

JBA Trust Limited

Annual Report 2023-24

Charity Number: 1150278

Company Number: 07840801

Highlights of JBA Trust's charitable activities in 2023-24



Director's Report

Over the past year, we have continued to expand our knowledge-sharing and engagement work with a Community of Practice around physical models and engagement resources. We have extended our reach through new and established partnerships, supporting a growing network of educators, researchers, and practitioners who use our resources to enhance understanding of climate risks, the water cycle, and resilience. Demand for our demonstration models continues to outstrip capacity, reinforcing the need for collaboration and shared learning.

The research and education sectors face funding challenges. Our university partners work hard to attract talent into doctoral research programmes. Pressures are also evident in taught postgraduate training and professional development, underlining the importance of our ongoing support. We remain committed to enabling high-quality research and specialist training by providing technical expertise, funding, and opportunities for early-career researchers and practitioners to develop their skills in applied science and risk management.

Generative Artificial Intelligence (AI) has taken off in the last year and is becoming a pervasive influence across society. We have already supported work on data-driven, machine learning models, particularly with a view to the interpretation and transparency of those models. Building on insights from our 10th anniversary review in 2022, we have engaged in research into the “explainability” of AI decision-making. We have used large language models (LLMs) for coding, data analysis, and natural language processing to improve accessibility of complex datasets about historical flood events.

With AI technology and usage evolving rapidly, we have also contributed to research into the fundamental behaviour of LLMs. This work will continue as we explore how emerging AI tools can be responsibly and effectively integrated into scientific and technical applications.

We are grateful for the continued support of our partners, including funding from the JBA Group of companies, enabling us to focus on sharing knowledge to help build resilience in the face of climate-related risks.

Rob Lamb, Managing Director

Contents

Director’s Report	3
Our purpose and activities	5
Science and research	6
Collaborative research.....	6
Doctoral research projects.....	8
Research publications.....	9
Support for postgraduate students	10
The British Hydrological Society and JBA Trust Studentship Awards	10
Flood and Coastal Risk Management Scholarships.....	11
Learning and engagement activities.....	12
STEM Equity Compass.....	12
STEM partnerships	13
Wider engagement in resilience, flood risk and water safety	14
Enabling knowledge exchange	15
Learning resources.....	15
Physical models.....	15
Sharing experience.....	16
Structure, governance & management	17
Financial review.....	19



Our purpose and activities

JBA Trust is a charity established and funded by the JBA Group of companies. We aim to help improve people's resilience to environmental risks by sharing knowledge. We do this by enabling research, education and engagement.

We work with academic researchers, NGOs, charities and the JBA Group of companies in four key areas:

- Facilitating collaboration between academia and industry to deliver high quality scientific research.
- Publishing and disseminating knowledge, enabling shared understanding and good practice.
- Supporting post-graduate training by providing technical expertise and financial bursaries for MSc and PhD studentships.
- Engaging with schools, charities and voluntary groups to share inspiration and learning resources.

This annual report reviews the activities of the JBA Trust over the past year and how our work has delivered public benefit.



Science and research

We facilitate collaboration between academia and industry to deliver high quality scientific research. By publishing and communicating research outputs, we enable knowledge exchange and share best practice.

Collaborative research

In 2023-24 we worked with universities, research institutions, public sector and charitable organisations. The highlights and outputs of our collaborative research projects are summarised below.

Support for Centres for Doctoral Training (CDTs)

The UK government has committed significant new investment for the provision of high quality, cohort-based doctoral education through Centres for Doctoral Training (CDTs).

We worked closely with university partners to support the co-development of centres that focus on the themes of flood and climate resilience, uncertainty and risk, and the underpinning data science that supports evidence-led decision making. As well as helping to identify knowledge gaps and needs within these themes, we aim to support the successful CDTs through PhD sponsorship and placement provision.

Of the seven that we formally supported, the following centres were funded and we look forward to working with these partners over the coming years:

- Fluid Dynamics (University of Leeds)
- STOR-i: Statistics and Operational Research (Lancaster University)
- FLOOD-CDT (University consortium of Southampton, Loughborough and Bristol)
- UNRISK: Understanding Uncertainty to Reduce Climate Risks (University consortium of Leeds, UCL and Exeter)

Mathematics Knowledge Exchange Catalyst for Humanity

We were delighted to start working with Dr Phil Trinh at the International Centre for Mathematical Sciences (ICMS) University of Bath through a maths KE Catalyst project. Our project ‘Upstream insights to downstream benefits’, will explore the impact of mathematical analysis on flood risk management and industry modelling practice.

The collaboration will explore how mathematical analysts can work with hydrologists and risk modellers to improve our understanding of the differences between models so they can be used more effectively.

Read more here: [KE Catalysts for Humanity](#)

UK Flood Hydrology Roadmap

The flood hydrology roadmap is a 25-year vision and plan to advance all aspects of flood hydrology in the United Kingdom. It was developed with inputs from more than 270 individuals from 50 organisations working in hydrology, flood management and related topics. We have supported the roadmap project since it started in 2018 through membership of its steering group and by contributing to publications and presentations.

We have continued supporting the roadmap through contributions to the Science and Technical Advisory Group, and by providing specific advice for projects developing within the Environment Agency’s Flood Hydrology Improvements Programme.

Read more here: [UK Flood Hydrology Roadmap](#)

British Chronology of Flash Floods: Interactive map and dataset

The chronology lists flash flood events in Britain derived by retired hydrologist David Archer from historical reports dating back over more than 200 years to support improved assessments of flash flood risk.

We have created an interactive online map that displays a point for each significant place name in the chronology to make it easier to search for flash floods by location, for example catchment or town. The new maps were shared with the hydrological community at the British Hydrological Society’s Symposium in September 2024.

Read more here: [British Chronology of Flash Floods](#)



Doctoral research projects

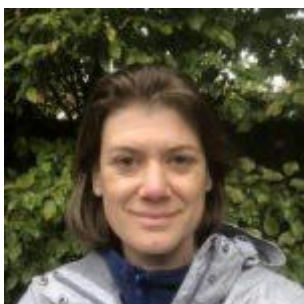
Our collaboration with universities across the UK enables us to support graduate researchers (research students) working on doctoral projects to develop advanced skills and deliver high quality research that helps enhance the understanding of a wide range of risks in the environment. We support doctoral researchers through a variety of programmes including doctoral training centres funded by UK Research and Innovation (UKRI). Information about all our PhD projects can be found here: [Early career researchers : JBA Trust](#)

This year, we supported 11 PhD students and were delighted to see two of our graduate researchers successfully complete their PhDs:



Andrew Johnson, studying at the University of Leeds, developed a comprehensive model and methodology to enable decision-makers to assess the vulnerability of freshwater communities to extreme hydraulic events.

His research will inform guidance on the best approaches to enhance resistance and resilience.



Helen Hooker, studying at Reading University, improved the capability of real-time 2D flood forecasts using data assimilation from earth observation data.

She developed a new method for validating flood maps using a scale-selective approach to enable a quantitative, location specific measure of flood map accuracy.

PhD project outputs

We are pleased to be able to share this year's peer-reviewed publications from the projects

Freya Muir, studying at Glasgow University, published a paper in the *Earth Surface Processes and Landforms* journal on '*VedgeSat: An automated, open-source toolkit for coastal change monitoring using satellite-derived vegetation edges*'. The aim of Freya's research is to develop an operational framework for predicting coastal change, using machine learning techniques that are trained with satellite observations.

Read the paper here: <https://doi.org/10.1002/esp.5835>.

Helen Hooker, studying at Reading University, has a journal paper in open review with *Hydrology and Earth System Sciences (HESS)* on '*Assimilation of satellite flood likelihood data improves inundation mapping from a simulation library system*'.

Read the paper here: <https://doi.org/10.5194/hess-2024-178>



Research publications

During the year, we supported and co-authored four studies published as papers in peer-reviewed scientific journals.

Title and link	Journal	Authors
Assimilation of satellite flood likelihood data improves inundation mapping from a simulation library system	Hydrology and Earth System Sciences Discussions	Hooker, H. and Dance, S. and Mason, D. and Bevington, J. and Shelton, K.
Gauged and historical abrupt wave front floods ('walls of water') in Pennine rivers, northern England	Journal of Flood Risk Management	Archer, D, Watkiss, S, Warren, S, Lamb, R & Fowler, HJ
How to cope with uncertainty monsters in flood risk management?	Cambridge Prisms: Water	Knotters, M, Bokhove, O, Lamb, R & Poortvliet, PM
VedgeSat: An automated, open-source toolkit for coastal change monitoring using satellite-derived vegetation edges	Earth Surface Processes and Landforms	Muir, F.M.E., Hurst, M.D., Richardson-Foulger, L., Rennie, A.F. & Naylor, L.A.



Support for postgraduate students

There are many academic subjects that generate the knowledge and understanding needed to manage risks in our environment. Whilst undergraduate courses such as Geography and Environmental or Physical Sciences are important, the relevant specialist training often comes into greater focus at postgraduate (PGCert, Masters or doctoral) level. We therefore emphasise support for students and projects at this level.

The British Hydrological Society and JBA Trust Studentship Awards

In 2023-24 we continued our partnership established in 2011 with the British Hydrological Society (BHS) to support students working towards MSc (or equivalent level) qualifications in hydrology, water resources, catchment management and other related subjects.

We awarded six bursaries of £2,250 and have now made awards to 113 students at 25 different UK universities since 2011.

Recipients of the bursaries last year told us about what difference the awards had made:

“The Studentship Award enabled me to go to my first choice university which was more expensive than other programmes”

“Having the opportunity to really focus my undergrad degree from general geography to river specific topics was really rewarding”

We continue to collect information on equality, diversity and inclusion (EDI) as part of the application process. The aim is to build an understanding of the diversity of recipients, alongside the partners’ ambitions to make the awards inclusive.

Flood and Coastal Risk Management Scholarships

The challenges of more frequent extreme weather and new flood risk responsibilities mean that there is a growing need for skilled water and environmental risk management professionals.

This year we continued our support by funding scholarships for Lancaster University’s Flood and Coastal Risk Management Postgraduate Certificate course. We offer financial support towards the course fees where the training will help individual recipients bring benefits to communities through third sector or public sector organisations.

The number of strong applications was significantly higher than previous years and all were from local authorities with flood risk and climate adaptation responsibilities. We made three awards, with a total value of £18,000. Congratulations to our scholarship recipients!



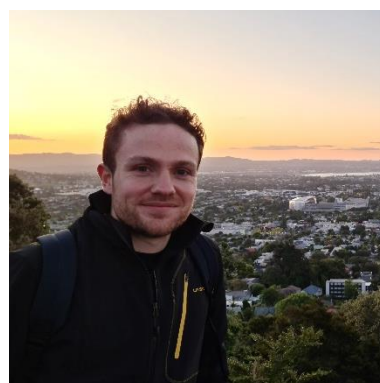
Kathryn Lawrence
FCERM Graduate Engineer, BCP Council

“ This course will be invaluable for increasing my technical knowledge, helping me to progress my career and in turn improve the flood resilience of our community by applying what I have learned to managing local flood risks. ”



Owen Grove
Flood & Water Management Officer, Milton Keynes City Council

“ Having grown up in Milton Keynes, I look forward applying the technical and practical knowledge provided by the course to the work that I do, with the ambition to implement best practices across the varied work we do as a team to serve the people of Milton Keynes as best as we can. ”



Robert Prescott
Engineer in Development Flood Risk, Wakefield Council

“ Deepening my understanding of flood prevention strategies will enhance my ability to manage and mitigate flood risks in my role at the lead local flood authority. By learning advanced techniques and gaining insight into sustainable approaches, I’ll be able to develop more effective flood resilience plans and better protect our communities. ”



Learning and engagement activities

We support a wide range of activities aimed at encouraging students at schools and universities to develop or enhance their interests in water and environmental management, which could also ultimately lead them to pursue careers in the field. Our learning and engagement activities also extend to the wider community, and to flood risk management professionals.

STEM Equity Compass

We are implementing the STEM Equity Compass in our outreach and engagement activity. Diversifying participation in science, technology, engineering and maths (STEM) is a key challenge within the water and environmental management sector.

Developed by UCL, the Equity Compass is a framework that helps to support socially just practice and improve the inclusivity and equity of informal STEM learning.

The tool is underpinned by social science research and is designed to enable practitioners to make decisions, plan, monitor and evaluate progress.

We are using it to reflect on our current practice and resources, and to identify where and how we can improve so we can make positive changes to our STEM activities.

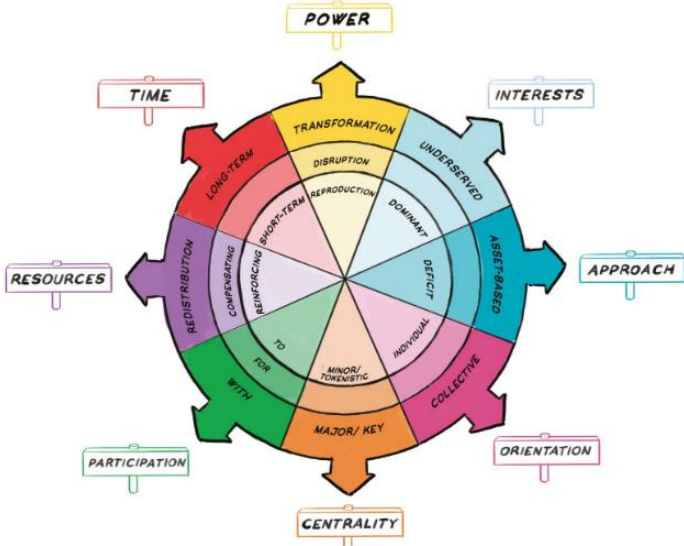


Image: YESTEM Project UK Team (2020) The Equity Compass: A Tool for supporting socially just practice. www.yestem.org

STEM partnerships

We worked with many different organisations this year to co-develop learning resources and deliver activities to support STEM engagement in schools and other educational settings.

Morecambe Bay Curriculum

The Morecambe Bay Curriculum (MBC) project is a community-curated, place-based approach to learning about sustainability. MBC helped us work with Myerscough College, a specialist provider of land-based and sports education. We co-developed resources to embed place-based learning on climate change and flood risk into specialist curriculum areas. Outputs of the project include teaching resources, lesson plans and guidance.

Envision OUT

In partnership with Lancaster University, we worked with 90 Year 9 students who took part in our new wave tank challenge game over 2 days, creating new designs for coastal flood resilience and exploring the impact of climate change on coastal communities. It formed part of the Envision OUT initiative, through Lancaster University's 'Nurturing Talent' days, which aim to widen participation in environmental sciences amongst underrepresented young people, engage students with the natural environment and facilitate links with higher education

TeenTech

We attended the Cardiff and Preston TeenTech Festivals along with over 1000 students between ages 10-14 and their teachers. TeenTech Festivals enable students and teachers to come together and help young people understand the range of opportunities across digital, science, technology and engineering. We delivered multiple hands-on sessions with our wave tank.

CityZen

Led by the ICE's Engagement and Inspiration team, the CityZen competition aims to engage school students with civil engineering and help them develop important skills for work and study, such as problem-solving, teamwork, critical thinking and communication. Student teams develop the infrastructure for a town within the context of climate change, flood risk and sustainability. Over 190 schools took part and we supported the judging and awards process.

UK Junior Water Prize

We supported the UK Junior Water Prize 2024, a STEM competition hosted by CIWEM where students develop a research project into an innovative yet practical solution to the water crisis. The UK winners were announced at the Flood & Coast conference in June 2024 and went on to win the international competition in Stockholm.

Industrial Cadets

We worked with 29 students from schools across Leeds, Bradford, Halifax, Huddersfield, York and Sheffield as part of the Industrial Cadets scheme organised by the Engineering Development Trust (EDT) and Yorkshire Water. The students took part in our hydraulic river flume session at Salts Mill to learn more about water safety and how engineered structures affect the flow and ecology of rivers.

Climate Ambassadors

We supported the Climate Ambassadors ‘Climate and Nature Action in Education’ event at the Great North Museum in Newcastle. The event was part of the Climate Ambassadors initiative that offers every education setting in England free access to volunteer support to develop and deliver impactful climate action plans. We showed educators how models like our wave tank can be used to explore the impacts of climate change and how we can adapt and make our communities more resilient to flood risk, sea-level rise and extreme weather events.

Wider engagement in resilience, flood risk and water safety

This year, we chose to develop partnerships with organisations that have strong relationships with local communities or have a well-established outreach and engagement track record. This approach helped us utilise our resources more effectively and enabled us to reach more diverse communities.

The Water Safety Centre of Excellence officially opened at the **London Fire Brigade’s** (LFB) Twickenham Station in July with our ‘big river’ flume forming the core learning resource.



The new centre aims to educate and encourage safe engagement with the River Thames and is part of the LFB’s push on water safety. LFB is working closely with schools, encouraging them to prioritise water safety education, and is also expanding delivery of water safety sessions to further year groups in partnership with Richmond Council, the RNLI and the Met Police.

We also supported the **London Science Museum** exhibition this summer in partnership with volunteers from the Environment Agency. Our wave tank supported engagement on the theme of ‘skills’ in relation to flood risk management, climate change resilience and environmental protection.



Enabling knowledge exchange

Our website (www.jbatrust.org) enables people to easily access all our publications and educational resources, as well as find information about JBA Trust and our research projects. It continues to help us deliver our charitable objectives of sharing best practice and supporting engagement and education.

JBA Trust's [YouTube channel](#) hosts all our video resources and we now have over 56,000 subscribers. Across all social media platforms, our videos have received over 35 million views.

We also use [LinkedIn](#) and [Twitter](#) to publicise research outputs, new resources, publications or scholarships and awards.

Learning resources

Our digital learning resources have elements of engineering, maths and geography included in each topic in the context of flood risk, water management, weather and climate. They include videos, worksheet activities, case studies and exercises.

This year we developed a new package of resources that supports an interactive roleplay game on coastal resilience that explores ways to work with communities to reduce coastal flooding and erosion risks, as well as developing skills such as team working, communication and problem solving. The new Coastal Resilience Challenge game is freely available on our website alongside all our learning resources: [Digital learning resources : JBA Trust](#).

Physical models

Our physical models of catchments, rivers and coasts enable us to bring to life topics including flood risk, coastal and river engineering and nature-based solutions. The collection includes four different sized hydraulic river flumes, four wave tanks, an augmented reality sandbox and a Projection Augmented Relief Model (PARM). Read more here: [Physical models : JBA Trust](#)

Sharing experience

In 2023-24 we responded to over 100 direct enquiries about our interactive maps, data, publications and tools as well as research support, bursaries and scholarships, physical models and support for STEM activities.

Of these enquiries, there were 30 requests from around the world for support and assistance from people who, having seen our physical model and weather station resources, would like to build their own or set up their own educational project.

By sharing factsheets and detailed specifications for our models, we aim to enable people to create their own educational resources to support their communities and raise awareness of flood risk management. In some cases, we have established an on-going dialogue with people who have approached us to help them with their own projects. We have helped high school and college students, university researchers, teachers and private individuals.

We're pleased to report that we have supported the creation of new wave tanks at the Seymour Marine Discovery Centre in Santa Cruz USA and a school in New Zealand.

We continue to share our designs for the water safety flume and learning resources with fire and rescue teams and have so far supported services in Leicestershire, London, West Yorkshire, South Yorkshire, Cheshire, North Cumbria, Surrey, Tees, Lancashire, Greater Manchester, Bury, Oregon and Richmond, USA.

Interactive models: Community of Practice

We have published an online map to support a 'Community of Practice' for people who use physical models of water to support education and engagement. The maps show where and how interactive models are being used across the globe and are designed to help educators share ideas, knowledge and inspiration to support outreach activities.



Structure, governance & management

JBA Trust is a company limited by guarantee and is governed by its Memorandum and Articles of Association. It was incorporated on 9 November 2011.

Directors and trustees

We were delighted to welcome two new trustees, Joanne Coles and Peter Jimack, to our board in September 2023. The Trustees serving during the year were as follows:

Trustees	Rob Lamb, JBA (Managing Director of JBA Trust)
	Jeremy Benn, JBA
	Jim Hall, Oxford University
	Keith Beven, Lancaster University (emeritus)
	Nick Russell, Independent financial consultant
	Joanne Coles, Environment Agency
	Peter Jimack, University of Leeds
Secretary	Craig Robson, JBA

Governance

The trustees review the activities of JBA Trust every six months to ensure that they are focused on supporting the purpose of the charity. The review also considers the strategic direction of the charity and considers how planned activities will contribute to public benefit.

We have referred to the guidance contained in the Charity Commission's general guidance on public benefit when reviewing our aims and objectives and in planning our future activities.

Appointment of trustees

On incorporation of the JBA Trust, the Board of Trustees was appointed by invitation.

To preserve independence of the JBA Trust from JBA Group companies, which provide part of its core funding, the JBA Trust's Articles of Association stipulate that the number of trustees connected to or employed by JBA Group shall always be less than half of the total number of trustees appointed at any given time.

The trustees are not remunerated (other than payment to cover travel and accommodation costs where required for JBA Trust business).

Trustee induction and training

Periodically, the trustees meet and are briefed on their legal obligations under charity and company law, updates to the Charity Commission's guidance on public benefit, the content of the Memorandum and Articles of Association and the JBA Trust business plan.

Organisation

The Board of Trustees meets every six months and is responsible for the strategic direction and policy of the charity. A Managing Director is appointed by the trustees to manage the day-to-day operations of the charity and is supported by a Programme Manager.

Risk management

The trustees have a risk management strategy which comprises:

- An annual review of the risks the charity may face
- Policies and procedures in place to mitigate those risks
- Plans in place to minimise the impact of the risks should they materialise.
- The principal risk to JBA Trust is financial sustainability. This is mitigated by having a robust reserves policy and a clear financial plan which is reviewed and subsequently approved by the trustees at the start of the financial year.
- JBA Trust adopts policies and procedures from our host, the JBA Group, which are externally validated where applicable. These include policies on: Health and Safety; Energy Use; Environment; Sustainability; Social Responsibility; Equality and Diversity.

Association of Charitable Foundations

As a member of the Association of Charitable Foundations (ACF), we support their vision of diverse, vibrant and effective foundations, working together for social good. We utilise the ACF's Stronger Foundations Initiative resources, in particular the '10 pillars of stronger practice for smaller foundations', to inform our strategy and help enhance our effectiveness.

Financial review

The principal funding source for JBA Trust is JBA Group dividends. JBA Trust also aims to leverage funding for research projects by supporting partners in applying for funding from external organisations, for example UK Research and Innovation (UKRI) grants awarded to university partners for PhD studentships. We also generate a small amount of additional income from hiring out our physical models for use by commercial organisations. Personal donations are processed through an online giving platform that enables Gift Aid to be claimed efficiently.

Reserves Policy

Reserves are required to minimise the financial risks associated with the unlikely event of unplanned or unforeseen expenditure. The JBA Trust maintains sufficient reserves to cover all contractually committed expenditure or liabilities and operating costs for one year.

Plan for future periods

JBA Trust anticipates continued long-term funding from JBA Group. To ensure that the charity maximises the value of its income in carrying out its activities, the strategic plan focuses on continuing to seek match funding for research projects from funding bodies, including Universities and Research Councils. In the future JBA Trust may also wish to generate an income by licensing datasets, results or models generated by research.

The trustees declare that they have approved the Trustees Report above.

On behalf of the trustees

Rob Lamb, Managing Director of JBA Trust

12 December 2024