



## A message from our CEO, Dr Katie Chicot

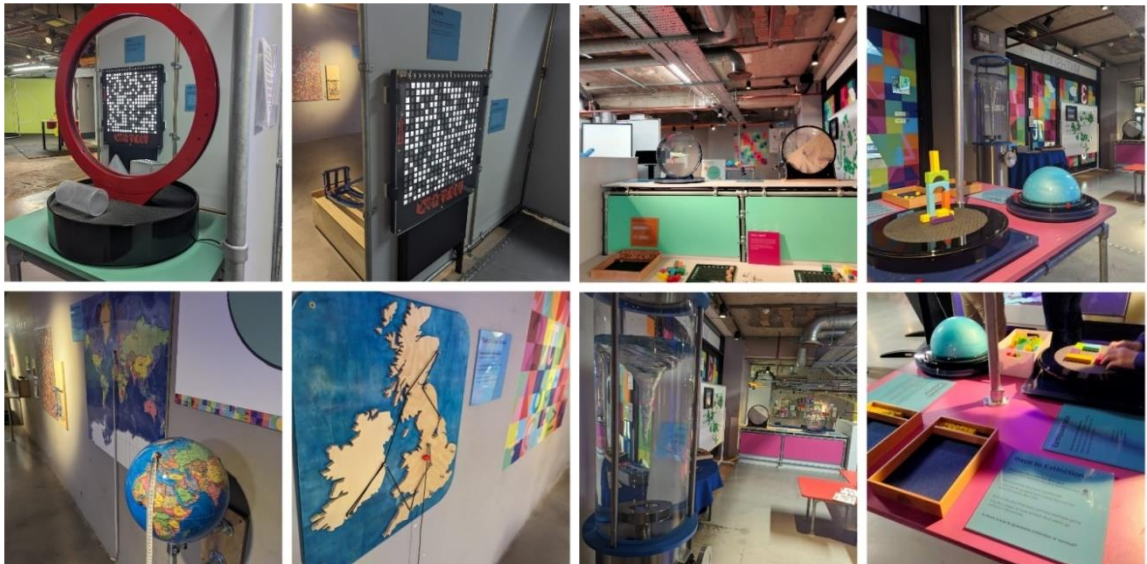


"Hello friends and supporters of MathsWorldUK,

Since our last newsletter, MathsWorldUK has been active in furthering its mission to establish **MathsWorld**, the UK's first National Mathematics Discovery Centre. Our first priority has been to continue to run and improve **MathsCity**. We shall celebrate our three-year anniversary in October. To date, we have received over 37,000 visitors. This past year we have focused on making **MathsCity** a self-sustaining operation financially and we are on track to achieve

this.

We have strengthened our collaboration with the University of Leeds, the Leeds Institute for Fluid Dynamics (LIFD) and the Open University to create an exhibition, *Our Chaotic Earth*, which gives an appreciation of the power of mathematics in explaining natural systems and predicting changes in our planet Earth. The exhibits relate to the applications of mathematics in meeting the major international challenge of delivering a sustainable environment, including aspects of climate change, biodiversity, provision of energy and transport. One of the main themes of the exhibits is stable and chaotic earth systems.



Installed in April 2024 and crammed with exciting activities: atmospheric turbulence, chaos (chaotic pendulum), avalanche demonstrations, a water vortex machine, earthquake plates and more.



Also featured is the *iSandbox*, which is an interactive sand box where users can change variables on the landscape such as water levels, freezing levels, the distance between contours on topographical maps, and lots more. The *iSandbox* has quickly become our most popular exhibit.



Following two years of running **MathsCity**, we sought to become a national-sized attraction. We met with the then Secretary of State, Michael Gove, and submitted an application to the government *Department for Levelling Up, Housing and Communities*. Our goal was to locate in Centenary Square, the main square in the city of Bradford.



We selected this city partly based on the research which shows that Bradford is nationally the town/city with the “strongest case for economic support as part of the levelling-up agenda, as well as significant capacity for new economic growth”. The city is undergoing re-development to make it a stronger cultural destination and it already houses the National Science and Media Museum.

Sadly, government funding eluded us in 2024, and so we revisited our strategy for growth. We are now planning for a MathsCity 2.0 in London. In this way we can bring our project to the attention of future supporters including government.

We will keep you updated as plans evolve.

Thank you for your ongoing interest in MathsWorldUK. We rely on your support.”

*Katie Chiccol*



## Feature: Dame Angela McLean FRS, UK Government Chief Scientific Adviser

In this Newsletter we are running a piece by Dame Angela McLean who is the UK Government Chief Scientific Adviser. Dame Angela has been a keen supporter of MWUK for many years. We hope this will be the first of many such articles in which top professionals and others describe the importance of mathematics in their working lives.

Angela McLean writes:

“This year is the diamond anniversary of the appointment of the first Government Chief Scientific Adviser (GCSA). Sixty years later, there have been 14 GCSAs who have served under 13 Prime Ministers. I am very proud to be the 14th GCSA, and I want to take a moment to say that I am honoured to be included in



this month's newsletter, and I would like to share a few reflections and priorities from the past 18 months of holding this exciting role.

I began my journey into government by joining scientific advisory councils whilst I was a Professor of Mathematical Biology at Oxford University. I always looked forward to days 'up in town,' hearing how Civil Servants were using science to make more informed decisions, and why that was sometimes quite difficult. These experiences gave me a small glimpse into the world of Government and how science and engineering can play a vital role in shaping decision-making.

I decided to take a leap and move from academia into the Civil Service in 2019, when I became the Chief Scientific Adviser to the Ministry of Defence. Then, in 2023, I was appointed into the GCSA role and as the Head of the Government Science and Engineering Profession.

My mission is to make sure there is excellent science advice at the heart of decision making and ensure the Prime Minister and Cabinet have access to the best scientific advice. I do this by providing science advice and technology insights directly on key areas, such as large global issues like climate change and engineering biology. I also put in place mechanisms to ensure science is at the heart of national security and resilience. Another priority for me is to harness science for strategic advantage, meaning we should be thoughtfully, sustainably and usefully good at science. This goal is only possible through clear collaboration across government and with academia, industry and the public. We recently released a how-to guide to help academics and industry experts engage with government science systems. Check out [this guide](#) to find out the various opportunities available to get involved and share expertise with government. I am also committed to building a more scientific Civil Service, including through the 10,000 members of the Science and Engineering Profession and through our network of Chief Scientific Advisers.

You're probably wondering how my degree in mathematics has helped to shape my role. Well, mathematics is the language of natural science and increasingly of behavioural science too, which are key areas of interest to government. Everything we're doing in government surrounding technological advancements, like AI advancements, has mathematics at its core; we're also seeing biology as an increasingly mathematical subject – nowhere more so than in the exciting technologies of engineering biology. So, everywhere I look in my day-to-day work I see mathematics at the centre.

Having a mathematics degree has given me a unique lens within, helping me to ensure that excellent science advice is at the heart of decision making. There is still plenty more to do, particularly in our ability to collaborate externally. But I am optimistic that my priorities are helping to achieve this, and I will continue to enjoy being a strong, clear voice for science and engineering inside government."

## MathsCity updates

Linda Rosen (right) has stepped down as the Manager of **MathsCity** to concentrate on some of her other interests. Linda did a wonderful job in launching **MathsCity**, especially during the early post-Covid period. We are very grateful for her hard work and input over the past two years, and welcome her back in a part-time, capacity as one of our team of enablers. The picture shows Linda explaining the Cipher Wall to visitors.







Max Hughes (pictured below doing an outreach session) has been appointed as the new Coordinator of **MathsCity**, which includes its day-to-day management. Max writes:



"It is an absolute pleasure to be back at MathsCity as Coordinator after starting off as one of the original Enablers when the centre first opened its doors in 2021. As the first centre of its kind in the UK, MathsCity represents a substantial leap forward the sphere of public engagement of mathematics, and I am excited to be working at the cutting edge of the frontier as MathsCity, and MathsWorldUK, grow to greater and greater heights.

"One of our novelties last year was hosting a Maths Music Night in **MathsCity**. Now, I am particularly looking forward to the year ahead, we have some amazing activities coming up, including a collaboration with Hasbro and Leeds BID looking at the *Mathematics of Monopoly* over the summer, and I aim to continue to increase the number of school bookings for the upcoming academic year."



Linda Rosen (left), Max Hughes (back row) and Katie Chicot (right) and members of our team of enablers at a Christmas event in MathsCity.



Maths Music Night in MathsCity



## 'Our Chaotic Earth' exhibition

As referred to earlier, this exhibition looks at the science and maths of our planet with exhibits focusing on air, land, sea and life on Earth. Although planet Earth can be chaotic, we will look at what mathematicians can and cannot predict.

Visitors can explore the air with our exhibit on atmospheric turbulence. They can see the beautiful swirling patterns found in our atmosphere, which make weather so hard to predict. They can discover the land with our avalanche simulator or create fascinating stripes when grains of different sizes separate, as seen in real-life avalanches.

Visitors can experiment in the sea with our wave tank and try different kinds of coastal defences to see which defences give the best protection against flooding.

Life on Earth can be investigated with our population dice to see how populations grow and shrink over time, and whether it is possible to predict that a species will go extinct.

There are a few more exhibits to come including *Future Mobility Simulator* (a city-planning exhibit with Lego), *Plus One Degree* (a shift in temperature means more extreme weather), and *Internal Waves* (waves appear in the sea, not just on the surface).

Do join us in exploring *Our Chaotic Earth*.



Max Hughes with the Chaotic Pendulum (left) and the avalanche simulator

## News of Trustees



Dr Christoph Bergemann (pictured with his Mobius bagel) has been appointed as a new Trustee of MathsWorldUK. Christoph is the Head of Research at G-Research, a London-based quantitative finance firm and a significant employer of top mathematical talent in the UK. He joined the company after a brief but distinguished career in academic research in condensed matter physics, most recently as a Royal Society University Research Fellow at the Cavendish Laboratory and Fellow at Trinity College, Cambridge. Christoph received his PhD from the University of Cambridge in 1999 and has held postdoctoral positions at Cambridge and ETH Zurich.

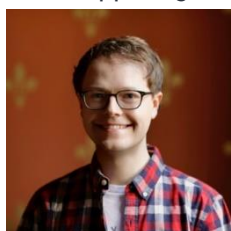


Originally from Hamburg, Christoph had a passion for mathematics from a young age and won a Silver Medal at the 1992 International Mathematical Olympiad as part of the German team. He now wants to pass on this passion, and to help convey the beauty and excitement of mathematics.

Following the stepping down of Geoffrey Wain as Chair of MathsWorldUK last year, Professor Margaret Brown has now taken up this role, with Professor Tom Ward (photo right) as our Deputy Chair. Tom recently retired as Pro Vice Chancellor of Education at Newcastle University. Readers might be interested in Tom's recent book: [People, Places, and Mathematics: A Memoir. Springer Biographies](#) (2023).



Dr Philipp Legner has also been recently appointed as a Trustee of MathsWorldUK. Philipp is the founder of Mathigon.org, an award-winning online platform for learning mathematics. With innovative content and digital tools, Mathigon makes online learning more interactive and engaging than ever before and has been used by tens of millions of students and teachers around the world. In 2021, Mathigon was acquired by Amplify, a pioneer in K-12 education in the US.



Philipp is also a Trustee of MoMath, the National Museum of Mathematics in New York City, as well as 'Dr Frost Maths'. Previously, he studied mathematics at Cambridge University and mathematics education at the UCL Institute of Education, and worked as a software engineer at Google, Bloomberg and Wolfram Research.

## Visit by Rachel Reeves to MathsCity

In July 2023, MathsCity was visited by the then Shadow Chancellor Rachel Reeves (now the new Labour Chancellor) following on from the successful visit of our other local MPs Hilary Benn (now Secretary of State for Northern Ireland) and Fabian Hamilton the previous May. Rt Hon Rachel Reeves got stuck in with the maths challenges, competing with pupils from her local constituency.







Rachel Reeves at MathsCity, July 2023



## Award to James Grime

We offer our congratulations to James Grime, our Content Creation Manager, who has recently been awarded one of four Alumni Awards for Outstanding Achievement from Lancaster University. James was given the award for his personal passion for maths communication and for his promotion of mathematics in schools and to the public. We remind readers that during the Covid pandemic, James made a whole series of videos for MWUK, *Maths at Home with MathsWorldUK*, all of which are to be found on our website. The whole collection is available on the [MathsWorldUK YouTube channel](#).



Pro-Chancellor the Rt Hon Alistair Burt with Dr James Grime (right); photo by Creative Studio, Lancaster University

## MathsWorldUK out and about

During the 2024 Easter holidays, Katie Chicot took our **MathsCity** festival kit to the Breeze holiday club for Little London Primary pupils on free school meals. This was a side of maths the pupils (and the holiday club staff) hadn't experienced before.

Katie Steckles and Max Hughes took the **MathsCity** kit to the [Electromagnetic Field camping festival](#) for those with an inquisitive mind. Max visited a further festival, GreenMan, where he worked with a team of neuroscientists to scan the brains of participants whilst they worked on our challenges. Those who have visited **MathsCity** won't be surprised to learn that the yellow 'T' puzzle generated the most brain activity!

MathsWorldUK presented at a number of conferences including:

- mini symposium on maths communication at the *British Applied Mathematics Colloquium: BAMC 2024* in April.
- *Teaching and Learning Conference* at Leeds Grammar School.
- *'Talking Maths in Public' Conference* in Newcastle, in September 2023.



## In print

You can read a little bit more about our work in mathematics journals:

Katie Chicot is the joint author of an article coming out in the American Mathematical Society Notices in October about MathsWorldUK and other maths museums around the world.

Jack Abramsky has an article on *Why Britain Needs a National Mathematics Discovery Centre* in the July 2024 issue (Volume 108, Number 572) of The Mathematical Gazette, the journal of the Mathematical Association.

## Where do we go from here?

As noted in our CEO's message at the start of this newsletter, MathsWorldUK has made major steps forward in our overall goal. We have met our attendance targets and have commissioned many new exhibits in MathsCity. We have developed our business case extensively, conducted detailed market research, and worked with architects and exhibit designers in preparation of creating a sustainable, national visitor centre, **MathsWorld**. Although our funding application for MathsWorld was not selected for the last budget we developed a great deal through the application process and will be ready to apply again as soon as the conditions are favourable.

In the meantime, we are working towards opening a second MathsCity as we have progressed to the stage of making our first MathsCity financially self-sustaining. We are actively seeking a space within London. The major obstacle is the very high cost of buildings in London in areas that are accessible to residents, school parties and international and national tourists within the capital city. Clearly, this is an evolving situation and it becomes a matter of watching this space!

## We remain grateful to our sponsors and donors



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