

2013 ANNUAL CONFERENCE

# Telling the Great Stories of Mathematics

3rd – 5th April  
Loughborough University

- Marcus Du Sautoy
- Rachael Horsman
- David Spiegelhalter
- Art Benjamin



## SESSION ABSTRACTS AND SPEAKER BIOS

### David Acheson

Aimed at: All

#### ***Whatever Happened to Geometry***

**Abstract:** The fastest way I know into the whole spirit of mathematics at its best, especially for a very young person, is through geometry. But what is the best way of actually doing it?

**About the speaker:** David writes and lectures maths for the general public, and is the author of *1089 and All That*. He was MA President for 2010-11.

### Lara Alcock

Aimed at: All

#### ***Promoting effective reading of mathematical proofs***

**Abstract:** This session will report eye-tracking research demonstrating a) that experts and novices use different processes when reading mathematical proofs, and b) that a simple intervention might dramatically improve the ability of novices to engage with such proofs. It will include opportunities for participants to reflect on their own reading processes.

**About the speaker:** Lara Alcock teaches mathematics and mathematics education at Loughborough University. She conducts research on students' thinking in undergraduate mathematics, with a focus on comprehension and construction of proofs and definitions, and has recently published a book entitled *How to Study for a Mathematics Degree*.

### Paul Andrews

Aimed at: S G

#### ***Same base, same height, same area: A great mathematical story***

**Abstract:** One great mathematical story is that given the same base and height, the area of triangles will be the same. In this session colleagues will solve several problems, each of which exploits this simple principle, to highlight some delightful and unexpected results, many of which allude to some interesting generalities.

**About the speaker:** Paul Andrews works in mathematics education research at the University of Cambridge. His research, typically based on videotaped lessons and interviews, focuses on how teachers in different countries present mathematics to their students. In so doing he collects problems from around the world that interest or amuse him.

## James Arathoon

Aimed at: S, P16, T, G

### ***Precision Engineered Mathematics***

**Abstract:** Can mathematics teaching benefit on occasion from an engineer's perspective? I will explore how some basic mathematical concepts and operations are interpreted and used by engineers to implement practical applications in the real world. The engineer designs a computing device and an associated algorithm to produce an answer fast enough for an application to work, and within a budget the client can afford. To end the session I describe how thinking from an engineering perspective may lead us to a practical implementation of a polynomial time factoring algorithm that can be applied in more than just a few special cases.

**About the Speaker:** James has a background in mechanical engineering and physics and has worked with computers for over 30 years, initially starting with a simple algorithm to calculate triangle numbers on an early (and slow) Research Machines 380Z computer that had been donated to his school (around 1980).

## Farzana Aslam, co presenter Nathan Dyke

Aimed at: S, P16, G

### ***Spiritual, moral, social and cultural (SMSC) development through mathematics***

**Abstract:** This session will highlight how teaching of mathematics can foster spiritual, moral, social and cultural development.

**About the Speaker:** I am currently working as Senior Lecturer at Coventry University. My research interests are in area of Mathematics Education, STEM outreach and Nano-Photonics.

## Farzana Aslam, co presenters Shaun Fisher and Sana Javaid

Aimed at: S, P16, G

### ***An investigation of key factors influencing the learning styles of GCSE students***

**Abstract:** This session will highlight the key findings of research undertaken on learning styles of GCSE students using Kolb Learning Styles Inventory version 3.1 .The session will also showcase the ways how findings of this research will help to design effective teaching resources in mathematics and outreach activities.

**About the speaker:** as before.

## Farzana Aslam, co presenter Sally Mendoza

Aimed at: S, P16, G

### ***Opening Minds in mathematics: An investigation on competence-based curriculum***

**Abstract:** The session will showcase the ways in which an Opening Minds curriculum is delivered by expert but non specialist teachers and the skills which they bring to the class room in order to facilitate the transition for students from Key Stage 2 into Key Stage 3.

**About the speaker:** as before.

## Farzana Aslam, co presenter Rowena Riddiford

Aimed at: S, P16, G

### ***Technology Integration for Mathematics Engagement at Key Stage 3***

**Abstract:** This session will explore the use of different Maths ipad Apps for teaching mathematics at Key Stage 3.

**About the speaker:** as before.

## Jenni Back

**Aimed at:** P

### ***Telling Stories About Teaching Arithmetic***

**Abstract:** Jenni will share experiences of working with networks of teachers from throughout England to develop the teaching and learning of arithmetic in early key stage 2. We will explore the transition from counting and active reasoning to multiplication.

**About the speaker:** Jenni is an experienced maths teacher and teacher educator and has worked for NRICH, CIMT and NCETM, as well as in primary and secondary schools. She is passionate about supporting teaching in primary schools. Jenni is joint editor of the MA journal *Primary Mathematics*.

## John Baylis

**Aimed at:** G

### ***Mathematics for the elderly by the elderly***

**Abstract:** I'll report on how the Pembrokeshire U3A Maths Group has developed over the two years since I spoke about it initially (Loughborough 2012), hoping to swap experiences and suggestions with you and persuade you that it's a good way to keep mathematically active after leaving the academic environment.

**About the speaker:** After 30 years lecturing in maths and maths education with some OU teaching, I took early retirement and did voluntary teaching in junior schools and in the U3A. I have always enjoyed the challenge of making difficult things accessible.

## David Bedford

**Aimed at:** G

### ***Mathematics and the Imagination***

**Abstract:** I've always been interested in mathematical problems which yield to deceptively simple and/or imaginative solutions. In this session I will present some of my favourites. No maths beyond A-level will be required.

**About the speaker:** David is a Senior Lecturer in Mathematics at Keele University with over 20 years' experience of lecturing to undergraduates. Alongside his research interests in Combinatorics, he has been actively involved in encouraging school children to explore the world of mathematics beyond the curriculum.

## Paul Brown

**Aimed at:** S, G

### ***Bringing proof to younger students***

**Abstract:** Proof is vital to mathematics and the earlier that students are involved with conjecture, reasoning and proof the better. This session will present successful classroom-ready methods of bringing proof to junior secondary students.

**About the speaker:** Dr Paul Brown teaches mathematics, chess and philosophy in Perth, Australia. His book on mathematical proof for senior secondary students has sold in many countries and he welcomes your feedback on ideas for the next book designed for a younger audience.

## Tom Button

Aimed at: P16

## ***Further Pure Mathematics with Technology***

**Abstract:** FPT is a new A2 Further Mathematics unit being developed by MEI for first examination in summer 2013. Students will have access to a computer with graph-plotter, spreadsheet, CAS and programming language in the teaching, learning and assessment. The development of the unit and resources will be discussed.

**About the speaker:** Tom Button is the Student Support Leader for the Further Mathematics Support Programme and MEI's Learning Technologies Specialist. Prior to this he taught mathematics in sixth form colleges. He has a strong interest in the use of ICT in the teaching and learning of mathematics, especially at A-level.

## **Steve Chinn**

Aimed at: All

### ***What can be done about the bottom quartile of achievers?***

**Abstract:** A recent survey by the speaker of almost 2000 students age 7 to 19 across the UK, highlights overall achievement and areas of particular concern in basic mathematics. The data is interpreted and the implications for teaching are discussed.

**About the speaker:** Steve Chinn was a teacher for 39 years, 25 of those with students with specific learning difficulties. His current interest is in maths learning difficulties, which is generally defined as the bottom quartile of learners. He has written several books and papers about this facet of maths education.

## **Alison Clark-Wilson**

Aimed at: S

### ***Students learning mathematics with technology: How do they do it in Europe?***

**Abstract:** This session will introduce participants to the outcomes of the 'EdUmaths' project, which involved 20 universities and schools from 7 EU countries. The partners worked to create a professional development resource for secondary mathematics teachers that encapsulated the most effective uses of technology from their curricula. Please bring a fully charged laptop with mathematical software\* installed if you would like to work on some of the mathematical problems during the session.

\* Geogebra, TI-Nspire, Cabri-geometry, The Geometer's Sketchpad would all be suitable.

**About the speaker:** Alison is a researcher in mathematics education, formerly of the University of Chichester (UoC) where she coordinated the work of The Mathematics Centre. Alison was the Project Director for 'EdUmaths' (European Development for the Use of Mathematics Technology in Classrooms), which was a 3-year project that was funded by the Comenius fund of the EU Lifelong Learning Programme (50324-UK-2009-COMENIUS-CMP).

## **David Crawford**

Aimed at: All

### ***It's a Kind of Magic***

**Abstract:** In this session I will present some mathematical tricks that I use to generate excitement and to provide a setting for algebraic work in the classroom. There will be plenty of audience participation required so please bring a pen and paper and prepare for some mathematical fun.

**About the speaker:** David is Head of Maths at an independent school in Leicester where he has taught for the last 15 years. David has been giving sessions like this at teacher conferences and in pupil masterclasses for the last 10 years or so and in 2008

the MA published his book on the subject *It's a kind of Magic*. He is also involved with UKMT writing Team Maths Challenge questions and editing Kangaroo papers.

## Stan Dolan

Aimed at: S, P16, G

### ***Mathematics from Ancient Egypt - I***

**Abstract:** This talk will look at a variety of classroom activities based upon mathematical ideas evident in Egyptian writings. The activities will cover the Secondary school age range.

**About the speaker:** An experienced Secondary School Mathematics teacher, examiner and author. He is the current editor of the Maths Association's 'Student Problems'.

## Stan Dolan

Aimed at: P16, G

### ***Mathematics from Ancient Egypt - II***

**Abstract:** The second part of this talk will be much more mathematical in nature. It will concentrate on a survey of the Erdos-Straus Conjecture and will illustrate an important application of quadratic reciprocity.

**About the speaker:** as before.

## Samantha Durbin

Aimed at: P, S

### ***My Favourite Maths Ideas -MYO Masterclass***

**Abstract:** Following on from the 'Maths through Masterclasses' sessions, this optional workshop gives you the opportunity to produce your own activity. Bring along your favourite maths idea and develop a masterclass-style session or activity to tell your own 'great story of mathematics'.

**About the speaker:** Samantha is Clothworkers' Associate in Mathematics (Secondary) at the Royal Institution. Her role involves supporting and developing the national network of secondary mathematics Masterclass groups and speakers, as well as delivering classes. Sam has worked in STEM enrichment and teaching, and has an MMath and an MSc in Science Communication.

## Samantha Durbin

Aimed at: S

### ***Maths Through Secondary Masterclasses***

**Abstract:** Royal Institution Mathematics Masterclasses aim to open the eyes of young people to the excitement, beauty and value of mathematics through hands-on and interactive sessions which go far beyond the school curriculum. Come along to find out more about the programme and masterclass network, and get some ideas to take away.

**About the speaker:** as before.

## Rob Eastaway & Andrew Jeffrey

Aimed at: G

### ***Maths Marmalade***

**Abstract:** Join Rob and Andrew for an assortment of their favourite maths ideas to engage you and your class. You'll discover the power of Zequals, an astounding card game, and as many other titbits as we can squeeze into an hour. Why "Maths

Marmalade”? Because it’s a bit like Maths Jam (look it up!), but with slightly chunkier segments.

**About the speakers:**

Rob Eastaway is the author of numerous bestselling books, including “*Why do Buses Come in Threes?*” and most recently “*More Maths for Mums & Dads – The Teenage Years*”. He is Director of Maths Inspiration, and is a Past President of the Mathematical Association.

Andrew Jeffrey is an author, INSET provider and international conference speaker. He is the director of Magic Message Ltd, and has a passion for children learning mathematics. He is well known for his free newsletters and books, though is occasionally also called upon to perform his Magic of Maths shows.

## Michael Fox

Aimed at: S, P16, T, G

### ***Simple Solutions to Puzzling Problems in Geometry***

**Abstract:** Some constructions are hard or impossible with ruler and compasses. Yet with a few simple ideas they can be done accurately on a computer. We look at many examples and see what different software can do. No advanced knowledge of geometry is needed.

**About the speaker:** Michael Fox is a regular speaker at MA conferences. He is a former secondary school teacher for whom geometry is a retirement pursuit.

## Tony Gardiner

Aimed at: All

### ***Pal Erdős = 100***

**Abstract:** Erdős was born on 26 March 1913. We shall celebrate his centenary by looking at some of his problems, the solvers he made famous, and by reflecting on his approach to mathematics.

**About the speaker:**

## Paul Harris

Aimed at: P16, T, G

### ***Mathematical uses of spread-sheets for non-specialist undergraduates.***

**Abstract:** At the University of Brighton we have been teaching non-maths students how to use Excel to carry out/solve mathematical and statistical investigations. In this talk I will discuss some of the ways we go about this and talk about my experiences of teaching this material to non-specialist undergraduates.

**About the speaker:** Paul Harris has worked in the mathematics division at the University of Brighton for over twenty years. In that time he has taught mathematics on a variety of courses, including the mathematics degree course, engineering courses and biological science courses. He has also served the MA as the chair of some committees and as Treasurer. He is currently the Editor-In-Chief.

## Amy Hooker

Aimed at: P

### ***Maths through Primary Masterclasses***

**Abstract:** In primary masterclasses, children enjoy lively sessions which, through games, activities and investigations, develop their mathematical reasoning, problem solving and communication skills. In this session delegates will hear about the

programme and masterclass network, and will get ideas to take back to young mathematicians.

**About the speaker:** Amy is Clothworkers' Associate in Mathematics (Primary) at the Royal Institution. Her role involves supporting and expanding the RI's network of primary mathematics Masterclass groups. Before joining the RI, she worked as a primary school teacher for over five years in Suffolk and Shropshire.

## Rachael Horsman

Aimed at: P, S

### ***Padlock Problems***

**Abstract:** Can you solve the challenges to open the padlock and win the prize? During this session we will use some new MA resources – Padlock Problems. We will discuss how to put together a problem using the publication, different ways of working with the resource and subtle ways to differentiate and support weaker/more able pupils.

**About the speaker:** Rachael is Assistant Head and Head of Maths at Mount Grace School, Potters Bar. She is also a Specialist Leader of Education for the Wroxham Training School. Rachael has taught in France, Spain, Hong Kong and Mongolia. As a keen traveller she has taken school trips to the States and Africa.

## Rachael Horsman

Aimed at: S, P16

### ***A Whistle Stop Tour of Engaging Ideas II***

**Abstract:** During the session we will try out a wealth of resources developed to encourage pupils to engage and enjoy their maths lessons; with the emphasis on problem solving and collaboration. Every attendee is free to receive as many of the resources and ideas for themselves as they wish.

**About the speaker:** as before.

## Ray Huntley

Aimed at: P, S, G

### ***Tales of Favourite Mathematical Curiosities***

**Abstract:** This session looks back over many years of mathematical discovery and I select several personal favourites amongst mathematical ideas, results and curiosities. Some old favourites, some maybe less well known that might make you think! Some tales will be told, some maths will also need to be engaged with!

**About the speaker:** Ray Huntley has worked as teacher and headteacher in primary and secondary schools in the UK and Australia. He is passionate about mathematics teaching and learning and enjoys solving problems as well as teaching budding mathematicians of all ages! Ray is a lecturer in mathematics education at Brunel University, London.

## Cyril Isenberg

Aimed at: S, P16, T, G

### ***A Journey Through the Solar System***

**Abstract:** The application of Newton's laws of motion have enabled man to explore the solar system. Some of the principles involved will be explained with the aid of demonstration.

**About the speaker:** Dr. Isenberg is a retired lecturer in theoretical physics from the University of Kent who is known for his demonstration lectures.

## Vinay Kathotia

Aimed at: P, S, P16, G

### ***Nuffield Mathematics***

**Abstract:** Engage with a range of resources designed to support the learning and teaching of mathematics, primary and secondary, arising from projects funded by The Nuffield Foundation. Areas we will touch on include algebra, co-operative learning, practical mathematics, probability, statistical literacy, visual representation – and research-based guidance on teaching key ideas.

**About the speaker:** Vinay Kathotia is Project Head for Mathematics at the Nuffield Foundation, which supports research and development in mathematics education. Areas of interest include foundations of mathematical learning and support for quantitative approaches across subjects and post-16. Prior to working at Nuffield, Vinay helped coordinate the UK-wide Royal Institution mathematics masterclasses.

## Gerry Leversha

Aimed at: S, P16

### ***Going slowly, going deeply: achieving enrichment in everyday classroom teaching***

**Abstract:** A significant danger in teaching GCSE and A-level is that of going too fast. This tendency is particularly marked when dealing with able pupils, in the belief that the faster they get through the syllabus the better, and it is often associated with the misguided policy of taking GCSE and A-level modules early. But this acceleration is often achieved only at the expense of sacrificing understanding. Students who have an aptitude for mathematics need, in particular, to approach the subject slowly, savouring each new idea and exploring concepts in depth. They must be offered every opportunity to experience the intellectual rigour of mathematics and to appreciate the value of tackling challenging multi-stage problems. The speaker will be illustrating this belief with many examples from his own teaching career of ways to achieve this end.

**About the speaker:** Editor of the *Mathematical Gazette*, author, setter, marker, speaker and volunteer with the UK Mathematics Trust.

## Emma Low

Aimed at: P

### ***Telling the Time***

**Abstract:** Teaching children to tell the time, and use time in problem solving, is often a cause of frustration for us. In this session we will explore pictures, practical resources and humorous stories to support children in their understanding of how time is measured and communicated.

**About the speaker:** Emma is a mathematics teacher, writer and consultant. She inspires teachers and children through engaging activities and contexts, and creative use of resources. Emma specialises in supporting teachers with practical classroom ideas, including the uses of ICT in mathematics, developing intervention strategies, and encouraging children's collaboration and reasoning.

## Francesca Lyon

Aimed at: P, S, G

### ***The Great Outdoors***

**Abstract:** Like Erastophenes before us, we will be using the sun to calculate the circumference of the Earth, tell the time, and as a compass. Continuing with these

new found survival techniques and tie knots using materials found readily in the wild, developing mathematical communication at the same time.

**About the speaker:** Having taught Secondary Maths for 7 years, Francesca needed some time off, so had a baby!

## Adam McBride

**Aimed at:** S, P-16, T, G

**Title:** *tba*

**Abstract:** tba

**About the speaker:** Past President of the MA and of the Edinburgh Mathematical Society. Past Chairman of the Scottish Mathematical Council and the British Mathematical Olympiad Committee. Currently Chair of MA Council and Treasurer (formerly Vice-Chairman) of the United Kingdom Mathematics Trust. And from 01/10/11 Adam became Emeritus Professor.

## Mark McCourt

**Aimed at:** All

### ***Beluga Maths: A Mathematics Learning World***

**Abstract:** Beluga Maths is an immersive learning world covering the whole of the mathematics curriculum. Influenced by Stern and constructivism, Beluga is the world's first app through which children actually learn mathematics, building their own knowledge, rather than just practice.

This will be a hands-on workshop, in which delegates will find out more about the research and principles of Beluga then explore the app themselves. iPads will be provided.

**About the speaker:** Mark McCourt is Chief Executive of the Independent Learning Foundation, bringing Beluga Maths to the community. He was formerly Senior Director at Tribal, Director at NCETM, school leader, AST and inspector. He now works with a range of organisations worldwide on innovative technology solutions for education and teacher professional learning. Mark owns the website [emaths.co.uk](http://emaths.co.uk) and tweets as EmathsUK.

## Elena Nardi

**Aimed at:** All

### ***Key issues in the transition from secondary school to university mathematics: An ICME12 Report***

**Abstract:** I will draw on a commissioned report produced by an international team and presented at ICME12, in order to discuss findings, grounded on a literature review and a survey of university mathematics lecturers' views, concerning the transition from secondary school to university mathematics. The session will be sample-based and interactive.

**About the speaker:** Elena Nardi is Professor of Mathematics Education and author of *Amongst Mathematicians: Teaching and Learning Mathematics at University Level* (Springer, 2008). She leads the Research in Mathematics Education Group at UEA, is director of the MA in Mathematics Education and has been editor of Research in Mathematics Education since 2007.

## Stuart Naylor

**Aimed at:** P, S

### ***Maximising engagement in mathematics***

**Abstract:** Does engagement in mathematics matter, or is mathematics supposed to be tedious for pupils? This session will focus on quick, simple and effective strategies that can make your life easier, make lessons more enjoyable, and make learning more creative and engaging.

**About the speaker:** Stuart Naylor has experience in secondary and primary classroom teaching and teacher education, and now works as a writer, researcher, consultant and course provider. He has a reputation for innovative publications, thought-provoking professional development and creative ways of enhancing teaching, learning and assessment.

## Clare Parsons & Simon Clay

**Aimed at:** P16

### ***Tips and Tricks for teaching A-level***

**Abstract:** Delivering the MEI TAM course to teachers starting to teach A-level for the first time this year, we have come across little tricks and tips which we wish we had known earlier – including ‘new’ ways of explaining concepts, resources for promoting rich thinking and suggestions for differentiating learning. We would like to share them with you.

**About the speakers:** Until May 2012 Clare Parsons was Head of Maths in a Sixth Form College in East London and Simon Clay was the Head of Faculty at King Edward VI Sixth Form College, Nuneaton. They now work for MEI as deputy course coordinators on the 15 month TAM course (Teaching Advanced Mathematics).

## Peter Ransom

**Aimed at:** P, S, G

### ***Creativity in the mathematics classroom***

**Abstract:** Participants combine creativity and mathematical history to inspire learners from the wide spectrum of attainment. This is a hands-on session where you make a variety of old mathematical instruments from basic materials. A CD-ROM of everything will be freely available. Forget the national curriculum and do some enjoyable applicable mathematics!

**About the speaker:** Peter is the President Designate of the MA. He takes risks. He has enjoyed mathematics all his life and tries to pass on that enjoyment to all he meets. Currently he does some part time work for Bath Spa University and freelances (no reasonable offer refused).

## Bill Richardson

**Aimed at:** All newcomers

### ***FIRST-TIMERS FORUM***

**Abstract:** This session will provide an opportunity to uncover and find out how an MA conference works. A chance to ask and discuss.

**About the speaker:** Bill is a long time MA member and has been to many conferences but he can still remember the excitement of his first one!

## Tony Robin

**Aimed at:** S, p16, T, G

### ***Generating Functions***

**Abstract:** We shall look at mainly but not entirely probability generating functions. We see how to find GFs for a variety of sequences, their properties and how they can be used. We find them for probability distributions which you are unlikely to have seen before. Also double GFs.

**About the speaker:** Tony taught at secondary level, with 20 years as Head of Department. Now he's an A-level examiner for Cambridge Assessment (statistics papers), and regularly leads sessions at the annual conference on a variety of topics.

## Liz Russell

**Aimed at:** P, S

### ***Robot Wars and other problem solving ideas.***

**Abstract:** I believe that we need to help our students build up resilience for problem solving, so come and take part in a Robot war where working in a team using reasoning and above all being resilient will help you win.

This activity has been used with students from year 7-10 as part of a personal development week.

**About the speaker:** Liz is a teacher in a very large secondary school which serves the local community.

## Sara Santos

**Aimed at:** All

### ***Cubics and banquets - where does *i* fit in?***

**Abstract:** Set in the Renaissance, this is the story of Cardano, Tartaglia, dal Ferro, Fior and Ferraria in the quest for solving the cubic equation. Fior challenged Tartaglia for a mathematical duel, the weapons being 10 cubic equations. The loser's forfeit is a banquet for the winner and his friends. At the same time, arising in the solution of the cubic- even to obtain real roots - the imaginary numbers were formalised by Bombelli. This show will work the audience through the solution of the cubic and the fascinating stories of the mathematicians involved.

**About the speaker:** Dr Sara Santos is the director and co-founder of Maths Busking, awarded a Recognition of Distinction at EngageU, European Competition of Best University Outreach and Public Engagement programme, and winner of the Seed of Science 2011 award in Science Communication. Sara's recent shows include 'Gems of Geometry' at Bulgaria's RATIO science event and 'Who is your audience' at The Schools Network Mathematics Conference 2012. Sara regularly trains communicators to engage with people using mathematics or science. Every year Sara's performers entertain passers by at festivals such as the British Science Festival and The Big Bang Fair, as well as at the queue at the Royal Institution Christmas Lectures. Sara's clients include the leading engineering firm ARUP, The Royal Society, The British Council and the Francis Crick Institute.

## Lydia Showan

**Aimed at:** Anyone involved in STEM education

### ***The National STEM Centre***

**Abstract:** The National STEM Centre is home to the UK's largest resource collections for STEM subjects ages 5-19. Come along to investigate:

- a treasure chest of inspirational resources
- how List functionality provides packages of resources to support teaching
- how our online community can support your school/college and networks
- where to look for wider STEM support.

**About the speaker:** Lydia Showan is the mathematics specialist at the National STEM Centre. Her background is secondary mathematics education, as a subject leader and assistant Head Teacher, and mathematics consultancy.

## Jim Simons

Aimed at: S, P16, G

### ***Dimensional Analysis***

**Abstract:** Dimensional analysis appears very briefly in the GCSE and A-level syllabi. Here we put on our dimensional analysis glasses, and look through them as aspects of mathematics, physics, engineering and biology. Partly to suggest a few cross-curricular enrichment ideas for A-level students, but mainly for fun.

**About the speaker:** After a career as a professional mathematician at GCHQ, Jim is now a private tutor for maths and physics A-level.

## Graham Smart

Aimed at: P16

### ***Innovative Assessment at Key Stage 5***

**Abstract:** This session will look at innovative ways to carry out assessment at KS5 using online tools with readily available content covering core modules. Learn how you can reduce marking time confidently whilst engaging students.

**About the speaker:** Graham is determined to use the technology to inspire the next generation of mathematicians and firmly believes that this is possible. He is currently spending most of his time working on making A-level maths more current to the younger generation.

## Andrew Taylor

Aimed at: S, P16, G

### ***Qualifications Reform: What will the next generation of mathematics exams look like?***

**Abstract:** GCSEs are to be replaced and A-levels reformed with universities closely involved in the process. This session will look at the emerging picture of the suite of qualifications that will be taken by students over the next five years, and consider the implications of change in the classroom and beyond

**About the speaker:** Andrew is Head of mathematics at AQA, one of the three English exam boards. He is responsible for the development and delivery of a range of mathematics qualifications from Entry level through to Further Mathematics A-level. He has been closely involved in assessment pilot work through the Curriculum Pathways Project and, more recently, the Linked Pair Pilot for GCSE mathematics.

Before joining AQA, Andrew taught mathematics for 17 years and was Head of Faculty in large comprehensive schools in Cambridgeshire and Manchester.

## Sidney Tyrrell

Aimed at: All

### ***Stories in Statistics***

**Abstract:** A string of stories threading their way through simple practical ideas which I have found helpful for teaching statistical concepts to students who find statistics boring, hard or both. Take away ideas together with a disk with resources to use, links to web based resources, useful real data sets, and useful Excel spreadsheets.

**About the speaker:** Sidney Tyrrell is an Honorary Teaching Fellow at Coventry University, engaged in outreach work to schools. A National Teaching Fellow she taught statistics to undergraduates for many years from mathematicians to nurses and town planners, and enjoyed the challenge of making stats interesting and sensible, which it is.

## Sue Waring

Aimed at: P, S SEN

### ***Maths Adventures with Twoo - stories for KS1 Maths***

**Abstract:** *Maths Adventures with Twoo - stories and activities to promote mathematical reasoning at KS1* is a new MA publication. A description of the ideas underpinning the book will be followed by story-telling with the aid of a whiteboard presentation and practical tips on using the material.

**About the speaker:** Sue Waring is the author of *Can you prove it?* which is based on over 30 years teaching experience and research into the use of pattern as a vehicle for teaching proof at school level.