THE SCHOOLS' OBSERVATORY

STRATEGY

THE SCHOOLS OBSERVATORY
2023 - 2028

PROUD TO BE PART OF
LIVERPOOL JOHN MOORES UNIVERSITY

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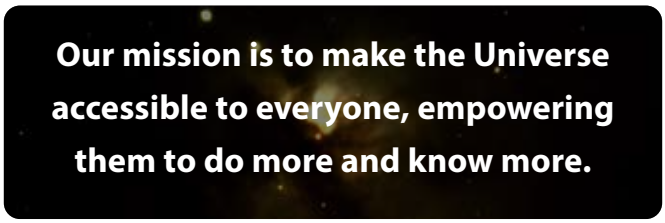
EXECUTIVE SUMMARY

Mission:

The world is facing huge challenges - from climate change to energy shortages and food supply issues. While scientists and engineers have the expertise to tackle these challenges, we're facing a shortage of individuals with the necessary skills. At The Schools' Observatory, we're committed to addressing this issue and empowering the next generation of problem-solvers.

We support and inspire teachers and their students to continue their journey in science, maths, engineering, and technology. We offer a range of resources, including inquiry-based learning and real science, that encourage exploration and curiosity. Our professional telescope and extensive website provide access to accurate information and engaging resources, helping students to develop a deeper appreciation for the Universe and their place within it.

Our mission extends beyond this. We focus on developing essential skills such as critical thinking, data analysis, and technological literacy. By doing so, we equip students with the tools they need to become informed, capable, and confident global citizens.



How will we do this?:

For more than 15 years, The Schools' Observatory has been supporting educators and inspiring students. Our dedicated team of professionals - including computer scientists, astronomers, chemists, physicists, planetary, and environmental scientists- work together to provide free access to resources that bring the wonders of the cosmos to life.

Our team has both the scientific expertise and communication skills needed to make the Universe truly accessible. We engage millions of people each year. We've delivered hundreds of thousands of images of the cosmos directly to classrooms across the UK and Ireland. We specialise in creating materials that cater to the needs of the education systems in these countries.

Our resources are designed for learners of all ages, from pre-school to the general public. We provide materials that are accessible, nurturing a love for science and astronomy for every age. Our aim is to create an inclusive environment where all learners are valued and encouraged in their STEM journey, however far that might be.

We're proud of our achievements and the positive impact we've had on countless students and educators over the years.

Services:

We provide access to the Liverpool Telescope, a professional fully robotic telescope located on the island of La Palma. Students can use this to schedule observations and collect data alongside professional astronomers from around the world. Our user-friendly software allows students to easily manipulate and analyse their data, providing a truly hands-on learning experience. In addition we offer a range of engaging resources that can be integrated across the curriculum, providing a multidisciplinary approach to learning about space. We also provide accurate and up-to-date information on space, physics, and astronomy to assist learners in their research and exploration. For teachers, we offer tailored support at all stages of their career, both online and in-person attended by hundreds of thousands of people each year.

> **"Inspirational resource. A unique opportunity for children to take images of space. It's very motivational, they can use it to see themselves as a scientist."**
>
> **- Primary Teacher, UK**

For those who want to pursue Science, Technology, Engineering, and Maths (STEM) further, we offer guidance and inspiration through our career heroes – diverse people from around the world with one thing in common – a passion for STEM.

The Market:

Our programme provides free access to resources and telescope observations for learners and educators worldwide. Our focus is on the UK and Ireland, with a range of activities specifically linked to each of the five national curricula. All resources are written by professionals, ensuring reliability, an element respected by our users. They are specifically designed for schools, with accessibility checks and guidance from practicing teachers. What sets us apart is our unique approach, guiding users through the process of carrying out observations on a professional telescope and then analysing the data that comes back.

> **"In our view, this initiative has unprecedented reach, and is one of the most significant educational initiatives in the STEM field linked to an HEI."**
>
> **- External Evaluation Sheffield Hallam University (2013)**

The Future:

The Schools' Observatory comprises a small yet dedicated team that has established ambitious goals for the next five years.

To increase the number of schools engaged with The Schools' Observatory

To reach our potential for growth in our audience, we will embark on a direct marketing campaign to target schools and teachers. We will expand our resources to link to all 5 nations' curricula more comprehensively across all ages, and grow our professional development portfolio for educators to engage with in a time and place that suits them best.

To support ethnically diverse learners

We acknowledge that The Schools' Observatory team is not ethnically diverse and, therefore, have an advocacy and allyship role to play. To achieve allyship, we aim to act as a platform for the global majority in astrophysics, physics, and wider STEM areas. We will ensure a fully accessible, decolonised, website and adhere to high diversity targets on the learners and schools we meaningfully engage with.

To focus on the Liverpool City Region

We aim to establish deeper and sustained relationships with our local community. Engaging schools, teachers, and their pupils to raise expectations and aspirations in STEM subjects and careers. We will focus on marketing in this region, recruit more local teacher representatives to our champions group, and initiate a longitudinal outreach programme.

To safeguard the future of The Schools' Observatory

At The Schools' Observatory, we recognize the significance of securing the future of our project. Despite our devoted and skilled team, there are potential risks associated with staffing changes. To ensure the longevity of the project, we have implemented measures to minimize these risks and eliminate any single points of failure. Our plan involves a combination of training, development, risk management, documentation, and publicity to safeguard us from potential risks

Our Impact:

To truly achieve our ambitions and goals, we need to demonstrate impact. For ourselves, for the sector, and for those we seek to support. At the heart of this lies our robust monitoring and evaluation framework. One that promotes an impact-driven evaluation approach, interlaced with process evaluation, to determine which interventions are most effective in bringing about the changes we seek to make.

In creating a cohesive approach to all our evaluation, aligning with national initiatives and informed by TASO (Transforming Access and Student Outcomes[1]), we aim to contribute to our sector's understanding of what works. To identify drivers of effective change, and ultimately demonstrate the impact of The Schools' Observatory.

1 taso.org.uk

ABOUT US

In the early 2000s, Liverpool John Moores University had an idea. What if we were to build the world's largest completely robotic telescope? Equipment which could respond so fast that we could see the first few minutes of a supernova explosion. Versatile enough to track a comet passing by the Earth. Innovative enough to carry out pioneering science and astronomy. And what if we also made it accessible to schools? For free.

> **"It provides an opportunity not readily available elsewhere; to take and manipulate unique images that can be subsequently used to better understand the universe."**
>
> **- External evaluation, Hope-Stone Research (2018)**

The Schools' Observatory was born, opening a new window to the Universe – inspiring students to do science and experience technology.

From the seed of an idea, we have brought astronomy into the classroom – supporting schools to take hundreds of thousands of observations of the cosmos. Engaging millions of people with space education over the last 15+ years.

> **"For a young person getting into astronomy, The Schools' Observatory was like an open door. It didn't hold us back, made us feel like we were smart enough."**
>
> **- Secondary student, UK**

We support students on their STEM journey – however far that might be. From the earliest stages we provide resources for preschool families to think about space. We offer advice for those who want to pursue a career in STEM. And along the way we inform, educate, and inspire.

Space is truly Universal. Away from our diverse experiences on this Earth, we all share the same planet. We all look out to the same galaxy and wonder the same big questions – where did it all begin? Are we alone? What will become of our planet? Space is truly wonderful. And in wondering about space, we can all learn. Science, maths, engineering, technology, programming, questioning and creativity. Skills which can set us up for life.

We are here for the journey. Providing a wealth of accurate information, quality things to do and support. Come and join us!

OUR VISION

The world is facing huge challenges. Challenges that can be addressed by scientists and engineers. But we do not have enough of them. We, The Schools' Observatory, want to change that. We support teachers and inspire students to continue their journey in science, maths, engineering, and technology.

We provide free access to the wonders of the Universe through our fully robotic telescope. For more than 15 years we have taken 200,000 images of space for tens of thousands of students. Images that allow for real science, real inquiry, and true inspiration about the world around us.

We support these observations with an extensive website. Full of accurate information and engaging resources – encouraging exploration and curiosity. And an appreciation for our place in the Universe.

We develop skills to think critically, handle data and become technologically literate. Supporting students to become empowered global citizens.

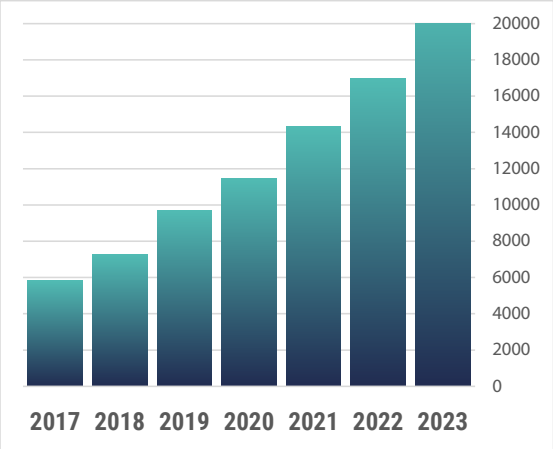
And we're just getting started.


Credit: Daniel Lopez/IAC

INDUSTRY ANALYSIS

A detailed industry analysis included an assessment of our customer and supplier power, key competitors and their behaviour, our current market share of schools across the UK and Ireland, and identified key trends in the STEM outreach landscape.

Registered Users



Demand and Supply

There is a high market demand for our services, demonstrated by a continuous year-on-year rise in active registered users. LJMU is our sole sponsor, with The Schools' Observatory fulfilling a crucial role in securing funding for the Liverpool Telescope (LT) and New Robotic Telescope (NRT). We provide high-quality impact. This was especially prominent in REF2021 and demonstrates our intrinsic worth to the university.

Our competitors

> **"Judged to be a particular strength... demonstrated outstanding impact, in terms of its reach and significance"**
>
> **- REF2021 panel feedback**

Competitor analysis places The Schools' Observatory as unique in its offering of direct access to a professional telescope for educators, pupils, and general users, including a range of supporting STEM resources - all for free. This sets us apart from other platforms that support either educators or pupils and are sometimes partially behind a paywall. While we are a national programme, we are also the only resource of our kind within the Liverpool City Region. While several competitors also offer exceptionally high-quality free resources, with our unique selling point and the size of the potential market share, we feel well placed to continue to thrive within our industry niche.

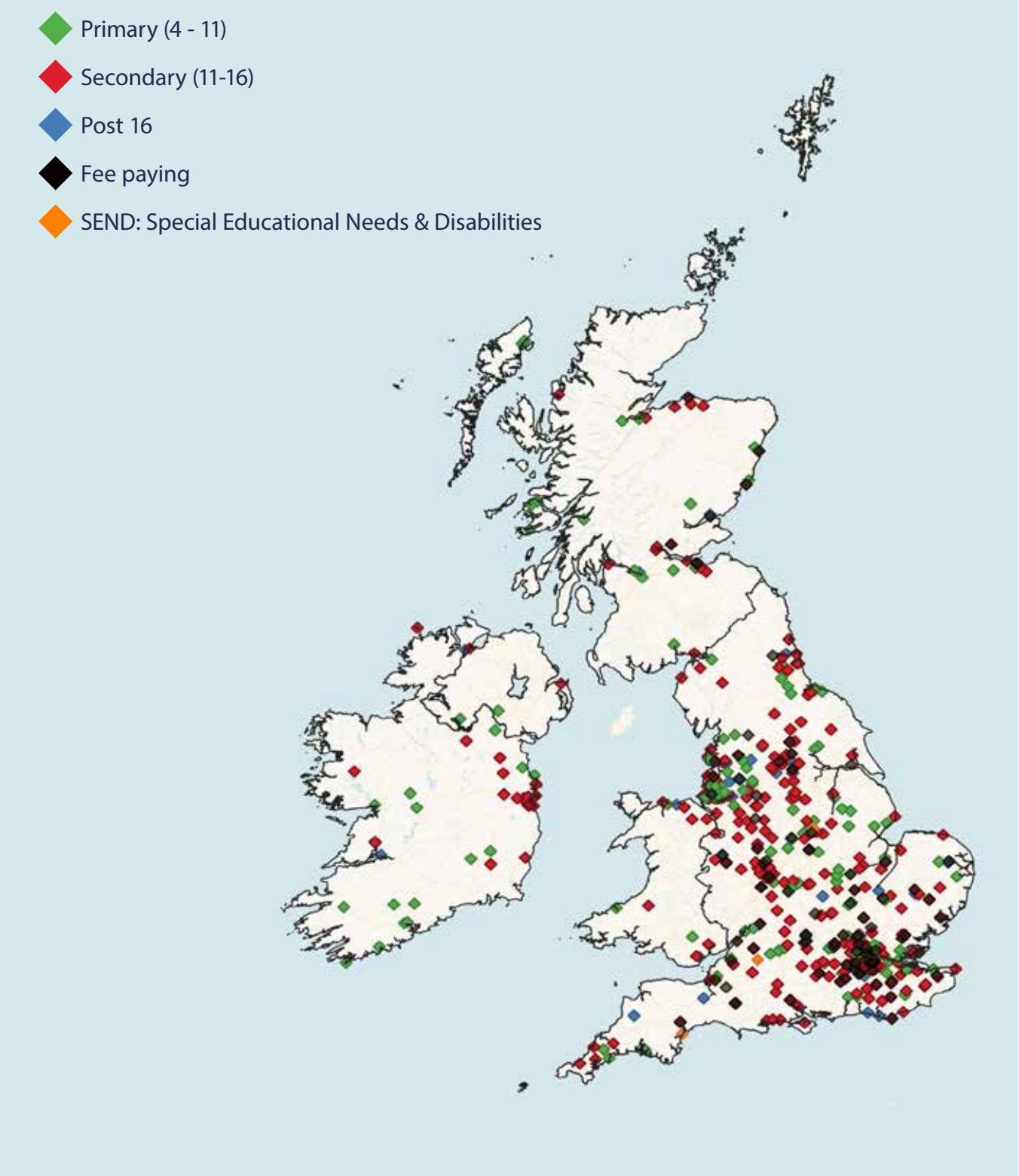
Reach and Market Share

Market share analysis shows that while the number of active registered schools is promising (n = 446), this translates to an overall market share of 1.1% - a notably low proportion. Variability is high, with a 4.4% market share of State-funded/Academy schools in England, 4.9% in Wales, and 1% in Northern Ireland. While we are proud to support all schools, a 7.8% market share for Scottish independent schools highlights the need for a re-focus on supporting pupils from lower socioeconomic areas and state schools. A big area for opportunity is the primary sector where our current market share is 0.4% (n = 104 schools).

Across the schools actively engaged with The Schools' Observatory, we have over 1000 active teacher accounts. Of these, 58% are secondary school teachers and 25% primary. While the proportion of registered secondary teachers is broadly in line with the England average, we have a clear opportunity to raise engagement of primary teachers (average 52% in England).

Another area of focus is on initial teacher training. Government targets for the recruitment of physics teachers reached 17% in 2022/23, with computing recruitment reaching 30% of their target. This represents a significant shortfall in the skills needed across the education sector. Given that the Merseyside area recruits the largest number of ITT students outside of London, The Schools' Observatory has an opportunity to not only support the latest generation of teachers, but also to embed ourselves in their teaching.

The map below shows the distribution of The Schools' Observatory registered schools across the UK and Ireland.



Adapting to changing media

Videos are an increasingly popular content format in today's digital landscape and can be easily shared on social media platforms. Additionally, closed captions can make them accessible to a wider audience. YouTube is free to use and consume making it an ideal solution for us to provide content to our users and those not currently engaging with our website.

As the second largest search engine in the world and the third most visited website, YouTube offers vast potential for increasing our reach. Google, the largest search engine, and owner of YouTube, prioritises video content in its search results, making it an attractive option for search engine optimisation purposes. With billions of monthly visitors and availability in 80 different languages, YouTube provides an international platform. Furthermore, since we can use YouTube for free to host our large video files, we can save money on hosting costs.

Demonstrating our Impact

Robust evaluation of our activity can demonstrate the impact of our work and is becoming a greater expectation from regulatory bodies such as the Office for Students[1]. Especially for outreach interventions that align to institutional Access and Participation targets[2]. It is also a growing expectation for funding bodies such as the Science and Technology Facilities Council[3] where funding awards are increasingly contingent on the inclusion of robust evaluation methodology. The Schools' Observatory are well placed to meet this expectation due to our evaluation framework; further details of this are on page 18.

1 www.officeforstudents.org.uk/advice-and-guidance/promoting-equal-opportunities/evaluation

2 www.officeforstudents.org.uk/advice-and-guidance/promoting-equal-opportunities/access-and-participation-plans

3 www.ukri.org/publications/stfc-public-engagement-evaluation-framework

MARKETING STRATEGY

During the upcoming strategic period, we will implement a comprehensive marketing plan to promote our project and increase engagement among our user groups. This will include targeted efforts to reach our intended focus audience, as well as a broader campaign to raise awareness of The Schools' Observatory.

Our SWOT analysis has identified several strengths and opportunities that we will leverage in our marketing efforts, which will evolve over time to reflect our learning and the changing marketing landscape.

Key elements of our marketing strategy for the upcoming period include improved social media integration and search engine optimisation. We will utilise our unique offerings, such as work experience and robotic telescope access, to support our marketing efforts. We will focus on strengthening our digital presence, including partnering with popular educational websites.

We will attend at least one education conference annually beginning in 2024 to establish a physical presence and connect with potential users. We will reach out to teaching unions and exam boards to encourage them to recognise The Schools' Observatory as a recommended resource.

We will develop and implement a conversion strategy that highlights case studies and user testimonials, as well as a referral programme to incentivise users to spread the word about our site.

Our marketing efforts will prioritise accessibility, including through the development of a new website with a more responsive design, updates to our "Go Observing" interface, and the launch of our AstroLab software to facilitate the analysis of observations. We will also ensure that our materials are accessible to users with varying levels of English proficiency.

We are passionate about the environment and sustainability and so will minimise the production of printed marketing materials. Those that we do create will be in consultation with our users so that we meet their needs and will reflect our brand identity. Additionally, we will invest in branded materials and products to support educators in promoting The Schools' Observatory, including display boards for schools.

Finally, we will develop and deploy a retention strategy to keep users engaged over the long term, both during individual visits to our site and throughout their educational journey.

SWOT ANALYSIS

STRENGTHS

Free access to the world's biggest fully robotic telescope.

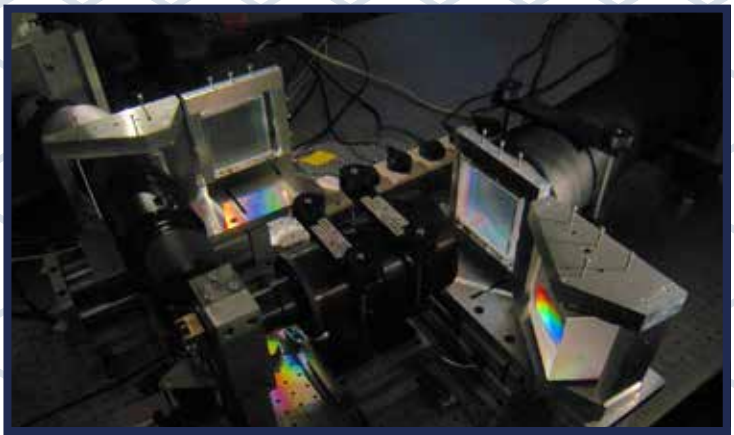
Easy-to-use, modern website packed with accessible information.

Innovative outreach: RHS Chelsea Flower Show, MPs in the Houses of Parliament, and Primary Christmas extravaganza!

Highly rated in our field with a 4* REF2021 Impact score.

Championing career heroes.

Image Credit: NASA



World-leading research environment at the Astrophysics Research Institute.

Teacher champions steering our direction and valuable as an educational resource.

Engaging millions through our website and hundreds of thousands through direct outreach.

Invaluable work experience program.

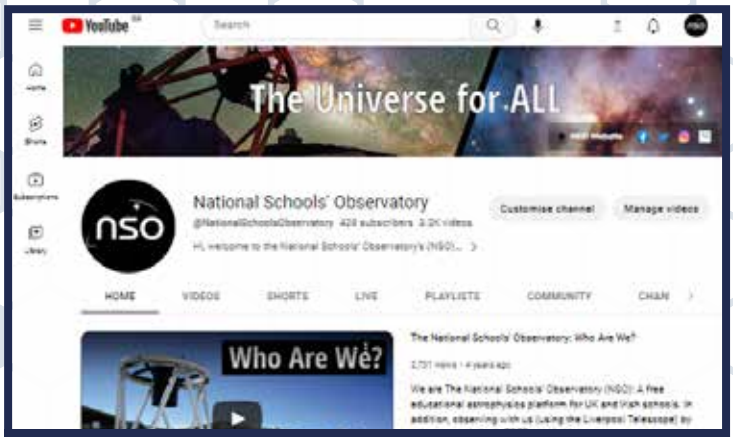
WEAKNESSES

- Historically missing a robust internal evaluation plan for activity.
- Lack of comprehensive documentation detailing structures within The Schools' Observatory.
- More clearly curriculum-linked resources.
- Capitalising on the development of the New Robotic Telescope and Astrophysics Research Institute's research areas.
- Limited visibility and lack of direct marketing.
- No current plan for future international development.

SWOT ANALYSIS

OPPORTUNITIES

High numbers of teachers who are not STEM-confident whom we can engage with.



The increasing popularity of online platforms for education.

Drupal website upgrades offer enhanced features.

Schools and students are more familiar with digital learning.

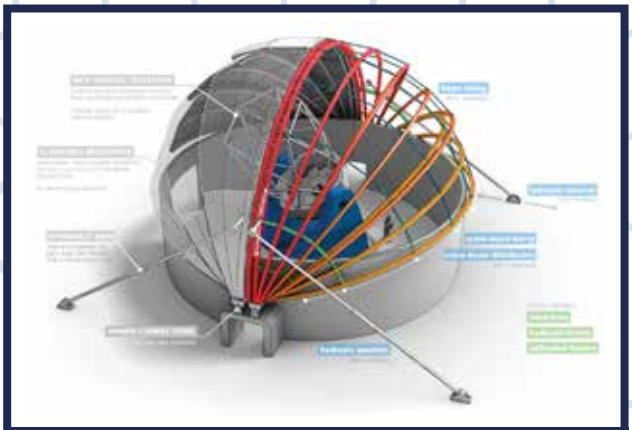
New requirements in education to align our programs and resources with.

Expand our digital resources and engagement due to increased use of digital learning post-pandemic.

Partnership opportunities with other online platforms.

Collaboration with the Dill Faulkes Educational Trust.

Launch of a new data viewer, AstroLab, removing some technological barriers to the project.



Several new astronomical facilities coming online and gaining media attention.

THREATS

- Acquisition of the Liverpool Telescope by an external company.
- Cessation of funding from LJMU for the project.
- A lack of stakeholder support impeding growth and expansion.
- Insufficient staff time to deliver on strategic goals.
- The emergence of a competitor with a more attractive offer.
- Single-point failures within the team.
- Difficulties in engaging teachers due to time constraints and other priorities.
- The lasting impact of the COVID-19 pandemic on education and student development.
- Technical failures and cyber threats to our services.

OBJECTIVES

The Schools' Observatory comprises a small yet dedicated team that has established ambitious goals for the upcoming five years. These goals are firmly grounded in a set of related objectives:

To increase the number of schools engaged with The Schools' Observatory

There is significant potential for growth in our audience, especially among non-physics specialist teachers and those teaching outside the UK and Ireland. Therefore, for the next strategic period, we've established the following objectives:

- A targeted marketing campaign to increase the number of registered teachers, including those new to the teaching profession.
- An increase in online engagement, primarily using YouTube.
- Expansion of our primary resources for each Key Stage, linked to the curriculum of each local nation, to attract and retain more registered primary teachers.
- A comprehensive teacher development program delivered via accredited website-hosted short courses.
- Links to the Astrophysics Research Institute's main research areas.
- Expansion of The Schools' Observatory internationally.

To support ethnically diverse learners

We acknowledge that The Schools' Observatory team is not ethnically diverse and, therefore, have an advocacy and allyship role to play. We aim to act as a platform for the global majority in astrophysics, physics, and wider STEM areas. To achieve this we will:

- Develop an accessible website that supports users for whom English is an additional language and ensure all content is decolonised.
- Target in-person and in-depth activities within the Liverpool City Region towards schools with the highest proportion of ethnically diverse pupils.
- Retain our goal of 30% participation by ethnically diverse learners in our week-long annual residential event.

To strengthen the engagement of registered users

We are committed to providing our users with the best possible experience. Therefore, we have established the following objectives to ensure that our users remain with the project and view us as a constant source of support.

- Enhance retention and sustained use of The Schools' Observatory resources.
- Ensure that The Schools' Observatory is a trusted resource that teachers recommend within their networks.

To focus on the Liverpool City Region

We aim to establish deeper and sustained relationships with schools, teachers, and their students to raise expectation and aspirations in STEM subjects and careers. Research shows that multi-intervention programmes lead to these outcomes. As such we will develop and implement a longitudinal outreach programme in the Liverpool City Region. In addition , we will carry out a targeted marketing drive to schools in the region.

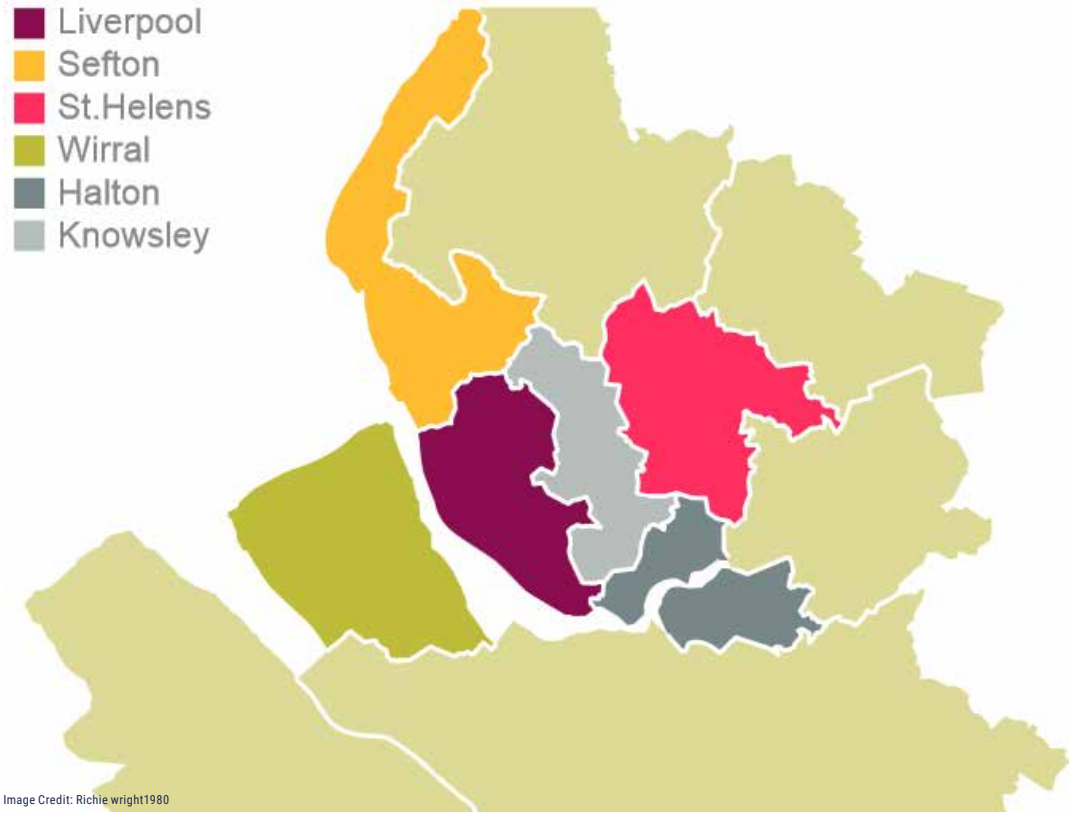


Image Credit: Richie wright1980

To safeguard the future of The Schools' Observatory

At The Schools' Observatory, we understand the importance of safeguarding the future of our project. Our team is small but dedicated, with varying skill sets, which presents inherent risks such as staffing changes or falling behind the rapidly changing world. Therefore, we have put measures in place to mitigate these risks and ensure the longevity of the project.

- Establish a comprehensive, tiered evaluation strategy for all Schools' Observatory activities. This will involve mapping the level of engagement with an appropriate evaluation to measure our impact more fully.
- Create comprehensive documentation for all aspects of operations. This will reduce the impact of single points of failure and ensure that all processes are well-documented and easy to follow.
- Promote our activity via Liverpool John Moores University press office and impact officers. This will help raise our profile within the university and ensure that The Schools' Observatory is better known and understood by the wider community.
- Increase the total staff time on The Schools' Observatory team. This will ensure that the project stays relevant and grows internationally. We believe that investing in our team is crucial to the success of the project.
- Update our Drupal website for continued security protection and create a comprehensive set of documentation detailing our server-side structures and procedures.

UNIVERSAL LEARNING OUTCOMES

All our activities are guided by a set of Universal Learning Outcomes which encompass the impact we wish to have on our audiences.

These ensure that those who engage with The Schools' Observatory will:

UNDERSTANDING

- Experience the wonder of space and astronomy
- Gain appropriate understanding and knowledge.

FEELINGS

- Feel valued and welcomed
- Be empowered to ask questions
- Feel a sense of achievement
- Be confident in their abilities
- Feel inspired to continue their learning

VALUES

- Cherish the Earth as a unique planet
- Understand their place as a global citizen
- Value the opportunities that a STEM career provides
- Understand the role of astronomy and STEM in culture and society
- Understand the power of astronomy and STEM to benefit the world

SKILLS

Develop the skills to:

- Become critical thinkers
- Apply the scientific method
- Collect, analyse, and interpret scientific data
- Apply maths knowledge to real-world contexts
- Improve their technical literacy
- Share their knowledge with others

BEHAVIOUR

- Deepen their engagement with STEM
- Take part in more STEM activities
- Be more likely to pursue STEM careers
- Become an advocate for STEM

To understand if we are meeting our Universal Learning Outcomes (ULOS) we have developed a robust evaluation framework. This framework outlines our approach to monitoring and evaluation and is informed by the approach of TASO[1] (Transforming Access and Student Outcomes), Wonder Initiative[2], and Science Capital[3].

1 taso.org.uk/evidence/our-approach-to-evaluation

2 ukri.org/what-we-offer/public-engagement/public-engagement-stfc/our-support-for-public-engagement-stfc/public-engagement-wonder-initiative

3 sciencecentres.org.uk/resources/science-capital

EVALUATION FRAMEWORK

Types of Evaluation

As we provide support to our users through various channels, from web access to intensive in-person activity, our evaluation approach must be structured accordingly. The evaluation levels we use will outline both light-touch and in-depth evaluation methods, as appropriate.

Goals

- Develop and implement a cohesive evaluation approach for all Schools' Observatory activities.
  1. Ensure all activities have a Theory of Change model and a suite of measures of success in place.
  2. Create a question bank for assessing ULOs that draws on validated survey tools from across the sector.
  3. Align evaluation with national initiatives.

- Demonstrate the impact of The Schools' Observatory.
  1. Where appropriate, progress select activities to comparator group evualation design.

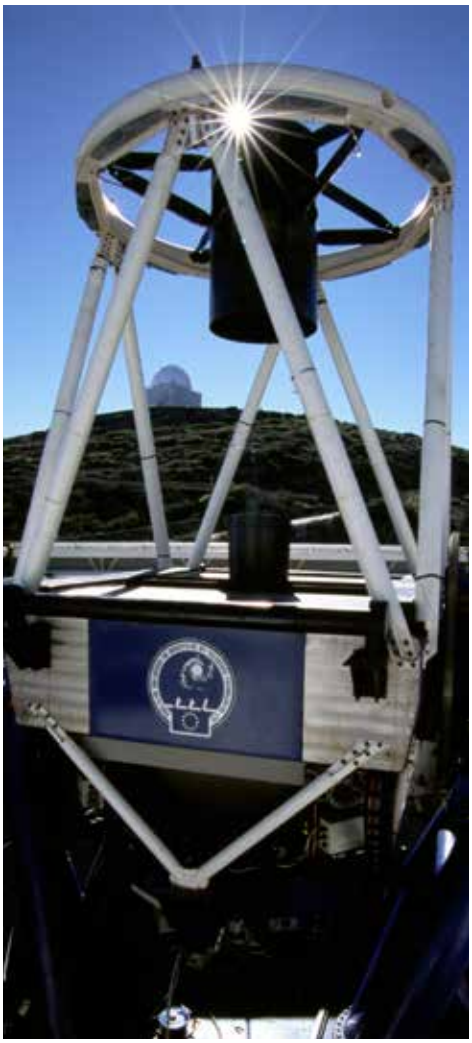
- Develop a culture of feed-forward evaluation practice.
  1. Engage the team in the design and implementation of evaluation, to embed good practice across all areas.
  2. Ensure that evaluation results are used to improve our offering and inform the development of new activities and resources.

- Contribute to the sectors knowledge base.
  1. Publish case studies of activity, including robust evaluation results, in high impact journals.
  2. Attend national and international conferences to share our learning more widely.

Evaluation monitoring

While each individual project will have its bespoke evaluation plan, an overarching document will be created to monitor progress overall.

This approach allows us to advance projects as appropriate through the different evaluation levels, helping us to demonstrate our impact.



OUR TEAM

Our team has grown significantly over the years, starting with only two part-time staff and now consisting of a dynamic group of seven individuals, including both full-time and part-time employees. We are proud of the diverse academic backgrounds, skills, and experience that each team member contributes. We strongly believe that this diversity enables us to approach projects from a wider perspective and ultimately provide better support and resources for our users.

Jenny Claydon
Teacher Liaison

Jenny leads the project's teacher training programme and the development of teacher networks. She also develops and evaluates educational materials, alongside supporting The Schools' Observatory's marketing strategy. She coordinates some of the Public Engagement and Widening Participation projects and events. Jenny has a PGCE in Primary Education and a PhD in Planetary Science. She previously worked in science research at the Natural History Museum and in public engagement at Jodrell Bank.

Stacey Habergham-Mawson
Project Manager

Stacey is one of the The Schools' Observatory Project Managers. She provides much of the astronomy content on the website, and quality checks all new materials developed. Stacey is jointly responsible for ensuring we deliver on our strategy and has been responsible for moving the team onto an agile project management environment. She is also responsible for seeking new strategic partnership projects and funding opportunities. Stacey has a PGCE in Secondary Science and a PhD in Astrophysics. She also contributes to teaching at Liverpool John Moores University.

Alison Keen
Development and Marketing

Alison leads the website development for The Schools' Observatory and creates much of the digital and printed marketing materials. She also leads video production for the team. Alison supports the team with Public Engagement and Widening Participation projects and events. Alison has been with the project for over a decade. She has a BSc Hons in Computer Science and previously worked at the Faculty of Education and the International Centre for Digital Content.

Vicki Last
AfRIS STEM Educator

Vicki is part of the Astronomy for Remote and Island Schools team as a STEM Educator. She has a masters degree and a PhD in Tropical Coastal Management and Marine Science. Her academic work focussed on human impacts on the seabed but the desire to inspire and educate children about science and the environment led her to change tack. She also works as an early years practitioner in an outdoor nursery, and as an Additional Support Needs assistant in several small local schools.

Chris Leigh
Strategic Projects

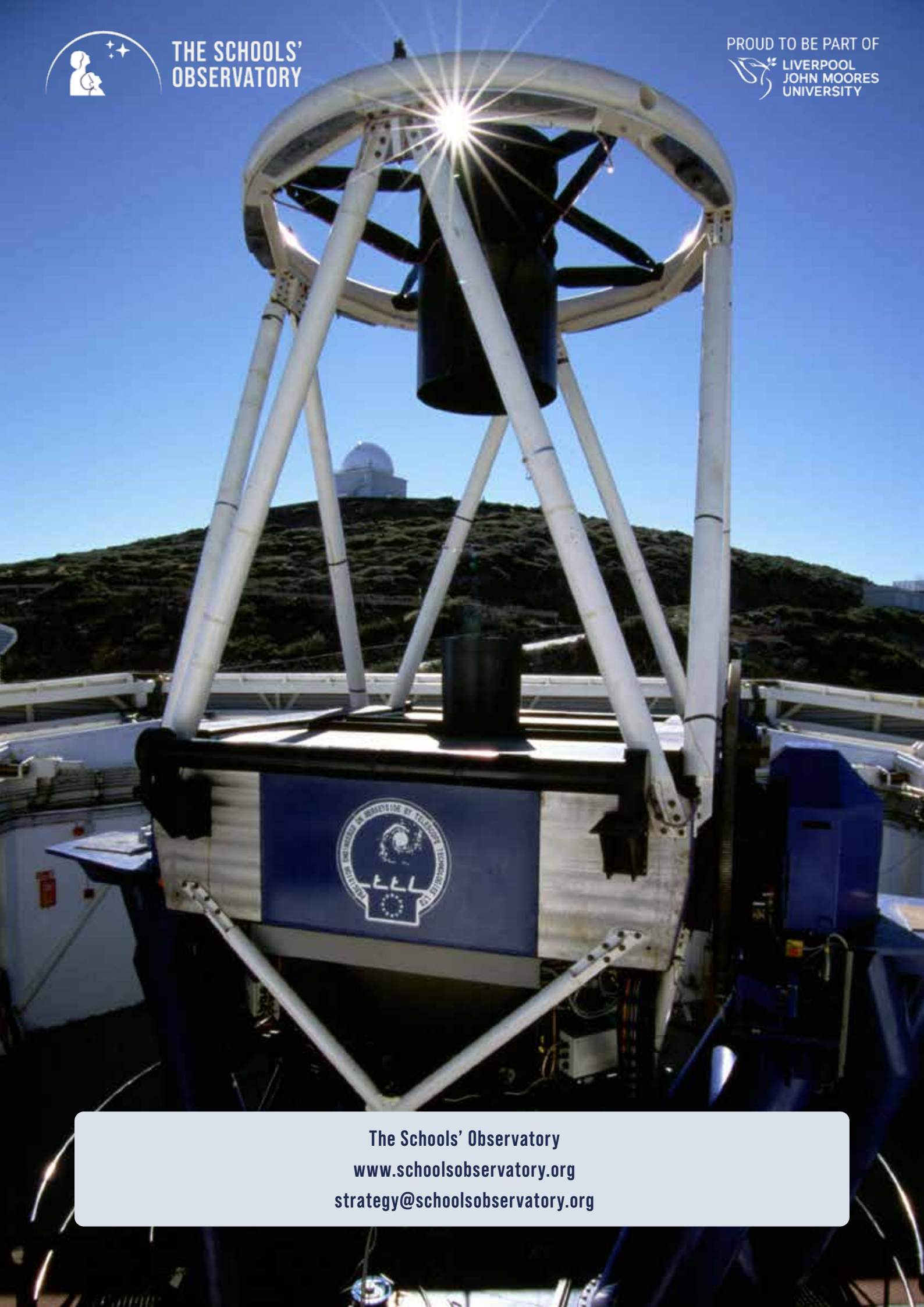
Chris manages the Astronomy for Remote and Island Schools project. Where small teams visit remote/island schools across the UK with the aim of setting up STEM Clubs. Chris has a masters and Ph.D in Astronomy, from the University of St Andrews. He maintains an interest in research: in the detection and characterisation of close-orbiting extrasolar giant planets. Chris is also the Parent Council treasurer of a small school in Argyll, as well as treasurer for a local community development trust.

Andy Newsam
Director

Andy is the Director of The Schools' Observatory and has been involved from the earliest days. As well as helping to guide the direction of the project and support the team, he also has a background in computing, and so does quite a lot of the technical work and coding. Andy has a PhD in Astrophysics and combines working for The Schools' Observatory with research, teaching, public engagement and arts collaboration.

Emma Smith
Project Manager

Emma is one of the The Schools' Observatory Project Managers. She is jointly responsible for ensuring that the project delivers on its strategy and has driven a focus to align with LJMU's Access and Participation Plan. She is also responsible for developing our evaluation strategy, and lead on international collaboration. An Environmental Scientist by training, with a PhD in Deep-Sea Biogeochemistry, Emma previously worked in central Outreach and Widening Participation. She also works for the university's Teaching and Learning Academy as a researcher with a focus on equality of oportunity within Higher Education.



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