

**Design and Technology  
Mathematics  
Science**



**Subject  
Enrichment  
Residential**

Autumn 2022, Crewe Hall

[www.ptieducation.org](http://www.ptieducation.org)



# Welcome

## Subject Enrichment Residential 2022

We are delighted to welcome you to this PTI Subject Enrichment Residential. Over the next three days, you'll engage with talks and presentations from a wide range of high-profile subject experts. There will also be time to explore subject leadership approaches and enrich your knowledge through workshops, panels, tours and taster sessions. This is a unique opportunity for you to step away from the classroom, to share best practice and to network with inspiring subject leaders from across the country. This weekend, we hope that you will:



**Discover new specialist subject knowledge**



**Develop new ways to extend, enthuse and inspire students and strengthen your curriculum**



**Consider more dynamic and creative practices to revitalise your department**

## Aims of the course

- » Empower and inspire Subject Leaders to be advocates for their subjects in and beyond school and for a curriculum that is challenging, innovative and enriching.
- » Encourage teachers, through both curricular and extra-curricular provision in their schools, to introduce pupils, regardless of their background or ability, to challenging and enriching materials and activities.
- » Enrich and develop teachers' subject knowledge and impact through academic talks, resources and discussion, and the sharing of best practice.
- » Motivate teachers to consider how to inspire engagement, enjoyment, curiosity and intellectual independence within and beyond the curriculum.

**2022**

**DESIGN & TECHNOLOGY • MATHEMATICS • SCIENCE**



# 20 years ...

## About the PTI Residentials

This year marks the 20th anniversary for our Subject Enrichment Residentials. Originally named 'The Prince of Wales Education Summer Schools', the first Summer School was held at Dartington Hall in Devon in 2002. Every year since, these courses have provided an opportunity for teachers to stand back and reflect on the nature of their subjects, on what is most important in the teaching of them, and how they can improve their teaching so as to inspire the next generation of children.

The first five Summer Schools for teachers of English and History were organised and led by teachers in their spare time, led by the eminent Headmistress Bernice McCabe. In 2006, HM The King announced the decision to create a charity called The Prince's Teaching Institute to pursue the ethos established in these Residentials, which would be in partnership with the University of Cambridge.

Over the last 20 years, we have been able to offer teachers a wider range of subjects, for example introducing Design and Technology for the first time at this Residential. We are also proud to offer a comprehensive suite of Programmes, such as our Subject Leadership Programme, which you will be eligible to join after this course. and our School Leadership Programme for school leaders. Since 2010, we have welcomed early career teachers to our New Teacher Subject Days and provide bespoke support to primary schools through our Primary Hubs Programme, created in 2018. Throughout the pandemic, we were able to ensure that teachers remained connected and moved our activities to an online format. With teachers at home and in need of support, we had three times the number of teachers join us in the summer term compared to a normal year.

The most powerful effect of the PTI courses to date has been that teachers have gone back to their schools feeling it is within their power to change their classroom approach; to put scholarship and a delight in their subjects at the heart of their teaching.

With 20 years of running Subject Enrichment Residentials, we are confident that you that will find this course both stimulating and challenging, and we hope you will return to your classrooms inspired to share your experiences with your pupils and your colleagues.





## An overview of the D&T Enrichment Residential

Design and Technology is at a critical stage in its history. How do we challenge people's perception of our subject and ensure it is fit for the next generation? How can we be instrumental in ensuring the next generation have the understanding of this rapidly changing world and consider the wider implications of design, as consumers and as designers? We aim to discuss some of these questions and open up a discussion finding solutions for our own practice. Whether it's re-evaluating your curriculum, redesigning your space or considering a new approach, the Residential will allow you to be among like-minded professionals, sharing enthusiasm, ideas and solving problems.

### Objectives of the course

- » To consider the role of Design and Technology and challenge perceptions.
- » To explore how Design and Technology fits into a rapidly changing physical and technological landscape.
- » To promote activities outside the classroom to engage and inspire students to look towards the future and their potential careers.
- » To consider how we design our own success, in the physical space and curriculum we offer.



### “ 2022 Residential participant

*The PTI residential always inspires me to be a better version of myself and reignite my passion for teaching through the love of my subject.*

## Speakers



### **KEYNOTE ELLA PODMORE MBE**

Ella Podmore MBE is a materials engineer for McLaren Automotive. She is responsible for all material-related investigations across the business, specialising in surface treatments and microscopic analysis. Ella has won IET's Young Woman Engineer of the Year 2020, been named Surrey's Top 40 Under 40 in 2022 and received an MBE for her contributions to engineering, innovation and diversity.



### **GEORGE CAVE**

George is part design engineer, part interaction technologist. He invents and prototypes the future of product interaction. In 2021 he launched *Interaction Magic*, mixing play, emotion, and magic alongside rigorous technical execution. George works with global brands in consumer technology and electric mobility, delivering R&D projects with emotional hardware interactions.



### **DANIEL CHARNY MBE**

Daniel is a designer, educator and creative director recognised for a range of culturally significant projects. He is a recipient of the London Design Innovation Medal, the Sir Misha Black Award for Innovation in Design Education and an MBE for services to design and creativity. Daniel is Professor of design at Kingston University and co-founder of Forth, a creative studio in London.



### **DR MATT MCLAIN**

Matt is a senior lecturer in education and professional learning at Liverpool John Moores University, with a research interest in D&T education. Matt is a D&T Association trustee and the conference chair for the international technology education research conference PATT40 Liverpool in 2023.



### **TONY RYAN**

Tony has been working in education for 32 years, spending 18 in senior management and 11 as Headteacher in two very diverse secondary Academies. He completed an MA in Educational Studies, majoring in the use of Information Technology. Tony is the CEO of The Design and Technology Association and is an active Fellow of The Royal Society of the Arts.



### **MICHAEL NELSON**

Michael Nelson is an External Advisor, Durham LA, for Primary and Secondary D&T and Engineering. He is MD and Founder of CAD2CODE CIC. Michael has 22 Years teaching experience, 8 years of these as a Head of Faculty. He is a D&T Association and STEM Learning Consultant, content writer and facilitator.

# Maths



## An overview of the Mathematics Enrichment Residential

Welcome to the PTI Mathematics Enrichment Residential. We have designed this course as a chance to explore Mathematics and rediscover our love of our subject. The speakers and activities have been chosen to challenge your thinking, to help you to reimagine the teaching of mathematics in the classroom and help to develop your curriculum. The residential is also a chance to work with like minded teachers to share ideas, knowledge and experience. At the end of the course you will have developed a clear action plan on how to take all of your new ideas back into your school setting to share with colleagues and students. We hope that there is something for everyone to enjoy and look forward to sharing the residential experience with you.

### Objectives of the course

- » Give time and confidence to explore ways to deliver the curriculum through use of challenging and enriching tasks.
- » Empower teachers to develop extra-curricular activities to enthuse students about maths beyond the curriculum.
- » Encourage teacher collaboration and exposure to high profile subject experts to develop subject knowledge.
- » Motivate teachers to embed cross-curricular links to strengthen the importance of maths within the school and the wider communities.

### “ Maths Residential attendee 2021

*The teacher led discussions are valuable and allow you to challenge your own delivery of topics and share best practice. It has been a wonderful opportunity to discuss maths with like-minded teachers who share your love of the subject.*





## Speakers



### **KEYNOTE DR SIMON SINGH MBE**

Simon joined the BBC science department after completing a PhD in particle physics at Cambridge University. Simon has won a BAFTA for his documentary about Fermat's Last Theorem. He is currently developing ways to increase the number and diversity of excellent mathematicians. In 2003, Simon received an MBE for services to mathematics education and science communication.



### **TOM BREE**

Tom is a geometer-artist, teacher and writer, based at the School of Traditional Arts at the Prince's Foundation. He focuses upon the use of geometry and cosmology in sacred art and philosophy. His practical art classes consist of teaching participants to draw geometric patterns - particularly those used in the Islamic and Christian traditions.



### **CHARLIE GILDERDALE**

Charlie is the NRICH Secondary Coordinator. He contributes to the NRICH website, developing classroom content which offers opportunities for learning mathematics through exploration and discussion. His recent work has focused on problem solving and reasoning and on encouraging students to think mathematically.



### **DR JAMES GRIME**

James is a mathematician with a personal passion for maths communication and the promotion of mathematics in schools and to the general public. He can be mostly found doing exactly that, either touring the world giving public talks, or on YouTube.



### **DR DEBORAH KENT**

Deborah is a Senior Lecturer in History of Mathematics at the University of St Andrews. Her research has involved solar eclipse expeditions and the flight of golf balls. For four years, she has also been on the faculty at an international residential summer program for students showing high promise and interest in mathematics.



### **GARROD MUSTO**

Garrod Musto is a Chartered Maths Teacher and Fellow of the Chartered College of Teaching and Institute of Mathematics and its Applications. He is currently Director of International Partnerships at Kingswood School in Bath, after having previously spent 20 years as Head of Mathematics and being on the Senior Leadership Team.



### **REBECCA RENNISON**

Rebecca is a Corporate Finance M&A Partner in EY's North Strategy & Transactions team. She brings over 20 years' experience working across large private equity and international trade transactions. Rebecca was previously Managing Director, Investment Banking at a large North American investment dealer. She is a Chartered Professional Accountant and a Chartered Financial Analyst charterholder.



## An overview of the Science Enrichment Residential

Science is everywhere. This was highlighted to society through the pandemic and continues to be shown through ever increasing coverage of 'big science' such as climate change, energy and general sustainability. As science teachers, it has never been more important to ensure that we continue to enhance our own knowledge and understanding of the changing world around us. This will ensure that we can support our students to actively engage with science, within their qualifications and also more widely as a member of the larger community.

### Objectives of the course

- » To explore how to best promote exceptional and exciting teaching that inspires and creates a passion about science in all students both inside and outside of the classroom.
- » To ensure that colleagues have access to cutting edge research and developments in science, to learn from and further engage their students through teaching in a rapidly evolving scientific world.
- » To foster opportunities for deeper discussion about the importance of science in the wider world, for example, the vital role science plays in tackling the world's problems and how it will directly impact on the lives of our students.
- » To highlight the links and impact that science has had and will continue to have in all areas including beyond STEM such as literature, religion, history, music and art.
- » To further explore how to engage, inspire and support students to develop their intellectual understanding, curiosity and problem solving through science.

### “ Science Residential 2021 participant

*The Residential has reminded me why enthusiasm and passion should be at the heart of what we do. Cross-curricular links and communicating to students regularly about why science needs to be taught has been placed firmly at the centre of my drive to teach.*





## Speakers



### **KEYNOTE ELLA PODMORE MBE**

Ella is a materials engineer for McLaren Automotive. She is responsible for all material-related investigations across the business, specialising in surface treatments and microscopic analysis. Ella has won IET's Young Woman Engineer of the Year 2020, been named Surrey's Top 40 Under 40 in 2022 and received an MBE for her contributions to engineering, innovation and diversity.



### **FIONA FOX MBE**

Fiona is the chief executive of the Science Media Centre, and has many years of experience working in media relations. Fiona has received many accolades for her services to science, including an OBE, honorary fellowships of the Academy of Medical Sciences, the Royal Society of Biology and the British Pharmacology Society.



### **ANDREW GREGORY**

Andrew is Professor of History and Philosophy of Science in the Department of Science and Technology Studies at University College London. His main research interest is science from the ancient world to around the seventeenth century, focusing on astronomy, cosmology and idea of the origins of the universe.



### **DAN GREEN**

Dan is the editor of The Week Junior Science+Nature, the UK monthly magazine for children aged 8-15. Dan has been working as a science communicator for more than 20 years. He has written over 50 titles for children, several of which have been selected as part of the National Science Teaching Associations' (NSTA) pick of outstanding books.



### **DR ANDREW LEE**

Andrew has a PhD in Bionanotechnology and Biophysics, and manages the Bragg Centre for Materials Research at the University of Leeds. He has pioneered novel combinations of DNA nanotechnology to develop new integrative analytical and diagnostic techniques capable of studying the functions of single enzymes.



### **ELAINE MESHKI**

Elaine holds a Masters degree in Systems Engineering from the University of Warwick. She is chartered professional and a Principal Consultant in the New Mobility team at Steer working to support the industry's transition to Zero Emission Vehicles. In 2020 she became a finalist for the WES Top 50 Women in Engineering: Sustainability awards.

## After dinner speaker

This year, we are pleased to welcome Professor Chris Molloy as our after dinner speaker!



### Professor Chris Molloy

Chris Molloy has a 30-year international board and executive career across a unique range of life sciences disciplines. After 14 years at Glaxo, where he helped lead the industrialisation of high throughput discovery, he became COO of MerLion Pharmaceuticals, an award-winning Singaporean anti-infectives biotech. Chris then ran corporate development for the global informatics firm, idbs during which time it won a Queen's Award for Enterprise, became a Fast-track 100 company, and developed the UK's first stratified medicine software platform using real-world health data.

Chris spent three years as CEO of the RSA Group, the global life science executive search specialist before becoming the founding CEO of Medicines Discovery Catapult: the national centre for innovation in drug R&D. During its first five years, MDC leveraged its grant fourfold, worked with over 180 UK companies and assisted the discovery of UK drug assets worth over £1bn. During the pandemic, Chris was the founding Director of the Lighthouse Labs – the largest diagnostics project in UK history – and chaired the industry-governmental consortium on rapid testing that increased UK test manufacturing capacity by twenty-fold.

Chris is the non-executive chairman of Thriver – a pioneer in at-home diagnostics; Exploristics and NorthWest EHealth: two UK tech companies using Real World healthcare data to improve clinical development. He is a Trustee of the Institute of Cancer Research and holds an honorary chair at the University of Manchester.



# The Subject Leadership Programme

The Subject Leadership Programme **membership is free** for the first year (or included in PTI Unlimited membership!).

Year-round support is available from our programmes team.

For more information please contact: [nick.park@ptieducation.org](mailto:nick.park@ptieducation.org) or call 020 3174 1592.



## Benefits of being a PTI Programme Member



### A FREE PLACE AT OUR ANNUAL SUBJECT LEADERSHIP DAY

*Join us in July 2023 for a reunion day with colleagues from this course*

Listen to high-quality speakers, share expert practice and discuss rich subject provision within and beyond the classroom.



### EARN THE AWARD OF THE PTI MARK

*Gain recognition for excellent subject teaching within your department*

At the Subject Leadership Day, you'll be awarded the PTI Mark once you demonstrate progress in your objectives which you will begin to define during this Residential.



### WEALTH OF SUBJECT-SPECIFIC CPD AND RESOURCES

*Your membership includes free access to online courses and much more*

As a member, you can log in to the PTI Staffroom which contains over 5,000 resources. This includes recorded lectures, presentations and lesson ideas. You can also book onto our subject-focused CPD Online Courses, which take place throughout the year, for free.

## After the Residential - what's next?

### Before the end of this term

Confirm your objectives with your department and your SLT.

### November 2022 to May 2023

1. Work on your objectives and strengthen your department.
2. Upload a unique teaching resource onto the PTI's online Staffroom, to add to our collection of thousands of resources available exclusively to our members.

### June/July 2023

Attend the Subject Leadership Programme Day, where the cohort from this residential will join the rest of our members for a day of inspiring subject-knowledge enhancement, networking and sharing experiences with like-minded colleagues. You will set objectives for the following year to build on your achievements, and those who have made progress will be awarded the PTI Mark.

### September 2023

Formal award of the PTI Mark. Certificate sent to you in the post.

### November 2023

PTI banner sent to your school to recognise departments that have achieved the Mark.



# PTI Unlimited



Schools can join PTI Unlimited, our most comprehensive membership option, and get full and free access to all of our CPD courses, events, programmes and resources for teachers and school leaders. Some of the benefits are listed below:

- ✓ Places on one-day subject-focused CPD and online courses for teachers at all levels
- ✓ Places for subject leaders on three-day Subject Enrichment Residentials
- ✓ Places for early career teachers on a four-day Saturday development course
- ✓ A place for headteachers on a two-day School Leadership Residential
- ✓ Places on an 18-month accreditation course for aspiring and established subject leaders

## Subjects

We currently run courses in the following subjects:

Art, D&T, English, Geography, History, Maths, Music, MFL, Science and Leadership.

## Contact us

If your school would like to find out more about PTI Unlimited, they can contact Heidi Mitchell by emailing [heidi.mitchell@ptieducation.org](mailto:heidi.mitchell@ptieducation.org) or calling 020 3174 0127.

PTI Unlimited price per  
state school per annum just

**£3700**

+VAT



# What's coming up at the PTI



## **CPD FOR TEACHERS AT ALL LEVELS**

**CPD Subject Days** | Autumn, Spring and Summer Term

**CPD Online Courses** | Autumn, Spring and Summer Term

## **CPD FOR NEW TEACHERS**

**New Teacher Subject Days** | starting Sat 12th Nov 2022 (Birmingham & Manchester)  
starting Sat 14th Jan 2023 (London)

## **CPD FOR SUBJECT LEADERS & ASPIRING SUBJECT LEADERS**

**Certificate for Subject Leadership Level 1** | Autumn, Spring and Summer Term

**Art, English & Music Residential** | 1st - 3rd July 2023

**Subject Leadership Days** | Summer 2023

**Subject Leadership Residential** (History, Geography, MFL) | Autumn 2023 - TBC

## **CPD FOR LEADERSHIP & ASPIRING SCHOOL LEADERS**

**Certificate for Subject Leadership Level 2** | Spring and Summer Term

**School Leadership Residential** | 2nd - 3rd February 2023

**School Leadership CPD** | Autumn, Spring and Summer Term

## **CPD FOR PRIMARY**

**Primary Leadership Residential** | 2nd - 3rd February 2023

**Primary Hubs** | Autumn, Spring and Summer Term

**Virtual Primary Hubs** | Autumn, Spring and Summer Term





# *Farewell to Chris Pope*

**Chris Pope is retiring as Co-Director of the PTI after 15 years.  
A heartfelt thank you from Carolyn Roberts and all of us at the PTI:**

It is with sadness we say goodbye to Chris Pope whose vision, dedication and persistence has built the PTI over the last 15 years. His determination that all teachers should have access to top-quality subject input and inspiration, no matter what the circumstances of the school, has reached thousands of professionals and, through them tens of thousands of children.

The PTI's tenacity and bold single-mindedness kept the importance of teacher scholarship and refreshment and the centrality of subject knowledge alive in the sector through years when it was nearly lost. That the curriculum is resurgent is thanks in no small part to Chris' work at the PTI and his relationships with key decision-makers.

Ask anyone who knows the PTI and the first thing they'll say is 'Chris Pope – what a lovely man!' but that's not the full story. Chris's outstanding interpersonal skills, his ability to make connections and keep them and his clear-sighted vision made and make people want to work with the PTI. More than that, his ability to make everyone he talks to feel known and remembered generates a loyalty to the organisation that has been invaluable. As one person said 'Chris always makes me feel as if I've made his day!'

Chris has helped us change the system for the better, for the children and young people in our schools. There is no greater service.



Summer School, 2008

Subject Enrichment  
Residential, July 2022





*With thanks*





**Inspirational professional development**  
*for teachers and school leaders*



**INSPIRING TEACHERS  
CHANGING LIVES**

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Facebook / LinkedIn: The PTI