



Welcome

We are now at a critical juncture for MathsWorldUK. We must now build on the success of MathsCity to consolidate its reputation, develop new interactive exhibits and make a decisive step forward to our goal of establishing MathsWorld, the UK's first National Mathematics Discovery Centre.

In this issue of our Newsletter, we will outline what we have been doing to consolidate the success of MathsCity and what our next steps are to progress towards a permanent home for MathsWorldUK.

Before we report on events at MathsCity, we want to add an appreciation of Geoff Wain, who is stepping down as our Chair after 10 years.

Geoff Wain



Our founder and Chair, Geoff Wain, is stepping down as our Chair due to ill health. He is being replaced as Chair by Professor Margaret Brown. So it's a sad farewell to Geoff and a warm welcome to Margaret.

In fact Geoff and Margaret have been co-chairing for the last year. Geoff has recently turned 90, but he is staying on as a Trustee and member of the Advisory Board of MWUK.

In recognition of Geoff's fantastic contribution to MWUK we are going to design a special exhibit in his honour. No one has done more for MathsWorldUK than Geoff. Anyone who would like to contribute towards this exhibit can do so by clicking on the 'Donate' tab on the [MathsWorldUK website](#), adding a note that the contribution is toward the Geoff Wain exhibit.

We have asked Geoff to write some words for this Newsletter, to reminisce about his career.

Geoff writes:

I graduated with a Mathematics degree from King's College London in 1954 and stayed at Kings to complete a PGCE in 1955.

In those days of National Service, I assumed that I would be called up into the army within days, but I decided to apply to the Royal Navy, who were recruiting graduates in mathematics and some other subjects on three-year short service commissions. I was accepted and spent an interesting first year on various courses and at sea, as the Royal Navy converted a cohort of recent graduates into naval officers. It was particularly interesting to me to learn how mathematics was used in navigation, ship stability and many other ways that I had never considered before. The rest of my time in the Royal Navy was spent teaching at the Britannia Royal Naval College, Dartmouth and at another officer-training establishment near Edinburgh. After the Navy, I taught for twelve years in Scotland and in Hertfordshire.

In 1970, I was appointed lecturer in Mathematics Education in the Department of Education in the University of Leeds. I worked there for 24 years, becoming director of teacher training for 6 years and for 2 years the Dean of the Faculty of Education. All my opposite numbers in the universities in



Geoff and Margaret speaking at the MWUK launch, House of Commons, February 2014

the UK were members of an association called the University Departments of Education Mathematics Study Group and we all met at an annual conference. A few years after my appointment I became chairman of that group with Margaret Brown as secretary, quite unaware of how our paths would cross as time went by. As chairman, I represented the group on the Joint Mathematical Council of the United Kingdom (JMC) which, among many other things, was concerned about the public image of mathematics. How could it be that, after eleven years of compulsory mathematics lessons taking up several hours per week, the subject was disliked by so many people?

Several efforts were made to address the problem, one of which was to set up a committee funded by the Nuffield Foundation to report on what might be done. I was now secretary of the JMC and chaired that committee.

I should now digress for a moment to mention the International Congress on Mathematical Education (ICME), an international event held every four years. The congress looks at the development of mathematical education across the world. Between the ICMEs, smaller regional conferences are sometimes held, and one was planned to be held in the University of Leeds in 1989 with the task of looking at the popularisation of mathematics. While this conference was in progress it was planned to set up in the University of Leeds what became known as the **Pop Maths Roadshow**. The hope was to provide an example of what might go into a permanent interactive mathematics centre and to attract funding to bring it about. Professor David Crighton of Cambridge University and I established a committee to organise the Roadshow and we were fortunate to receive secretarial and management support from the Royal Society.

The Roadshow ran in Leeds in the week 16th-23rd September 1989. After that, a sub-set of the Roadshow went on tour around twenty cities in the UK and attracted over a quarter of a million visitors. In each city a host was identified who came to Leeds during the Roadshow to be briefed on the plans. Each of the hosts added to the touring material with local activities. During the week in Leeds there were 29 exhibitors including La Villette from Paris, 35 film shows, 21 presentations to audiences of about 350 and a series of competitions for school pupils judged by an international panel from the ICME conference.

Although the Pop Maths Roadshow was very well attended at all the venues that it visited, the hoped-for interest in funding a permanent interactive mathematics centre did not come about. We had asked fund raisers to work for us, but they did not manage to raise any money at all. All the costs of the Pop Maths Roadshow were born by the host institutions and a very few private donors. Sadly, we were forced to accept that there would be no follow up to the Pop Maths Roadshow.



Geoff with the Wave Pendulum



I retired from the University of Leeds in 1994 and went to work as a professor at the new University of Malaysia in Sarawak. A few years after my return, I met up with Margaret Brown and we reflected on the fate of the Pop Maths Roadshow and discussed whether we might try again. We decided that we would and MathsWorldUK was born, becoming both a Company and a Charity in 2013.

For the next few years after that, we developed our ideas and made contact with similar developments overseas. Our main contacts were with Mathematikum in Giessen, Germany, the National Museum of Mathematics (MoMath) in New York and the Museum of Mathematics of Catalonia (MMACA) in Barcelona. These contacts proved very helpful to us: one particularly important outcome occurred. We were invited to host the second international MATRIX conference for people around the world engaged in the popularisation of mathematics. This conference was held in the University of Leeds in September 2016 and was very valuable in establishing MathsWorldUK.

During this time, we also attended many other conferences, held a launch event in the Houses of Parliament in 2014 and had displays at many events around the country, including The Big Bang in Birmingham. We attracted a small amount of funding until, out of the blue, we received from the USA an anonymous donation of £125,000 on condition that we were able to attract matching funding, which we were able to do. This made it possible for MathsWorldUK to appoint a CEO, Dr Katie Chicot, and begin a serious search for somewhere to house our first interactive centre. We continued to develop our mission and finally opened MathsCity in the Trinity Centre in Leeds in October 2021.



L-R: Steven Foster, Geoff Wain, Hilary Benn MP and Katie Chicot in MathsCity, 26 May 2023

MathsCity

The lease for MathsCity in Trinity Leeds has been extended until April 2024, although this still is to be confirmed in writing. We have been assured that no building work has been scheduled in Trinity Leeds until 2025, so we hope that our lease will be extended on a rolling basis until 2025. This gives us security for at least another year and maybe more.

As we expand and develop new exhibits, we may be forced to look for alternative larger premises, and so we have been exploring other outlets in Leeds and going even further out to Bradford. There has been discussion of whether MathCities could be developed in several cities simultaneously, but for the moment we have decided that this would not be feasible as we simply do not have sufficient financial and staffing resources to accomplish this. Other cities being considered as possible permanent sites for MathsWorld include Manchester and London.

Visitor numbers to MathsCity have been very encouraging. By the beginning of May we had had over 21,000 visitors since we opened in October 2021. Numbers have always been restricted owing to the small space of the venue and the severe restriction imposed by the Covid pandemic. There were times during the pandemic when there were no visitors, and similarly at the start of a school year. So, in the first year we slightly under achieved our target numbers, but in the second year we have exceeded expectations. Also, shop sales have increased in the second year providing MWUK with much needed income.



New enablers for MathsCity

We welcome three new enablers who have recently been to MathsCity: Thomas Wadsack, Sakina Kakar, and Dan Praag.



Thomas Wadsack



Sakina Kakar



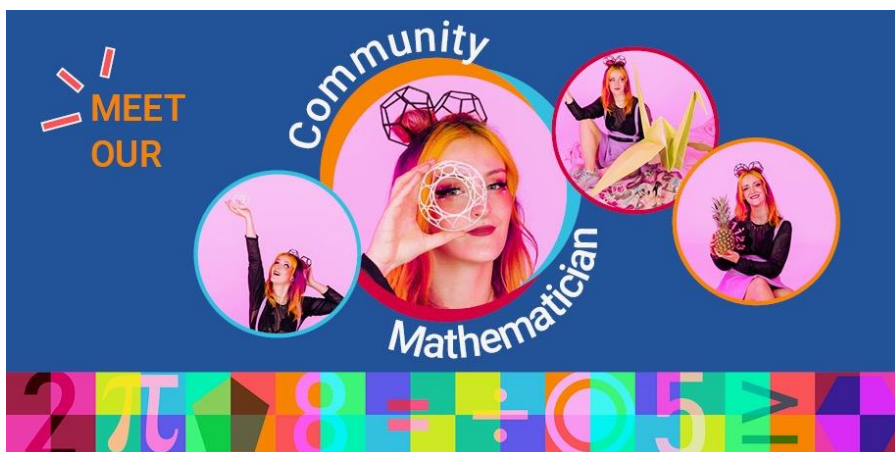
Dan Praag

Community Mathematician for MathsCity

The Maths communicator and TikToker, Aylean MacDonald, has been appointed the first Community Mathematician at MathsCity. Aylean will run a series of workshops and events at MathsCity and wants to make maths a multi-sensory experience. Her sessions will include maths art activities, craft workshops, and maths-inspired food tasting! In her own words, Aylean is a 'Mathemactivist and Craftamatician constantly trying to unleash the beauty of Maths for all to see!'

On May 12, the day celebrated as **International Women in Mathematics Day (IWMD)**, Aylean interviewed Dr Brigitte Stenhouse, a mathematician and historian, about the famous nineteenth century mathematician and astronomer Mary Somerville who was the first female member of the Royal Astronomical Society, the discoverer of the planet Neptune, and an ardent supporter of women's rights.

The date of the 12th of May was chosen to celebrate women mathematicians because the late Maryam Mirzakhani, who was the first of only two women to have won the Fields Medal for mathematics, was born on that day.



Aylean MacDonald



Pi Day

MathsCity celebrated **International Mathematics Day**, March 14, by sponsoring a Pi-Athlon. Competitors had to run 314 metres, recite the first twenty digits of Pi, and eat a pie without using their hands. The winners were the Leeds Breeze Team. Watch their winning entry on the [MathsCity Facebook page](#).

The winners won a family ticket to MathsCity but are using the prize in a competition that they are running in the summer.

School Holiday Fun

MathsCity continues to provide exciting, themed activities throughout each school holiday period, alongside the regular exhibits.

Children and their families enjoyed learning about fighting floods during February half term when we were joined by researchers from the Fluid Dynamics department of the University of Leeds.

They were able to explore turbulent waters with a flood demonstration using our brand-new wave tank and experiment with a choice of flood defences to observe the impact on water control. There were also craft activities with a bubble-popping surface tension experiment where visitors made unique paint-blown greetings cards.



Easter saw the return of our popular egg decorating stations that enabled visitors to explore the fascinating theme of patterns. We saw some marvellous marbled egg creations made from liquid pattern experiments and we also brought back the retro Spirograph, which lead to some unique egg designs with geometric patterns.



Our most recent event was our Board Game Bonanza during the May half term holiday, where we provided a selection of fun table top games to play inside MathsCity.

Testing their beam-bending logic powers with the popular Laser Maze game, visitors used mirrors and beam-splitters to direct lasers through mind-challenging mazes to light up the target.

We also took Sudoku to the next level with our 3D puzzles that included a Rubik's Cube-esque 'flip and rearrange' colour cube game and a skyscraper grid where no two buildings of the same height can be built across the board.

Along with our popular permanent exhibits like Genius Square and a giant Rush Hour game, families enjoyed playing together to boost their problem-solving skills with a selection of classic games throughout the week.

Special thanks are given to our mathematician friends Kevin Houston from the University of Leeds and Peter Rowlett from Sheffield Hallam University, who came along during half term to support our activities and help visitors with the games. Peter also set up an additional table with games that featured a clever twist on the classics like Noughts and Crosses and a collection of physical puzzles for logical thinking.





Visits by local MPs to MathsCity

Leeds MPs Hilary Benn and Fabian Hamilton visited MathsCity on Friday the 26th of May. Shadow Chancellor, Rachel Reeves, was also due to visit MathsCity, but her visit on the 9th of June has had to be rescheduled. It may now take place on the 14th of July, but this awaits confirmation.

Hilary Benn, Labour MP for Leeds Central, and Fabian Hamilton, Labour MP for Leeds North East, took an interactive tour of MathsCity. The MPs got a staggering new perspective on maths during their visit, showing huge support for this unique discovery centre and the benefits it provides to communities. Their reactions to MathsCity show the powerful role this visitor attraction can have in changing attitudes towards maths.

Hilary Benn remarked: "It forces you to look at maths in a different way and it helps people of all ages. We all get quite young when we come in here, which we need!" Fabian Hamilton exclaimed "I'm staggered!"

Dr Katie Chicot, CEO of MathsWorldUK, said: "We want to break down the barriers that exclude so many people in the UK from flourishing in maths. School teaches calculations, but what does it mean in real life?"

MathsCity has been designed to allow everyone to develop their problem-solving skills in a really fun, no-pressure environment, using logic puzzles and sensory exhibits. It's all about boosting maths confidence and discovering the joy of maths.

Leeds is an under-served city with science discovery centres. We're incredibly grateful to Trinity Leeds for giving us space inside their prime shopping centre to launch MathsCity. For the project to become self-sustainable, and to really put Leeds on the map, we are seeking government support to help fund a world-class visitor attraction, which will enable us to continue improving people's relationship with maths."

Hilary Benn's visit certainly left him with a great impression of MathsCity: "MathsCity is fantastic! I really enjoyed my visit, talking to the students from Leeds City College who were engaged in a school visit, but also having my brain challenged by fiendish puzzles! I'd urge everyone to visit."

The following selection of photos from the event, all taken by Chris Vaughan Photography, speak for themselves.



Fabian Hamilton and Hilary Benn inside the giant kaleidoscope



The two MPs test the Ring of Fire



Hilary Benn with enabler Dr Alan Slomson



Hilary Benn at the Cipher Wall



What is the fastest path down?



This was the only way out of the Da Vinci Dome!



Hilary Benn with Leeds City College students & staff



Fabian Hamilton, Hilary Benn & Katie Chicot



Letter to the Prime Minister

Following on from the visit of Hilary Benn to MathsCity, we have written to the Prime Minister pointing out how MathsCity, and eventually MathsWorld, could play an extremely important role in changing public attitudes and understanding of mathematics and thereby lead to an increase in numbers wanting to study mathematics beyond GCSE level and so improve the mathematical skills base of the UK in an internationally competitive world. We stressed how government support for MWUK would boost their own programme of wanting all students to pursue some form of mathematical study to the age of 18.

In addition to this initiative, we have invited Tracy Brabin, the Mayor of the new West Yorkshire Combined Authority to visit MathsCity in the near future, and we are proposing a cross – party parliamentary group to look at the role of a Maths Discovery Centre in promoting mathematical understanding and appreciation throughout the United Kingdom.

New Trustees



We welcome our new Trustees: Helen Clapham, Sam Lewis, Lynne McClure OBE, Mark Rushmore and Tom Ward; they also become members of our Advisory Panel. Each brings new areas of expertise into our ranks.

Helen is the Director of External Relations at The Grammar School at Leeds and she is committed to the school playing its part in making Leeds one of the best cities in the UK for children and young people.

Her school works with organisations across the city to provide enrichment opportunities, as well as spending more than £1m pa on means-tested bursaries to enable academically talented pupils to attend the school.

Sam graduated from the University of Warwick with a BSc in Maths, Operations, Research, Statistics and Economics. He joined the ASDA Graduate Scheme in 2005, where he trained as an IT project manager.

Sam has been an Operations Manager for Mosaic Church in Leeds, where he was responsible for managing Finances, HR, and Contracts. He was also one of the founding directors of The Barn Coffee Shop, Meanwood – a successful social enterprise start-up.

Sam is now the Treasurer for MWUK.



Lynne is currently Head of Mathematics Solutions at Cambridge Partnership for Education at the University of Cambridge. Previous project leadership roles include Director of Cambridge Mathematics, Director of NRICH and PI on the Government funded A-level project Underground Mathematics.

She was a member of the Advisory Committee on Mathematics Education from 2009 to 2013 and again from 2017 to 2020 and sits on the Royal Society Mathematical Futures Board and the Partnership Grants Panel.

She is active in various mathematics education communities



including as chair of governors of the Cambridge Maths School and trustee of National Numeracy, and she chairs the Education workstream for the proto-Academy for the Mathematical Sciences. She was President of the Mathematical Association in 2014/5 and Executive Chair of the International Society for Design and Development in Education. She is a fellow of the Institute of Mathematics and its Applications.



Mark is the founder and Director of two DeepTech start-ups focussed on addressing sustainability challenges in medicine and computing. Mark has a degree in modern languages from Oxford and is a Daiwa Scholar. He believes that maths is a fundamental skill that can be accessible to everyone and that, like everything, one's early experiences and encouragement paves the way to being able to enjoy and exploit it fully in later life.

Professor Tom Ward is a mathematician and retired as Pro Vice-Chancellor Education from Newcastle University, where he was responsible for the educational strategy for the University. Tom's research is in ergodic theory and its relation to number theory.



Ambassadors



We are proud to have a new Ambassador, Professor James Maynard FRS. Professor Maynard is an Oxford Professor of Number Theory and a Fellow of St. John's College, Oxford. He was awarded the 2022 Fields Medal for Mathematics. He is our second Ambassador to hold this high honour along with Sir Martin Hairer FRS, and the fourth of our supporters to do so, along with Sir Michael Atiyah FRS (now deceased) and Sir Timothy Gowers FRS.

Future Exhibits

We are beginning to develop two major exhibitions. The first will be a series of exhibits forming a complete zone **The Mathematics of Planet Earth**. This zone will include items relating to tipping points, climate change, flood control, earthquakes and avalanches, tornados, water waves, complexity of life on earth, fractal coast lines, navigation and more.

We are assembling a team of experts from the universities of Bath, York, Leeds and East Anglia and elsewhere to advise our exhibits leader, James Grime, on the best ways forward. This will be a very comprehensive set of exhibits which will cost much to develop from first conceptions to finished products. Therefore, we shall be seeking sponsors to support this development. We would welcome any offers of philanthropy from interested individuals, Business Groups or Foundations.

The second major Exhibition we hope will be in partnership with the Design Museum in London two or three years down the line. Discussions are underway with Sebastian Conran, who is a Trustee of the Design Museum, and Andrew Nahum who has curated several exhibitions recently at the Design Museum, and formerly at the Science Museum in London. MWUK has also invited our own James Grime and Steve Pizzey of Science Projects to join in the discussions.

The current proposal is to have an Exhibition called **Building Bridges** relating mathematics to design in engineering. Sebastian Conran is the son of Shirley and Terence Conran, the original



founder of the Design Museum. We are extremely grateful to Shirley Conran, who through her foundation has donated £100,000 for a working partnership between MWUK and the Design Museum. This exhibition will be the result of this partnership. We would welcome anyone who has thoughts about possible exhibits for this exhibition to get in touch with us via the following email link: admin@mathsworlduk.com.

Other Partnerships

We have received two grants each of £10,000 from CIVA and the Foundation for Integrated Transport towards a Transport Exhibit. The rest of the cost of this exhibit will be borne by the Dresden Transport Museum, which will host the exhibit for the first 18 months before passing it on to MWUK.

MWUK is exploring a partnership with the Open University. This will give us a free online Open Learn, which gets 18 million views per year.

Future Funding

As usual, we end with an appeal for funds – funds both large and small, from individuals, Foundations or other organisations.

With special thanks to our donors and sponsors, including:

**Association for Information
Technology Trust**

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