size, which of course then leads to continued fractions. Then we will consider a generalisation in which starting with a rectangle, rectangles with a specified ratio are removed, leading to some difficult, if not as-yet-unsolved mathematical problems.

1H Rob Eastaway Andrew Jeffrey	***Oxford Maths Marmalade***	General

Join Rob Eastaway and Andrew Jeffrey for yet another assortment of some of their favourite maths ideas to engage you and your class. There will be magic, sport and lots of other maths curiosities. Why 'Maths Marmalade'? Because it's a bit like Maths Jam (look it up!), but with chunkier segments – and since this is Oxford Maths Marmalade, the chunks promise to be bigger than ever.

Friday 1st April 16.40-17.40 SESSION 2

2A Fran Watson	***Mastering Mathematics and Problem Solving***	Primary

Join the NRICH Primary Team to investigate the place of problem solving in supporting students to become competent and confident mathematicians. How does the term 'mastery' relate to this and how can NRICH tasks support students to master mathematics?

2B Alexandre Borovik	***Cute Little Inner Wolfies***	Primary

Mathematics is a language of communication with subconsciousness. When trying to recall the value of "7x8", you send to your subconsciousness the command "Retrieve: 7x8". I will explain why I refer to mathematical subconsciousness as "Inner Wolf". Kids learning mathematics train and bond with their pet "inner wolfies".

2C Brenda Yearlsey, Alannah Moore	***Industry related maths: Siemens' Formula for Thrills***	Secondary

Formula for Thrills provides students with an opportunity to use mathematics in a real world environment through stimulating contexts. Showcasing, in an interactive format, how real-life mathematical thinking is used by engineers, designers, mechanics and planners; to entertain and thrill people whilst keeping them safe

2D Bob Burn	***Historical awareness for teaching*** (continuation session 1)	General

2E Andrew Palfreyman	*Odd Perfect Numbers* I expect you know what perfect numbers are, but can they ever be odd? Using some number theory we will examine some of the conditions that need to hold if odd perfect numbers are to exist, which of course they may not!" This is based significantly on work that I did privately when I was about 17. Therefore, I would say that it is suitable for teachers of Key Stage 5 (for which it could contain useful stretch material for their students, given that that is how it functioned for me!) or those with a interest in some of the details of number theory / recreational maths.	Secondary
2F Nathan Barker	*Problems for any student* Withdrawn	Post-16
2G John Mason	*Some Mathematical Questions about Rectangle Removal* (continuation session 1)	All
2H Gareth Ffowc Roberts	*Can we count you in?* What links 'three score years and ten' with '*quatre-vingt-dix*'? Learn to count the traditional Welsh way, but in English. How does our experience of language, coupled with the cultural context of that language, influence our learning of number? A largely practical session viewing number through a Welsh prism.	General

<div align="center">

Saturday 2nd April 9.00 – 10.15
Primary Plenary, Jane Jones
'Reasoning about the problems of inspirational teaching'

</div>

Saturday 2nd April 10.45-11.45 SESSION 3

3A Jennie Pennant	*Developing Classroom practice: the power of coaching EY, Primary, Secondary*. Jennie will draw on her research into coaching as a model for teacher professional development in mathematics and consider how the principles of coaching can support the whole school community to achieve their best. Come and discuss how the principles can be applied to peer-peer conversations, INSET delivery and classroom dialogue.	**Primary**
3B Kate Lea	*Primary Maths and Global Citizenship* A global citizenship approach offers numerous, diverse opportunities for real-life learning in maths. This interactive workshop for primary teachers will provide a range of practical ideas linked to key areas including measurement and time, ordering and comparing numbers, interpreting data and percentages.	Primary
3C Jenny Gage, David Spiegelhalter	*Teaching Probablity Better* Teaching probability is hard, right? But studies suggest it might be easier if it were taught using the concept of 'expected frequencies'. In this session you will collect experimental data and see how it can be used to teach the probability curriculum, from year 7 to year 11.	Secondary

3D **Melanie** **Muldowney**	***Embedding Bread and Butter Maths Skills at KS4*** Most secondary teachers will know how it feels to teach a topic (and teach it well!) only for students to have very little recall a couple of weeks later. The session will look at how those "bread and butter" skills upon which other topics rely, can be reinforced through regular interleaved practice. Led by Christian Seager & Melanie Muldowney. Having previously led the Maths Department of "most improved school in England out of "National Challenge" the duo have moved together to Alcester Academy to build a new department with a fresh set of challenges.	Secondary
3E **Jim Simons**	***What I've learnt by teaching*** Nearly fifty years after leaving school, I started tutoring A level. From this unusual vantage point, I have learnt something about current education, some mathematics I thought I understood perfectly well until I tried to teach it, and some pedagogy. To lighten the mixture, I'll toss in some mathematical bonbons.	Post-16, General
3F **Sidney Tyrrell**	***Statistics – Inspired or confused?*** This session contains simple bite sized practical ideas which I found helpful for teaching statistical concepts to students who initially find statistics far from inspiring but confusing, boring, hard or all 3. Ideas, links to web based resources, useful real data sets, and Excel spreadsheets.	Secondary, Post-16, Tertiary, General.
3G **Charlie** **Gilderdale**	***NRICHing classrooms - opportunities for creativity*** Creative mathematicians ask good questions, experiment with examples, draw helpful diagrams, look for connections and find new ways of applying familiar ideas. In this workshop I will share our latest NRICH resources which are designed to encourage students to be curious and creative.	Secondary, General
3H **Michael Fox**	***Mathematical Oddities*** We shall look at: a strange property of a stack of bottles, leading to a kaleidoscopic pattern; how to lace shoes economically; how to divide an inheritance; a numeralogical construction; and a few fallacies.	General

Saturday 2nd April 11.55-12.55 SESSION 4

4A **Debbie Morgan**	***Moving on with Mastery*** The concept of mastery is inspiring teachers to take a different approach to the teaching of mathematics. This year the government is funding through the NCETM and the Maths Hubs a programme to support the development of mastery specialist teachers. This session will share the impact of the programme thus far and how others might get involved. The intended audience is primarily primary. But I am sure it will also be of interest to Secondary Colleagues as the Maths Hubs Mastery programme moves into Secondary.	Primary

4B **Jenni Back** **Sue Gifford** **Rose Griffiths**	***Sticks and stories: building mathematical understanding for teachers and children using physical objects.*** Nuffield Project findings and resources for primary and early years teachers, teacher educators, researchers and advisers. This workshop and discussion session will share information and resources from our Nuffield funded 'Making Numbers' project focused on the use of manipulatives to support the development of number sense in young children. We will draw on eviden ce from research, our own questionnaire responses and our development of activities for use in classrooms.	Primary
4C **Kate Lea**	***Secondary Maths and Global Citizenship*** A global citizenship approach offers numerous, diverse opportunities for real-life learning in maths. This interactive workshop for secondary teachers will provide a range of practical ideas linked to key areas including measurement and time, ordering and comparing numbers, interpreting data and percentages.	Secondary
4D **Chris Pritchard**	***Binary Investigations*** Binary numbers (and their kin) turn up in a variety of situations in elementary mathematics. We will consider some investigations in which binary can be used, from modelling paper folding to the generation of bubble diagrams, and from the arrangement of Cuisenaire rods to walking the streets of New York. All of them can be used with 12-16 year olds.	Secondary, Post-16, General.
4E **Jonny Griffiths**	***Lyness Cycles*** Withdrawn	General, Post-16
4F **Philip Coggins**	***Tales of the Unexpected*** This looks at a number of mathematical oddments that have at one time or another struck me as 'unexpected' in some way. All could be used, or at least referred to, at school level.	Secondary, Post-16
4G **Douglas Butler**	***Vectors and Differential Equations - my favourite topics*** No more do the students cry "I hate vectors" when they are taught using dynamic software. There are so many basic principles that, when established visually in 2D, work effortlessly in 3D.. This session will take the vectors topic all the way from KS3 to KS5,. A similar 'bottom-up' approach will be applied to the study of 1st order differential equations - where again the visual approach can be so engaging and meaningful.	Secondary, Post-16

4H **Mick Blaylock**	***Getting Started with Core Maths*** The session will focus on practical steps to introduce Core Maths in a school or college. Core Maths Leads, who are teaching Core Maths in their centres and supporting others, will describe their experiences and lessons learnt. The session inlcudes an overview of the DfE funded Core Maths Support Programme.	Secondary, Post-16, Tertiary,

Saturday 2nd April 15.30-16.30 SESSION 5

5A **Dave Godfrey**	***Number Fun – using Songs as a Powerful Teaching Tool in Primary Mathematics.*** A fun-filled and active session to introduce delegates to some of Dave's 170 Number Fun songs and the theory behind their use. Dave will identify three main types of songs and demonstrate how to effectively use them as a powerful and creative tool for mathematical learning in the Primary classroom.	Primary
5C **Michael Anderson**	***Resources to support the development of problem solving skills*** In this workshop, join me on a journey through the National STEM centre's eLibrary, meeting some old favourites as well as a wealth of new maths resources which can be used to develop problem solving skills at key stages 3 and 4. Along the way you will learn how the National STEM centre website can be used to make your own resource packages, what the community area can offer and what other support available from the centre. To get the most from the session, bring along your own technology and pre-register on the site before the event at https://www.nationalstemcentre.org.uk/signup .	Secondary
5D **Lara Alcock**	***Electronic resources designed to support mathematical comprehension: Good intentions, poor outcomes.*** Students who make the transition to university mathematics are often faced with a very different classroom experience from the one they had in school: lecture classes are much bigger and opportunities for individual attention are more limited. As a result, many university lecturers (like school teachers) want to take advantage of new media to support student learning; universities, schools and funding bodies are also keen to promote the effective use of e-Learning. But what constitutes an effective online educational resource? This talk will describe a specific type of resource designed to support comprehension of logically challenging mathematical arguments. It will report that although these resources were thoughtfully designed and well received, rigorous evaluation showed that they did not support effective learning - studying the same arguments on paper led to better retention. It will go on to explore why, using evidence from an eye-movement study to examine the effects of these resources on student	Post-16, General

reading behaviours and thus providing insight into when students do and do not need support of this type for learning mathematics.

5E **Stephen Siklos**	***Preparing for STEP: a view from behind the scenes*** How can busy teachers best help their students prepare for STEP? Probably by advising on strategy and resources. We will talk about the guiding principles of setting and marking STEP, and then run through the main resources, including the new DfE-funded pilot `correspondence course'.	Secondary, Post-16
5F **Stella Dudzic**	***Using large data sets in teaching statistics in A level Mathematics*** The national compulsory content for A level Mathematics for teaching from September 2017 includes a requirement to use technology and to explore at least one large data set. How could this work in the classroom and what are the opportunities for learning?	Post-16
5G **Vinay Kathotia**	***Algorithms - the mechanisation of mathematics*** Crafting algorithms seems a mechanistic approach to mathematics but can deepen understanding – why does an algorithm work, how could it be optimised? We will consider a number of examples (from arithmetic, geometry, decision-making), including the example of number, as the original 'algorithm' was for writing numbers in decimal form.	ALL
5H **Seb Schnoller,** **David Jennings**	***Can an open online course support adults learning Level 2 maths?*** Citizen Maths (https://citizenmaths.com) is a free online course to help people understand how mathematics (at Level 2) might be powerful for them in their everyday and working lives. In this session, we will present the pedagogic rationale, illustrate the approach and provide data about the student response.	General

Saturday 2nd April 16.40-17.40 SESSION 6

6A **Charlie Harber** **Rachel Rayner**	***Herts for Learning - Helping Billy Become Fluent With the Basics*** For some children learning the basic number facts seems easy. This workshop aims to deal with the essential business of helping all children to develop number sense. Through a phased approach we tackle the question of what fluency really is and how do we know when a child is truly fluent. We model the 'discovery' approach that will encourage children to move towards generalisation as well as 'fluency feeders' used to rehearse and develop aspects of number sense and to maintain fluency.	Primary
6B **Lynne McClure** **Darren Macey**	***Cambridge Maths – the story so far*** Cambridge Maths is an ambitious collaborative enterprise based at the University of Cambridge. We are aiming to produce a framework which maps the full domain of mathematical knowledge from pre-school to the end of the secondary phase, and to design pathways through the framework which will be fully supported by resources, professional development and assessments. We're taking into account a wide range of research and evidence and have a large number of international	General

colleague who are knowledgeable and enthusiastic supporters. Our story has only just begun but we'd be delighted to share our thoughts so far.

6C **Gerry Leversha**	***Inspiring and enriching lessons at GCSE*** The MA believes that students are best served by 'digging deep', building robust, fluent and confident use and understanding of mathematics. A key element of this is building enrichment into all GCSE lessons. This challenges teachers as well as students, and I show in this presentation some ways to achieve this.	Secondary, General
6D **Julia Brown**	***Lessons from Shanghai: the experience of one Maths Hub participating in the England-Shanghai exchange*** This workshop will consider the approaches used for teaching secondary maths when we visited a Shanghai school, how the Chinese teachers delivered lessons in our school, what the data is telling us about the classes which have experienced these methods and what we are now doing as a result.	Secondary
6E **Adam McBride**	***Problems ! Problems* !** I shall discuss some material on problem solving that I have used with S6 (Y13) students in Scotland. The problems can be solved with little more than insight, logic and the ability to count.	Secondary, Post-16, Tertiary, General
6F **Cyril Isenberg**	***Some Challenging Problems for G & T Students*** Some problems and solutions in number theory that will challenge and inspire school students. They will be motivated to propagate this knowledge to their colleagues.	Secondary, Post-16, Tertiary, General
6G **Stan Dolan**	***What lies between 1/2 and 1?*** There are just five integer-sided triangles that have area equal to perimeter. Only the (3, 4, 5) triangle has the smallest possible ratio of area/perimeter, which is 1/2. What lies between? This talk will look at the methods which can be used to obtain a surprising result.	
6H **David Crawford**	***It's a Kind of Magic*** In this session I will present some mathematical 'tricks' that could be used to introduce a 'wow' factor into lessons. Please bring pencil and paper (and a calculator if you want) and be prepared to have a go. Audience: teachers of KS2, KS3, KS4	General

Sunday 3rd April 9.00-10.00 SESSION 7

7A **Cherri Moseley**	***Moving on with Mastery*** Our new mastery curriculum has brought with it a whole range of new vocabulary for teaching. What are conceptual variation, procedural variation and intelligent practice? How can you implement these and other ideas in the classroom? Come to this session to find out more.	Primary

7C Natalie Carr	***There's Maths Everywhere*** *"What's the point of this topic Miss? When will I ever need this?"* Yet mathematicians remain some of the most sought after people in science, humanities, computing and many other subjects. This session is an opportunity to share/see resources and ideas: including bringing climate change modelling into GCSE algebra, seeing the physics of glaciers through trigonometry and many more.	Secondary
7D Jennie Golding	***Building algebraic reasoning for all in the secondary classroom*** Experience a range of classroom-tested activities and approaches to reasoning embedded in number and algebra, for use with 10-16 year olds, and embedded in a belief that all young people can reason mathematically, and with both understanding and enjoyment. All resources available to edit and use in a classroom.	Secondary
7E Paul Brown, Lizzie Kimber	***The Cambridge Mathematics Education Project: teaching resources for KS5*** Cambridge Mathematics Education Project (CMEP) is developing free resources for KS5 mathematics. CMEP aims to make studying mathematics a richer, more coherent and thought-provoking experience for students and teachers. We will share some resources, show video of students working on the tasks, and discuss ideas emerging from work with teachers.	Post 16
7F Francesca Baker	*101 lesson ideas for dice, cards, and paper*. Withdrawn	Secondary, Post-16
7G David Acheson	***From Calculus to Chaos*** How can we tell the wider public, and young people in general, about calculus? I will suggest a 'big picture' approach based on the history of the subject, from Archimedes' time to the present day.	General
7H Mick Blaylock	***Making Connections – number and algebra*** Drawing on experiences in mathematics education of teaching, examining, observing and inspecting the session will focus on: algebra as generalised arithmetic with examples from basic operations through to quadratic equations; and linking graphical representations with algebraic methods for conceptual understanding in calculus and trigonometric functions with appropriate digital technologies.	Secondary, Post-16, Tertiary

Sunday 3rd April 10.10-11.10 SESSION 8

8B Peter Ransom	***Cross-curricular activities with KS2 pupils*** This is a workshop session where you will be introduced to some activities that can enhance the learning of mathematics through problem solving using cross-curricular themes. We will look at linking mathematics with science through the use of sundials, with history through fortification and Trafalgar: free CD of all materials!	Primary
8C	***Pulling on Loose Threads***	Secondary

Oliver Thompson	Progression in learning mathematics, perhaps more than in other subjects, means building on firm foundations of understanding. When students have misconceptions, this is often because they have not understood the more basic topics studied previously. We will reflect on some concepts and methods that run through secondary school mathematics, discussing how they might be introduced and developed. There will be a chance to share your own ideas and pet hates. Suitable for anyone interested in mathematics in secondary school (KS3, KS4, KS5).	
8D	*Session slot now available.*	Secondary
8E **Richard Lissaman**	***Hands-on with STEP past papers*** A chance to explore and discuss STEP past papers. The session is aimed at teachers who are looking to support students' preparation for STEP or students who are looking to incorporate ideas from STEP as extension problem-solving activities in A level Mathematics sessions. No previous experience assumed.	Secondary
8F **Jane White**	***Using A level mathematics to model infection spread and control*** In this session, I will demonstrate how mathematical concepts studied at A level play an important role in understanding and controlling infectious diseases. In particular, I will use differential equations, integration techniques and curve sketching to model the recent outbreaks of scarlet fever in England and to explore possible methods for its control. All of the material presented in the session will be appropriate for use in the classroom to motivate A level content.	Post 16
8G **Tony Robin**	***Ahnentafel Numbers, Ancestry and Succession to the Crown*** Many people are interested in genealogy and tracing their ancestors. We consider a way of numbering all our relatives, however distant. We use Binary numbers, and Excel to store and sort out details in a variety of ways.	All
8H **Adrian Oldknow**	***A new STEM strategy for schools, academies and colleges*** School Leaders' and STEM subject associations have developed the iSTEM+ approach for schools, academies and colleges to provide a world-class, integrated approach to STEM education and skills for all learners 5-19, which has now been adopted by the DfE. Examples will be shared of innovative cross-curricular projects involving mathematics.	General

Sunday 3rd April 11.30 - 12.30
Closing Plenary, Ben Sparks
'Moving Mathematical Moments'

Circumstances beyond the MA's control may necessitate programme changes, therefore we reserve the right to do so.