

Annual Report & Financial Statements 2022



Royal
Astronomical
Society

Royal Astronomical Society

Patron

Her Majesty The Queen remained our Patron until her death in September 2022

Trustees

Council Members who served during 2022

Prof. Emma Bunce (President until May 2022, G, University of Leicester)

Prof. Mike Edmunds (President from May 2022, A, University of Cardiff)

Dr Megan Argo (Vice-President, A, until May 2022, University of Central Lancashire)

Dr Mandy Bailey (Senior Secretary, A, Open University)

Dr Jo Barstow (Councillor, A, Open University)

Dr Nigel M Berman (Treasurer, A)

Prof. Phil Charles (Councillor, A, University of Southampton)

Dr Hannah Dalgleish (Councillor, A, University of Oxford/Armagh Observatory and Planetarium)

Prof. Stephen Eales (Vice-President, A, from May 2022, University of Cardiff)

Dr Olivia Keenan (Councillor A, from May 2022, SEPnet)

Prof. Mark Lester (Secretary, G, University of Leicester)

Martin Lunn (Councillor, A until May 2022)

Dr Jane MacArthur (Councillor, G, until May 2022, University of Manchester)

Dr Matthew Middleton (Councillor, A, until May 2022, University of Southampton)

Prof. Steven Miller (Vice-President, G, until May 2022; Councillor, G, from May 2022, University College London)

Dr Arvind Parmar (Councillor, A, European Space Agency)

Prof. Nick Rawlinson (Vice-President, G, University of Cambridge)

Prof. Ian Robson (Vice-President, A, University of Edinburgh)

Dr Jasmine Kaur Sandhu (Councillor, G, Northumbria University)

Prof. Caroline Smith (Councillor, G, Natural History Museum)

Prof. Colin Snodgrass (Councillor, G, University of Edinburgh)

Patricia Tomkins (Councillor, A, from May 2022)

Dr Sheona Urquhart (Secretary, A, Open University)

Prof. Clare Watt (Vice-President, G, from May 2022, Northumbria University)

Prof. Belinda Wilkes (Councillor, A, University of Bristol)

Prof. Silvia Zane (Councillor, A, from May 2022, University College London)

- Note: 'A' signifies all areas of astronomy and astrophysics; 'G' covers geophysics, solar-terrestrial physics and planetary sciences.

Senior staff

Executive Director: Philip Diamond

Deputy Executive Director: Dr Robert Massey

Registered and Principal Office

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Charity registration number

226545

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Bankers

HSBC Bank plc

West End Corporate Banking Centre

70 Pall Mall

London

SW1Y 5EZ

National Westminster Bank

St James' & Piccadilly Branch

PO Box 2 DG

208 Piccadilly

London

SWJ 9HE

Investment managers

Newton Investment Management Ltd

The Bank of New York Mellon Centre

160 Queen Victoria Street

London

EC4V 4LA

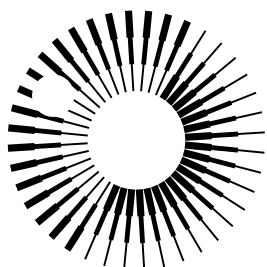
Solicitors

Bristows

3 Lincoln's Inn Fields

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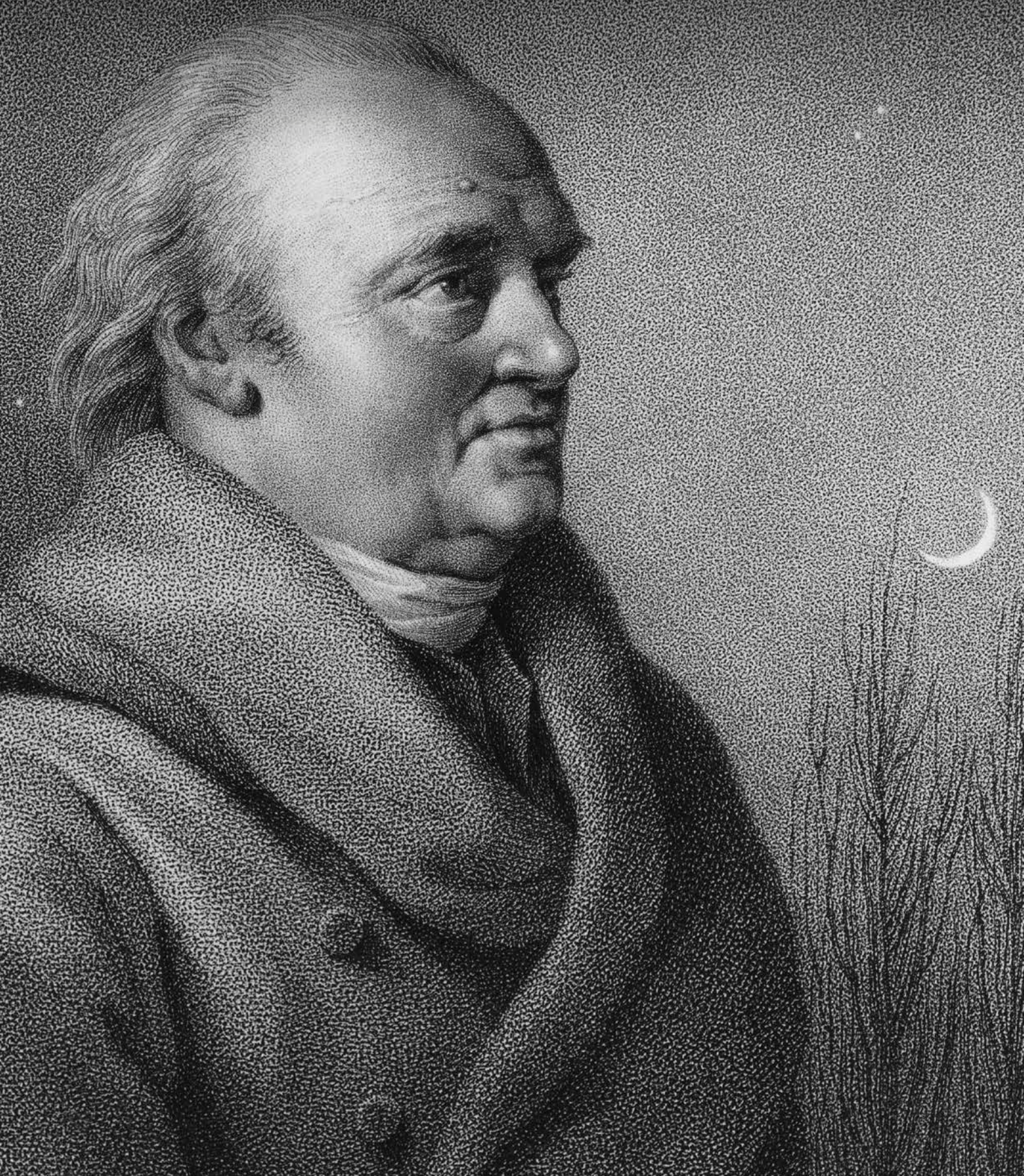
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The RAS supported a meeting of the Herschel Society in Bath, to celebrate the bicentenary of the death of William Herschel, first Present of the RAS, musician, astronomer, cosmologist, who discovered Uranus. (RAS/Science Photo Library)



Welcome From Our President

It is a pleasure to introduce the Annual Report of the Royal Astronomical Society for 2022. We were saddened by the death of our Patron, HM The Queen, and formally offered our condolences to His Majesty the King and the Royal Family.

We were pleased to be able to finally open our doors once again to our Fellows and others, and welcome them to our programme of scientific meetings, held in hybrid mode. Virtual attendance is a bonus, but there is nothing to replace the experience of discussing research face-to-face with colleagues. I thoroughly enjoyed being present at re-convened monthly meetings where well-known researchers carefully laid out the evidence, but were almost despairing at how to push on with the great unknowns of cosmology – just the sort of debate to stimulate progress and inspire the next generation.

I am pleased to say that, after a rigorous tendering exercise we chose to renew our contract with Oxford University Press from the end of 2023. We are excited to continue this successful partnership at a critical time in the evolution of our journals, when the research and publishing landscape is changing fast.

After careful consideration, RAS Council, advised by our publisher, decided that the Society's journals will transition to full open access from January 2024. This decision has been taken to ensure their sustainability and compliance with open access policy mandates in the long term. Removing barriers to access is a major step towards openness, transparency and reproducibility, accelerating scientific discovery and increasing the impact of research. This is an exciting new phase in the journals' history.

I was delighted (and a little relieved) that we were able to hold the National Astronomy Meeting at the University of Warwick in July, the first in-person NAM for three years. The hybrid format allowed virtual attendance, but we were heartened to see that nearly 600 delegates came to Warwick. Particularly gratifying was that many young researchers were there – for many their first in-person conference.

The Society continues to advocate on behalf of our communities. Uncertainty over UK association

with the Horizon Europe research fund persisted throughout 2022. At the same time, the increasing impact of satellite constellations on astronomy became clearer. The Society is now a contributing member of the International Astronomical Union Centre for the Protection of the Dark and Quiet Sky from Satellite Constellations.



In May, the Society held its first parliamentary reception. The reception allowed us to showcase our sciences to many Lords and MPs, including government ministers and their opposition shadow ministers. First-hand testimony from people who had benefitted from the RAS200 outreach programmes really impressed this distinguished audience.

There is much to be done in the coming months. A priority for us is to secure our long-term residency in Burlington House. We continued to engage with government ministers and civil servants on the terms of our lease, against a turbulent political backdrop. I dearly hope our negotiations will resolve in 2023, but we will be formulating alternative plans to ensure the Society's future is secure whatever the outcome. We are also finalising work on our Strategy, some high-level goals of which are outlined in this report.

We have all lived through challenging times, but our work to advance understanding and share knowledge of our subjects continues undimmed. That endeavour only succeeds, of course, with the willing support of our Council, committees, the RAS staff and our Fellows.

Prof. Michael G Edmunds,
President of the RAS 2022

Objectives

The RAS exists to advance, and to record the history of, our understanding of the Earth, the solar system, the stars and galaxies, and the nature of the universe. It does this by promoting astronomy and geophysics, interdisciplinary sciences that encompass and further our understanding of physics, chemistry, mathematics, biology, engineering and computer science to answer deep questions about the origin and fate of the cosmos, and people's place in it. Through this, the Society contributes to the growth and dissemination of knowledge and thereby fulfils its charitable objective of serving the public interest.

The Society refers to the Charity Commission's general guidance on Public Benefit when reviewing its aims and objectives and in planning future activities. These disclosures comply with the Charities Act 2011.

Our objectives for 2022 fell within two broad areas: advancing understanding and sharing knowledge; the organisation of the Society supports these goals.

The Society's principal objectives are to:

- publish high-quality peer-reviewed journals;
- support students and early-career scientists through research fellowships and grants;
- recognise achievement through its medals and prizes;
- maintain high-quality research meetings, including the National Astronomy Meeting, and Public Lectures;
- sustain our Library and Archive service;
- continue our political engagement;
- maintain our programme of education and outreach activity, including Friends of the RAS;
- promote the work of the Society and Fellows in the media and on social media;
- build our outreach work with other Courtyard Societies.


In 2022 the Society worked, in addition, on development of a strategy for the next five years that will focus on:

- membership (including Fellowships and grants);
- education and outreach – building on the success of RAS200;
- our library and heritage;
- our accommodation.

Cross-cutting themes to inform the strategy review include:

- diversity and inclusion;
- our digital presence;
- the impact of the pandemic; and
- uncertainty in our long-term location.

Advancing Understanding



An artist's impression of a galaxy in the early universe, one of the environments explored in a Specialist Discussion Meeting focusing on the production and escape of Lyman photons at high and low redshifts. (ESO/M Kornmesser)

Journals

The Society's journal portfolio consists of three peer-reviewed, scholarly publications: *Monthly Notices of the Royal Astronomical Society (MNRAS)*, *Geophysical Journal International (GJI)* and *RAS Techniques and Instruments (RASTI)*.

MNRAS is one of the world's leading astronomy journals and publishes articles in positional and dynamical astronomy, astrophysics, radio astronomy, cosmology, space research and the design of astronomical instruments. The *MNRAS* editorial board of 26 scientific editors continues to be led by Prof. David Flower as Editor-in-Chief. In 2022 *MNRAS* received 5128 submissions, published 3886 papers, and had 4449336 downloads. Its two-year impact factor for 2021 was 5.235.

GJI is an international journal publishing primary research articles on all aspects of theoretical, computational, experimental, applied and observational geophysics. The editor-in-chief, Prof. Joerg Renner, leads an editorial board of 33 scientific editors. In 2022 *GJI* received 1095 submissions, published 520 papers, and had 1 737 230 downloads. Its two-year impact factor for 2021 rose to 3.352.

RASTI published its first volume in 2022, leading with an editorial authored by editor-in-chief, Prof. Jonathan Tennyson and deputy editor-in-chief Prof. Anna Scaife. *RASTI* is broad in scope and encourages submission of papers that cover topics in both astronomy and geophysics, across instrumentation, data science, machine learning, software, and numerical and statistical methods. The editorial board, led by Prof. Tennyson, consists of 14 academics appointed to ensure *RASTI* maintains the high editorial standards set by *MNRAS* and *GJI*. During 2022, *RASTI* published seven articles which were downloaded 2385 times.

All three journals are published with

The RAS is committed to advancing understanding of our sciences by:

- Publishing journals
- Supporting scientists financially with fellowships and grants
- Organising scientific meetings
- Recognising excellence through awards
- Running a Library and Archive for research
- Producing a magazine for our members
- Advocating for the community with government
- Promoting diversity in our community
- Supporting early-career researchers

Oxford University Press (OUP) and, following a tendering process, OUP was selected to remain the Society's publishing partner for a further term of five years from the end of 2023.

RASTI is a fully Open Access (OA) title; authors pay an Article Processing Charge (APC) for publication. The payment of APCs allows worldwide access to the scholarly research in *RASTI*, removing barriers to readership and reuse. *MNRAS* and *GJI* continued to be published as 'hybrid' journals whereby OUP sells institutional subscriptions to the journals, at the same time as offering OA publication to those authors who wish to, or are mandated by funders to, publish

The RAS has been publishing on geophysics since 1922; this figure from Whipple (1928) describes observations of a meteor's passage (RAS)

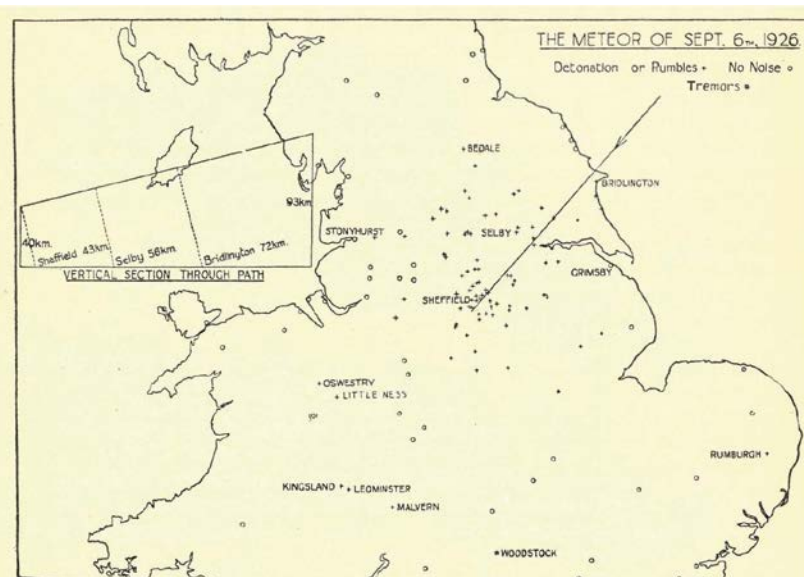


FIG. 1.—The meteor of 1926 September 6. The path of the meteor is shown by the arrow. Places where sounds were heard are indicated by crosses, places where no sound was heard, though meteor was seen, by circles.



Above: Professor Jonathan Tennyson and the publishing managers, Liz Baker (left) and Kim Clube, at NAM. (RAS/Lensi Photography)

their papers OA. During 2022, 18% of *MNRAS* papers and 22% of *GJI* papers were published OA.

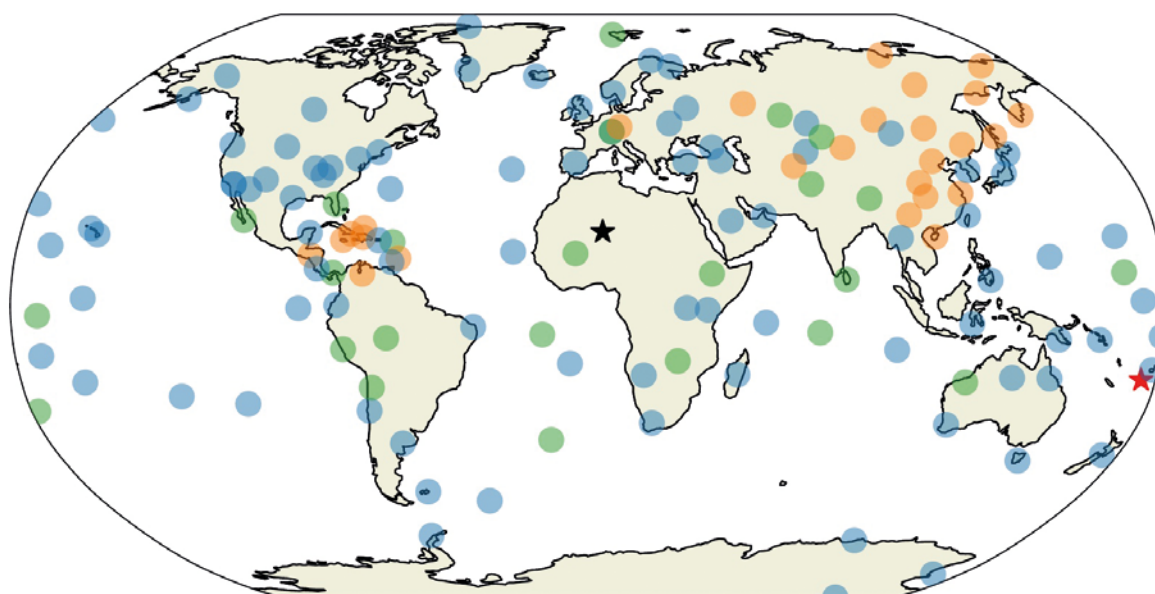
Looking to secure the future of the Society's journal portfolio, during 2022 RAS Council approved the move of *MNRAS* and *GJI* to fully OA publication from January 2024. Articles in all three RAS journals will be free to read from the point of publication, and APCs will replace the subscriptions to *MNRAS* and *GJI*.

The RAS journal team is managed by two part-time publishing managers and the administration of the peer review process is overseen by eight assistant editors. The peer review process on *RASTI* is provided by OUP. In April, the

journal team, editors-in-chief and OUP presented their annual reports to the RAS Publications Management Committee.

There was an increase in journal marketing in 2022 primarily through social media (@RAS_Journals), and press releases supported by the RAS Communications Team. OUP marketing included Calls for Papers, online adverts, email campaigns, high-impact article collections and a booth at the American Geophysical Union Conference. OUP also exhibited at the National Astronomy Meeting (NAM) at the University of Warwick alongside the RAS. Also at NAM, the journal team ran a Publications workshop for early career researchers and hosted a celebratory reception to promote the launch of *RASTI*.

One significant milestone in 2022 was the 100-year anniversary of geophysics publishing by the RAS. The year started with three short videos and concluded with the publication of the first of 12 virtual collections of *GJI* papers. Papers for each collection have been selected by the *GJI* editors as being the top 100 most important geophysics papers published by the Society, and each collection is introduced by a different editor. The



The Hunga volcanic eruption was recorded worldwide; Geophysical Journal International published a special issue bringing together information on this novel explosive activity, combining air pressure variations and seismic signals. (Image from Ringler et al.)

★ Hunga Tonga Eruption ★ Eruption Antipode ● No Data ● Seismic ● Pressure and Seismic

winners of the *GJI* Student Award for the best paper by an early career scientist were Gauthier Guerin, Paul Alberto Jarrin Tamayo, and Solvi Thrastarson, who each received a certificate and cash prize.

For further details on the RAS journals, the editors and editorial boards, see our website at ras.ac.uk/journals

Research Fellowships and grants

The RAS grants, fellowships and awards support research, education and outreach activities. 75 grants, fellowships and awards, totalling £178 412 (2021: £105 878) were awarded to institutions and 40 grants, medals and awards totalling £28 066 (2021: £18 801) were made to individuals. Expenditure supporting an RAS Research Fellowship totalled £32 000 (2021: £7 350). Adjustments to other grants resulted in credits to expenditure totalling £54 180 (2021: £13 364). Total grant making support costs were £35 000

THE RAS AWARDED £178 412 IN GRANTS TO INSTITUTIONS

Below: Dr Rebecca Smethurst (University of Oxford) held the RAS Fellowship from October 2022. (RAS/Lensi Photography)



(2020: £30 000). A full list of all grantees and analysis can be found on the Society's website.

In 2022 the RAS Fellowship was held from October 2022 by Dr Rebecca Smethurst (University of Oxford): 'Co-evolution cracked: the contribution of non-merger processes to supermassive black hole growth'.

Scientific meetings

The Society held 15 Specialist Discussion Meetings during 2022, attended by 1145 people. The meetings were initially held online, but became hybrid from October onwards. NAM was a fully hybrid meeting.

Specialist Discussion Meetings

Global monitoring of geospace

The production and escape of **Lyman photons through time and space**

Sources and **inventory of cosmic dust:**

from space to the Earth's surface

Careers and **perspectives in big data astronomy**

Planetary Ultra-Low Frequency Waves:

Theory, Modelling and Observations

Future solar and heliospheric **assets**

for space weather prediction:

instruments, modelling and machine-learning

Exoplanet modelling in the James

Webb era II: Terrestrial planets and subneptunes

Forecasting solar energetic particles

and associated eruptive events

The new **transient radio sky**

Solid-liquid interactions in **deep**

planetary interiors

Formation, evolution and dispersal of

protoplanetary discs

Exploring **planetary atmospheric**

processes from terrestrial worlds to giant planets

JWST commissioning and first science

from a UK perspective

Undergraduate research bursaries

The RAS funded 11 undergraduate research bursaries at universities across the UK. Topics explored during the six-week projects this year were: software improvement for solar spectroscopy, young variable stars, gamma ray bursts, solar magnetic field, azimuthal perturbations in MHD, waves in the solar corona, radial velocity systematics, machine learning for gravitational wave sources, electrons surfing electromagnetic waves, and the history of astronomy. The students valued the opportunity to learn independently and in depth, and relished spending time as part of research groups.

Meteor science in the UK

2nd Meeting on progress in **astrophysics with type-1a supernovae** (PATIAS-2)

Ordinary Meetings

1443 people attended Ordinary Meetings in 2022. The meetings were online only at the start of the year, and hybrid from the October meeting onwards.

The following spoke at Ordinary Meetings:

Dr Karen Aplin (University of Bristol) 'The charge of the spheres: sparking studies of the planets' James Dungey Lecture 2021

Dr James Owen (Imperial College London) Fowler (A) Award 'The origin of the exoplanet radius gap'

Dr Julia Stawarz (Imperial College London) Winton (G) Award 'Turbulence-driven magnetic reconnection in collisionless plasmas: new insights from NASA's Magnetospheric Multiscale Mission'

Dr Richard Morton (Northumbria University) Fowler (G) Award 'Revealing the hidden corona with infrared'

**1145 PEOPLE
ATTENDED
SPECIALIST
DISCUSSION
MEETINGS
IN 2022**

Supporting diversity in research

RAS grants have helped to fund the annual Conference for Undergraduate Women in Physics for the past eight years. In 2022 it was held jointly by the Universities of Glasgow and Syrachclyde, with more than 100 student participants. RAS funding supported venue hire and support for student accommodation.

The meeting was oversubscribed and the organisers focused on having a diverse group of attendees: more than half identified as LGBT+, 35% as people of colour and 24% with a disability. The conference had a significant impact on how participants saw themselves: 45% believed that they could succeed in a career in physics before the meeting, rising to 70% afterwards. Feedback from attendees included: "Myself and women from the same university have decided to start a society for women and non-binary people in physics as we realised the real lack of representation and socialisation between these groups at our university"; "The talks were great and the academic panel was amazing"; "I want to educate myself about the issues that BAME people face and what I can do as an ally".

Dr Matt Nicholl (University of Birmingham) Fowler (A) Award and RAS Research Fellowship 'Tidal disruptions of stars by supermassive black holes'

Prof. Giovanna Tinetti (University College London) RAS Eddington Lecture 'A chemical survey of planets in our galaxy'

Dr Sanne Cottaar (University of Cambridge) Harold Jeffreys Lecture 2022 'Geological mapping of the core-mantle boundary: unravelling the mysteries of the deep Earth'

Dr Jennifer Y H Chan (Canadian Institute for Theoretical Astrophysics (CITA) and University of Toronto) Michael Penston Thesis Prize 2020 'Probing the evolving universe with confidence: All-sky radiative transfer and characterisation for cosmic structures'

Prof. Pedro G Ferreira (University of Oxford) Gerald Whitrow Lecture 'Cosmic Ignorance'

Dr Olivia Jones (UK Astronomy Centre, Royal Observatory Edinburgh) 'Early science from JWST'

Dr Licia Ray (Lancaster University) James Dungey Lecture 2022 'Neither here nor there: The coupling between giant planets and their surroundings'

Dr Juan Alday Parejo (The Open University) Keith Runcorn Thesis Prize 2021 'Investigating the isotopic composition of the atmosphere of Mars with the ExoMars Trace Gas Orbiter'

Dr Rebecca Smethurst (University of Oxford) Winton (A) Award and RAS Research Fellow 'The growth of supermassive black holes'

Dr Patricia Fara (University of Cambridge) The RAS Diary Talk 'Herschel 2022: a double anniversary'

National Astronomy Meeting 2022

This year the National Astronomy Meeting, together with the MIST and UK Solar Physics groups, took place in July at the University of Warwick. This was the first face-to-face NAM since 2019 and 750 people attended (600 in person and 150 online). The hybrid aspect of the meeting supported those who did not or could not travel and allowed those who came down with Covid-19 before or during the event to take part, as speakers and delegates. There was a full complement of NAM features, with plenary lectures, including one from Gold Medalist George Efstathiou, specialist lunches, a dedicated

outreach programme, a very well-attended poster session and a packed Awards Dinner where we celebrated success across our community.

2022 RAS Medals and Awards

The Society recognises outstanding achievements among early-career researchers as well as celebrating career-long excellence and service to our sciences. These are the recipients of the 2022 RAS awards and medals:

Gold Medal in Astronomy Prof. George P Efstathiou, University of Cambridge

Gold Medal in Geophysics Prof. Richard B Horne, British Antarctic Survey

Herschel Medal Prof. Catherine Heymans, University of Edinburgh

Eddington Medal Prof. Alan Heavens, Imperial College London

Chapman Medal Prof. Sandra Chapman, University of Warwick

Price Medal Professor Hrvoje Tkalčić, Australian National University, Australia

Jackson-Gwilt Medal Dr Frank Eisenhauer, Max Planck Institute for Extraterrestrial Physics, Germany

Annie Maunder Medal Dr Nicolas Bonne, Dr Jennifer Gupta, Dr Coleman Krawczyk, University of Portsmouth

Primary Education Award Rachael Wood, Southfield Primary School

Secondary Education Award Jacob Harding, Sharples School

Higher Education Award Prof. Melvin Hoare, University of Leeds

Award for Service in Astronomy Professor Donald Kurtz, University of Central Lancashire, North-West University, South Africa

Award for Service in Geophysics Prof. Farideh Honary, Lancaster University

Fowler Award (Astronomy) Dr Matt Nicholl, University of Birmingham

Fowler Award (Geophysics) Dr Beatriz Sánchez-Cano, University of Leicester

750 PEOPLE
ATTENDED
THE 2022
NATIONAL
ASTRONOMY
MEETING

Winton Award (Astronomy) Dr Rebecca

Smethurst, University of Oxford

Winton Award (Geophysics) Dr Tim

Lichtenberg, University of Oxford

Group Award in Astronomy The EAGLE

simulations team, Durham University,

Liverpool John Moores University and

Leiden University The Netherlands

Group Award in Geophysics UK Fireball

Alliance, Natural History Museum

Harold Jeffreys Lecture Dr Rhodri

Davies, The Australian National

University, Australia

George Darwin Lecture Professor Alan

Fitzsimmons, Queen's University Belfast

James Dungey Lecture Dr Licia Ray,

Lancaster University

Gerald Whitrow Lecture Professor

Pedro Gil Ferreira, University of Oxford



Honorary Fellows

Dr Morton S Roberts, National Radio
Astronomy Observatory, USA

Dr Ashwin Vasavada, Jet Propulsion
Laboratory, California Institute of
Technology, USA

Professor Kathryn McWilliams, University
of Saskatchewan, Canada

*Above: Prof. Dr Eva
Grebel, director of the
Astronomisches Rechen-
Institut, Heidelberg
University, Germany, and
winner of the inaugural
Caroline Herschel Award
(Prof. Dr Eva Grebel/RAS)*

Rob and Cathryn Wilcock, Winchcombe,
Gloucestershire

The Caroline Herschel Award

This year saw the celebration of the first Caroline Herschel Award to **Prof. Dr Eva Grebel**, director of the Astronomisches Rechen-Institut, Heidelberg University, Germany. This new prize recognises outstanding research by women astrophysicists in the UK and Germany, and is funded by the UK government. The prize is jointly administered by the RAS and the German Astronomical Society and will be awarded in Germany and the UK in alternate years.

Prof. Dr Grebel has made outstanding contributions to understanding the evolution of galaxies and galactic archaeology, leading research into galaxy evolution and near-field cosmology. She and her group discovered the ultra-faint dwarf galaxies, which provided evidence for the role of dark matter in galaxy formation. She has also pioneered the use of variable stars to understand the 3D structure of our galaxy and its neighbours.

Prof. Dr Grebel's Prize Lecture took place at the German Astronomical Society's annual conference in the University of Bremen in September. She spoke on 'Caroline Herschel, The Hunt for Faint Features and Galactic Archaeology', including a detailed account of Caroline Herschel's life and achievements.

Student Prizes

The RAS awards prizes for the best PhD theses in the fields of astronomy and astrophysics (the Michael Penston Prize), geophysics and planetary science (the Keith Runcorn Prize), and instrumentation (the Patricia Tomkins Prize). There is also a Patricia Tomkins Prize for undergraduate work in

instrumentation. The 2022 thesis prizes go to:

Maria Vincenzi (University of Portsmouth) won the Michael Penston Thesis Prize for her thesis entitled: 'Core-collapse contamination in photometric samples of Type Ia Supernovae'.

Dr Juan Alday Parejo (University of Oxford) won the Keith Runcorn Prize for the best doctoral thesis in geophysics with 'Unravelling the isotopic imprints of martian CO₂ and H₂O using solar occultation observations from the Atmospheric Chemistry Suite onboard ExoMars Trace Gas orbiter'.

Library and Archive

The library was open for two days per week at the beginning of 2022, rising to three days in April, and four days in mid-November, meaning the library was open for about 150 days overall. We hosted 44 visits by external researchers, and 20 by Fellows. By November 2022, Fellows could once more use the library without an appointment. 202 research enquiries were handled through the year.



Above: Caroline Herschel's notebook, on display in Bath (Image courtesy of The Herschel Museum of Astronomy – Bath Preservation Trust)

Below: A&G magazine reflecting our research community (RAS)

At the Chartered Institute of Library and Information Professionals (CILIP) Rare Books and Special Collections Group conference the Librarian co-presented with book artist Kate Bernstein about her book inspired by the RAS Library, *Measuring the Heavens*. This is the latest in several outreach talks delivered since the book was created in 2020.

The Librarian presented a talk entitled 'The Herschels in their own words' at the public conference organised by



the Herschel Society to celebrate the bicentenary of William Herschel's death. A new article about RAS Fellow Gertrude Bacon has been added to the Oxford Dictionary of National Biography.

Our membership magazine

A&G continued to document both RAS activities and research progress across RAS sciences, outreach activities and community initiatives. Over the year, 244 178 articles were downloaded. Among the news and research reviews highlighted by A&G in 2022 was the work of the RAS Early Career Network. The ECN Committee guest-edited and produced articles focused on the concerns of this part of our community, including research by early career researchers. Other highlights included a first-hand account of the hunt for the Winchcombe meteorite, an overview of the meeting marking 200 years since the death of William Herschel, and the launch of the new RAS journal, *RASTI*. A&G also marked 50 years since the final Apollo Moon mission, Apollo 17, with a Fellow's account of taking part in the International Youth Science Tour in 1972 – including bumping into Neil Armstrong.

Political engagement

This was a busy year marked by continuing uncertainty about UK association with the Horizon Europe research fund, and the increasing impact of satellite constellations on astronomy, as the number of deployed spacecraft in low-Earth orbit rose above 5000.

The Society gave input to the work by the Campaign for Science and Engineering with BEIS on the design of a 'Plan B' replacement to foster international collaboration in science, should the negotiations to be part of Horizon Europe fail.

The Society responded to a consultation on Diversity and Inclusion in STEM for the Commons Science and Technology Committee, and to the OfCom consultation on the use of the 14GHz band. As a result of the latter, OfCom proposes to offer some protection to the Jodrell Bank and e-MERLIN observatories.

Satellite constellations featured in sessions at the National Astronomy Meeting and the European Astronomical Society, and in an RAS presentation at the GNOSIS conference. The Society is now a contributing member of the International Astronomical Union Centre for the Protection of the Dark and Quiet Sky from Satellite Constellations (we contribute support in kind) and a member of the Centre's policy and community engagement hubs. The Society now also provides the secretariat for the All-Party Parliamentary Group for Dark Skies.

The Society held its first parliamentary reception in May, a postponed event originally intended to celebrate the RAS bicentenary. Some 23 MPs and 15 members of the House of Lords attended. We had speeches from Greg Clark MP, Chi Onwurah MP, Lord Rees of Ludlow and Jon Culshaw, as well as a powerful address from a beneficiary of the RAS200 project in partnership with Bounceback. Attendees also spoke to RAS staff and Trustees about their work, engaged in outreach activities, and used a virtual reality system to explore data from ESA's Gaia mission.

Diversity

The RAS responded to concerns about whether James Webb played a part in discrimination against homosexual men at NASA in the 20th century; Council voted that Society publications should use the acronym JWST only, rather than the full name of the telescope. The Society

**5561 PEOPLE
CAME TO THE
EXHIBITION
CELEBRATING
WILLIAM
HERSCHEL
AT THE
HERSCHEL
MUSEUM IN
BATH, 200
YEARS AFTER
HIS DEATH.**

RAS staff delivered training in disability confidence, allyship and self-promotion skills online and face-to-face. Audience numbers varied between 18 and 250. The workshop on Allyship given at the National Astronomy Meeting attracted more than 50 delegates – mostly early career researchers – and offered tools and strategies to drive change.

The Early Career Network (ECN), established in 2020, is being run by and represents the views of Early Career RAS

The ECN also had a strong presence at NAM 2022, delivering two collaborative sessions focused on Early Career Development and Careers and an Early Career Lunch which were well attended both in person and online. The events included a panel of experts on hand to offer support and practical career advice to participants from across the world. The year has been a great success – and we are looking forward to future events designed to support our community.



Sharing Knowledge



The RAS hosted an ESA press briefing
at Goonhilly Earth Station in June, on
the huge Gaia Data Release 3 (GES)

Education and outreach events

The Society's Education and Outreach activities also moved back to face-to-face events while continuing with hybrid access to reach a broader audience.

In February the spectacular Bicentenary Timeline artwork was installed in Burlington House. This celebration of our origins, heritage and activities over 200 years also has an online presence on Instagram. The Society also contributed to the International Astronomical Union celebration of Women and Girls in Astronomy, providing five videos from leading women astronomers – all RAS Fellows – telling 'Inspiring Stories' about their lives and work. So far these have been viewed around 1500 times. The videos celebrating 100 years of geophysics publishing by the RAS have been viewed 500 times. A YouTube EO highlight was the conversation with author Oliver Jeffers to promote his new book 'Meanwhile Back on Earth', viewed by 290 school classes.

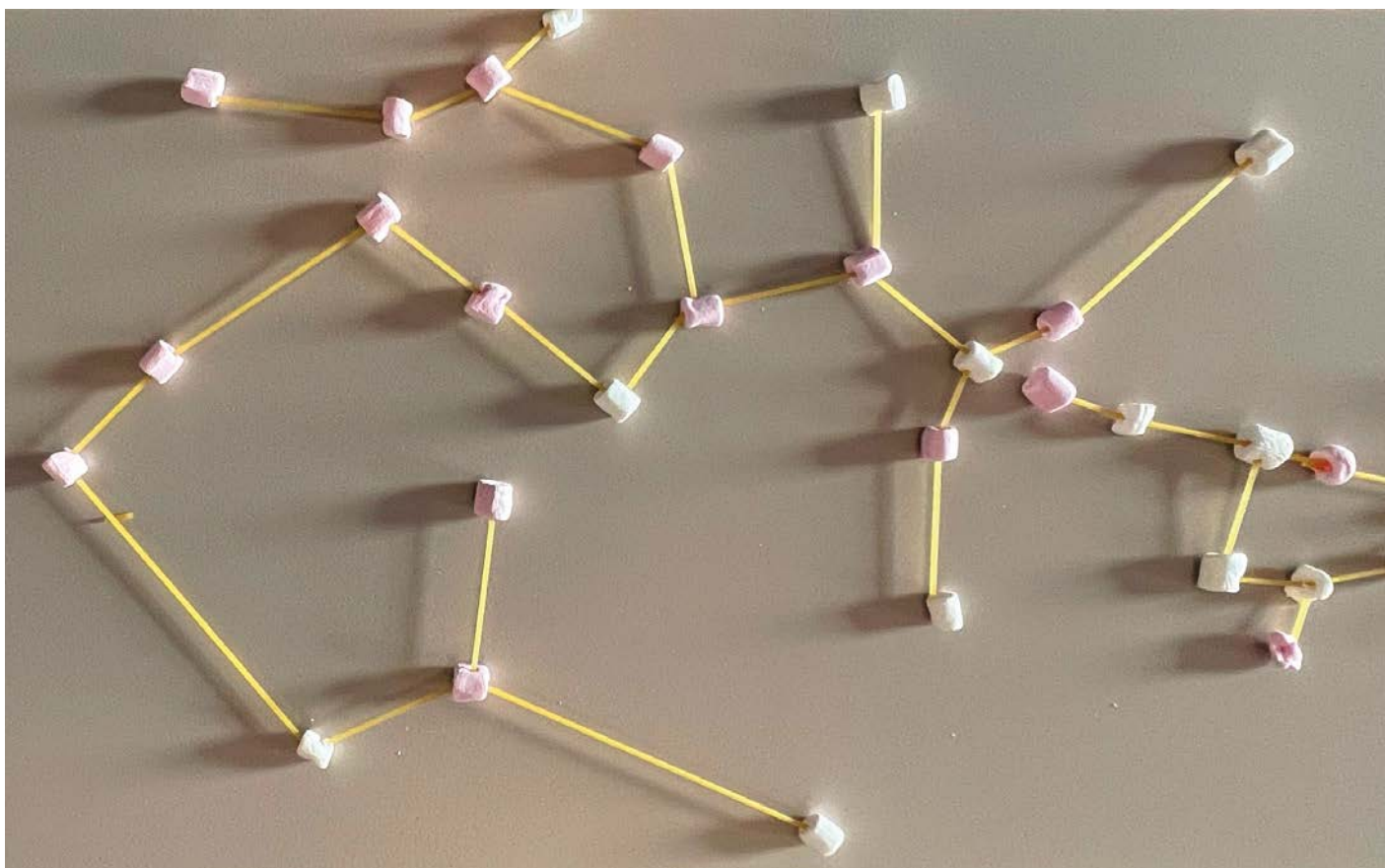
Over the year RAS staff gave keynote

The Society disseminates knowledge to students, the press and the wider public by:

- Organising education and outreach events
- Arranging a programme of Public Lectures
- Exploiting the resources of the Library and Archives
- Promoting research in the media and social media
- Supporting the Friends of the RAS
- Working with specialist partners through RAS200
- Working with the Courtyard Societies as a cultural hub

talks at the University of Kent, the Cheltenham Science Festival, the Ogden Trust, and the Lancashire Primary Teachers' Conference. They spoke to school students and teachers in London and the northwest of England, including schools' events for British Science Week, the ESERO Space Connections event (75 teachers) and the Interact conference in Cardiff, as well as running sessions at NAM, the European Astronomical Society meeting, and events in settings such as local libraries, reaching several hundred people. Some 65 students are enrolled in GCSE Astronomy classes run by the Society.

Below: Marshmallow constellation, one of the outreach activities run by RAS staff in 2022 (RAS/L Offer)



Public lectures

In 2022 the RAS ran seven public lectures, mostly with an audience in Burlington House as well as online. The lectures were attended by 1884 people and had a total of 4000 views online on the RAS YouTube channel.

Katrin Raynor-Evans Exploring astronomy and space through philately – a brief introduction

Áine O'Brien The Winchcombe Meteorite: Looking back on the lockdown meteorite one year on

Dr Jenny Carter Earth versus Sun: a precarious relationship in space

Prof. Elizabeth Tasker How to build a habitable planet

Prof. Martin Rees Space exploration and the search for extraterrestrial life -- with humans and with robots.

Prof. Virginia Trimble and Prof David Weintraub A conversation with the editors of 'The sky is for everyone: women astronomers in their own words'

Dr Henrik Melin New Eyes on The Universe: The James Webb Space Telescope

Library and Archive outreach

The main outreach event for the RAS Library was taking part in Open House 2022 for the first time in three years. Instead of a single day in September, the Society hosted a nine-day series of tours, performances, activities and events, with 300 attendees ranging from school children and members of the public to Fellows and Trustees, allowing people to see the library and its collections related to Lynda Laird's audio-visual installation (e.g. Caroline Herschel's copy of *Atlas Coelestis*), the bicentenary quilt, and the Timeline banner installation.

After a virtual tour for Care for Carers in January, demand for online visits dropped off. In-person visits resumed in



Getting young Eyes on Mars

Eyes on Mars was created by Catherine Regan and Priya Patel, PhD students at the Mullard Space Science Laboratory, University College London, with support from an RAS Education and Outreach grant. They wanted to raise awareness of UK work on Mars exploration among students aged 7–13. Inspired by the UK-built camera onboard the Rosalind Franklin Rover, Catherine and Priya designed an activity where students can make their own filter wheel (above) and use it to conduct science in the environment

around them – just like the next Mars rover will!

So far, they have provided free resources for this activity to 29 schools and youth groups, reaching more than 1400 students. The activity packs sent to groups contain the materials needed for participants to make their own filter wheel, as well as the complete lesson plan for demonstrators, alongside activity sheets and stickers. Many participants said that their perceptions of scientists had changed after taking part in Eyes on Mars, and they now believed that this was a career that was accessible to them. (Eyes on Mars)

May, with over 100 visitors taking part in eight tours for groups such as Friends of Imperial College, Open Age, London Amateur Astrophysics Group, the NASA Insight team and a NERC doctoral training programme.

Media and social media

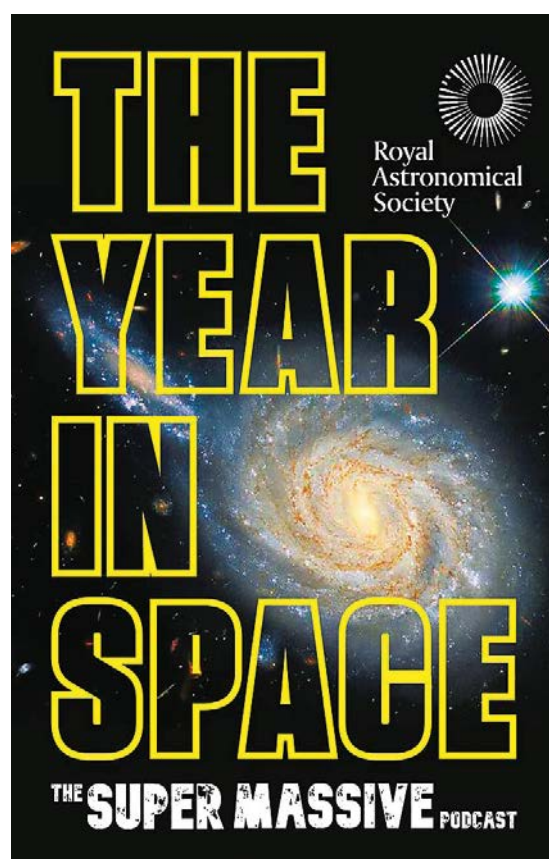
51 press releases were sent out to promote research published in Society journals and presented at our conferences in 2022, as well as our announcements, awards and medals; these led to an estimated 250 articles, at the least. We continue to reach national and international news providers, including all major UK newspapers and broadcast outlets. Highlights included the possibility of a habitable exoplanet orbiting a white dwarf star, the partial solar eclipse in October, and a new record holder for the most distant galaxy yet observed.

The National Astronomy Meeting led to around 100 articles. By happy coincidence, the first James Webb Space Telescope results were announced that week, resulting in 18 radio and TV interviews with conference delegates. *The Sky at Night* filmed a NAM audience reacting to the first images released to the public.

Over the year RAS staff were interviewed and quoted 115 times by press, online, TV and radio outlets, on topics ranging from Moon Trees to the solar eclipse and other astronomical events. The RAS hosted a press conference for third Gaia Data Release, from Goonhilly Earth Station, Cornwall.

Social media channels and YouTube continued to grow in importance. Our Mars opposition post was viewed 2600 times, for example, after a mention and link in a *Daily Mail* article. Our social media followers grew over 2022, particularly on

Right: *The Supermassive* podcast team published a spinout book *The Year in Space*.



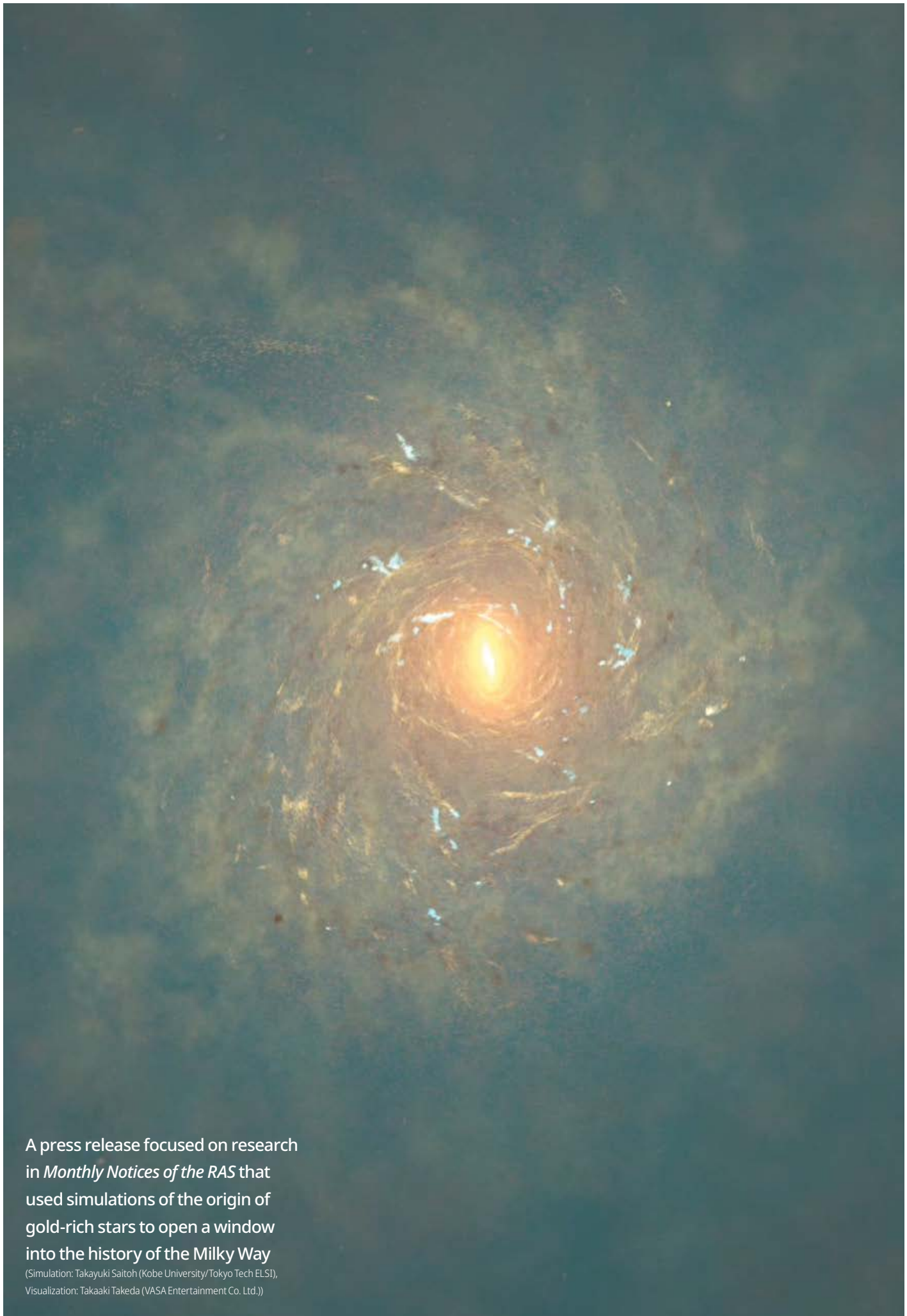
**THE SUPER-
MASSIVE
PODCAST
HAS BEEN
LISTENED TO
MORE THAN
650,000
TIMES**

LinkedIn (+196%) and Instagram (+31%). Facebook and Twitter followers grew by 4% and 5% respectively. The RAS created a Mastodon account to establish a presence there. Our most successful tweets were on the opposition of Mars (nearly 77 000 impressions) and the partial solar eclipse (168 000 impressions).

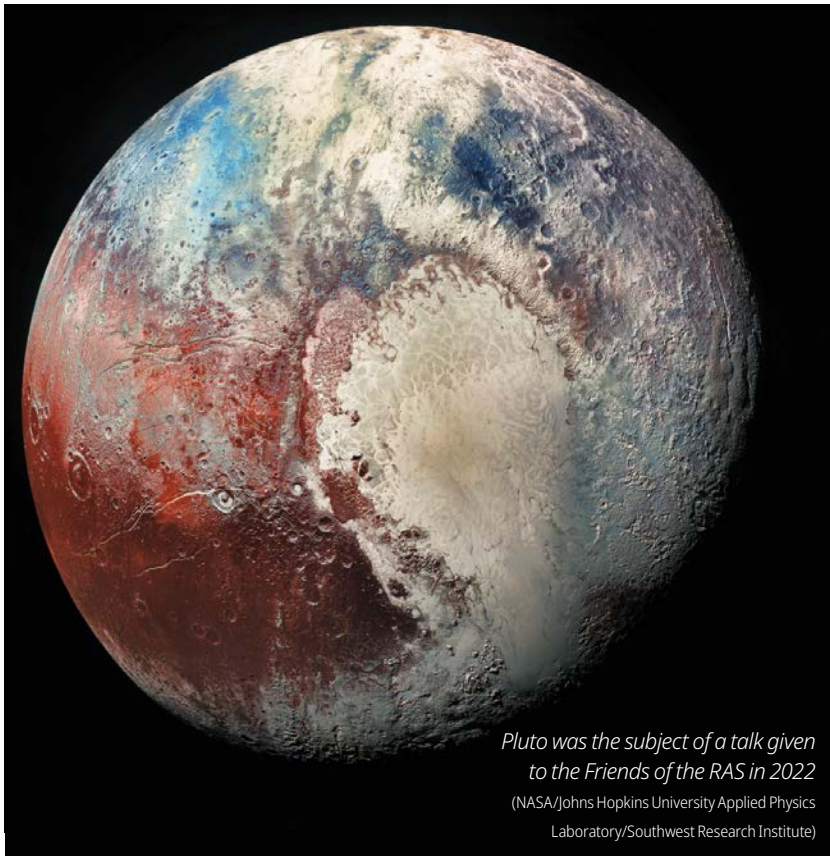
The Supermassive podcast continues to perform very strongly, regularly the number 1 astronomy podcast in the UK and US charts, and has now been listened to more than 650 000 times – 18 000 per episode, on average. The largest audience share is in the 25-34 years old age group and, unusually for STEM podcasts, one third of the listeners are women. This year the team published a spinout book *The Year in Space*, a project initiated by the publisher Hachette.

Friends of the RAS

The Friends of the RAS continued to hold lectures online through 2022, with topics including 'Astronomy in an age of



A press release focused on research
in *Monthly Notices of the RAS* that
used simulations of the origin of
gold-rich stars to open a window
into the history of the Milky Way
(Simulation: Takayuki Saitoh (Kobe University/Tokyo Tech ELSI),
Visualization: Takaaki Takeda (VASA Entertainment Co. Ltd.))



individuals – in depth engagement – or increasing the numbers engaging with STEM – breadth of engagement – or both. Through these projects, our partner organisations and the Fellows who worked with them took RAS sciences out to significant new audiences and learned how those sciences could further their objectives: boosting confidence, broadening horizons, enhancing well-being and inspiring learning. RAS200 leaves the Society a legacy of greater social engagement and involvement, and offers lessons for effective future outreach.

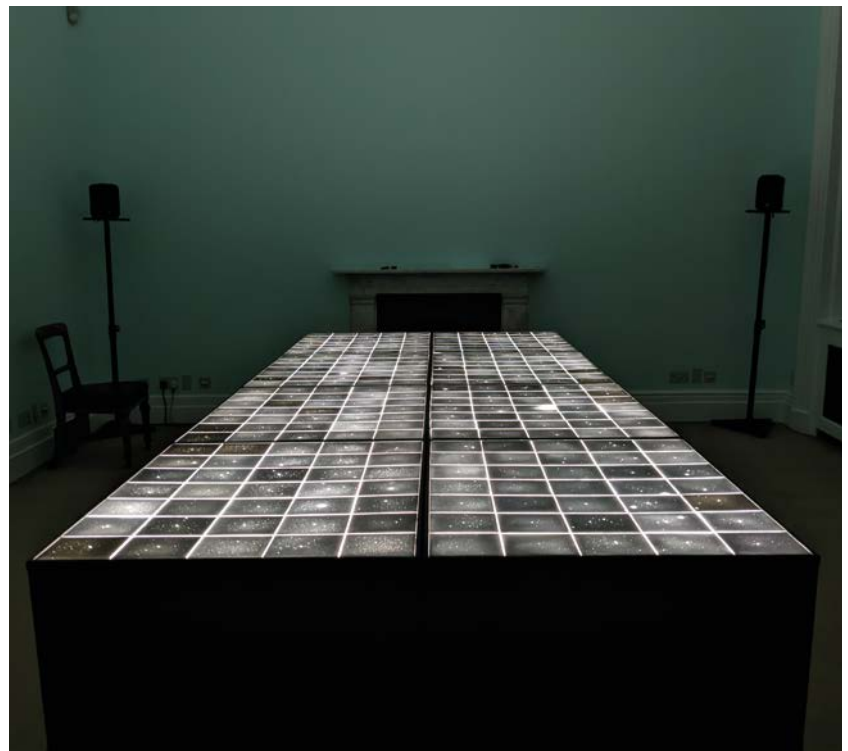
Working with Burlington House Courtyard Societies

An installation created by artist Lynda Laird was the focus for outreach activities at the Open House event, in which we joined our fellow Courtyard Societies. This photographic work 'An Imperfect Account of a Comet' arose from the work of Caroline Herschel; speakers and activities for families included a Spectrum Drama actress playing Caroline Herschel.

revolutions: the foundation and founders of the Royal Astronomical Society, 'The Pluto Story' and 'The Euclid mission: measuring the geometry of the Universe'. The membership reached 268 in 2022.

RAS200

RAS200: Sky & Earth was planned as a cornerstone of the Society's bicentenary celebrations – an innovative outreach project in which the RAS worked with specialist partner organisations to bring our sciences to wider audiences. The Covid-19 pandemic affected the Society's celebration of the bicentenary; it also meant that many RAS200 partner organisations took longer to complete their projects. The final evaluation report showed that the projects as a whole reached a direct audience of more than 200,000 people. This reflects those who took part in workshops, activities and courses, and attended exhibitions and planetarium shows, for example. RAS200 projects focused on development of



Above: At Open House, visitors had the opportunity to examine the installation 'An Imperfect Account of a Comet' by Lynda Laird, using objects observed by Caroline Herschel (L Laird/RAS)

Our Organisation



The combined solid Earth and atmospheric impacts of the eruption of Hunga volcano, Tonga, in January, were among the largest recorded; a special issue of *Geophysical Journal International* brought aspects of the research together. (ESA Jamie Perera/Midjourney)



The organisation of the RAS supported our objectives during 2022 by:

Developing a strategy for the next five years to focus on:

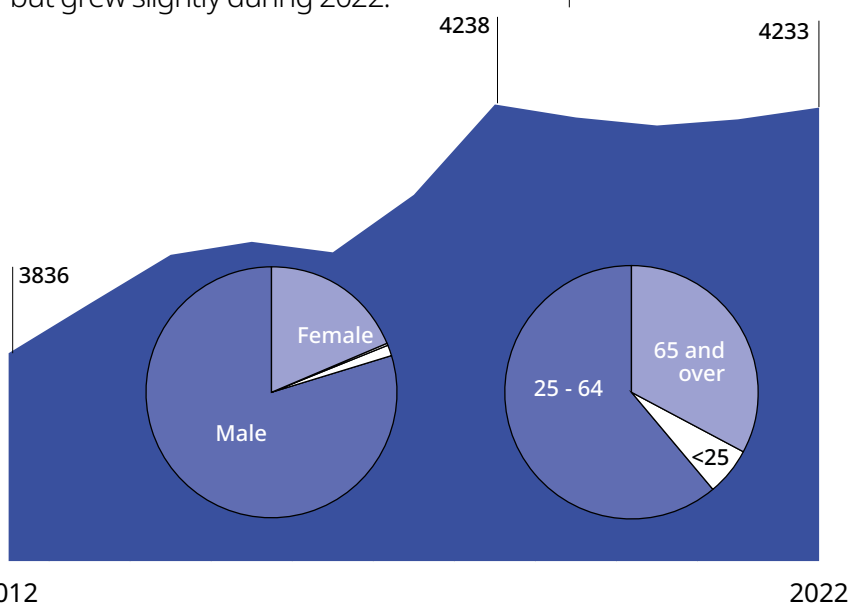
- Membership (including Fellowships and grants)
- Education and outreach – building on the success of RAS200
- Our library and heritage
- Our accommodation.

Cross-cutting themes to inform the strategy review include:

- Diversity and inclusion;
- our digital presence;
- the impact of the pandemic, and
- uncertainty in our long-term location

Membership

In 2022 the RAS had 4233 Fellows of whom 161 were Honorary Fellows. The proportion of women remained at 19%; 30% were aged 65 or over and 5% were under 25 years of age. Most Fellows, 82%, lived in the UK, with 7% based in Europe and 11% in the rest of the world. The number of people elected to fellowship decreased during 2019, 2020 and 2021, but grew slightly during 2022.



Developing RAS strategy

RAS Council convened a number of working groups to cover Membership, Education and Outreach and Library and Heritage. The groups each developed a series of high level objectives for their respective areas and these were discussed in depth at a Council away-day at the Møller Institute in Cambridge in November.

The Education and Outreach working group has consulted the community more widely by organising a Specialist Discussion Meeting in this area (held in February 2023). We intend to consult further with the Fellowship and other stakeholders during 2023.

Looking Forward



The first images
were released from
the JWST during the
National Astronomy
Meeting in 2022. (NASA)

Objectives for 2023

The Society will:

- publish high-quality peer-reviewed journals;
- support students and early-career scientists through research fellowships and grants;
- recognise achievement through our medals and prizes;
- maintain high-quality research meetings, including the National Astronomy Meeting, and Public Lectures;
- sustain our Library and Archive service;
- continue our political engagement;
- maintain our programme of education and outreach, including the Friends of the RAS;
- promote our work and Fellows' work in the media and on social media;
- build our outreach work with other Courtyard Societies.

Our strategic aims for the next five years include:

- supporting and developing the Early Career Network;
- ensuring that the RAS nurtures, supports and improves diversity and inclusivity within its core community;
- working to increase both the engagement and satisfaction of our Fellows;
- reviewing the RAS and Norman Lockyer Fellowship Schemes with a view to ensuring maximum impact;
- increasing the involvement of RAS Fellows in education and outreach activities;
- ensuring our subscription rates are fair, equitable and in line with modern best practice;
- achieving maximum impact from the library, archive and object collections, within available resources;

The RAS is making plans for 2023 and the future by:

- Setting objectives to support our strategic aims
- Identifying specific goals over the next five years

- increasing the impact, reach and focus of our public engagement activities by prioritising events targeted at under-served communities.

Events since the year end American Astronomical Society Reception in Seattle

In January, the RAS and our publishing partner Oxford University Press hosted a reception in honour of Gold Medal (A) winner Professor George Efstathiou, who gave a plenary lecture at the conference. We were joined by many of our Fellows attending the AAS conference.

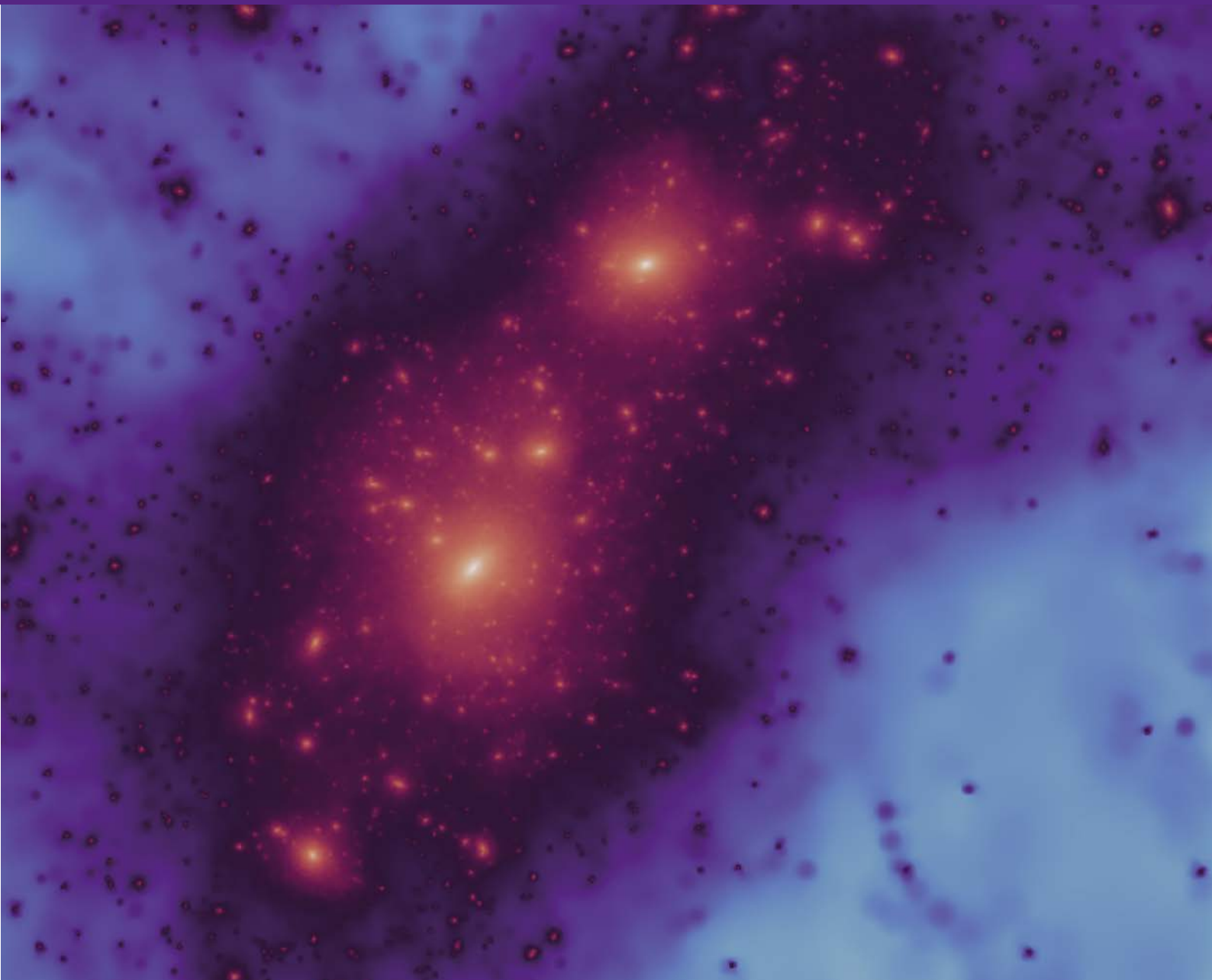
RAS200 meeting and reception

In February, RAS invited its RAS200 partners to a discussion meeting in Burlington House to discuss the outcomes, legacy and benefits to the partners of the initiative to mark its concluding phase. An evening reception was held for the partners and our active participants in the project.

Specialist discussion meeting on Education and Outreach

The RAS strategic working group on Education and Outreach led by its chair, Council member Professor Belinda Wilkes, organised the first Specialist Discussion Meeting devoted to Education and Outreach for some years. The meeting served as a community engagement session on RAS strategy in this area, where practitioners in the field could learn about the conclusions of the RAS's strategic working group and provide feedback and advice. The strategy has been refined as a result of the meeting.

Structure and Governance



Part of the SIBELIUS-DARK simulation, the largest, most accurate model of the universe; a team led from the University of Helsinki, Finland and including researchers from the University of Durham published their results in *Monthly Notices of the RAS*. (Dr Stuart McAlpine)

Governance

The Royal Astronomical Society was founded in 1820 and is incorporated by Royal Charter and managed according to byelaws that were revised at the Annual General Meeting in 2015. The objectives, charters and byelaws are detailed on the Society's website ras.ac.uk.

The control of the Society rests with the General Meeting of Fellows. Subject to that, direction and management are the responsibility of the Council (as the Trustees of the charity). The Council consists of a President, a Treasurer and three Secretaries together with four Vice-Presidents and 12 Councillors. In addition, the President-Elect attends Council for one year prior to taking up the post.

Trustee recruitment and appointment

Annually, the full membership of the Society is asked to nominate themselves or other members of the Society to available positions on Council. A nomination must be supported by two other members of the Society. Council approves the ballot list and this together with a narrative on each candidate is sent to the full membership for their consideration prior to casting their votes. We moved to fully electronic voting and an online AGM in 2020 in line with Covid-19 restrictions; we will continue with solely online voting in future. Members of the Council are elected by ballot at the AGM, for the following normal and maximum terms of office, as set out in the byelaws. In summary:

- President, two years
- Vice-Presidents, two years
- Treasurer and Secretaries, five years
- Councillors, three years.

Trustee induction and training

New members of Council attend a Trustee induction programme before

Regulations and procedures of the Society:

- Society governance
- Trustee recruitment and appointment
- Trustee induction and training
- Organisational structure
- Risks

their first Council meeting. All members of Council are asked to complete a conflict of interest declaration and to sign a Trustee declaration form. Trustees have the opportunity to attend training, where appropriate; for example, on The Governance Code. In addition to the induction session organised for new trustees, the Society held two strategy days in October/November for all Council members at the Møller Institute in Cambridge. A workshop on diversity and inclusion facilitated by an external expert was incorporated into the meeting.

Fundraising

The Society is not currently fundraising actively, but if it does so in future it will comply with best practice as outlined by the Charity Commission, and also in compliance with GDPR. The Society offers information and guidance about leaving a legacy to the RAS on the website.

Organisational structure

The RAS Council normally meets six times during the year and its function is to direct, on behalf of the Society, all the affairs and business of the Society. Council appoints standing committees (Publications Management, Editorial [for each journal], Outreach and Education, Finance, International, Membership, Library, Astronomical Heritage, Diversity in Astronomy and Geophysics) and ad hoc committees (e.g. Awards) to forward its objectives. It appoints the managing editors and editors of the Society's research journals, *Monthly Notices of the Royal Astronomical Society*,



Geophysical Journal International, and RAS *Techniques and Instruments*, who provide their services, as does the Treasurer, for an honorarium. The Society has formal associations with a number of organisations having shared interests, and has less formal arrangements with several other bodies. These include:

- The British Geophysical Association, jointly sponsored by the RAS and the Geological Society of London to represent solid-Earth geophysicists whose interests fall within the remits of both parent societies
- The Paneth Meteorite Fund that the Society administers under the direction of the Paneth Fund Trustees
- The Society is the UK national member organisation of the International Astronomical Union and the European Astronomical Society and is represented on the UK Panel of the International Union of Radio Science
- The Society is represented on a number of organisations including the Science Council, the Parliamentary and Scientific Committee and the Campaign for

Above: Artist's impression of a cataclysmic variable system as if seen from the surface of an orbiting planet; a new method of detecting such stars was the subject of an RAS press release in 2022.

(Departamento de Imagen y Difusion FIME-UANL / Lic. Debahni Selene Lopez Morales D.R. 2022)

Science and Engineering

- The Society recognises the appeal of astronomy and geophysics to the general public by offering annual membership to Friends of the RAS for a small fee. Friends' benefits include a series of Friends-only lectures, as well as priority seating for the Society's popular Public Lectures, visits to observatories and science centres, use of the Society's Library, as well as a reduced subscription to the Society's members' magazine *A&G*.

Risks

The principal risks and uncertainties identified by the Trustees are:

- Maintenance of the quality of, and income from, publications (a significant income stream of >60%)
- Open Access publishing
- Affordability of rent and service charges for the premises at Burlington House

The Finance Committee regularly reviews the Society's risk register and the Council annually reviews the major risks to which the Society is exposed and the systems that have been established to manage

those risks. In regards to the most significant risks:

- The Society insists that rigorous peer review is used to maintain the quality of the three journals and thereby the demand by authors and readers for the highly successful publications and, with the publishers, ensures that it adopts a robust business model for production and sales.
- The uncertainty over future rental charges remains an ongoing concern for the Society. The Society, alongside the other Courtyard Societies, continues to seek a satisfactory resolution with the landlord. The Trustees still hold the view previously stated (Annual Report 2015) that the Society has the resources to cover increases in rental charges over the current lease period. In the meantime, the Society will explore options for alternative accommodation if a satisfactory resolution cannot be achieved.

Other key risks identified and their mitigation measures include:

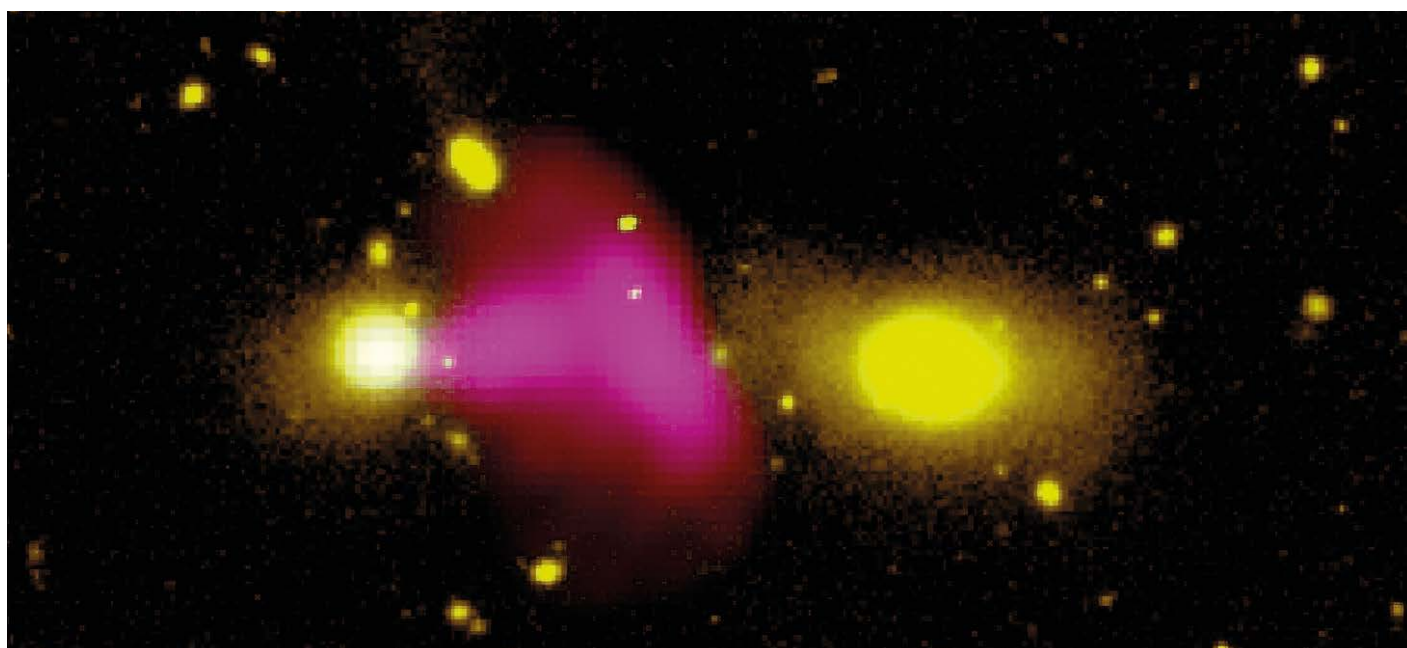
- Maintenance of the (listed)

premises (by regular repair and refurbishment)

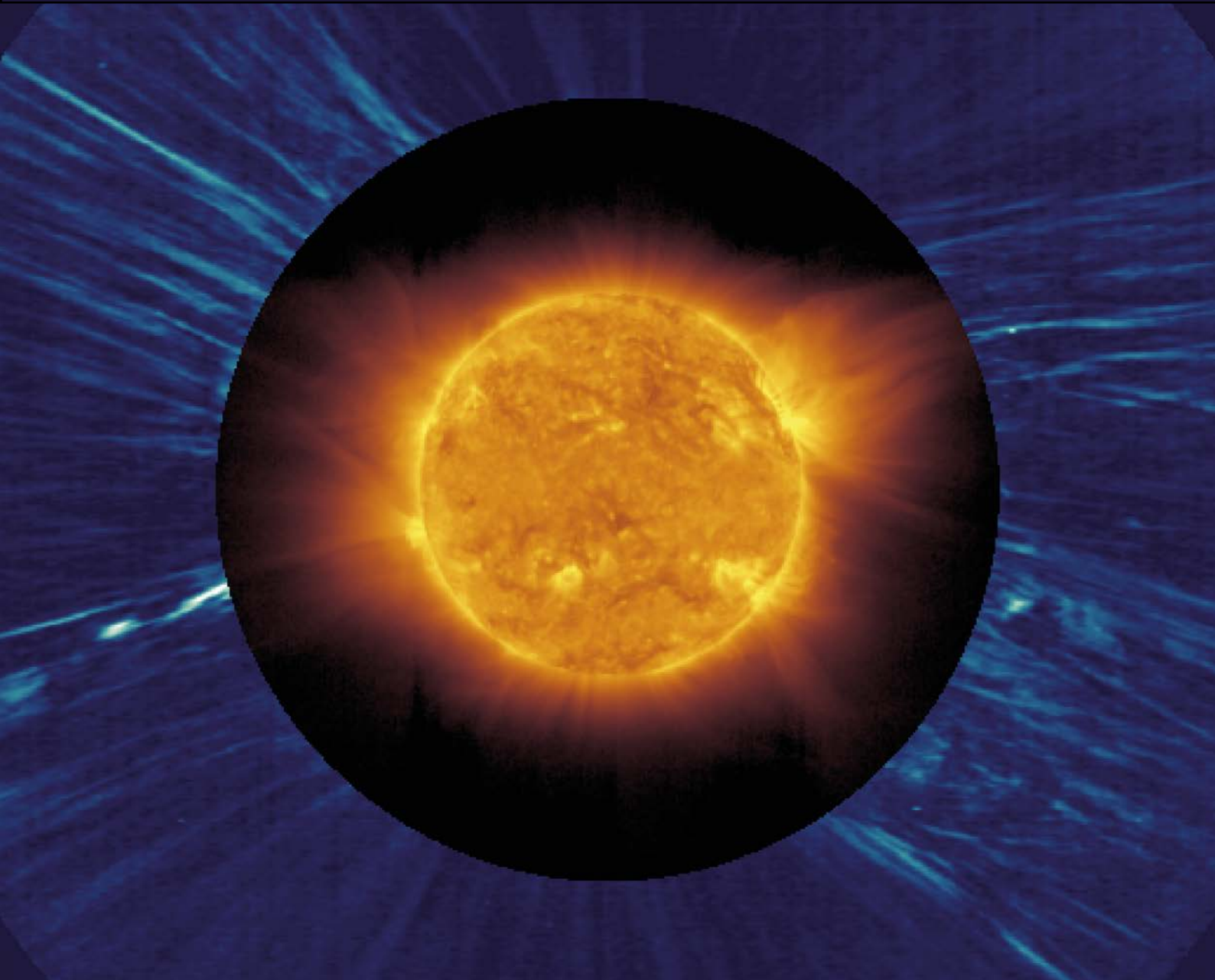
- Maintenance of the size of the membership (by regular review of services and subscriptions and outreach activities to potential new members)
- The implementation of a broad range of statutory regulation, for example GDPR (using expert external assistance where necessary).

The Trustees consider the fluctuations in investment fund values and variability of investment returns to be a risk for the Society. The fund, Newton Growth and Income Fund for Charities, is actively and expertly managed and administered by Newton Investment Management who were reappointed after a competitive tender. Funds are invested in a diverse portfolio comprising mainly equities and bonds. This managed strategy mitigates fluctuations in fund values and seeks opportunities for fund growth and income. The Trustees consider this approach mitigates the subsequent exposure to any investment risk.

Below: A large radio bubble (in pink) from a black hole in a galaxy (in yellow) reaches as far as a companion galaxy, research published in Monthly Notices of the RAS and featured in an RAS press release. (Dr Ananda Hota, GMRT, CFHT, MeerKAT)



Financial Statements



ESA's Solar Orbiter catches a solar switchback;
solar activity and its impacts on Earth was
discussed at RAS meetings in 2022.

(ESA & NASA/Solar Orbiter/EUI & Metis Teams and D. Telloni et al. (2022))

FINANCIAL REVIEW

The Society's total funds decreased from £23,646,473 to £23,477,081 during the year, both figures including a large contribution from the Society's heritage assets (rare books, clocks, telescopes and fine art) which totalled £9,470,879 (2021 – £9,470,879). Income increased to £5,280,990 (2021 – £5,236,311) due to increased income from publishing and investments. Publishing income, increased by £162,662. The Society's expenditure increased to £4,733,200 (2021 – £4,455,397) which is mainly due to increased activity enabled by the easing of Covid-19 restrictions, including travel, RAS200 activities and in-person scientific meetings.

Policy on reserves

The reserves policy aims to maintain adequate financial cover for the main risks to the Society and provide in the normal way for an efficient winding-up if that ever became necessary. Working cash reserves are maintained so the Society does not rely on realisation of investments gains, or capital invested. The total funds amounted to £23,477,081 of which £9,470,879 are held in heritage assets, leaving funds of £14,006,202 (2021 – £14,175,594) to cover the main risks and the operational needs of a going concern. The requirement for significant reserves falls into two areas:

- The need to have contingency plans in place to maintain publication income if Open Access regulations threaten the current business model for academic journals; and
- The need to make some provision for either substantial increases in rent, and maintaining the premises, or alternatively, a change in the status of our accommodation. This remains under continual review by the Society and four other Courtyard Societies. The Society's right to remain at

Burlington House under the present lease is not in doubt, but whilst the scale of future rent increases has been estimated, there remains uncertainty as to when these increases will slow down or cease. Negotiations continue with the landlord and all long-term options including alternative accommodation will be explored.

The Accommodation fund is detailed in note 17, page 56, along with the other Designated funds.

The Open Access Fund and the Burlington House Fund are currently maintained at high levels to support any significant changes to the Society's operations and the General Fund is available to provide further financial support if either of these risks materialise. The General Fund is also available, should it ever be needed, to enable an orderly winding up of the Society. At 31 December 2022 the free reserves of the Society, defined as unrestricted, undesignated funds, excluding tangible fixed assets, are £7,028,151 (2021 – £7,422,049). The Trustees are satisfied that the current level of reserves is appropriate given the risks and uncertainties outlined above.

It has been the policy of the Society to fund grant activity from the Research and Grants fund, which is now included in the balance of designated reserves.

Investment policy

Investments are held with BNY Mellon Charities Fund: Newton Growth and Income Fund for Charities, with the aim of generating capital growth and income over the medium to long term, with actively managed assets held in global equities and fixed income securities. Surplus cash is held in the COIF Charities Deposit Fund with CCLA Investment Management, which provides a high level of capital security, interest, and liquidity. The Fund has an actively managed

diversified portfolio of sterling denominated money market deposits and instruments. Income and gains from these investments contribute to fund the Society's charitable activities. Investment performance is monitored by the Accountant, Treasurer, Finance Committee and Council.

The Trustees, by resolution, adopted a total returns approach to the invested endowment funds in accordance with the requirements of the Charity Commission believing that this approach is in the best interests of the Society. The fund reconciliation is disclosed in note 12. This approach was applied from 1 January 2015 when the value of the endowment funds at that date of £1,652,682 was used as a proxy for the original value of the endowment funds. In adopting this policy, permanent endowment funds will not be permitted to fall below the original value of £1,652,682. The Trustees aim to maintain the real value of the permanent endowment as a measure against the movements in the retail prices index. This was 13.5% for the year (2021 – 7.5%). No transfers to the restricted funds were made during the year, (2021 – £281,404).

Grant making policy

The RAS has for many years provided small grants to support the community in activities not funded by the research councils. Primarily these have been awarded to help students at the start of their careers, either with funding for summer bursaries enabling them to experience working in a research environment while still an undergraduate, or to enable PhD students to present work at research conferences. The RAS has also supported scientific meetings in the UK, especially those held outside London. These broad categories of support have been discussed many times at Council and serve the purpose of encouraging entrants to the profession

and extending the activities of the Society to members and the public outside London.

In addition to these grants to individuals the Society funds a series of research fellowships to promote the careers of the highest quality young postdoctoral scientists. These currently include RAS Fellowships (on any subject) and the Norman Lockyer Fellowship (in Solar and Solar Terrestrial Physics). The Norman Lockyer Fellow is funded from an endowment fund set up for that purpose.

A further activity funded by the Society is the award of medals to recognise the highest quality work in various categories. These awards are proposed to Council by a separate awards panel and no awards are made to serving Councillors.

The grants, fellowships and awards are funded from several sources including the restricted and endowment funds invested with Newton Investment Management and the income and gains from these investments and interest from the CCLA COIF Charities Deposit Fund are used to support the grants expenditure in accordance with the bequests.

The Grants Panel deliberates twice a year and further grants are awarded by the Education and Outreach Committee. It comprises the Treasurer (Chair) and the three Secretaries. 107 applications were received for the two deadlines in February and in August. Panel members observe strict rules on conflict of interest, taking no part in decisions on grant applications from their home institutions. In addition, it is usual for panel members to absent themselves from discussions on grant applications from scientists with whom they have had recent close contact, such as research students supervised in the past five years.

Information relating to RAS200 can be found on page 22

FINANCIAL REVIEW (continued)

Key management personnel

The key management personnel of the charity in charge of directing and controlling, running and operating the charity are the Trustees, the Executive Director and the Deputy Executive Director; the latter two are employees. They are assisted by the Accountant, a further five managerial level officers and other staff.

Council ensures that the RAS carries out a salary comparison exercise every 3-5 years. The comparability study compares the staff salaries to other similar external positions to reassure the trustees that the levels of remuneration are appropriate. The last comparison exercise was carried out in 2018 with a review planned for 2023.

The Society does not have a performance related pay scheme. The trustees annually consider a salary increase in regards to cost of living that applies to all staff.

Pension scheme

The Society's defined benefit pension surplus and its accounting treatment is explained in note 20 of these financial statements. This scheme is closed to new members and has three deferred members only and nine annuitants. The Society operates a defined contribution group personal pension scheme for current staff.

Legacies and donations

The Society encourages Fellows to include donations to the Society in their wills and receives donations during the year from Fellows and members of the public. During the year the Society received donations of £4,009 (2021 - £657) and legacies of £12,324 (2021- £173,030).

Heritage assets

The Society's collection of rare books, fine art, telescopes and clocks was valued in 2011 at approximately £9.5 million. The Society does not regard these as assets which can be converted to their cash value, except in the most dire circumstances.

The Society continues to periodically receive donated items. All such donations are gratefully received and appreciated by the Society. Where a valuation is available for additions to the collection, this is reflected in the financial statements. A valuation will always be obtained for additions that are financially material to the whole collection

Investment performance

The Newton Growth and Income fund for Charities provided a yield of 2.2% and a total return gross of -5.4% in the year. Annual management charges of 0.6% are taken from the capital of the fund. Interest from the COIF Charities Deposit Fund yielded 1.2%. Performance of the fund managers is kept under continual review.

TRUSTEES' RESPONSIBILITIES IN THE PREPARATION OF FINANCIAL STATEMENTS

The Trustees are responsible for preparing the Trustees' report and the financial statements in accordance with applicable law and United Kingdom Accounting Standards (United Kingdom Generally Accepted Accounting Practice).

The law applicable to charities in England and Wales requires the Trustees to prepare financial statements for each financial year which give a true and fair view of the state of affairs of the charity and of the income and expenditure of the charity for that period. In preparing these financial statements, the Trustees are required to:

- select suitable accounting policies and then apply them consistently;
- observe the methods and principles in Accounting and Reporting by Charities: Statement of Recommended Practice applicable to charities preparing their financial statements in accordance with the Financial Reporting Standard applicable in the UK and Republic of Ireland (FRS 102);
- make judgments and estimates that are reasonable and prudent;
- state whether applicable United Kingdom Accounting Standards have been followed, subject to any material departures disclosed and explained in the financial statements;

- prepare the financial statements on the going concern basis unless it is inappropriate to presume that the charity will continue in operation.

The Trustees are responsible for keeping proper accounting records that disclose with reasonable accuracy at any time the financial position of the charity and enable them to ensure that the financial statements comply with the Charities Act 2011 and the provisions of the Royal Charter and Bye Laws. They are also responsible for safeguarding the assets of the charity and hence for taking reasonable steps for the prevention and detection of fraud and other irregularities. The Trustees are responsible for the

maintenance and integrity of the charity and financial information included on the charity's website. The Council of the Society believes that it has carried out these requirements.

AUDITORS

A resolution to appoint Buzzacott for 2023 will be proposed at the Annual General Meeting.

Approved by the Council and signed on its behalf by:

Prof. Michael G Edmunds

President

12 May 2023

INDEPENDENT AUDITOR'S REPORT TO THE TRUSTEES OF ROYAL ASTRONOMICAL SOCIETY

Opinion

We have audited the financial statements of Royal Astronomical Society (the 'charity') for the year ended 31 December 2022, which comprise the statement of financial activities, the balance sheet, the statement of cash flows, the principal accounting policies and the notes to the financial statements. The financial reporting framework that has been applied in their preparation is applicable law and United Kingdom Accounting Standards, including Financial Reporting Standard 102 'The Financial Reporting Standard applicable in the UK and Republic of Ireland' (United Kingdom Generally Accepted Accounting Practice).

In our opinion, the financial statements:

- give a true and fair view of the state of the charity's affairs as at 31 December 2022 and of its income and expenditure for the year then ended;
- have been properly prepared in accordance with United Kingdom Generally Accepted Accounting Practice; and
- have been prepared in accordance with the requirements of the Charities Act 2011.

Basis for opinion

We conducted our audit in accordance with International Standards on Auditing (UK) (ISAs (UK)) and applicable law. Our responsibilities under those standards are further described in the auditor's responsibilities for the audit of the financial statements section of our report. We are independent of the charity in accordance with the ethical requirements that are relevant to our audit of the financial statements in the UK, including the FRC's Ethical Standard, and we have fulfilled our other ethical responsibilities in accordance with these requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Conclusions relating to going concern

In auditing the financial statements, we have concluded that the trustees' use of the going concern

basis of accounting in the preparation of the financial statements is appropriate.

Based on the work we have performed, we have not identified any material uncertainties relating to events or conditions that, individually or collectively, may cast significant doubt on the charity's ability to continue as a going concern for a period of at least twelve months from when the financial statements are authorised for issue.

Our responsibilities and the responsibilities of the trustees with respect to going concern are described in the relevant sections of this report.

Other information

The trustees are responsible for the other information. The other information comprises the information included in the annual report and financial statements other than the financial statements and our auditor's report thereon. Our opinion on the financial statements does not cover the other information and we do not express any form of assurance conclusion thereon.

In connection with our audit of the financial statements, our responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the financial statements or our knowledge obtained in the audit or otherwise appears to be materially misstated. If we identify such material inconsistencies or apparent material misstatements, we are required to determine whether there is a material misstatement in the financial statements or a material misstatement of the other information. If, based on the work we have performed, we conclude that there is a material misstatement of this other information, we are required to report that fact.

We have nothing to report in this regard.

Matters on which we are required to report by exception

We have nothing to report in respect of the following matters in relation to which the Charities Act 2011 requires us to report to you if, in our opinion:

- the information given in the trustees' annual report is inconsistent in any material respect with the

financial statements; or

- sufficient accounting records have not been kept; or
- the financial statements are not in agreement with the accounting records and returns; or
- we have not received all the information and explanations we require for our audit.

Responsibilities of trustees

As explained more fully in the trustees' responsibilities statement, the trustees are responsible for the preparation of the financial statements and for being satisfied that they give a true and fair view, and for such internal control as the trustees determine is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, the trustees are responsible for assessing the charity's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless the trustees either intend to liquidate the charity or to cease operations, or have no realistic alternative but to do so.

Auditor's responsibilities for the audit of the financial statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with ISAs (UK) will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

Irregularities, including fraud, are instances of non-compliance with laws and regulations. We design procedures in line with our responsibilities, outlined above, to detect material misstatements in respect of irregularities, including fraud. The extent to which our procedures are capable of detecting irregularities,

including fraud is detailed below.

Our approach to identifying and assessing the risks of material misstatement in respect of irregularities, including fraud and non-compliance with laws and regulations, was as follows:

- the engagement partner ensured that the engagement team collectively had the appropriate competence, capabilities and skills to identify or recognise non-compliance with applicable laws and regulations;
- we identified the laws and regulations applicable to the charity through discussions with management, and from our knowledge and experience of the sector;
- we focused on specific laws and regulations which we considered may have a direct material effect on the financial statements or the operations of the charity, including the Charities Act 2011, data protection legislation, anti-bribery, employment, pensions and health and safety legislation;
- we assessed the extent of compliance with the laws and regulations identified above through making enquiries of management and inspecting legal correspondence; and
- identified laws and regulations were communicated within the audit team regularly and the team remained alert to instances of non-compliance throughout the audit.

We assessed the susceptibility of the charity's financial statements to material misstatement, including obtaining an understanding of how fraud might occur, by:

- making enquiries of management and those charged with governance as to where they considered there was susceptibility to fraud, their knowledge of actual, suspected and alleged fraud; and
- considering the internal controls in place to mitigate risks of fraud and non-compliance with laws and regulations.

To address the risk of fraud through management bias and override of controls, we:

- performed analytical procedures to identify any unusual or unexpected financial relationships;
- tested journal entries to identify unusual financial

- transactions;
- tested authorisation controls during substantive testing of expenditure;
 - assessed whether judgements and assumptions made were indicative of potential bias; and
 - investigated the rationale behind significant or unusual financial transactions.

In response to the risk of irregularities and non-compliance with laws and regulations, we designed procedures which included, but were not limited to:

- agreeing financial statement disclosures to underlying supporting documentation;
- reading the minutes of meetings of those charged with governance; and
- enquiring of management and those charged with governance as to actual and potential litigation and claims.

There are inherent limitations in our audit procedures described above. The more removed that laws and regulations are from financial transactions, the less likely it is that we would become aware of non-compliance. Auditing standards also limit the audit procedures required to identify non-compliance with laws and regulations to enquiry of the trustees and other management and the inspection of regulatory and legal correspondence, if any.

Material misstatements that arise due to fraud can be harder to detect than those that arise from error as they may involve deliberate concealment or collusion.

A further description of our responsibilities for the audit of the financial statements is located on the Financial Reporting Council's website at www.frc.org.uk/auditorsresponsibilities. This description forms part of our auditor's report.

Use of our report

This report is made solely to the charity's trustees, as a body, in accordance with section 144 of the Charities Act 2011 and with regulations made under section 154 of that Act. Our audit work has been undertaken so that we might state to the charity's trustees those matters we are required to state to them in an auditor's report and for no other purpose. To the fullest extent permitted by law, we do not

accept or assume responsibility to anyone other than the charity and the charity's trustees as a body, for our audit work, for this report, or for the opinions we have formed.

Buzzacott LLP



Statutory Auditor
130 Wood Street
London
EC2V 6DL

16 May 2023

Buzzacott LLP is eligible to act as an auditor in terms of section 1212 of the Companies Act 2006

STATEMENT OF FINANCIAL ACTIVITIES YEAR TO 31 DECEMBER 2022

	Notes	Unrestricted funds £	Restricted funds £	Endowment funds £	2022 Total funds £	2021 Total funds £
Income						
Donations and legacies	1	13,101	3,232	—	16,333	173,687
Other trading activities		9,309	—	—	9,309	25,691
Investment income	2	174,271	10,623	67,136	252,030	203,973
Charitable activities	3	5,003,318	—	—	5,003,318	4,832,960
Total income		5,199,999	13,855	67,136	5,280,990	5,236,311
Expenditure						
Raising funds		42,313	—	—	42,313	8,157
Charitable activities	5	4,687,107	3,780	—	4,690,887	4,447,240
Total expenditure		4,729,420	3,780	—	4,733,200	4,455,397
Net income before investment gains and losses						
		470,579	10,075	67,136	547,790	780,914
Net (losses) gains on investments	12	(494,856)	(30,371)	(191,955)	(717,182)	1,358,192
Net (expenditure) income for the year and net movement in funds						
		(24,277)	(20,296)	(124,819)	(169,392)	2,139,106
Reconciliation of funds:						
Total funds brought forward at 1 January 2022		20,518,565	1,078,588	2,049,320	23,646,473	21,507,367
Total funds carried forward at 31 December 2022		20,494,288	1,058,292	1,924,501	23,477,081	23,646,473

All gains and losses for the year are recognised in the above statement. All activities are classed as continuing.

The notes on pages 47 to 60 form part of these financial statements.

STATEMENT OF FINANCIAL ACTIVITIES YEAR TO 31 DECEMBER 2021

	Notes	Unrestricted funds £	Restricted funds £	Endowment funds £	2021 Total funds £
Income					
Donations and legacies	1	173,557	130	—	173,687
Other trading activities		25,691	—	—	25,691
Investment income	2	141,139	7,726	55,108	203,973
Charitable activities	3	4,832,960	—	—	4,832,960
Total income		5,173,347	7,856	55,108	5,236,311
Expenditure					
Raising funds		8,157	—	—	8,157
Charitable activities	5	4,440,802	6,438	—	4,447,240
Total expenditure		4,448,959	6,438	—	4,455,397
Net income before investment gains		724,388	1,418	55,108	780,914
Net gains on investments	12	937,152	51,768	369,272	1,358,192
Net income for the year		1,661,540	53,186	424,380	2,139,106
Transfer between funds	12	—	281,404	(281,404)	—
Net movement in funds		1,661,540	334,590	142,976	2,139,106
Reconciliation of funds:					
Total funds brought forward at 1 January 2021		18,857,025	743,998	1,906,344	21,507,367
Total funds carried forward at 31 December 2021		20,518,565	1,078,588	2,049,320	23,646,473

All gains and losses for the year are recognised in the above statement. All activities are classed as continuing.

The notes on pages 47 to 60 form part of these financial statements.

BALANCE SHEET 31 DECEMBER 2022

	Notes	2022 £	2022 £	2021 £	2021 £
Fixed assets					
Tangible assets					
. Heritage assets	11	9,470,879		9,470,879	
. Other assets	11	570,167		656,325	
Investments	12	9,155,783		9,872,965	
			19,196,829		20,000,169
Current assets					
Debtors	13	1,141,492		1,112,854	
Cash at bank and in hand		4,853,609		4,446,569	
		5,995,101		5,559,423	
Creditors: amounts falling due within one year	14	(1,643,346)		(1,793,956)	
Net current assets			4,351,755		3,765,467
Total assets less current liabilities			23,548,584		23,765,636
Creditors: amounts falling due after one year	14		(71,503)		(119,163)
Total net assets			23,477,081		23,646,473
The funds of the charity					
Endowment funds	15	1,924,501			2,049,320
Restricted income funds	16	1,058,292			1,078,588
Unrestricted income funds					
. Designated funds	17	13,385,888		12,993,027	
. General funds		7,108,400		7,525,538	
			20,494,288		20,518,565
			23,477,081		23,646,473

The financial statements were approved by Council on 12 May 2023 and signed on its behalf by

Prof. Michael G Edmunds
President
12 May 2023

The notes on pages 47 to 60 form part of these financial statements

STATEMENT OF CASH FLOWS YEAR TO 31 DECEMBER 2022

	Notes	2022 £	2021 £
Cash flow from operating activities			
Net cash provided by operating activities	A	191,163	521,526
Cash inflow from investing activities			
Dividends and interest from investments		252,030	203,973
Purchase of tangible fixed assets		(36,153)	(15,462)
Net cash provided by investing activities		215,877	188,511
Change in cash and cash equivalents in the year		407,040	710,037
Cash and cash equivalents at 1 January 2022	B	4,446,569	3,736,532
Cash and cash equivalents at 31 December 2022	B	4,853,609	4,446,569

NOTES TO THE STATEMENT OF CASH FLOWS FOR THE YEAR TO 31 DECEMBER 2022

A Reconciliation of net movement in funds to net cash flow from operating activities

	2022 £	2021 £
Net movement in funds (as per the statement of financial activities)	(169,392)	2,139,106
Adjustments for:		
Depreciation charge	122,311	122,230
Net losses (gains) on investments	717,182	(1,358,192)
Dividends and interest from investments	(252,030)	(203,973)
Increase in debtors	(28,638)	(264,471)
(Decrease) increase in creditors	(198,270)	86,826
Net cash used in operating activities	191,163	521,526

B Analysis of cash and cash equivalents

	2022 £	2021 £
Total cash and cash equivalents: Cash at bank and in hand	4,853,609	4,446,569

C Reconciliation of net funds

	1 January 2022 £	Cash flows £	31 December 2022 £
Cash and cash equivalents	4,446,569	407,040	4,853,609

PRINCIPAL ACCOUNTING POLICIES

The principal accounting policies adopted, judgements and key sources of estimation uncertainty in the preparation of the financial statements are laid out below.

Basis of preparation

These financial statements have been prepared for the year to 31 December 2022.

The financial statements have been prepared under the historical cost convention with items recognised at cost or transaction value unless otherwise stated in the relevant accounting policies below or the notes to these financial statements.

The financial statements have been prepared in accordance with Accounting and Reporting by Charities: Statement of Recommended Practice applicable to charities preparing their financial statements in accordance with the Financial Reporting Standard applicable in the UK and Republic of Ireland (Charities SORP) the Financial Reporting Standard applicable in the UK and Republic of Ireland (FRS 102) and the Charities Act 2011.

The charity constitutes a public benefit entity as defined by FRS 102.

The financial statements are presented in sterling and are rounded to the nearest pound.

Critical accounting estimates and areas of judgement

Preparation of the financial statements requires the Trustees and management to make significant judgements and estimates.

The items in the financial statements where these judgements and estimates have been made include:

- publication income (see income recognition policy below);
- the useful economic life of tangible fixed assets and non-depreciation of heritage assets; and
- the accrual for Burlington House rent.

Assessment of going concern

The Trustees have assessed whether the use of the going concern assumption is appropriate in preparing these financial statements. The Trustees

have made this assessment in respect of a period of at least one year from the date of approval of these financial statements.

The Trustees are fully cognisant of the risks that the Society is carrying such as the uncertainty and risks of increased rental charges for the accommodation in Burlington House, the possible risk posed by Open Access and a possible impact on the business model that relies on the publishing income and also of a low probability, albeit high impact risk, that the quality and success of the Society's publications will decrease.

Whilst recognising these risks the Trustees are content that the Society has strategies in place to manage them and are of the opinion that the Society has adequate free reserves and therefore sufficient resources to meet its liabilities as they fall due. The Reserves Policy in the Trustees' report provides more detail.

The Trustees have considered the continuing impact due to Covid-19 on the ability of the Society to continue its charitable activities. During 2022 the threat of Covid-19 declined and face to face meetings were reintroduced from July including NAM, Specialist Discussion and Ordinary Meetings.

The Trustees have also considered the continuing impact of the Russian invasion of Ukraine. The Newton Growth and Income Fund for Charities has little or no exposure to Russian or Ukraine and subsequent interest rate rises during the year increased income significantly from the CCLA COIF Charities Deposit Fund. The Society's publishing activities are world-wide, but there are no editors based in Russia or Ukraine, and Oxford University Press reports the impact on these publishing activities is minimal. Higher energy costs did not materially impact the Society and tariffs were renegotiated to 2024.

The Trustees therefore conclude that the preparation of these financial statements on a going concern basis is justified.

The Trustees have concluded that there are no other material uncertainties related to events or conditions that may cast significant doubt on the ability of the charity to continue as a going concern.

The most significant areas of judgement that affect items in the financial statements are mentioned above and detail provided in the section on risks in the Trustees' report.

Income recognition

Income is recognised in the period in which the charity has entitlement to the income, the amount of income can be measured reliably and it is probable that the income will be received.

Income comprises donations, investment income, income from the sale of publications, membership subscriptions, and other related income.

Donations, are recognised when the charity has confirmation of both the amount and settlement date. In the event of donations pledged but not received, the amount is accrued for where the receipt is considered probable. In the event that a donation is subject to conditions that require a level of performance before the charity is entitled to the funds, the income is deferred and not recognised until either those conditions are fully met, or the fulfilment of those conditions is wholly within the control of the charity and it is probable that those conditions will be fulfilled in the reporting period.

Legacies are included in the statement of financial activities when the charity is entitled to the legacy, the executors have established that there are sufficient surplus assets in the estate to pay the legacy, and any conditions attached to the legacy are within the control of the charity.

The Society has a contract with Oxford University Press for the publication of journals, which gives a percentage of the surplus made to 31 December each year to the Society. Although payments are received net, income is recognised in the financial statements on a gross basis which reflects that the Society retains the underlying long term rights. All publication income is accounted for on a receivable basis.

Membership subscriptions are payable in respect of a twelve month period in advance. The unearned portion of income received relating to the period after 31 December is carried forward as deferred income.

Investment income is recognised once the dividend has been declared and notification has

been received of the dividend due.

Interest on funds held on deposit is included when receivable and the amount can be measured reliably by the charity; this is normally upon notification of the interest paid or payable by the bank.

Expenditure recognition

Expenditure is recognised as soon as there is a legal or constructive obligation committing the charity to the expenditure. All expenditure is accounted for on an accruals basis and has been classified under headings that aggregate all costs related to the category.

Expenditure on charitable activities includes all costs associated with furthering the charitable purposes of the charity as described in the Trustees' Report.

Grants payable for the support of research or study in any areas of astronomy and geophysics are recognised in the financial statements as soon as the obligation has been authorised by the Grants Committee, which meets twice-yearly (ca. February and August) to allocate funds, the recipient has a reasonable expectation that they will receive a grant and any condition attaching to the grant is outside the control of the Society.

The costs of raising funds consist of room hire expenditure and RAS diaries bought for resale.

Allocation of support and governance costs

Support costs, including governance costs, represent indirect charitable expenditure. In order to carry out the primary purposes of the charity it is necessary to provide support in the form of personnel development, financial procedures, provision of office services and equipment and a suitable working environment.

Governance costs comprise audit fees, legal advice for trustees and costs associated with constitutional and statutory requirements, e.g. cost of trustee meetings and preparing statutory financial statements as well as costs associated with the strategic management of the Society

Support costs are apportioned based on the proportion of floor area occupied by, or proportion of staff time spent on, the activity.

Taxation

The Society is a registered charity and no liability to taxation arises on the results of its activities as applied for charitable purposes, with the exception of investment income, which is taxed at source.

Operating leases

Rentals under operating leases are charged to the statement of financial activities on a straight-line basis over the term of the lease.

Pension costs

The Society operates two pension schemes for employees and former employees. The assets of the schemes are held separately from those of the Society.

The Society operates a defined benefit pension scheme for former employees, who joined its service before 1 January 2002, providing benefits based upon final pensionable earnings. Royal London manages the pension scheme, with the investments now 100% held by Royal London.

The latest actuarial valuation at 31 December 2022 shows a pension surplus which is not recognised on the balance sheet as an asset because it is not available to the Society by way of reduced future contributions.

Actuarial gains and losses arising from new valuations and from updating valuations to the balance sheet date are recognised in the statement of financial activities as other recognised gains and losses.

The Society has established a second pension scheme (a defined contribution scheme) for employees who began service with the Society after 1 January 2002. The amount charged in the statement of financial activities in respect of the defined contribution pension scheme is the contributions payable in the year.

Foreign currencies

Monetary assets and liabilities denominated in foreign currencies are translated at the rate of exchange ruling at the balance sheet date. Transactions in foreign currencies are recorded

at the rate ruling at the date of the transaction. All differences are taken to the statement of financial activities.

Heritage assets

Heritage assets are included in the financial statements at a historic valuation which is being treated as deemed cost. There are two main classes of heritage assets that the Society possesses, which are:

- Rare Books and Manuscripts
- Fine Art and Collectibles – Historic books, portraits, busts, instruments and antique furniture.

The Society's rare book and manuscript collection is reported in the balance sheet at a valuation by Christies in 1996, with a number of items re-valued by B Quaritch Limited in 2011. The valuation basis was High Auction Estimate.

The Society's fine art and collectibles are reported in the balance sheet at a valuation by Bonhams in 1992, including index linking, with a number of items revalued by Bonhams in 2011.

The Society continues to periodically receive donated items. All such donations are gratefully received and appreciated by the Society. The Society would only obtain a valuation of the donation, if it was deemed to materially affect the overall value of the heritage asset portfolio.

Depreciation is not charged on heritage assets due to immateriality based on their extremely long useful lives and high residual values.

Other tangible fixed assets

The Society capitalises tangible fixed assets with a cost greater than £250 and an estimated useful life over one year.

Tangible fixed assets are depreciated on cost on a straight line basis from the date of acquisition over their expected useful lives as follows:

- Telephone and security system and computer equipment 4 years
- Leasehold Improvements 20 years
- Plant and machinery 10 years

Investments

Listed investments are a form of basic financial instrument and are initially recognised at their transaction value and subsequently measured at their fair value as at the balance sheet date using the closing quoted market price.

Realised gains (or losses) on investment assets are calculated as the difference between disposal proceeds and their opening carrying value or their purchase value where the investment is acquired subsequent to the first day of the financial year. Unrealised gains and losses are calculated as the difference between the fair value at the year end and their carrying value at that date. Realised and unrealised investment gains (or losses) are combined in the statement of financial activities and are credited (or debited) in the year in which they arise.

or their use restricted to, a specific purpose, or contributions subject to donor imposed conditions.

Designated funds represent monies set aside out of unrestricted funds and designated by the trustees for a specific purpose.

Unrestricted funds represent those monies which are freely available for application towards achieving any charitable purpose that falls within the Society's charitable objects.

Debtors

Debtors are recognised at their settlement amount, less any provision for non-recoverability. Prepayments are valued at the amount prepaid.

Cash at bank and in hand

Cash at bank and in hand represents such accounts and instruments that are available on demand or have a maturity of less than three months from the date of acquisition.

Creditors and provisions

Creditors and provisions are recognised when there is an obligation at the balance sheet date as a result of a past event, it is probable that a transfer of economic benefit will be required in settlement, and the amount of the settlement can be estimated reliably. Creditors and provisions are recognised at the amount the charity anticipates it will pay to settle the debt.

Fund structure

Endowment funds comprise assets which normally must be held as capital. The income arising therefrom is used to support specific activities determined in accordance with the wishes of the donor.

Restricted funds comprise monies raised for,

NOTES TO THE FINANCIAL STATEMENTS

1 Donations and legacies

	Unrestricted funds £	Restricted funds £	2022 Total funds £	Unrestricted funds £	Restricted funds £	2021 Total funds £
Donations	1,009	3,000	4,009	527	130	657
Legacies	12,092	232	12,324	173,030	—	173,030
Total funds	13,101	3,232	16,333	173,557	130	173,687

2 Investment income

	Unrestricted funds £	Restricted funds £	Endowment funds £	2022 Total funds £
Income from listed investments	141,776	8,703	55,000	205,479
Bank interest	32,495	1,920	12,136	46,551
2022 Total funds	174,271	10,623	67,136	252,030

	Unrestricted funds £	Restricted funds £	Endowment funds £	2021 Total funds £
Income from listed investments	140,726	7,707	54,974	203,407
Bank interest	413	19	134	566
2021 Total funds	141,139	7,726	55,108	203,973

3 Income from charitable activities

	Unrestricted funds	
	2022 £	2021 £
Publications (note 4)	4,578,797	4,416,135
Membership	369,762	375,992
Scientific meetings	27,958	15,228
Public policy	2,105	830
Library	4,677	2,503
Educational	543	2,083
Other	19,476	20,189
Total funds	5,003,318	4,832,960

4 Publications

	2022 £	2021 £
Income		
Monthly Notices of the Royal Astronomical Society	3,437,288	3,276,424
Geophysical Journal International	1,046,550	1,046,248
Astronomy & Geophysics	81,118	86,703
Royal Astronomical Society Techniques & Instruments	7,518	—
Other	6,323	6,760
	4,578,797	4,416,135
Expenditure		
Monthly Notices of the Royal Astronomical Society	2,447,568	2,435,372
Geophysical Journal International	699,828	651,209
Astronomy & Geophysics	168,291	189,458
Royal Astronomical Society Techniques & Instruments	20,959	—
Other	33,714	32,836
	3,370,360	3,308,875

5 Expenditure on charitable activities

Expenditure on charitable activities is analysed as follows:

	Direct costs £	Support costs £	2022 £	Direct costs £	Support costs £	2021 £
Publications (note 4)	2,948,115	422,245	3,370,360	2,926,637	382,238	3,308,875
Scientific meetings	95,751	204,579	300,330	11,924	185,195	197,119
Membership	8,842	48,582	57,424	7,203	43,979	51,182
Educational	147,795	80,590	228,385	171,284	73,480	244,764
RAS 200	86,930	5,000	91,930	19,285	4,000	23,285
Library	102,583	395,822	498,405	120,874	358,318	479,192
Public policy	62,796	81,257	144,053	69,265	73,558	142,823
	3,452,812	1,238,075	4,690,887	3,326,472	1,120,768	4,447,240

Grants, fellowships and awards in support of research are principally included under Educational and RAS 200 above to reflect the responsibilities for the management and administration of grants. 75 grants, fellowships and awards, totalling £178,412 (2021 – £105,878) were awarded to institutions and 40 grants, medals and awards totalling £28,066 (2021 – £18,801) were made to individuals. Expenditure supporting an RAS Research Fellowship totalled £32,000 (2021 – £735). Adjustments to other grants resulted in credits to expenditure totalling £54,180 (2021 – £13,364).

Total grant making support costs were £35,000 (2021 – £30,000).

A full list of all grantees and analysis can be found on the Society's website.

All expenditure on charitable activities is unrestricted except for £3,780 (which is entirely included within the educational category) which is restricted (2021 – £6,438).

6 Support costs

Support costs analysed by function are as follows:

	2022 £	2021 £
Executive	124,102	123,363
Finance	96,280	97,591
Facilities	99,890	90,026
Membership	41,625	38,901
IT	84,202	74,065
Policy, development and press	107,819	100,990
Burlington House	168,808	151,804
Other	362,237	320,696
Governance (note 7)	153,112	123,332
	1,238,075	1,120,768

Staff time (based on a review of staff time apportionment) and floor area, are used as bases of apportioning support costs over charitable activities.

7 Governance costs

	2022 £	2021 £
Auditor's remuneration (note 8)	23,350	24,000
Trustees' and Committee costs	18,921	6,277
AGM expenses	9,107	8,353
Staff time and other expenses	101,734	84,702
	153,112	123,332

8 Net (expenditure) income for the year

This is stated after charging:

	2022 £	2021 £
Depreciation	122,311	122,230
Auditor's remuneration:		
. Charity audit	17,500	18,000
. Pension scheme audit	5,850	6,000
. Other services	750	—
Operating lease rentals:		
. Office equipment	7,449	9,347

9 Staff costs and remuneration of key management personnel

	2022 £	2021 £
Wages and salaries	972,010	913,672
Social security costs	106,197	86,264
Pension costs (see note 20):		
• Stakeholder pension scheme	82,315	79,918
• Death in service contributions	6,924	4,531
	1,167,446	1,084,385

During the year one employee of the Society earned between £80,000 and £90,000 (2021 – one employee) one employee earned between £70,000 and £80,000 (2021 – no employee) and one employee earned between £60,000 and £70,000 (2021 – one employee). Employer contributions to the stakeholder pension scheme for employees earning over £60,000 were £ 21,980 (2021 – £14,840).

The average number of employees was 24 (Administration 7, Outreach 2, Editorial 10, Library 2, House 1, Press & Policy 2) (2021 – 24).

The key management personnel of the charity in charge of directing and controlling, running and operating the charity on a day to day basis comprise the Trustees and the Executive and Deputy Executive Directors. The total remuneration (including taxable benefits and employer's pension and national insurance contributions) of the key management personnel for the year was £202,413 (2021 - £187,172).

10 Transactions with Trustees

The Trustees receive reimbursement for travel expenses incurred in attending meetings. The amount reimbursed during the year for 14 Trustees was £11,561 (2021 – £98).

Remuneration of £6,292 was paid to one Trustee during 2022 (2021 – £5,914 to one Trustee). By agreement with the Charity Commissioners (dated 14 June 2004, case No. 299189, Sealing No. 344/04) the Treasurer is paid an Honorarium. This is formally approved each year by Council.

Grants Made to Councillors

The following grants were made to Councillors during the year as part of the RAS grant awarding process. The recipients had no influence or part in the decisions on the award of these grants. For the most part the grant holders were not the main personal beneficiaries as the support was directly received by their students or meeting attendees. Excluding Councillors from the grants round completely is not seen as a satisfactory policy. It would strongly dissuade members from standing for election as Councillors and would be at variance

with the accepted practice in research councils where members of grants panels are not excluded from applying. The process of grant review and award fully complies with the Nolan Principles and closely follows Government Research Council practice.

The grants were:

- Sir Norman Lockyer Memorial Trust as disclosed in note 22 (which shares the same board of trustees as the Society).
- F A Paneth Meteorite Collection as disclosed in note 22. Dr Nigel Berman, Treasurer, is a Trustee and Dr Caroline Smith, Trustee, is Secretary of the F A Paneth Meteorite Collection
- A £1,200 summer undergraduate bursary was awarded to Northumbria University, supervised by Clare Watt who is a Trustee
- A £1,200 summer undergraduate bursary was awarded to the University of Southampton, supervised by Matthew Middleton who is a Trustee.
- £1,000 from the Patricia Tomkins Thesis Prize fund was awarded to University College London. Patricia Tomkins is a Trustee.

11 Tangible fixed assets

a) Heritage assets

	Rare books and manuscripts £	Fine art and collectibles £	Total £
At 1 January 2022 and 31 December 2022	4,951,500	4,519,379	9,470,879

Fine art and collectible additions of £30,000 were recorded in 2020. There were no other additions in the last five years.

The rare book collection is preserved by storing in an air-conditioned, temperature-controlled environment; the fine art and collectibles are also continually preserved in order to maintain their values.

Certain heritage assets are on public display at exhibitions. The Society's Librarian controls access to those heritage assets which are kept at Burlington House.

b) Other assets

	Leasehold improve- ments £	Plant and machinery £	Telephone, security & computer equipment £	Past Presidents' Portraits £	Total £
Cost					
At 1 January 2022	1,878,405	36,375	316,308	9,994	2,241,082
Additions	1,017	1,985	33,151	—	36,153
Disposals	—	—	(10,000)	—	(10,000)
At 31 December 2022	1,879,422	38,360	339,459	9,994	2,267,235
Depreciation					
At 1 January 2022	1,294,523	17,235	272,999	—	1,584,757
Charge for the year	94,013	3,836	24,462	—	122,311
Disposals	—	—	(10,000)	—	(10,000)
At 31 December 2022	1,388,536	21,071	287,461	—	1,697,068
Net book values					
At 31 December 2022	490,886	17,289	51,998	9,994	570,167
At 31 December 2021	583,882	19,140	43,309	9,994	656,325

12 Investments

	2022 Total funds £	2021 Total funds £
Market value at 1 January 2022	9,872,965	8,514,773
Net unrealised investment (losses) gains	(717,182)	1,358,192
Market value at 31 December 2022	9,155,783	9,872,965
Historical cost as at 31 December 2022	4,917,081	4,917,081

Investments comprise BNY Mellon: Newton Growth and Income Fund for Charities

The permanent endowment fund investments and movements in the unapplied total return are set out below.

	Trust for investment £	Unapplied total return £	Total endowment £
At 1 January 2022	1,652,682	396,638	2,049,320
Add: Total return			
. Investment income		67,136	67,136
. Net losses on listed investments		(191,955)	(191,955)
		(124,819)	(124,819)
Less:			
. Allocation to income from total return		—	—
At 31 December 2022	1,652,682	271,819	1,924,501
	Trust for investment £	Unapplied total return £	Total endowment £
At 1 January 2021	1,652,682	253,662	1,906,344
Add: Total return			
. Investment income		55,108	55,108
. Net gains on listed investments		369,272	369,272
		424,380	424,380
Less:			
. Allocation to income from total return		(281,404)	(281,404)
At 31 December 2021	1,652,682	396,638	2,049,320

When adopting total applied return with effect from 1 January 2015, in the absence of reliable records of the original donations, the Trustees considered that the market values of the investments as recorded as at 1 January 2015 were appropriate to be considered as the initial value of the trust for investment. Since that figure sets the baseline below which disposals may

not be made, taking a higher value than the actual original donations was considered to be prudent.

The Trustees have resolved that they wish to maintain the real value of the permanent endowment using the retail price index as a measure. Transfers to the restricted funds of £nil were made in the year (2021 – £281,404).

13 Debtors

	2022 £	2021 £
Trade debtors	8,492	25,987
Prepayments and accrued income	1,107,943	1,061,782
Other debtors	25,057	25,085
	1,141,492	1,112,854

14 Creditors

a) Amounts falling due within one year

	2022 £	2021 £
Trade creditors	26,128	116,601
Accruals	234,353	156,938
Grants payable	71,503	218,286
Tax and social security	208,691	200,918
Deferred income	1,038,917	1,039,016
Other creditors	63,754	62,197
	1,643,346	1,793,956

b) Amounts falling due after more than one year

	2022 £	2021 £
Grants payable	71,503	119,163

c) Deferred income

	2022 £	2021 £
Balance as at 1 January 2022	1,039,016	1,054,806
Released to income	(1,039,016)	(1,054,806)
Income received from Fellows in advance	56,540	60,920
Publications income received in advance	950,000	950,000
Other income received in advance	32,377	28,096
Balance as at 31 December 2022	1,038,917	1,039,016

15 Endowment funds

	1 January 2022 £	Income £	Investment losses £	Transfers £	31 December 2022 £
Research and Grants funds:					
. Sir Norman Lockyer fund	1,585,356	51,937	(148,496)	—	1,488,797
. Other funds	158,988	5,208	(14,892)	—	149,304
	1,744,344	57,145	(163,388)	—	1,638,101
Benevolent fund	99,789	3,269	(9,347)	—	93,711
Library fund	47,399	1,553	(4,440)	—	44,512
Lectures & Awards fund	157,788	5,169	(14,780)	—	148,177
	2,049,320	67,136	(191,955)	—	1,924,501

	1 January 2021 £	Income £	Investment gains £	Transfers £	31 December 2021 £
Research and Grants funds:					
. Sir Norman Lockyer fund	1,474,749	42,631	285,670	(217,694)	1,585,356
. Other funds	147,896	4,276	28,648	(21,832)	158,988
	1,622,645	46,907	314,318	(239,526)	1,744,344
Benevolent fund	92,827	2,683	17,981	(13,702)	99,789
Library fund	44,092	1,275	8,541	(6,509)	47,399
Lectures & Awards fund	146,780	4,243	28,432	(21,667)	157,788
	1,906,344	55,108	369,272	(281,404)	2,049,320

16 Restricted income funds

	1 January 2022 £	Income £	Expenditure £	Investment losses £	Transfers £	31 December 2022 £
Research & Grants fund	788,269	8,468	70	(14,970)	—	781,837
Benevolent fund	42,527	—	(712)	—	—	41,815
Library fund	50,178	894	—	(2,555)	—	48,517
Education fund	137,142	4,493	(1,000)	(12,846)	—	127,789
Lectures & Awards fund	60,472	—	(2,138)	—	—	58,334
	1,078,588	13,855	(3,780)	(30,371)	—	1,058,292

	1 January 2021 £	Income £	Expenditure £	Investment gains £	Transfers £	31 December 2021 £
Research & Grants fund	521,871	3,815	(2,503)	25,560	239,526	788,269
Benevolent fund	29,492	130	(797)	—	13,702	42,527
Library fund	38,703	645	—	4,321	6,509	50,178
Education fund	112,989	3,266	(1,000)	21,887	—	137,142
Lectures & Awards fund	40,943	—	(2,138)	—	21,667	60,472
	743,998	7,856	(6,438)	51,768	281,404	1,078,588

16 Restricted income funds *(continued)*

The Restricted Funds are consolidated into five groups to serve the Council's priorities and address modern needs: Research & Grants, Benevolent, Library, Education and Lectures & Awards.

A detailed fund summary can be found on the RAS website.

The restricted funds were classified to either Restricted (R), Endowment (E), Designated (D), or General (G) funds as indicated below:

Research & Grants fund

E AG Stillhamer Trust Fund (1937)
D EW Brown Trust Fund (1939)
E Plummer Bequest (1946)
G General
R Victor Nadarov Fund (1950)
E Sir Norman Lockyer Memorial Trust (1990)
R Hosie Bequest (2000)
D Mrs. J.M Jelley-Freeman Bequest (2000)
D CAG Bearpark Trust (2000)
R Patricia Tomkins Fund (2011)
G Special Purposes Fund
E E A Milne Travel Fund (2013)
R R Potter Research Fund (2017)
R Osmaston Fund (2020)

Benevolent fund

E Lee & Jansen Trust Fund (1834/1879)

E Gerald Merton Fund (1986)

G Donald R. Barber Fund (2001)

Library fund

E Turnor Fund and Horrocks Memorial Fund (1853/1876)

E Harry Watson Memorial Fund (1923)

E Warin Bushell Fund (1964)

E Gaythorp Bequest (1969)

E Ian Ridpath Conservation Fund (2006)

R Dewhurst Fund (2013)

Education fund

R Newbigen Fund (1990)

R Michael Penston Memorial Fund (1991)

R Sir William Hunter McCrea Memorial Fund (2000)

R Paul Ruffle Memorial Fund (2014)

D Education Committee

Lectures & Awards fund

E Hannah Jackson-Gwilt Trust Fund (1861/1893)

E George Darwin Lectureship Fund (1926)

E George Darwin Support Fund

D AS Eddington Commemoration Fund (1948)

E Harold Jeffreys Lectureship Fund (1962)

E AT Price Medal Fund (1999)

E Gerald Whitrow Memorial Lecture Fund (2001)

E Fowler Prizes Fund (2004)

17 Designated funds

	1 January 2022 £	New designation £	Utilised/ released £	31 December 2022 £
Accommodation fund	1,000,000	500,000	—	1,500,000
Burlington House fund	552,836	—	(94,013)	458,823
Heritage Asset fund	9,470,879	—	—	9,470,879
Building fund	1,311,622	—	94,013	1,405,635
Open Access fund	392,596	—	—	392,596
RAS 200	142,433	—	(86,930)	55,503
Research & Grants fund	122,661	—	(20,209)	102,452
Total designated funds	12,993,027	500,000	(107,139)	13,385,888

17 Designated funds *(continued)*

	1 January 2021 £	New designation £	Utilised/ released £	31 December 2021 £
Accommodation fund	1,000,000	—	—	1,000,000
Burlington House fund	646,800	—	(93,964)	552,836
Heritage Asset fund	9,470,879	—	—	9,470,879
Building fund	1,217,658	—	93,964	1,311,622
Open Access fund	392,596	—	—	392,596
RAS 200	161,718	—	(19,285)	142,433
RAS 2020	15,000	—	(15,000)	—
Research & Grants fund	122,848	75,000	(75,187)	122,661
Total designated funds	13,027,499	75,000	(109,472)	12,993,027

(i) Accommodation fund

This fund represents the requirement to finance a possible relocation due to the ongoing negotiations concerning the lease at Burlington House.

(ii) Burlington House fund

Under lease agreements signed in 2005 with the Department of Communities and Local Government (previously Office of the Deputy Prime Minister - ODPM), the Society and four others in the Burlington House courtyard secured future occupancy on the basis of paying rent and additionally, being responsible for the external fabric of the building, following a renovation programme, carried out by the ODPM in mid-2006. In 2006-7, the Society executed a refurbishment project on the interior of the apartments. Expenditure incurred on the project has been capitalised and designated as the Burlington House fund.

(iii) Heritage Asset fund

A fund has been established to include the Society's heritage assets to recognise that there is no intention to dispose of these assets and the amount is not readily available to meet expenditure.

(iv) Building fund

The repairs and maintenance of the exterior of the building, its insurance and some security costs are carried out by the landlord for all the occupants and a proportion recharged to the Society. The Building

Fund should provide for internal and external maintenance of the building and provide for the possibility, at the end of lease, if necessary, to obtain a building for the Society's use. The Finance Committee will recommend how much more to accumulate in this fund and at what rate. The timescale for expenditure is difficult to forecast but in principle could start within five years.

(v) Open Access fund

A fund has been established to provide against the risk of the possible collapse of the current business model for learned publishing due to various forms of open access. The timescale for expenditure is difficult to forecast but could in principle start within five years.

(vi) RAS 200

The original fund balance of £1,000,000 was the total committed grant expenditure for RAS 200. RAS 200 grant expenditure is being charged to this fund from 2015 to 2023.

(vii) RAS 2020

This represented the estimated expenditure associated with the RAS bicentenary celebrations, associated events and activities.

(viii) Research and Grants fund

This represents those funds to be used for research and grants.

18 Analysis of net assets between funds

	General funds £	Designated funds £	Restricted funds £	Endowment funds £	2022 Total funds £
Tangible assets:					
. Heritage assets	—	9,470,879	—	—	9,470,879
. Other fixed assets	80,249	489,918	—	—	570,167
Investments	4,320,008	1,852,982	1,058,292	1,924,501	9,155,783
Current assets:					
. Debtors	1,141,492	—	—	—	1,141,492
. Cash at bank and in hand	3,098,990	1,752,189	2,430	—	4,853,609
Current liabilities	(1,532,339)	(108,577)	(2,430)	—	(1,643,346)
Non-current liabilities	—	(71,503)	—	—	(71,503)
Total net assets	7,108,400	13,385,888	1,058,292	1,924,501	23,477,081

	General funds £	Designated funds £	Restricted funds £	Endowment funds £	2021 Total funds £
Tangible assets:					
. Heritage assets	—	9,470,879	—	—	9,470,879
. Other fixed assets	103,489	552,836	—	—	656,325
Investments	5,095,056	1,650,001	1,078,588	2,049,320	9,872,965
Current assets:					
. Debtors	1,112,854	—	—	—	1,112,854
. Cash at bank and in hand	2,860,801	1,567,866	17,902	—	4,446,569
Current liabilities	(1,646,662)	(129,392)	(17,902)	—	(1,793,956)
Non-current liabilities	—	(119,163)	—	—	(119,163)
Total net assets	7,525,538	12,993,027	1,078,588	2,049,320	23,646,473

19 Leasing commitments

At 31 December 2022, the charity had total future minimum commitments in respect of non-cancellable operating leases as follows:

Office equipment	2022 £	2021 £
Amounts payable within one year	7,134	6,496
Amounts payable between two and five years	5,105	11,601
	12,239	18,097

20 Pension schemes

A qualified actuary carried out a triennial review of the defined benefit scheme as at 1 January 2022; the actuarial valuation showed that the market value of the Scheme's assets was £1,009,000 which represents 124% of the benefits that accrued to members after allowing for expected future

increases in earnings. The actuary has calculated that no contributions are payable from 1 January 2016.

Pension costs comprise £82,315 (2021 – £79,918) in respect of the defined contribution scheme and £6,924 (2021 – £4,531) in respect of Death in Service contributions.

20 Pension schemes *(continued)*

Retirement benefits disclosure under FRS102

The actuarial valuation for FRS 102 purposes, at 31 December 2022, shows a pension surplus of £507,000 (2021 – £472,000) which cannot be recognised as this is not available to the Society by way of reduced future contributions.

The amounts recognised in the balance sheet are as follows:

	2022 £'000	2021 £'000
Present value of funded obligations	(259)	(537)
Fair value of scheme assets	766	1,009
Surplus not recognised	(507)	(472)
Surplus in scheme at end of the year and available to the Society	—	—

Changes in the present value of the defined benefit obligations are as follows:

	2022 £'000	2021 £'000
Opening defined benefit obligation	537	548
Interest cost	11	8
Re-measurement arising from changes in assumptions and experience	(198)	(19)
Benefits paid	(91)	—
Closing defined benefit obligation	259	537

Changes in fair value of scheme assets are as follows:

	2022 £'000	2021 £'000
Opening scheme assets	1,009	916
Interest Income	21	14
Actual return on plan assets, excluding interest income	(173)	79
Benefits paid	(91)	—
Closing scheme assets	766	1,009

The amounts recognised in other recognised gains and losses are as follows:

	2022 £'000	2021 £'000
Remeasurement of defined benefit obligation	(198)	(19)
Return on plan assets	173	(79)
Effect of surplus restriction	25	98
Total	—	—

The actual return on scheme assets was negative £152,000 (2021 – positive £93,000).

20 Pension schemes *(continued)*

Retirement benefits disclosure under FRS102 *(continued)*

The major categories of scheme assets as a percentage of total scheme assets are as follows:

	Fair value of scheme assets	
	2022 %	2021 %
Equities	21	25
Bonds	9	12
Property	5	6
Cash	10	8
Gilts	55	49
	100	100

Principal actuarial assumptions at the balance sheet date (expressed as a weighted average):

	2022 %	2021 %
Discount rate at 31 December	4.9	2.1
Retail Prices Index	3.1	3.5
Consumer Prices Index	2.5	2.8
Increases in deferment	2.5	2.5
Future pension increases – pension earned before 6 April 1997	0.0	0.0
Future pension increases – pension earned on or after 6 April 1997	3.1	3.5

The current mortality rate assumptions include sufficient allowance for future improvements in mortality rates. The assumed life expectancy for a pensioner retiring at 65 on the balance sheet date is:

	2022	2021
Retiring now		
Male	20.2	20.2
Female	22.2	22.5
Retiring in 20 years		
Male	21.4	21.5
Female	23.7	23.9

Amounts for the current and previous four periods are as follows:

Defined benefit pension scheme:

	2022 £'000	2021 £'000	2020 £'000	2019 £'000	2018 £'000
Defined benefit obligations	259	537	548	488	461
Scheme assets	766	1,009	916	911	823
Surplus	507	472	368	423	362

21 Grants committed

Grants, principally fellowships and travel and research grants to the value of £281,500 have been committed for future payment, subject to certain conditions, specified by the Society, having been met (2021 – £347,981). These grants were not approved or communicated to the recipients until after the year end and therefore have not been accounted for in the year ended 31 December 2022.

22 Connected Charities and related party transactions

Since 2001, the Society has been the administration agent for the Trustees of FA Paneth Meteorite Collection, a charity connected to the Royal Astronomical Society. The Paneth Trustees decided that its income should support research in Cosmochemistry by graduate and postdoctoral students. The accumulated net expenditure of £50,789 (2021 – £46,772), is included in Other Creditors. Grants awarded in 2022 totalled £5,920 (2021 – £nil). Total income was £10,365 (2021 – £10,261).

The Society also administers the Sir Norman Lockyer Memorial Trust, (charity registration number 900135). By agreement with the Charity Commission the Society includes the following information within

these financial statements. Each charity remains a separate legal entity. The Norman Lockyer Fellowship is awarded to enable an outstanding researcher to devote the majority of their time to research on an astronomical topic, including solar system and planetary science. They are named after Sir Norman Lockyer (1836-1920), pioneering solar astronomer and discoverer of helium. The fellowship is available every three years, with applications sought in the years 2016, 2019, 2022 etc. for fellowships starting in the following year. The fellowship is open to those who hold a doctorate from a recognised institution of higher education at the time of taking up the award. Applicants must normally be 30 years of age or younger on 1 October of the year of appointment. The Society funds Fellows between spine points 30 and 36 (inclusive) on the UCU HE Framework single pay spine. During the year The Norman Lockyer Fellowship funded no fellowships. Expenditure for the year amounted to £nil, (2021 – £1,003). The fund balance, including the unspent balance in the restricted fund is £2,059,388 (2021 – £2,155,949)

Transactions involving Trustees are also disclosed in note 10.

A £3,000 donation was received from the Patricia Tomkins Foundation. Patricia Tomkins is a Trustee.





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