

Maths Manifesto

A manifesto for mathematics

Unlocking the power of mathematics to benefit society

Mathematics plays a pivotal role in advancing knowledge, fostering innovation, and addressing the challenges of our rapidly evolving world.

The mathematical sciences community is committed to the development, integration, and promotion of mathematics, statistics, and data science across the economy, technology, and wider society.

This manifesto outlines our collective vision and priorities for the sustained growth and impact of mathematical sciences in the UK.

‘This is the era of mathematics and its influence will become still more intense. It is a discipline in which the UK can shine and lead. Now is the time to invest in its future in the UK.’

Nicholas Stern, Lord Stern of Brentford, Kt CH FRS FBA

The Council for the Mathematical Sciences (CMS) is made up of the five UK Learned Societies in the mathematical sciences: the Edinburgh Mathematical Society, the Institute of Mathematics and its Applications, the London Mathematical Society, the Operational Research Society, and the Royal Statistical Society.
<https://www.cms.ac.uk/>

The Academy for the Mathematical Sciences is a charitable organisation. Its ambition is that the mathematical sciences deliver on their full potential to improve lives, help people, strengthen society, enhance economic productivity, and benefit and enrich our world. It was set up by the CMS to act as the coordinating focal point for the UK mathematical sciences community.
<https://www.acadmathsci.org.uk/>

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A note on devolution

This document was produced ahead of the forthcoming UK General Election. Some policy areas raised here are the responsibility of the Westminster government across the whole of the UK. Some other areas, particularly in education, are devolved. Where we make recommendations on devolved issues, this manifesto therefore refers specifically to England only. We intend to make similar policy proposals ahead of future elections for the Scottish Parliament, Senedd Cymru, and the Northern Ireland Assembly.

Vision

Mathematical sciences in the UK are world-leading across a very wide front. We must leverage this strategic advantage through:

1 Excellence in research and innovation

Building on and enhancing UK global leadership in mathematical research and innovation – supporting cutting-edge research that drives technological advancements, informs policy decisions, and addresses complex societal and economic challenges.

2 Maths education and outreach

Improving mathematical literacy across all levels of education, from early years through to schools, colleges, and universities, emphasising the relevance and benefit of mathematical skills to the individual and to society.

3 Collaboration and interdisciplinary integration

Facilitating the transfer of mathematical knowledge to other scientific, technological, and industrial domains – because the most important contemporary challenges are interdisciplinary.

4 An inclusive and diverse community

Encouraging and fostering a diverse mathematical sciences community, so that through contributions from people of all backgrounds, the mathematical sciences can achieve their full potential, and everyone – regardless of gender, ethnicity, region, or social background – has access to the rewarding careers that STEM skills allow.

5 Unlocking technological advances

Supporting the research behind key technologies of the future such as artificial intelligence, data science, and quantum computing – and providing effective ways for UK industry and society to benefit from this research.

6 A new National Academy

Leveraging the opportunities unlocked by the government announcement of support for a new National Academy focussed on the mathematical sciences.

Priorities and actions

1

Improving mathematical literacy.

2

Increasing investment in research and commercialisation.

3

Bringing further insight to public policy and industry.

4

Improving attitudes towards mathematics in society.

‘The mathematical sciences are a British success story [...] A healthy supply of mathematicians is fundamental to an economy and society that function efficiently to the benefit of all. And they will provide the great technological innovations of the future whether that be driverless cars, new vaccine technology, or quantum computers.’

Susan Garden, Baroness Garden of Frognal, PC

1 Improving mathematical literacy.

A shortage of skills for jobs that require mathematics excludes many people from rewarding STEM-based careers, and risks the UK falling behind as data literacy, AI, and quantitative skills become increasingly important in the global economy. We must increase mathematical engagement and skills among young people, and support adults to upskill or retrain across their working lives.

Our goal That by the end of the Parliament, every school has the funding needed to offer Core Maths Qualifications; every school and college leaver has achieved a mathematics qualification; there are opportunities and enhanced qualifications for more young people to study mathematics to Level 3 every year; and programmes that teach basic adult numeracy have doubled in reach.

We are calling for

- **A year on year increase in the number of qualified maths teachers in schools:** through expanding scholarship schemes for recruitment; enhancing mathematics early career education; a guarantee of 35 hours of subject-related CPD annually for STEM teachers (as called for by the Royal Society's Manifesto for Science); supporting varied pathways for teacher entry including the new apprenticeships in teaching; and improving retention schemes and relocation support for current maths teachers.
- **The creation and promotion of additional qualifications for young people in mathematics:** through approving at least one new apprenticeship scheme for data science and AI careers; increasing support for Core Maths so that the number of students taking it increases to 10 times the 2023 level; and an improved maths curriculum from early years to 18 focusing on mathematical and statistical literacy, critical thinking, and investigative skills. (Here we support the recommendations from the Royal Society's Mathematical Futures review of maths and data education.)
- **Enhanced support for lifelong learning:** through doubling the number of adults taking apprenticeships in the mathematical sciences from its 2023 level; ongoing funding and expansion of adult numeracy programmes; embedding functional maths training into all government-funded retraining schemes; and greater support for adult progression through to higher level skills.

2 Increasing investment in research and commercialisation.

Research in mathematical sciences from universities, and its commercialisation through new companies and industrial collaborations, drives innovation and economic growth. But the current level of investment leaves huge potential benefits unrealised.

Our goal That by the end of the Parliament, funding for mathematical R+D through UKRI has tripled; that private sector research funding has substantially increased; that the ecosystem for Knowledge Exchange between mathematicians in universities and industry has been strengthened; and that support for spin-outs underpinned by advanced mathematics has increased, with a goal of 5 new UK-based 'unicorns' by the end of the Parliament.

We are calling for

- **A substantial year on year increase in UKRI funding for research,** including research in the mathematical sciences; support for greater 'crowding in' of private sector research funding; embedding mathematical sciences within interdisciplinary research calls; and a doubling of Masters-level places and funded PhD studentships across the mathematical sciences by the end of the Parliament.
- **New and expanded anchor institutions that underpin research and knowledge exchange:** increasing funding to the Alan Turing Institute, the Heilbronn Institute for Mathematical Research, the Isaac Newton Institute, and the International Centre for the Mathematical Sciences; and exploring the creation of a new national laboratory to ensure strong knowledge exchange across the country.
- **Support for spin-outs and scale-ups of mathematics based enterprises:** through implementing the conclusions of the independent review of university spin-out companies, and helping early-stage STEM spin-outs to access independent capital.

'Productivity [...] is significantly higher in mathematical science occupations compared to the UK average' (approximately £109,000 vs £53,000 per year)

Deloitte, 2013, converted to 2023 prices

3 Bringing further insight to public policy and industry.

Mathematical research and insights should be better integrated into public policy and commercial R+D. This will support better decision-making in government and enhance economic growth.

Our goal That by the end of the Parliament, there is far closer collaboration between mathematical scientists, government, and companies. This includes strengthening incentives for early-career researchers to bring cutting-edge methods directly into both industry and policymaking.

We are calling for

- **Support for formal advice in public policy:** including an expansion of exchange schemes between government and academia so that, by the end of the Parliament, there are at least 40 mathematical scientists seconded into government; greater support for all those serving in government to maintain professional links and CPD; and, through the new National Academy, providing a focal point for expertise and support for policy development across the full breadth of mathematics, statistics, modelling, and data science.
- **Facilitation of greater academic collaboration with policymakers:** including a cross-Government and cross-industry review to sweep away unnecessary red tape and obstacles; a review of how to recognise and value the contribution made by applied research to public policy (e.g., through the Research Excellence Framework); and a particular focus on incentivising policy-relevant contributions from early-career researchers.
- **Expanding the UK Knowledge Exchange Hub for Mathematical Sciences:** to provide mathematical, statistical, and modelling expertise to companies and third sector organisations across the UK.

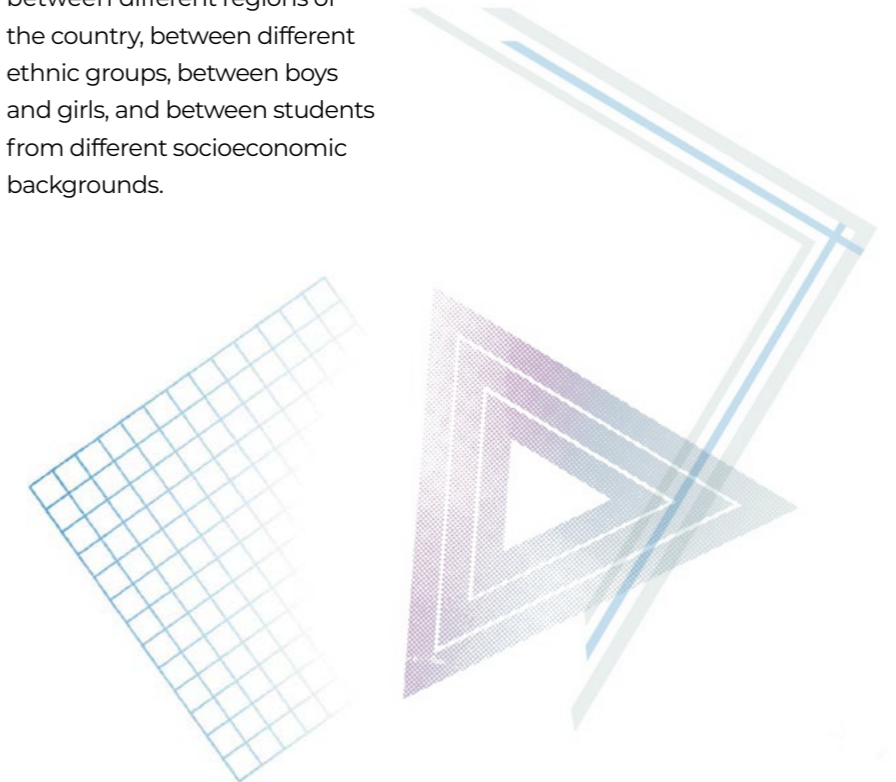
4 Improving attitudes towards mathematics in society.

Too many people leave school with a negative attitude towards mathematics. Moving the national debate from fear to understanding would unlock significant social and economic opportunities for the UK.

Our goal That by the end of the Parliament, the proportion of all adults saying they are positively inclined towards mathematics will be significantly increased, and that gaps in mathematics participation in schools and colleges are significantly reduced.

We are calling for

- **Campaigns and engagement across government, industry, and wider society on the importance of mathematics** including using the 2024 Axiom Mathematics Annual Report as a benchmark to measure mathematics sentiment among adults.
- **Targeted actions across the whole “people pipeline” to address gaps in the uptake of mathematics qualifications:** including setting targets to reduce achievement gaps between different regions of the country, between different ethnic groups, between boys and girls, and between students from different socioeconomic backgrounds.



Conclusion

This manifesto serves as a collective commitment to advancing the mathematical sciences across the UK.

By embracing the principles outlined, we aim to foster a dynamic and inclusive ecosystem that propels the mathematical sciences to new heights of excellence, impact, and relevance. Together, we will shape a future where mathematics is a powerful force behind progress, policy, and innovation in our society.

We call upon political parties, and all those who have an interest, to play their part in creating this future.

‘The courage of those seeking to improve their everyday maths must be met by the collaboration of businesses, policy makers and education leaders. Doing so will help achieve greater social mobility and lay the foundations for a more prosperous and fairer economy.’

Bina Mehta (Chair of KPMG UK)



