

Dublin Institute for Advanced Studies

Annual Report





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Philip Nolan, Director General Science Foundation Ireland, visits DIAS and meets with representatives from all of our Schools and Sections.



Registrar & CEO Dr. Eucharia Meehan and Senior Professors









Astronomy & Astrophysics Section



An Taoiseach Micheál Martin TD visits DIAS to launch *Poetics and Polemics* by School of Celtic Studies Assistant Professor Dr. Michelle O'Riordan. The visit took place during the DIAS School of Celtic Studies Summer School. L-R Professor Liam Breatnach, Dr. Michelle O'Riordan, An Taoiseach Micheál Martin, Professor Ruairí Ó hUigínn (Director, DIAS School of Celtic Studies), Dr. Eucharia Meehan (DIAS CEO & Registrar).

Chairman's Statement

2022 was the year whereby the physical Institute was re-invigorated and strengthened as a place of collegial interaction and teamwork, as a hub for sharing ideas and knowledge, and as a space for discourse and engagement. New ways of working with international collaborators and researchers were also embedded leading to a richer research environment. It was wonderful to see the images from the first in-person Everyone@DIAS Day since 2019.

The year of course was another year of discovery. The first images from the Webb Space telescope, which launched on December 25th 2021, were published in July. DIAS is the only Irish research group involved with the global multi-billion dollar project, having been a Co-PI on the development of one of the four instruments on board, i.e. the MIRI camera. Each few months brought new images and data, and years of exciting research and discovery await. This development with the installation of Ireland's first underground seismic station at Mitchelstown Cave, very appropriately marked 75 years of School of Cosmic Physics at DIAS!

2022 also saw the launch of a wonderful resource for those with an interest in Celtic studies and in particular in ancient manuscripts. A new website for the Irish Script on Screen (ISOS) repository of digitised manuscripts was launched in November. DIAS thanks its national and international collaborators who facilitate the digitisation work by enabling access to these precious manuscripts. The new website has significantly enhanced search and research capabilities. Also of note in 2022 in the field of Celtic Studies was the launch, by the then Taoiseach, Micheál Martin T.D. of a book entitled 'Poetics and Polemics' by Dr. Michelle O'Riordan.

Another very special moment, for the Institute in 2022 was the hosting of a stakeholder meeting at DIAS – Dunsink Observatory. The meeting was chaired by Minister Simon Harris and attended by the then Tánaiste, Leo Varadkar T.D. and by Senator Emer Currie, along with representatives from the OPW, Dublin City Council and Fingal County Council. DIAS has expressed an ambition to expand the outreach offering at the Observatory and to open it up more to the public. During 2022, DIAS also contributed to the consultations at all stages of the Fingal County Development Plan. We thank the local councillors of Fingal County for their enthusiasm for our vision and we look forward to working with them and local representatives into the future to realise the vision for the benefit of the local community, for Fingal and Dublin Counties, and for the Leinster region. Watch this space!



Finally, my sincere thanks to all staff for their ongoing excellent research endeavours. I would at this juncture like to in particular welcome a new Senior Professor who joined the School of Theoretical Physics, in 2022, namely Professor Sergei Gukov, who joined us from the USA. In doing so I wish to acknowledge the significant contribution of his predecessor, Professor Werner Nahm, to DIAS and to the field of theoretical physics. The Nahm Equations are well known in that field.

Thanks also to the members of our Council, Governing Boards, our collaborators, suppliers and all those who helped keep the organisation functioning in a very challenging time. Thanks also to the members of the Audit and Risk Committee for the vital role they play in terms of risk, control, governance and associated assurances of the Institute. And finally, thanks to the Department of Further and Higher Education, Research, Innovation, and Science for its support.



DIAS Dunsink Observatory Stakeholders Meeting. Attendees included An Tánaiste Leo Varadkar, Minister Simon Harris, Senator Emer Currie and representatives from the OPW and Fingal County Council.

Statement of Registrar and CEO

I am pleased to welcome you to another Annual Report by the Dublin Institute for Advanced Studies (DIAS). This report is for a year that reflected a full return to something close to normal in terms of in person activities and in particular post summer 2022, saw a significant increase in on site working. I was delighted to once again host an in person Everyone@DIAS Day in Dunsink Observatory in early October and I know that all relished engaging with new members of DIAS that they hadn't met before in addition to meeting colleagues whom they had only seen on screen over the previous 2.5 years!

Very much reflecting the world that we now live in, DIAS published its statement 'Contributing to the sustainability of our world' on World Earth Day in April and in doing so set out its commitment to the attainment of the Sustainable Development Goals. It was an important step for the organisation as it moves forward with new confidence after a number of challenging years. This statement also provided an important bedrock for the DIAS Climate Action Roadmap (formally completed in 2023).

Also reflecting global developments, following the invasion of Ukraine by Russia, DIAS quickly signalled its willingness to host Ukrainian academics and Professor Rebenko joined us late summer from National Academy of Science Ukraine.

More internally focused reflections of changes in the external environment was the updating of the DIAS Gender Equality, Diversity and Inclusion Strategy. Also engagement with PhD researchers on foot of the 'cost of living crisis' resulted in some measures being introduced to ease the impact of the crisis on that cohort.

The core focus for DIAS as always was research and scholarship, some of which you can read about in this short report under our strategic goal headings (See our 2018-2024 strategy, "Embedded Globally, Strength Locally" https://dias.ie/strategy2018_2022). However of note is that DIAS, in its returning to normal in terms of in person activities, instigated and organised numerous academic events for the benefit of the broader academic community and its disciplines. The largest conference was the International Astronomical Union workshop held in the Slieve Russell Hotel, Co. Cavan. There were over 220 attendees.

The Columbia-DIAS-Yale (CDY) Initiative https://www. dias.ie/2022/09/19/cdy-initiative/, launched during the COVID-19 pandemic, went from strength to strength and in September 2022 launched a second series of seminars and workshops, The CDY initiative aims to integrate the expertise of different physics/astrophysics communities globally towards the understanding of the nature of extreme accelerators of cosmic rays. Other academic events included the "Computer science for knotty math problems" workshop organised by our new Senior Professor in the School of Theoretical Physics, Professor Sergei Gukov.

DIAS of course throughout the year continued to provide key research infrastructure to the community through the Irish National Seismic Network (INSN), I-LOFAR and the Irish Script on Screen portal to name a few.



Partnerships grew throughout the year. The partnership between the three historical observatories on the island of Ireland, namely Armagh, Birr and Dunsink deepened. With respect to the latter, investment was secured through the government's Historic Structure Fund for the refurbishment of the South Dome and the Grubb telescope therein.

New international collaborations included C-FORCE: "Carbon Cycle Feedbacks from Response to Carbon Emissions" is a global internationally focussed multidisciplinary project, which officially started in early November 2022. DIAS is a principal research partner, mainly through the PORO_CLIM stream.

And of course there was our fifth Samhain agus Science festival over the Halloween period. All but one of our events were in person, including a talk in Mitchelstown Cave. Once again we had a fantastic programme, with at least one event representing each School/Section. A global audience continues to benefit from all of these talks which are available on our YouTube channel https://www.youtube.com/diasdublin

Finally, thanks to all staff and scholars, but in particular to the Health and Safety Officers and Representatives and all administrative and IT staff for their optimising conditions for hybrid working.

Míle buíochas libh go léir!

DIAS at a Glance

PERSONNEL

115 In 2022, DIAS had 115 team members



engaged directly in advanced studies/ research and **19** in general administration/ support and non-research roles

Of the **96**;

96

13 Professors (Senior Professors and Professors)

19 Other specialist academic and technical staff

64 Early career researchers (Fellows, postdocs and scholars)

59% Of the early stage career researchers, 59% are funded by external competitively sourced funding

ORIGIN OF RESEARCHERS

SCHOLARS



Total number of countries: 24

GENDER



FELLOWS/PROJECT STAFF



Our Financial Resources

FUNDING SOURCES



Funding Expenditure

OIREACHTAS GRANT

€8.143m

OTHER SOURCES



Our Partners

ISLAND OF IRELAND COLLABORATIONS

TCD	University of Galway
WIT	UCD
UCC	Irish Astronomical Society
DCU	Maynooth University
RIA	Armagh Observatory & Planetarium
QUB	National Museum of Ireland
NCI	National Monuments Service
TUD	Met Éireann
IADT	Department of Foreign Affairs

ADJUNCT APPOINTMENTS

Professors 24

Fellows

Social Media

Followers: 31 December 2021 885

Followers: 31 December 2022 **970**

Percentage increase +10%

Followers: 31 December 2021

1,462 Followers:

31 December 2022 1,652

Percentage increase **13%**

Followers: 31 December 2021

507

Followers: 31 December 2022 **582**

Percentage increase +15%

Followers: 31 December 2021

2,611

Followers: 31 December 2022

2,848 Percentage increase

A flavour of our research...

DIAS Astronomy & Astrophysics International Telescope Projects

DIAS are currently involved in five satellite missions and three major land based telescope partnerships:

JWST



Solar Orbiter



JUICE



Ariel



Juno



I-LOFAR



HESS







Seismic Activity Detections

In 2022 the Irish National Seismic Network (operated and maintained by DIAS and supported by Geological Survey Ireland) detected 21 earthquakes and 982 quarry explosions.



Geomagnetic/Solar Storms

A total of 64 solar storms were detected by MagIE (the Magnetometer Network of Ireland, founded by DIAS and TCD School of Physics) in 2022.



Number of peer reviewed publications

The Schools of Cosmic Physics and Theoretical Physics had over 100 physics peer reviewed publications in 2022.

Books published by the DIAS School of Celtic Studies

2022 publications now available through our bookshop include;

Easter Ross Gaelic



Celtica 34



Bretha Comaithcheso



Geophysics Fieldwork 2022

As the pandemic receded, national and international fieldwork resumed at pace. Geophysics fieldwork often involves challenging locations, climates, and terrain.



Dr. Colin Hogg at Mount St. Helen's, Washington State USA to assist international collaborators set up a magnetotelluric monitoring system.



Left: Dr. Florian Le Pape and Dr. Clara Gómez Garcia waving goodbye from the Celtic Explorer, on the SPeeD cruise, in collaboration with UCC, (Sediment Plume Sampling, Bedrock Drilling & Coral Surveying) which deployed three ocean bottom seismometers.



Dr. David Craig working to set up one of our newest seismic stations in Macroom Co. Cork, part of the INSN - Irish National Seismic Network.



Dr. Martin Molhoff (L) with scientists from The University of Edinburgh and Geophysical Institute of Ecuador on Sierra Negro volcano on Equador's Galápagos Islands. The team were there to upgrade the monitoring station in the middle of a caldera just in time for Christmas!

DIAS in 2022 – Working Towards our Strategic Goals



Geophysics

Listening to our planet Spotlight on activities in 2022 reported in line with the four overarching strategic goals in the DIAS Strategy *Embedded Globally, Strength Locally**



*The Dublin Institute for Advanced Studies is committed to making achievements and progress under the four goals set out in this strategy, initially set to run from 2018-2022. At the time of writing the strategy, nobody could have envisaged the devastating impact of COVID-19 on the world. DIAS staff and researchers continued to work throughout the lockdowns, despite personal and professional challenges. We thank and applaud our people for their dedication and commitment in unprecedented times. "Embedded globally, strength locally" took on a new meaning.

Progress on the strategy goals slowed significantly during the pandemic due to restrictions and other circumstances beyond our control. Accordingly, in May 2022 the DIAS Council agreed to extend the lifetime of the strategy to the end of 2024. This will allow further opportunities to build on progress already made under our four goals as well as identifying key focuses for our next strategy document. We continue to strive for "continued success for DIAS and the enrichment of human knowledge".

Goal 1 – Discovery of new knowledge and understanding through excellence and researcher led endeavour

Gaining Insights To Our Celtic Heritage

Launch of New ISOS Website

The School of Celtic Studies launched its newly revamped Irish Script on Screen (ISOS) website during the Tionól in November 2022. Established over 20 years ago, ISOS has been engaged in the digitisation of Irish manuscripts in Irish and in Latin. There are today in excess of 5,000 Irish manuscripts in existence both in Ireland and in other parts of the world. Some can be dated as far back as the seventh century. Diverse in their nature, they have much to tell us about Ireland, Irish society and Ireland's place in Europe throughout history.

Due to the passage of time, some are in a very fragile condition, the legibility of others has been impaired due to fading or staining, while more have split with their constituent parts now found in different libraries. ISOS allows scholars and members of the general public from all over the world who are interested in these manuscripts to view them without having to travel to the libraries in which they are held. It also helps to preserve the manuscripts as it limits the number of people physically handling them. Using the International Image Interoperability Framework facility (IIIF), the new website affords the user a wider range of viewing possibilities, as ISOS Director Anne Marie O'Brien explained in her demonstration. The image of the manuscript can be greatly enhanced through enlargement or through changing the brightness, thus allowing manuscripts which may be difficult to read or totally illegible to the naked eye to be read with greater ease. Manuscripts split into different parts can be 'reunited' digitally, and texts from different manuscripts can be placed side by side for the purposes of comparison.

There are in excess of 400 manuscripts currently on the ISOS site. These include the Cathach of St Colmcille (7th century) and the lavishly decorated Book of Ballymote (14th century). ISOS has established partnerships with 28 different institutions around the world including the Royal Library, Brussels; the National Library of Scotland and the State Library of Victoria, Melbourne, all of which have contributed digitised copies of Irish manuscripts in their holdings to our growing collection.

https://www.isos.dias.ie/



New ISOS website home page. The new website is much more accessible to researchers and the general public.

Reaching For The Stars

DIAS scientists observe cosmic explosion with unprecedented detail

For the first time in international science, our researchers observed a cosmic explosion with unprecedented detail and witnessed particle acceleration outside our solar system.

DIAS scientists, including: Dr. Jonathan Mackey, Professor Felix Aharonian, Dr. Robert Brose and Dr. Davit Zargaryan are members of an international team that was able to observe this acceleration process for the first time, due to specialist telescopes which were used at the HESS (High Energy Stereoscopic System) facility in Namibia.

The team observed a nova explosion – a violent eruption from the surface of a star – in August 2021, from a binary star system called "RS Ophiuchi". This led to the discovery that particles from the explosion were accelerated to energies several hundred times higher than previously observed from novae.

The team also observed that energy released from the explosion was transformed extremely efficiently into accelerated protons and heavy nuclei, such that the particle acceleration reached the maximum rate calculated in theoretical models. Dr. Mackey was part of a four-person team that worked on creating a theoretical model to interpret the data from the observations, while all four DIAS scientists were involved in developing the manuscript and were co-authors of the research findings, which have recently been published in Science.

Listening To Our Planet

Pacific Eruption detected by DIAS/INSN

The eruption of the Hunga Tonga-Hunga Ha'apai volcano was detected by seismometers globally, including by the Irish National Seismic Network (INSN). The network is run by DIAS in conjunction with Geological Survey Ireland.

The underwater volcano "Hunga Tonga-Hunga Ha'apai" in Tonga has been experiencing ongoing volcanic activity since the 20th December 2021. From the 5th of January 2022 activity had decreased, but on the 15th it increased again with a large eruption occurring with a sonic boom that was heard hundreds of kms away. The event was recorded by seismic stations worldwide, including stations in the INSN (see figure below). Ground vibration signals from the explosion were recorded approximately 20 minutes after the event.



Artist's impression of the RS Ophiuchi Nova outburst. The fast shockwaves form an hourglass shape as they expand, in which gamma rays are produced. This gamma-ray emission is then detected by the H.E.S.S. telescopes (shown in the foreground). Image: DESY/H.E.S.S., Science Communication Lab.

Ireland's first underground seismic station installed at Mitchelstown Cave

As part of a joint project, DIAS and the Irish National Seismic Network (INSN) installed Ireland's first underground seismic station, at Mitchelstown Cave. Having a seismic station located deep underground within the quiet Galtee-Vee valley provides us with a unique opportunity to collect high quality data that is not adversely affected by human activity such as building sites and road and rail traffic. This allows us to detect Ireland's smallest earthquakes on our seismic network, and to better understand the forces at play beneath our feet.

Since 1980, the Irish National Seismic Network has worked 24/7 feeding real time data on local and global earthquakes to the international scientific and public safety communities. We are currently nearing completion of a total physical upgrade of the INSN, through a collaboration agreement with Geological Survey Ireland, which commenced in 2018.

COSMIC 75 - 75 years of ground-breaking discoveries about our planet and universe

24 March 2022 marked 75 years since the foundation of the School of Cosmic Physics. The School has developed a reputation as an international leader and has contributed to many important global discoveries. From its inception, top cosmic physicists from around the world and Ireland have worked at the School, with many being at the forefront of ground-breaking research on Earth's land surface and in its deep oceans, not to mention trail-blazing research in space within and beyond our solar system.

Examples of key achievements for the School of Cosmic Physics over the past 75 years include the following:

• Apollo 16 mission: In 1972, and in partnership with University of Berkeley, DIAS professors, Denis O'Sullivan and Alex Thompson worked on the first ever Irish experiment in space on the lunar surface as part of the NASA Apollo 16 mission, launching



James Grannell and Dr. David Craig with Mitchelstown Cave owner John English.



Going underground.



Dr. David Craig & James Grannell with some of the INSN equipment in Mitchelstown Cave.



The Pacific eruption was recorded by seismic stations worldwide, including stations in the Irish National Seismic Network (INSN).

space physics research in Ireland. DIAS are currently involved in five satellite missions: James Webb Space Telescope, Ariel, Solar Orbiter, JUICE and Juno.

- Expansion of Irish maritime territory: In 1987, DIAS researcher Brian Jacobs, in cooperation with the University of Hamburg and UCD, conducted a project on the formation of the North Atlantic. It led to Ireland's maritime territory doubling in size in the mid-90s.
- International Space Station: In 2001 DIAS was one of the first 10 (and first Irish) experiments on the International Space Station after an extremely competitive international selection process.

DIAS-made detectors were used to measure the effects of cosmic radiation on the human body. Work on space technology continues to this day, with DIAS being the only Irish research institution involved in the Webb Space Telescope – the largest and most powerful space telescope ever built. • Volcanoes: During 2016 and 2017, ground-breaking new insights into the working of volcanoes were published by DIAS geophysicists. Their work demonstrated that the upper two kilometres of the Earth's crust is substantially weaker than previously thought, which has fundamental knock-on effects on eruption initiation.

Some of the projects the School of Cosmic Physics are currently involved in include:

• **GEO-URBAN:** The need to reduce greenhouse gas emissions is an important issue facing society at present. This project aims to explore the potential for low enthalpy geothermal energy in urban environments. It could lead to creating more energy efficient and environmentally sustainable communities.



The DIAS Astronomy HESS Team at the HESS site in Namibia for the first time in October 2022. L-R Christopher Burger-Scheidlin, Dr. Robert Brose, Dr. Jonathan Mackey.

- Volcano monitoring: The next Hekla Volcano eruption is considered overdue and could be hazardous to air travel. A real-time monitoring system for the Hekla Volcano in Iceland was recently installed by DIAS Geophysics. This project will result in a substantial improvement in early warning capability.
- **Exploration of Jupiter:** The Jupiter Icy Moons Explorer (JUICE) is the first European mission to explore Jupiter. Launching in 2023, one of the main objectives of the mission is to study the planet's ability to support life. DIAS researchers are involved in the mission by developing the spacecraft's instruments to ensure they deliver accurate measurements.
- Early warnings for solar storms: The DIAS Solar Physics Research Group has made it to the second round of the ESA Nanosatellites for Space Weather campaign. They are proposing to build SURROUND, which is a constellation of small satellites that will identify and track solar storms and solar radio bursts as they travel through the inner solar system. If selected, this mission would provide us with early warnings and more accurate forecasts of the impacts of solar storms on Earth.
- The Ariel Mission: The Ariel Mission will be launched by the European Space Agency in 2028 to explore the atmospheres of distant exoplanets, i.e. planets around other stars. How similar these planets are to ours, and whether they have the potential to harbour life, are amongst the questions Ariel will help answer. DIAS is part of the consortium building Ariel's main instrument and testing whether its components survive in the extreme environment of space.



Professor Tom Ray (Director of the School of Cosmic Physics, Dr. Jack Piercy (Astronomy & Astrophysics, Shilpi Bhunia (Astronomy & Astrophysics), Professor Chris Bean (Head of DIAS Geophysics) and Louise Collins (DIAS Geophysics) launching Cosmic 75 at the Diving Bell in Dublin's Docklands.

Goal 2 – International research collaboration benefitting Ireland and the world

EUROPEAN AND Global Infrastructure Participation

Some Examples of Research and Infrastructure Collaboration

The James Webb Space Telescope (JWST)

Following its deployment on Christmas Day 2021, the instruments on the James Webb Space Telescope were commissioned in the first half of 2022. Dr. Patrick Kavanagh who worked on the Mid-Infrared Instrument (MIRI) with MIRI Co-Principal Investigator Professor Tom Ray, and an international team, travelled to Webb Mission Operations Centre in Baltimore to work on the commissioning. The Mid-Infrared Instrument (MIRI) which DIAS helped to build and test was tested out for the first time in space beyond the Moon and was found to be functioning perfectly. It is expected that the Webb Telescope may now last two decades!

DIAS has contributed to the design and fabrication of MIRI by producing special filters that are used to break up infrared light into its various components. In recent years DIAS has played a major role in understanding the instrument's performance, and in providing specialised



This image of Stephan's Quintet was captured by MIRI and was one of the first images released on 12 July. Stephan's Quintet was the first compact galaxy group ever discovered in 1877, 63 years before the foundation of DIAS in Dublin. Four of the five galaxies within this quintet are locked in a cosmic dance of repeated close encounters.

software (led by Dr. Patrick Kavanagh), so as to produce science-ready data. DIAS is the only Irish research organisation with technology on board the JWST.

12 July 2022 was a momentous day, which saw the release of the first images captured by instruments on JWST. A full capacity audience joined Professor Tom Ray and Dr. Patrick Kavanagh in DIAS Dunsink Observatory to witness the live release of images from Webb. The images, the first of their kind, were shared by NASA, in partnership with European Space Agency



Dr. Patrick Kavanagh spent several weeks at Webb Mission Operations Centre in Baltimore.

and the Canadian Space Agency, during a televised broadcast, which DIAS livestreamed to the audience which comprised members of the general public and the science community.

Columbia-DIAS-Yale Initiative

The Columbia-DIAS-Yale (CDY) Initiative is a series of seminars and meetings established by Columbia University (New York), Dublin Institute for Advanced Studies (Dublin), and Yale University (New Haven).

The CDY initiative aims to integrate the expertise of different physics/astrophysics communities towards the understanding of the nature of extreme accelerators of cosmic rays. CDY provides an opportunity to introduce motivated young researchers beginning their careers into this international research community, in particular PhD students and early career postdocs. DIAS are proud to be part of such an important initiative that aligns with the work of the Astronomy & Astrophysics Section. Professor Felix Aharonian is co-chair of the initiative, and undertakes research on astroparticle and high-energy astroparticle physics. Dr. Jonathan Mackey is also a member of the initiative, undertaking much of the local organisation. He is a Royal Society-SFI University Research Fellow in computational and high-energy astrophysics at DIAS Dunsink Observatory.

PORO-CLIM

The PORO-CLIM Project is a large, over-arching and multidisciplinary project aimed at understanding the complexity and feedbacks involved in the coupling of atmospheric and ocean processes to those in the Earths deep convecting mantle. PORO-CLIM is looking at how Earth's deep interior has affected global climate in the geological past.



A NASA composite image of the Crab Nebula, just one of the topics under discussion at the CDY initiative seminar series.

It is built upon the substantial body of work gathered by DIAS researchers and both national and international collaborators along the conjugate continental margins of the North Atlantic. This work involves a large globally distributed team of experts in the diverse scientific fields required for this ambitious project and will introduce the next generation of young researchers to this research viewpoint. The Geological Survey of Denmark and Greenland (GEUS) and the Dublin Institute of Advanced Studies (DIAS) are the main collaborators, with contributions from the University of Aarhus, University of Brighton, University of Cambridge, Galway-Mayo Institute of Technology, University of Ghent, Tonnta Energy Ltd, Trinity College Dublin, and University College Dublin. First successful marine experiments took place in the Porcupine Basin and the Hatton-Rockall Basin region to measure critical properties that gauge thermal flux from the Earth in 2021. DIAS Professor Brian O'Reilly is Co-Principal Investigator of the project and Dr. Haleh Karbala Ali is part of the team and acts as Outreach Officer for the project.

ISOS

A new partnerships to ISOS, St. Edmundsbury Cathedral Library was established. The Bury Fragments, vellum fragments from Melchior Hittorp, De Catholicae Ecclesiae divinis officiis (Georgio Ferrari, Rome, 1591) were digitised and are now available from the new ISOS website.





Image from The Bury Fragments on ISOS.

Some Examples of Early Researcher Career Development and Training Collaborations

DIAS is a partner in three International Training Networks funded by the EU Horizon 2020 and Horizon Europe research and innovation funding programmes.

These are:



IMPROVE: a multi-disciplinary network of European Research Institutes and Small-Medium Enterprises. Early Stage Researchers are trained to innovative research in volcano science extending across the academia-industry bridge, and including cooperative work, leadership skills, and independent thinking. Volcano science includes from innovative monitoring and prospecting to advanced lab experiments, High Performance Computing, and Artificial Intelligence. Two volcanic areas provide ideal cases for relevant scientific advance and training-through-research: Mount Etna in Sicily, one of the most monitored volcanoes in the world and the place where to extend our understanding of active volcano dynamics; and the Krafla caldera in Iceland, site of a large geothermal circulation system largely exploited for energy production, and of a shallow magmatic intrusion which is catalysing break-through research from all over the world. DIAS is partnered with Italian, French, German, Icelandic and UK institutions.



SPIN: The overarching goal of the SPIN network is to advance seismic observation, theory and hazard assessment alike by fully integrating the latest ground-motion sensing technology for optimising the forecasting and monitoring of geohazards and create a fertile environment to train a new generation of unique European researchers who can incorporate new sensor types into widespread, societally-relevant applications. DIAS is partnered with French, German, Dutch, Swiss, US and UK institutions.



STELLAR: focused on the training of the next generation of radio astronomers. DIAS is partnered with institutions in Bulgaria and the Netherlands. The initiative, "Scientific and Technological Excellence by Leveraging LOFAR Advancements in Radio astronomy" (STELLAR), will significantly increase the LOFAR technical and scientific expertise at TUS and IANAO. It will allow IANAO and TUS to develop and strengthen collaborations with ASTRON and DIAS. The focus brought by LOFAR technology and science will open a new exciting direction for scientific research and technological development in the area.

DIAS Contributing to the sustainability of our world

In 2018, we made a commitment to the United Nations Sustainable Development Goals (SDGs) in our strategy "Embedded globally, strength locally".

Under the strategic goal – International research collaboration benefitting Ireland and the world, we have an objective to "Leverage our excellence and international connectedness, and explore opportunities to contribute through research to the Sustainable Development Goals (SDGs)". On Earth day, 22 April 2022, we published "Contributing to the sustainability of our world" – a statement highlighting the work DIAS has done since 2018, and continues to do, in support of the SDGs.

In the interests of sustainability, this document was produced in soft copy only.



Our International Research Collaborations



EUROPEAN AND GLOBAL INFRASTRUCTURE PARTICIPATION











Goal 3 – Attraction, and retention of, research leaders for today and the future

New Senior Professor in Theoretical Physics

Professor Sergei Gukov was appointed as the new Professor of Theoretical Physics in Q3 of 2022. Professor Gukov joined DIAS from the California Institute of Technology, where he was Professor of Mathematics and Theoretical Physics since 2007.

He previously held a long-term prize fellowship at the Clay Mathematics Institute at Harvard University and was a member of the School of Mathematics at the Institute for Advanced Study, Princeton. His current research areas focus on exploring hidden algebraic structures in topology and in guantum field theory.



Senior Professor Sergei Gukov.

He is a graduate of both the Moscow Institute of Physics and Technology, and Princeton University.

Professor Caitríona Jackman Inaugural Lecture

Professor Caitríona Jackman delivered her inaugural lecture at DIAS Dunsink Observatory in the autumn of 2022. The event was attended by government representatives, representatives from funding bodies including SFI and IRC, colleagues from universities across Ireland and science communication specialists, as well as family and friends.

Professor Jackman's inaugural lecture focused on 'Adventures in the Solar System'. She gave the audience an insight into how space missions transition from initial idea, to planning and construction, launch, manoeuvring, data collection and finally the death of the spacecraft. Throughout this story she shared personal anecdotes as to how her career has been shaped by various events involving different spacecraft including Juno, Cassini and others. Professor Jackman also gave the audience an insight into planetary magnetospheres, what they are and how they affect us. She ended by giving a glimpse into what her research could focus on in the future and reminding us of how much we still have to learn about the planets within our own solar system.

Early Career Researchers

5 of 36 awards in the sciences strand of the new SFI/ IRC Pathways programme for early career researchers, announced July 2022, were made to DIAS.



Senior Professor Caitriona Jackman delivers her inaugural lecture.



Professor Caitriona Jackman and her team of researchers at her inaugural lecture in DIAS Dunsink Observatory.



L-R Dr. Florian le Pape (DIAS Geophysics), Dr. Donna Rodgers-Lee (DIAS Astronomy and Astrophysics), Dr. Venus Keus, Dr. Silvia Nagy (both DIAS School of Theoretical Physics) and Dr. Patrick Kavanagh (DIAS Astronomy and Astrophysics).

Everyone at DIAS Day

2022 saw the return of Everyone at DIAS Day at DIAS Dunsink Observatory. Over 75% of our staff and scholars attended what was a very positive and interactive day, the first Institute-wide in person gathering since 2019.



Everyone at DIAS Day, October 2022.



DIAS is a truly international Institute. In 2022 our staff and scholars came from 24 countries around the globe.



Focus on New Starters at DIAS in 2022

Astronomy & Astrophysics



Stephenie Brophy Lee (Technical Officer)



Dr. Mika Holmberg (Research Fellow)



Jeroen Jaspers (PhD Student)



Sadhbh Leahy (Public Engagement Officer)



Dr. Arun Matthew (Research Fellow)



Shauna Rose Raeside (PhD Student)



Dr. Donna Rodgers-Lee

Celtic Studies



Dr. Seán Ó Hoireabhárd (Scholar)



Regina Maas

(PhD Student)



Eoghan Totten (Research Scientist)



Athira Vijayan (PhD Student)



Maurice Weber (PhD Student)

Theoretical Physics



Dr. Atri Dey (Research Fellow)



Dr. Aradhita Chattopadhyaya (Research Fellow)



Professor Sergei Gukov (Senior Professor)



Dr. Venus Keus (Research Fellow)



Dr. Saki Koizumi (Postdoctoral Scholar)



Dr. Swapnamay Mondal



Giorgio Pizzolo (PhD Student)



Jasmine Thomson-Cooke (PhD Student)

PhD Defences 2022

- Pearse Murphy
- Brendan Clarke
- Aoife Maria Ryan
- Eoin Baldwin
- Anton Feeney-Johansson
- Maria Moutzouri
- Camille Elizabeth Stock
- Kevin Kavanagh
- Aaron Conlon

Professor Werner Nahm MRIA, FRS



In 2022 we bade farewell to Professor Werner Nahm as he retired after over 20 years at DIAS.

Werner is a mathematical physicist who is best known for his development of Nahm equations, a series of nonlinear ordinary differential equations that extend the ADHM construction of instantons to magnetic monopoles. These equations have also found applications in differential geometry.

Werner's other research highlights include his early work to classify all possible supersymmetries in space-time of various dimensions — thereby revealing the symmetries that have since been found to underlie both the different string theories as well as supergravity theory. Werner also conducted research about the Mayan civilisation and their astronomy.

He received many awards in recognition of his work, including the Max Planck Medal for Theoretical Physics in 2013 and the Gold Medal in Physical and Mathematical Sciences of the Royal Irish Academy in 2014. In addition to being a Fellow of the Royal Society, was elected as a Member of the Royal Irish Academy.

Werner joined DIAS in 2002 and is the former Director of the School of Theoretical Physics. DIAS, and our people, have benefitted greatly from Werner's knowledge, dedication and collegiality over the past twenty years.

Eileen Flood



Having joined DIAS Astronomy and Astrophysics in 1980, Technical Officer Eileen flood retired in 2022 after 42 years with the School. Eileen supported research activities across the section and will be missed by her colleagues past and present.

In 2020, Eileen was asked what DIAS meant to her and her response sums up her time at DIAS.

DIAS means a lot to me, I've worked here for half its lifetime and have seen lots of changes but one thing remains constant and that is the standard of research carried out. It is a wonderful place for young researchers, who get great opportunities to work with experts in their areas of interest, meet with lots of prominent people from Astronauts to Nobel Prize winners along with several Irish Presidents. Many of these young researchers have then gone on to become experts in their own right. I have been involved in lots of great projects over the years from the study of cosmic rays to the effects of radiation on pilots and astronauts, to the development of James Webb Space Telescope. It's a unique place which fosters a love of research and curiosity in all who work there. It's a great place to work.

We wish Eileen well in her retirement.

School of Cosmic Physics Adjunct Faculty 2022

Adjunct Professors

Professor Richard Schwartz, NASA Goddard Space Flight Centre

Dr. Aline Vidotto, School of Physics, TCD

Professor Turlough Downes, Mathematical Sciences, DCU

Dr. Gareth O'Brien, Microsoft

Professor Antonella Natta

Professor Ana Ferreira, Dept. of Earth Sciences, University College London

Professor Sergei Lebedev, Univ of Cambridge

Adjunct Fellows

Dr. Ivan Colantoni, Università di Roma

Dr. Pietra Zucca, Netherlands Institute for Radio Astronomy

Dr. Deirdre Coffey, School of Physics, UCD

Dr. E Whelan, Dept of Experimental Physics, NUIM

Dr. Jose Groh, School of Physics, TCD

Dr. Masha Chernyakova, School of Physical Sciences, DCU

Dr. Andrew Schaeffer, Geological Survey of Canada

Dr. Javier Fullea, Complutense University Madrid

Dr. Rebeca Garcia Lopez, UCD

Dr. Lea Gritton, IRAP, Toulouse

Dr. Nicola Piana Agostinetti, Universita' di Milano Bicocca

Adjunct Researcher

Dr. Laura Hayes, NASA Goddard Space Flight Centre

School of Theoretical Physics Adjunct Faculty 2022

Adjunct Professors

Professor Cliff Burgess; McMaster University, Ontario Professor Nilanjana Datta, University of Cambridge Professor Brian Dolan, Maynooth University Professor Paul Feehan; Rutgers University, New Jersey Professor Veselin Filev, Bulgarian Academy of Sciences Professor Ruth Gregory; King's College, London Professor Fatima Laytimi, University of Lille Professor Ronan McNulty, University College Dublin Professor Charles Nash, Maynooth University (Formerly) Professor Alexei Rebenko, National Academy of Sciences Ukraine

Professor Sumati Surya; Raman Research Institute, Bengaluru

Professor D. H. Tchrakian, Maynooth University (Formerly)

Professor Michael P. Tuite; National University of Ireland, Galway

Professor Alina Vdovina, City College of New York

Professor Katrin Wendland, Trinity College Dublin

Professor Badis Ydri; Badji Mokhtar-Annaba University, Algeria

Adjunct Fellows

Dr. Larisa Jonke; Ruđer Bošković Institute, Zagreb

Dr. Graham Kells, Dublin City University

Dr. Marianne Leitner, Trinity College Dublin

Dr. Silvia Nagy, University of Durham

Dr. Cormac O'Raifeartaigh, Waterford Institute of Technology

Gender Equality and Inclusion Team (GEIT) Report 2022

There were two meetings of the GEIT in 2022, both held online via Zoom.

Major Focus in 2022

Our application for Institute of Physics Juno Practitioner status was submitted by the Physics Schools in the November application window. Preparation of this application was particularly onerous and the GEIT expresses thanks to the Juno Committee, co-chaired by Professor Caitriona Jackman and Dr. Venus Keus. The outcome will not be known until Spring 2023.

The Juno Committee comprised:

- Academics: Senior Professor Caitriona Jackman (Astro) Co-chair; Dr. Venus Keus (STP) Co-chair; Dr. Jonathan Mackey (Astro); Senior Professor Denjoe O'Connor (STP)
- Central Administration Representative:
 Michelle Tobin
- **Postdocs:** Dr. Haleh Karbala Ali (Geo); Dr. Ian Jubb (STP)
- **PhD Students:** Ee Liang Chua (Geo); Jasmine Thomson-Cooke (STP)

Some further progress was made in terms of the following:

- Gender and Inclusion Strategy has become a standard agenda item for all meetings of School Boards and the Council.
- Adjunct appointments were gender balanced.
- There was further focus on having a better gender balance in public events and our communications, and also in terms of demonstrating the work of early career researchers in general at DIAS. This year saw our first female DIAS Day speaker, science integrity specialist Dr. Elisabeth Bik.
- The commitment to having c. 30-40% female speakers at events across institute and schools was attained by some sections and centrally organised events. Further work is needed.

Key areas for attention in 2023 as advised by GEIT

An Institute-wide training calendar is being developed. Dignity in the Workplace, Gender Dimension in Research and Unconscious Bias training sessions to be scheduled as part of this.

Athena Swan application remains a target, pending the outcome of the Juno process. Athena Swan application windows are April and November.

An Institute-wide culture, engagement and inclusivity survey programme to be introduced in early 2023, taking on board the learnings from the survey sent to the Physics Schools in preparation for the Juno application.

Renewed focus on formation of a subgroup to review sexual harassment policies in light of sector wide conversation on this matter.

DIAS Gender Equality and Inclusion Team

- Dr. Eucharia Meehan (Chair)
- Professor Chris Bean
- Professor Peter Gallagher
- Professor Denjoe O'Connor
- Professor Ruairí O'hUiginn
- Professor Caitriona Jackman
- Dr. Michelle O'Riordan
- Dr. Duygu Kiyan
- Dr. Marianne Leitner
- Dr. Sophie Murray
- Dr. Takaki Matsumoto (from April 2022)
- Dr. Mahul Pandey (until April 2022)

Mary Burke

- Clara Gomez Garcia
- Annemarie O'Brien
- Michelle Tobin
Goal 4 – Strengthening disciplines and research communities nationally

Section A – Strengthening Disciplines – Research Community

Case Study: School of Theoretical Physics

STP Conferences 2022

ITP 2022: What began as the annual Irish Quantum Field Theory Meeting now covers a broad range of topics including quantum foundations, quantum information, condensed matter theory, cosmology and relativity. To better represent the diverse array of fields discussed in more recent iterations of the conference, the conference was renamed the Irish Theoretical Physics 2022 conference, or ITP2022. The conference brought together Irish and international researchers, and gave early career researchers an opportunity to present their work.

Computer science for knotty math problems:

Professor Sergei Gukov hosted a conference exploring the relationship between computer science and mathematics, which attracted international experts and attendees to DIAS for the week. The conference, split between Burlington Road and DIAS Dunsink Observatory, focussed on various crossroads and bridges between computer science and mathematics, including (but not limited to) machine learning and knot theory.

STP Statutory Lecture

The DIAS School of Theoretical Physics Statutory Lecture 2022 saw Professor Werner Nahm return to deliver a talk entitled "A Tale of Two Volcanoes". He took attendees on a classical journey to the Bronze Age to discuss these volcanoes, in a departure from his usual focus on Theoretical Physics. The lecture attracted attendees from institutions in Ireland and further afield as well as members of the public.



Attendees at ITP 2022.



Attendees at Computer Science for Knotty Math Problems at DIAS Dunsink Observatory.





In a change from his usual focus on Theoretical Physics, Professor Werner Nahm delivered the 2022 STP Statutory Lecture telling "A Tale of Two Volcanoes".

STP Public Lectures

During ITP2022 there were two O'Raifeartaigh Lectures.

Professor Fay Dowker of Imperial College London gave a lecture titled "What we talk about when we talk about the Quantum World" which was followed by Professor John Ellis of King's College London whose talk was titled "What are we? Where do we come from? Where are we going? A capacity audience for both talks included conference attendees, academics, students and scholars from other institutions and members of the public.

As part of the "Computer Science for Knotty Math Problems" Professor Louis Kauffman (University of Illinois Chicago) delivered a public lecture titled "Knots, Knotted Vortices & the Physics of Knots". The lecture discussed the history of knots, from maritime sailing's practical knot tying in the 17th century, the 19th century theory of vortex atoms by physicist Lord Kelvin (Sir William Thompson), and more modern knot theory experiments. Films of real experiments and computer models of vortices and the reconnection of vortices were shown to the audience which comprised members of the public and academics from other institutions as well as workshop attendees.

STP DIAS Summer Internships for Undergraduate Students

STP opened its summer internship programme again in 2022. Following an application and assessment process, internships were awarded to students from DCU, UCC and UCD. Two of the UCD students continue to work with Professor Tony Dorlas, beyond the internship.

STP Visitors 2022

Removal of travel restrictions saw a return to regular visitors to the School of Theoretical Physics. The School welcomed 15 international visitors in 2022:

Professor Alina Vdovina, City College of New York

Professor George Zoupanos, National Technical University Athens

Dr. Kasia Rejzner, University of York

Professor Seckin Kurkcuoglu, Middle East Technical University

Professor Fedele Lizzi, INFN Naples

Professor A. P. Balachandran, Syracuse University

Professor David Evans, Cardiff University

Professor Cliff Burgess, CERN & McMaster University, Ontario

Dr. Dganit Meidan, Ben-Gurion University of the Negev

Dr. Alessandro Romito, Lancaster University

Dr. Javier Peraza, University of the Republic, Montevideo

Professor John Ellis, CERN & King's College London

Professor Fay Dowker, Imperial College London

Dr. Francisco Navarro-Lerida, University of Madrid

Professor Alexei Rebenko, National Academy of Sciences, Ukraine



L-R Professor John Ellis, Professor Fay Dowker, Professor Denjoe O'Connor and Dr. Cormac O'Raifeartaigh after The O'Raifeartaigh Lectures.



Professor Louis Kauffman delivered a public lecture as part of Computer Science for Knotty Math Problems.

Case Study: School of Celtic Studies

Tionól 2022

Having returned on a hybrid basis in 2021, 2022 saw a full *Tionól* programme in Burlington Road which attracted attendees from national and international institutions. The programme for the weekend also included the School's Statutory Public Lecture "The Limitations of Satire in Medieval Ireland", delivered by SCS Professor Liam Breatnach.

Irish Platonisms Conference April 2022

Attendees from national and international institutions attended this important conference at DIAS, with a hybrid option available for those unable to attend in person. The conference aimed to survey the various forms that Platonism has taken in Ireland's history from the seventh century to the present.

The Renaissance Society of America

The School of Celtic Studies was pleased to host a sectional session of the Annual Meeting of the Renaissance Society of America which took place in Dublin 30 March-2 April.

Summer School 2022

The triennial Summer School in Celtic Studies took place in Burlington Road 11–22 July. Originally scheduled for 2020, it twice had to be postponed due to the global pandemic. Over 50 students from 15 countries attended. Courses given were: Old Irish (Professor D. Stifter, Maynooth University), Early Irish Law Texts (L. Breatnach), Middle Welsh (B. Lewis), Reading Irish Manuscripts (C. Kobel), Early Modern Irish (R. Ó hUiginn), Poets and Poetry in Medieval Ireland (L. Breatnach) and Reading the Ulster Cycle (R. Ó hUiginn). In addition to the core courses, some additional lectures were arranged: Fergus Kelly 'The Old Irish Triads: a ninth-century wisdom-text' and 'Women in Early Irish society: the legal evidence'; Aoibheann Nic Dhonnchadha 'Irish medical texts, 1350-1700'; and Michelle O Riordan 'Seventeenth Century Political Poetry'. A highlight of the fortnight was the visit by An Taoiseach, Mícheál Martin T.D., to launch Dr. O Riordan's monograph Poetics and Polemics: Reading seventeenth century Irish political verse, when he addressed participants of the Summer School. A presentation of some of our publications was made to An Taoiseach on the occasion. On 17 July participants enjoyed a tour of some medieval sites in North Co. Dublin, Louth and Meath, expertly led by Dr. Seán Ó Hoireabhárd.



The School of Celtic Studies Statutory Lecture was delivered by DIAS Professor Liam Breatnach.



Poster for the Irish Platonisms Conference.

Section B: Ongoing provision, and management, of Research Infrastructures based in Ireland benefitting the community

See page 26 for research infrastructures in the international domain in which DIAS collaborates.

Research infrastructure	Function	Nature of involvement
Irish National Seismic Network	Detects earthquakes and other seismic activity-part of global network	Leader and operator
Irish Script on Screen (ISOS)	Digitisation of Irish manuscripts; available online	Leader
Ogham in 3D	3D digitisation and conservation project for Ogham stones; made available online	Leader
Publishing in Irish and Celtic Studies	International publishing house for Irish and Celtic Studies; publisher of premier academic journal in Celtic Studies, Celtica	Publisher, editor and vendor
Bibliography of Irish Linguistics & Literature	Catalogue of publications in Celtic Studies	Leader
iMARL	National ocean-bottom listening infrastructure	Leader
I-LOFAR	National and international radio-telescope infrastructure	Key partner, Academic Director
Irish Centre for High-end Computing (ICHEC)	National high-performance computing infrastructure	Key partner and member of Academic Flagship Programme
National CTBTO Office	Comprehensive Nuclear-Test Ban Treaty Organisation	Host (for Department of Foreign Affairs)

2022 marked the 10th anniversary of Ireland's National Data Centre (NDC) for CTBTO hosted by DIAS Geophysics on behalf of the Department of Foreign Affairs. The NDC receives data from the seismic stations that monitor signs of nuclear explosions.



We were delighted to be visited by Department of Foreign Affairs officials Orlaith Fitzmaurice, Director of the Disarmament Division, and Jamal Alkayed, to mark the anniversary.

Section C: Strengthening Disciplines – Public Outreach

Samhain agus Science Festival

Our 2022 Samhain agus Science festival was a huge success, with six events held over ten days from the end of October into early November. Five of the six events took place in person and all were made available to those unable to attend via our YouTube Channel. A highlight was the talk given by Professor Chris Bean and Dr. Martin Molhoff in Mitchelstown Cave, a very special setting and the location of a new INSN monitoring station. This was also the first Samhain agus Science event to take place outside of Dublin.





Dublin Festival of History

DIAS held two events as part of the Dublin Festival of History in 2022. Both talks are available to view on our YouTube channel.

The first was a wonderful talk by Professor Luke Drury who took us through the 75 years of the School of Cosmic Physics. The audience was captivated by tales of research, discoveries, and many of the wonderful people who've passed through the school over its 75 years in existence.

The second talk celebrated another 75th anniversary, that of the signing of the agreement to fund the Armagh-Dunsink-Harvard Telescope. Renowned historian Professor Mary Daly joined DIAS Professor Peter Gallagher and Professor Michael Burton of Armagh Observatory and Planetarium to discuss the history and science of the telescope as well as the significance of the first North-South agreement.



The first North-South Agreement, 1947 Armagh-Dunsink-Harvard Telescope

Durslink Observatory



DIAS Day Lecture 2022

The annual DIAS Day Lecture was conceived in 2020, as part of the calendar of events to mark the 80th anniversary of the establishment of the Institute. The 2022 DIAS Day lecture "The Dark Side of Science: Misconduct in Research" was delivered by internationally acclaimed scientific integrity expert and microbiologist Dr. Elisabeth Bik. Dr. Bik was awarded the John Maddox Prize for "outstanding work exposing widespread threats to research integrity in scientific papers "in 2021.

The talk was held online and attracted a large national and international audience of researchers and members of the research excellence and integrity community as well as member of the public.







DIAS Reach for the Stars Astrophotography Competition

Winner – Out of this World

A Fiery Rosette Photographers: Tom Dineen & Raluca Dana Lica



Runner Up – Out of This World

The Jewel of Orion Photographer: Richard Sweeney







Runner Up – Back on Earth

Copper Coast Fireball Photographer: Adrian Hendroff



Runner Up – Out of This World

The Bens Under the Milky Way Photographer: Aisling McGuire







DIAS' astrophotography competition "Reach for the Stars" ran for the second year in a row in 2022.

This year saw the competition split into two categories:

Out of this World: Images depicting scenes/features or elements of astronomical interest. For example, deep space images or images of the solar system.

Back on Earth: Astro-landscape images that depict a feature or element of astronomical interest and capture elements such as nature, cityscapes, buildings or monuments, land, or water.

Along with the public choice category, an additional Cosmic 75 prize was introduced seeking an image that best represented the work of the School of Cosmic Physics.

An outdoor exhibition of the winning and shortlisted entries was held on the railings at Burlington Road for several months and once again received a very positive reception.



Other external events with DIAS participation included The Heaventree of Stars, Culture Night, Open House Dublin and the Hamilton Walk.



Institute Staff

Council of the Institute 2022

Chairman J Hegarty

Ex-Officio Members

A. Deeks (to April 2022)M. Rogers (from May 2022)L. DoyleM. Canning

Members Appointed by the Governing Board of Constituent Schools

M. Ní Mhaonaigh M. Fowler R. Ó hUiginn T. Ray D. O'Connor P. Goddard

Governing Board of the School of Celtic Studies

Chairperson M. Ní Mhaonaigh

Senior Professors

L. Breathnach R. Ó hUiginn

Appointed Members

R. C. Stacey M. Haycock J. F. Nagy D. Stifter G. Toner

Governing Board of the School of Theoretical Physics

Chairperson P. Goddard

Senior Professors

D. O'Connor W. Nahm (to July 2022) T. Dorlas S. Gukov (from August 2022)

Appointed Members

- A. P. Balachandran
- B. Dolan
- F. Dowker
- D. Evans
- F. Lizzi

P. Vitale

S. Ryan

Governing Board of the School of Cosmic Physics

Chairperson

M. Fowler

Senior Professors

- T. Ray
- C. Bean
- P. Gallagher C. Jackman
- C. JUCKINUN

Appointed Members

M. Burton J. Drew K. Verbruggen J. P. Montagner C. O'Sullivan N. Vilmer

Administrative and Other Support Staff of the Institute 2022

Registrar Eucharia Meehan

Finance Officer Grace Forkin

Senior Administrative Officer Mary Burke

Senior Exec Officer Michelle Tobin

Assistant Finance Officer Ronan Byrne

Creditor and Wages Clerk Helena Moynihan **Messenger** Patrick Wynne (to 29/3/2022)

Cleaner Colette Doyle

Head of IT Dmitri Grigoriev

Senior IT Support Administrator David Miller (to 21/10/2022)

Senior IT Systems Administrator Jean Francois Bucas

IT Systems Administrator Philippe Grange

Technical Advisor Stephen McCullagh

Systems Administrator Andrew McCarthy

HR/Admin Assistant Agency Temp

Receptionist/Admin Assistant Pauline Hutton (to 31/7/2022) Aline Morais D Silva (from 2/8/2022)

Accounts Assistant Agency Temp

Integrated Training Work Placement Rhynna Melanson (from 1/6/2022 to 30/6/2022)

Staff and Scholars of the School of Celtic Studies 2022

Senior Professors Liam Breatnach Ruairí Ó hUiginn

Professor Barry Lewis

Assistant Professor Aoibheann Nic Dhonnchadha

Publications Officer Michelle O'Riordan **Dialectologist** Brian Ó Curnáin

Bibliographer Alexandre Guilarte

Bergin Fellow Micheal Hoyne (to 9/1/2022) Deirdre Ní Charthaigh (from 1/7/2022) Chantel Kobel

School Administrator Eibhlín Nic Dhonncha

Librarian Margaret Irons

Library Assistant Orla Ni Chanainn

Technical Staff ISOS Anne-Marie O'Brien

Book Sales and Stock Records Officer Fernanda Mandolesi (from 1/3/2022)

Temporary Library Assistant Eibhlín Ní Chearbhaill (from 12/9/2022 to 31/12/2022)

Scholars Christina Cleary (Ireland) Deirdre Ní Charthaigh (to 31/6/2022) (Ireland) Caitlin Ellis (United Kingdom) Sean Ó Hoireabhárd (from 1/6/2022) (Ireland)

Research Students/Interns Medb Ní Ruadháin (from 27/6/2022 to 26/8/2022) Eibhlín Ní Chearbhaill (from 27/6/2022 to 26/8/2022)

Staff and Scholars of the School of Theoretical Physics 2022

Senior Professors Tony Dorlas Denjoe O'Connor Sergei Gukov (from 1/8/2022)

Research Fellows

Venus Keus Giandomenico Palumbo **Post Doc Fellow** Swapnamay Mondal (from 1/10/2022) Aradhita Chattopadhyaya (from 1/10/2022)

Librarian/School Administrator George Rogers

Post Doc Researchers Silvia Nagy (from 1/3/2022 to 31/8/2022)

Scholars

Ian Jubb (to 30/9/2022) (United Kingdom) Mahul Pandey (to 30/9/2022) (India) Takaki Matsumoto (to 31/12/2022) (Japan) Neetu (India) Atri Dey (from 1/9/2022) (India) Saki Koisumi (from 1/9/2022) (Japan) Giorgio Pizzolo (from 1/7/2022) (Italy) Jasmine Thomson Cooke (from 1/9/2022) (United Kingdom)

Research Students/Interns

Ali Gunning (from 15/6/2022 to 14/8/2022) Cillian Murphy (from 15/6/2022 to 14/8/2022) Conor O'Mahony (from 15/6/2022 to 14/8/2022) Nicole Tinulas (from 15/6/2022 to 14/8/2022) Ralph Jason Costales (from 15/6/2022 to 14/8/2022)

Staff and Scholars of the School of Cosmic Physics 2022

Senior Professors Peter Gallagher Caitriona Jackman Chris Bean Tom Ray

Professor Felix Aharonian Zdenek Martinec

Assistant Professor Brian O'Reilly

Director of Seismic Networks Martin Möllhoff

Research Fellow Eoin Carley (to 8/7/2022) Duygu Kiyan

Senior Technical Officer

Clare Horan

Technical Officer

Sophie Murray Stephanie Brophy Lee (from 3/10/2022) Colin Hogg Louise Collins David Craig (from 3/10/2022) Eileen Flood (to 30/6/2022)

Research Assistant (Temporary)

Eoghan Totten (from 1/10/2022)

Research Project Officer

Huda Mohamed

Secretary

Clodagh Moriarty

Project Staff

Donna Rogers Lee (from 1/3/2022) (Ireland) (SFI/IRC Pathway) Mika Holmberg (from 21/3/2022) (ESA/DIAS) (Sweden) Dale Weigt (from 1/6/2022) (Ireland) (STELLAR) Alexandra Fogg (United Kingdom) (IRC/GOI) Corentin Louis (France) (DIAS/SFI) Devaraj Rangaswamy (India) (EASY) Pauline McGinnis (to 28/11/2022) (Brazil) (EASY) Davit Zargaryan (to 31/8/2022) (Armenia) (IRC) Robert Brose (Germany) (IRC/GOI) Arun Matthew (from 1/7/2022) (India) (SFI/URF) Gaurav Tomar (to 31/7/2022) (India) (SEAI- DIG project) Tao Ye (China) (SEAI DIG) Chiara Civiero (Italy) (till 31/3/2022) (SFI SEA-SEIS) David Craig (to 2/10/2022) (Ireland) (GSI INSN) Meysam Rezaeifar (Iran) (SEAI DIG) Patrick Smith (United Kingdom) (SFI ICRAG2/Tara Mines) Nima Nooshiri (to 15/9/2022) (Iran) (DEEP) Emma Chambers (United Kingdom) (SEAI DIG) Nicholas Celli (Italy) (DEEP) Regina Maas (from 1/6/2022) (Germany) (EU IMPROVE) Haleh Karbala Ali (from 1/4/2022 to 31/12/2022) (Iran) (University of Edinburgh Tomorrow Cities) Maurice Weber (from 1/4/2022) (Germany) (EU IMPROVE) Florian le Pape (France) (SFI Pathway) Raffaele Bonadio (Italy) (SFI) Jack Piercy (United Kingdom) (MKIDs) Jonathan Mackey (Ireland) (SFI)

Oisín Creaner (Ireland) (SFI) Shane Maloney (Ireland) (STELLAR) Clara Gomez Garcia (from 10/10/2022) (Spain) (SFI) Patrick Kavanagh (Ireland) (MIRI) Sadhbh Leahy (Ireland) (SFI)

Scholars

Giuseppe Maggio (Italy) Janneke de Laat (to 30/4/2022) (Netherlands) Bruna Chagas de Melo (to 21/8/2022) (Brazil) Ee Liang Chua (Singapore) S. Baranbooei (Iran) James Grannell (Ireland) Athira Vijayan (from 1/7/2022) (India) Jereon Jaspers (from 1/0/2022) (Netherlands) Shauna Rose Raeside (from 10/10/2022) (Ireland) David McKenna (Ireland) Luis Alberto Canazares (Ireland/Spain) Anton Feeney-Johansson (to 31/3/2022) (Ireland) Camille Stock (to 31/12/2022) (USA) Marie Nelissen (to 30/9/2022) (Belgium) John Malone Leigh (Ireland) Jeremy Rigney (Ireland) Shilpi Bhunia (India) Eoin Baldwin (Ireland) (to 31/7/2022) Maria Moutzouri (to 30/9/2022) (Greece) Elizabeth O'Dwyer (DIAS Scholar) (Ireland) Christopher Philipp Burger-Scheidlin (Austria) (DIAS Scholar) Eoin Baldwin (Ireland) (to 31/7/2022) Eleanor Dunn (MSCA ITN) (United Kingdom)

Research Students/Interns

Kevin Smith (from 16/5/2022 to 15/8/2022) Serena O'Connor (from 12/6/2022 to 22/7/2022) Amy Clancy (from 1/6/2022 to 31/8/2022) Eoghan Lacy (from 1/6/2022 to 31/7/2022) Pawel Janas (from 11/7/2022 to 10/9/2022) Thomas Jones (from 4/7/2022 to 3/9/2022) Akhil Vinod Kumar (from 1/7/2022 to 31/8/2022) Jack Cullen (from 1/7/2022 to 31/8/2022)

Professors Emeritus

- L. Drury
- A. Jones
- P. Readman
- A. Thompson

Health and Safety Report

Staff and scholars continued to be facilitated to work from home, or work on site for 2022. Guidelines in relation to home working continued to be followed as part of the homeworking policy. For on-site working, the overarching COVID-19 Operational Plan and site specific COVID-19 Response Plans were updated post the conduct of updated risk assessments and a Response Levels policy adopted.

As the year progressed an increasing number of staff and scholars in 2022 were back working onsite, in addition as COVID-19 prevalence decreased, DIAS adopted guidelines in line with the prevailing Government public health guidelines. In Q4 a new hybrid working policy was put in place.

Good practice measures like CO_2 monitoring in each work space that were put in place during the pandemic continued to be used. Air purifiers are still in situ in the offices and are used as required. Mask wearing, whilst not mandatory, continues to be encouraged.

In addition, to the above measures, continued progress continues to be made on each site in terms of

managing Health and Safety. Each Health and safety representative updated site specific risk assessment in the second quarter of 2022. Fire drills and training are continuing to be carried out on each site. Manual handling and induction training continued to be carried out in 2022.

Further progress has been made with building Fire Safety upgrades, a new L1 standard fire alarm system with wireless sensors and detection was designed and procured in Q4 2022 in DIAS Merrion Square. Works are due to commence in 2023.

The Health and Safety Statement was reviewed in Q2 2022, and approved by the Council in that year.

	Number	Comment
Accidents recorded	2	March 22 incident with employee trying to avoid bovine whilst accessing a field in order to access Dunsink. Employee had some cuts.
		Staff member fell on wet floor in Merrion in October.
Near misses	5	4 reported incidents of joy riding in Dunsink lane whilst staff using the lane.
		1 incident of a burnt car in Dunsink Lane.
		Near miss regarding trip incident in Merrion but no injury.
Days lost (FTE)	0	-

Financial Statements

for year ended 31 December 2022

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Information

Members of the Council of the Dublin Institute for Advanced Studies: 2022

Chairman

J. Hegarty

Ex-Officio Members

A. Deeks, President, UCD to April 2022M. Rogers, President. UCD from May 2022L. Doyle, Provost, TCDM. Canning, President, RIA

Members Appointed by the Governing Boards of Constituent Schools

M. Fowler P. Goddard M. Ní Mhaonaigh D. O'Connor R. Ó hUiginn T.Ray

Registrar and Chief Executive Officer

Dr. Eucharia Meehan

Head Office 10 Burlington Road, Dublin 4

Internal Auditors

Mazars, Block 3, Harcourt Centre, Harcourt Road, Dublin 2

Auditors

The Office of the Comptroller and Auditor General, 3A Mayor Street Upper, Dublin 1

Bankers

Bank of Ireland, College Green, Dublin 2 Bank of Ireland, Baggot Street, Dublin 2

Governance Statement and Council Members' Report

The Dublin Institute for Advanced Studies (DIAS) is a statutory corporation and was established in 1940 under the Institute for Advanced Studies Act of that year.

The Council is accountable to the Minister for Further and Higher Education, Research, Innovation and Science and is responsible for ensuring good governance. The Council performs this task by setting strategic objectives and targets and taking strategic decisions on all key business issues. The day-to-day management and control of the Institute are the responsibility of the Registrar/CEO and the senior management team. The Registrar/CEO and the senior management team must follow the broad strategic direction set by the Council. The executive must ensure that the Council Board members have a clear understanding of the key activities and decisions related to the entity, and of any significant risks likely to arise. The Registrar/CEO acts as a direct liaison between the Council and management of the Institute.

Council Responsibilities

The work and responsibilities of the Council are set out in the Institute for Advanced Studies Act 1940. Standing items considered by the members of Council include:

- reports from committees,
- financial reports/management accounts,
- performance reports, and
- reserved matters.

The Council is responsible for keeping adequate accounting records which disclose with reasonable accuracy at any time the financial position of the Institute and which enable it to ensure that the financial statements comply with Section 28(2) of the Act.

In preparing those financial statements, the Council is required to:

- select suitable accounting policies and apply them consistently,
- make judgements and estimates that are reasonable and prudent,
- prepare the financial statements on the going concern basis unless it is inappropriate to presume that it will continue in operation, and disclose and explain any material departures disclosed from applicable standards. The maintenance and integrity of the corporate and financial information on the Institutes' website is the responsibility of the Registrar/CEO.

The Council is also responsible for safeguarding the assets of the Institute and for taking reasonable steps for the prevention and detection of fraud and other irregularities.

The Council considers that the financial statements of the Institute give a true and fair view of the financial performance and the financial position of the Institute at 31 December 2022.

Council Structure

The Council consists of a Chairman appointed by the President, on the advice of the Government, three ex-officio members and six members appointed by the Governing Boards of the constituent schools. DIAS has a Registrar/CEO and a Central Administration. The members of Council were appointed for a period of five years. Two meetings of Council were held during the period. The table below details the appointment period for current members:

Governance Statement and Council Members' Report (continued)

Council Member	Role	Period of Appointment
Dr. John Hegarty	Chairman	22 Nov 2021 to 30 June 2025
A. Deeks, Presid., UCD	Ex-Officio Member	1 Aug 2020 to 30 April 2022
M. Rogers, Presid., UCD	Ex-Officio Member	1 May 2022 to 30 June 2025
L. Doyle, Prov., TCD	Ex-Officio Member	1 Aug 2021 to 30 June 2025
M. Canning, President, RIA	Ex-Officio Member	1 Aug 2020 to 30 June 2025
Professor M. Fowler	Appointed by Gov. Board	1 Aug 2020 to 30 June 2025
Professor P. Goddard	Appointed by Gov. Board	1 Aug 2020 to 30 June 2025
Professor M. Ní Mhaonaigh	Appointed by Gov. Board	1 Aug 2020 to 30 June 2025
Professor D. O' Connor	Appointed by Gov. Board	1 Aug 2020 to 30 June 2025
Professor R.Ó hUiginn	Appointed by Gov. Board	1 Aug 2020 to 30 June 2025
Professor T. Ray	Appointed by Gov. Board	1 Dec 2021 to 30 June 2025

The Council has established an Audit and Risk Committee.

The Audit and Risk Committee comprises four members. The role of the Audit and Risk Committee is to support the Council in relation to its responsibilities for issues of risk, control and governance and associated assurance. The Audit and Risk Committee is independent from the financial management of the organisation. In particular the Committee ensures that the internal control systems including audit activities are monitored actively and independently. The Audit and Risk Committee reports to the Council twice a year and formally in writing annually.

The members of the Audit and Risk Committee are: Mr. John Boland, Chairman, Professor Dervilla Donnelly, Mr. Stewart Roche and Ms. Lesley Goulding. In 2022 the Audit and Risk Committee met on three occasions.

Schedule of Attendance, Fees and Expenses

A schedule of attendance at the Council and Audit and Risk Committee meetings for 2022 is set out below including the fees and expenses received by each member.

	Audit & Risk			
	Council 2022	Committee 2022	Fees €	Expenses €
No. of Meetings	2	3		
Dr. John Hegarty	1			
A. Deeks, Presid., UCD, to April 2022	0		-	-
M. Rogers, Presid., UCD, from May 2022	0			
Dr. L. Doyle, Prov., TCD	0		-	-
M. Canning, President, RIA	1		-	-
Professor M. Fowler	1		-	315
Professor P. Goddard	1		-	976
Professor M. Ní Mhaonaigh	1		-	377
Professor D. O' Connor	1		-	-
Professor R.Ó hUiginn	1		-	-
Professor C. Bean	1		-	-
Mr. J. Boland (Ch)		3	-	-
Professor D Donnelly		3	-	-
Mr. S. Roche		3	-	-
Ms. L.Goulding		3	-	-

Key Personnel Changes

The membership of the Council changed during 2022.

Professor A. Deeks resigned as President of UCD in April 2022.

Professor M. Rogers was appointed as President of UCD in May 2022.

Disclosures Required by Code of Practice for the Governance of State Bodies (2016)

The Council is responsible for ensuring that the Institute has complied as appropriate with the requirements of the Code of Practice for the Governance of State Bodies ("the Code"), as published by the Department of Public Expenditure and Reform in August 2016. The following disclosures are required by the Code:

Consultancy Costs

Consultancy costs include the cost of external advice to management and exclude outsourced "business-as-usual" functions.

	2022	2021
	€	€
Legal Fees	42,859	25,688
Financial/actuarial	39,710	51,075
Communication	68,967	86,407
External Review	-	152
Site Reviews and Development	49,812	-
Other	33,750	77,617
Total Consultancy Costs charged to the Income and Expenditure	235,098	240,939

Travel and Subsistence Expenditure

Travel and Subsistence Expenditure is categorised as follows:

	2022	2021
	€	€
Domestic		
Employees & Board	6,643	3,590
Academic Visitors	57,525	158
Project	28,627	16,036
Field	8,532	2,343
Total	101,327	22,127
International		
Employees & Board	35,284	11,840
Project	196,439	21,108
Total	231,723	32,948
Conferences and Online Seminars	138,118	48,025
Transport and Other Field	17,523	43,454
Overall Total	488,691	146,554

Governance Statement and Council Members' Report (continued)

Hospitality Expenditure

The Income and Expenditure includes the following hospitality expenditure:

	2022 €	2021 €
Staff Hospitality	6,594	111
Client Hospitality	2,144	298
Total	8,738	409

Statement of Compliance

The Institute has complied with the requirements of the Code of Practice for the Governance of State Bodies in 2022.

John Hegarty

Dr. John Hegarty Chairman of Council

Date 19th July 2023

have Meehon

Dr. Eucharia Meehan Registrar/CEO

Statement of Responsibilities of the Council

The Council of the Dublin Institute for Advanced Studies is required under section 28(2) of the Institute for Advanced Studies Act 1940 to prepare financial statements in such form as shall be approved by the Minister for Further and Higher Education, Research, Innovation and Science with the concurrence of the Minister for Public Expenditure and Reform. In preparing those financial statements the Council is required to:

- select suitable accounting policies and apply them consistently;
- make judgements and estimates that are reasonable and prudent;
- prepare the financial statements on the going concern basis unless it is inappropriate to presume that the Institute will continue in operation; and
- disclose and explain any material departures from applicable accounting standards.

The Council is responsible for keeping adequate accounting records which disclose with reasonable accuracy at any time the financial position of the Institute and which enable it to ensure that the financial statements comply with Section 28(2) of the Act. The Council is responsible for safeguarding the assets of the Institute and for taking reasonable steps for the prevention and detection of fraud and other irregularities.

- Shllegon

Ruairí Ó hUiginn Council Member

Date 19th July 2023

Darjoe O Comor

Denjoe O'Connor Council Member

Statement on Internal Control

Scope of Responsibility

On behalf of the Council of the Institute we acknowledge our responsibility for ensuring that an effective system of internal control is maintained and operated. This responsibility takes account of the requirements of the Code of Practice for the Governance of State Bodies (2016).

Purpose of the System of Internal Control

The system can only provide reasonable and not absolute assurance that assets are safeguarded, transactions authorised and properly recorded, and that material errors or irregularities are either prevented or would be detected in a timely period.

Capacity to Handle Risk

The Council has an Audit and Risk Committee comprising of four external members.

The Audit and Risk Committee continues to review internal control matters and issues raised by the Comptroller and Auditor General. In 2022, the Audit and Risk Committee met on three occasions.

In addition, the 2022 report on internal control systems as provided by the Internal Auditor has been made available to Members of Council.

Risk and Control Framework

The Council has taken steps to ensure an appropriate control environment by

- clearly defining management responsibilities;
- adopting the principles of corporate governance contained in the 2016 Code of Practice for Governance of State bodies;
- establishing formal procedures for reporting significant control failures and ensuring appropriate corrective action; and
- establishing formal procedures to monitor the activities and safeguard the assets of the organisation.
- The Council has established processes to identify and evaluate business risks by
- identifying the nature, extent and financial implication of risks facing the Institute including the extent and categories which it regards as acceptable;
- assessing the likelihood of identified risks occurring;
- assessing the Institute's ability to manage and mitigate the risks that do occur;
- assessing the costs of operating particular controls relative to the benefit obtained.

Ongoing Monitoring and Review

The system of internal control is based on a framework of regular management information, administrative procedures including segregation of duties, and a system of delegation and accountability. In particular it includes:

- comprehensive budgeting system with an annual budget which is reviewed and agreed by the Council of the Institute;
- regular reviews by the Council of periodic and annual financial reports which indicate financial performance against forecasts;
- setting targets to measure financial and other performance;
- adherence to public procurement guidelines;
- regular reviews by the Council of external research projects.

Procurement

We confirm that the DIAS has procedures in place to ensure compliance with current procurement rules and guidelines. Matters arising regarding controls over procurement are highlighted under internal control issues below.

Internal Control Issues

During 2022, expenditure of €122,433 was incurred in relation to goods and services where the procedures employed did not comply with procurement guidelines. The expenditure costs identified by DIAS were in respect of premises and maintenance costs, gardening services and agency costs.

Premises and Maintenance costs €58,945

Post COVID-19, there was an urgent need to prepare the buildings for occupancy. It was necessary to increase expenditure on premises and maintenance support in order to ensure that the buildings and facilities were ready for the safe return of staff and scholars working on site. As a consequence, the cost of premises and maintenance support exceeded the €25,000 threshold.

Gardening Services €15,870

DIAS spent €15,870 in respect of gardening services in Dunsink. Procurement guidelines were not followed and DIAS is currently working with the Office of Government Procurement to get the matter resolved.

Agency Costs €47,618

Due to a vacancy in the HR department, it was necessary to provide temporary contract services. There was a delay in advertising for the HR position as two front of house positions became vacant and required immediate attention. The HR post will be advertised in 2023.

A non-competitive contract was entered into by DIAS for goods to the value of €137,000 excl.VAT. The purchase was from a sole supplier.

Impact of COVID-19 on the Control Environment

DIAS management have sought to ensure that the strong control environment has been maintained despite staff working remotely during the period. DIAS operations have been aligned with government policy and the senior management team have been meeting on a weekly basis in order to manage the DIAS response to COVID-19.

Emphasis has been placed on research and advanced study work to continue as normal and to ensure a minimum disruption to output. A number of critical national fieldwork activities were maintained and DIAS provided on-line events and seminars where possible.

Financial Controls

Roles and responsibilities have remained the same throughout and there continues to be segregation of duties across all of the finance operations. Authorisation limits and payment thresholds were not changed. Sign-off and evidence of approval are now via electronic signature and/or email as opposed to manual sign-off pre-pandemic. The process around the posting and approval of journals has not changed as a result of the new working arrangements. Monthly balance sheet reconciliations continue to be performed in a timely manner. Strong controls remain in place regarding the changing of employee and supplier bank details.

Budgeting and Forecasting

DIAS has a robust budgeting and forecasting process. There is a comprehensive annual budgeting system in place and Council continue to review the periodic and annual financial reports and forecasts. Expenditure in the schools and sections is constantly monitored against budget to ensure there is not significant overspends. The financial impact of COVID-19 on the Institute is closely monitored.

Risk Management

During 2020 and most of 2021, a COVID-19 Risk Register was in place to deal specifically with the risks associated with the pandemic. In December 2021 the Covid -19 Risk Register and the General Risk Register were merged into one document. The Risk Register was presented to Council in May and December 2022. Risk is a standing item on the ARC agenda and the Risk Registers were reviewed by the ARC in April, June and October 2022.

Information Technology

DIAS procured a number of laptops for central administration staff. There was an upgrade to the primary and failover DIAS routers. In relation to IT security, there is secure VPN based on individual password-protected SSL certificates specifically authorised for access to the DIAS server. Access to VPN was rolled out for all DIAS research staff and scholars. Procedures were established for carrying out IT support for home working.

Training and guidance was provided on Zoom and Microsoft Teams in order to facilitate meetings and to access seminars.

Review of Effectiveness

We confirm that the DIAS has procedures to monitor the effectiveness of its risk management and control procedures.

The Council's monitoring and review of the effectiveness of the system of internal control is informed by the work of the internal auditor, the Registrar and other officers within the Institute who have responsibility for the development and maintenance of an appropriate internal control framework and comments made by the Audit and Risk Committee and the Comptroller and Auditor General in his management letter or other reports.

Protected Disclosure

Investigation into an ongoing Protected Disclosure concluded in 2022. No further action is required. There was no other case of Protected Disclosure in 2022.

Statement on Internal Control (continued)

We confirm that for the 12 month period ended 31st December 2022, Council conducted a review of the effectiveness of the internal controls of the Institute.

A review of the internal control in 2022 was carried out by an external firm and was reviewed by the members of the Audit and Risk Committee on 23rd March 2023. The review of the internal control in 2022 was signed off by Council in March 2023.

We confirm that the Institute has an appropriate system of internal control in place.

Signed on behalf of the Council of the Institute.

John Hegarty

Dr. John Hegarty Chairman Council of the Institute

Date 19th July 2023

Mechan

Dr. Eucharia Meehan Registrar/CEO



Ard Reachtaire Cuntas agus Ciste Comptroller and Auditor General Report for presentation to the Houses of the Oireachtas

Opinion on the financial statements

I have audited the financial statements of the Dublin Institute for Advanced Studies for the year ended 31 December 2022 as required under the provisions of the Institute for Advanced Studies Act 1940. The financial statements comprise

- the statement of income and expenditure and retained revenue reserves
- the statement of comprehensive income
- the statement of financial position
- the statement of cash flows, and
- the related notes, including a summary of significant accounting policies.

In my opinion, the financial statements give a true and fair view of the assets, liabilities and financial position of the Institute at 31 December 2022 and its income and expenditure for 2022 in accordance with Financial Reporting Standard (FRS) 102 — The Financial Reporting Standard applicable in the UK and the Republic of Ireland.

Basis of opinion

I conducted my audit of the financial statements in accordance with the International Standards on Auditing (ISAs) as promulgated by the International Organisation of Supreme Audit Institutions. My responsibilities under those standards are described in the appendix to this report. I am independent of the Institute and have fulfilled my other ethical responsibilities in accordance with the standards.

I believe that the audit evidence I have obtained is sufficient and appropriate to provide a basis for my opinion.

Report on information other than the financial statements, and on other matters

The Institute has presented certain other information together with the financial statements. This comprises a governance statement and Council members' report, a statement of responsibilities of the Council, and a statement on internal control.

My responsibilities to report in relation to such information, and on certain other matters upon which I report by exception, are described in the appendix to this report.

I have nothing to report in regard to those matters.

Mary Henry For and on behalf of the Comptroller and Auditor General

24 July 2023

Appendix to the report

Responsibilities of Council members

The members are responsible for

- the preparation of annual financial statements in the form prescribed under the Institute for Advanced Studies Act 1940
- ensuring that the financial statements give a true and fair view in accordance with FRS102
- ensuring the regularity of transactions
- assessing whether the use of the going concern basis of accounting is appropriate, and
- such internal control as they determine is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

Responsibilities of the Comptroller and Auditor General

I am required under the Institute for Advanced Studies Act 1940 to audit the financial statements of the Institute and to report thereon to the Houses of the Oireachtas.

My objective in carrying out the audit is to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement due to fraud or error. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with the ISAs 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.

As part of an audit in accordance with the ISAs, I exercise professional judgment and maintain professional scepticism throughout the audit. In doing so,

 I identify and assess the risks of material misstatement of the financial statements whether due to fraud or error; design and perform audit procedures responsive to those risks; and obtain audit evidence that is sufficient and appropriate to provide a basis for my opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.

- I obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the internal controls.
- I evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures.
- I conclude on the appropriateness of the use of the going concern basis of accounting and, based on the audit evidence obtained, on whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Institute's ability to continue as a going concern. If I conclude that a material uncertainty exists, I am required to draw attention in my report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify my opinion. My conclusions are based on the audit evidence obtained up to the date of my report. However, future events or conditions may cause the Institute to cease to continue as a going concern.
- I evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

I communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that I identify during my audit.

I report by exception if, in my opinion,

- I have not received all the information and explanations I required for my audit, or
- the accounting records were not sufficient to permit the financial statements to be readily and properly audited, or
- the financial statements are not in agreement with the accounting records.

Information other than the financial statements

My opinion on the financial statements does not cover the other information presented with those statements, and I do not express any form of assurance conclusion thereon.

In connection with my audit of the financial statements, I am required under the ISAs to read the other information presented and, in doing so, consider whether the other information is materially inconsistent with the financial statements or with knowledge obtained during the audit, or if it otherwise appears to be materially misstated. If, based on the work I have performed, I conclude that there is a material misstatement of this other information, I am required to report that fact.

Reporting on other matters

My audit is conducted by reference to the special considerations which attach to bodies in receipt of substantial funding from the State in relation to their management and operation. I report if I identify material matters relating to the manner in which public business has been conducted.

I seek to obtain evidence about the regularity of financial transactions in the course of audit. I report if I identify any material instance where public money has not been applied for the purposes intended or where transactions did not conform to the authorities governing them.

Statement of Income and Expenditure and Retained Revenue Reserves

		2022	2021
	Notes	€	€
Income	2		
Oireachtas Grant	3	8,143,303	7,637,146
Net deferred funding for retirement benefits	10.d	1,084,747	1,141,770
Sales of Publications		44,900	52,077
Projects	4	4,169,267	2,595,658
Other	5	127,824	33,093
		13,570,041	11,459,744
Transfer (to)/from Capital Reserve	14	(612,504)	159,346
Amount released on Disposal		-	7,904
		12,957,537	11,626,994
Expenditure	2		
School of Celtic Studies		1,815,879	1,773,191
School of Theoretical Physics		2,198,891	1,643,071
School of Cosmic Physics		5,769,096	5,235,308
Administration		3,183,932	2,846,133
		12,967,798	11,497,702
Surplus/(Deficit) for the year		(10,261)	129, 291
Balance at 1 January		670,227	540,936
Balance at 31 December		659,966	670,227
		2022	2021
Statement of Comprehensive Income	Notes	€	€
Surplus/(Deficit) for the year		(10,261)	129,291
Experience gains/(losses) on retirement benefit obligations		4,036,000	905,000
Changes in assumptions underlying the present value of retirement benefit obligations		24,665,000	68,000
Actuarial Gain/(Loss) on Retirement Benefit Obligations	10.c	28,701,000	973,000
Adjustment to Deferred Retirement Benefit Funding		(28,701,000)	(973,000)
Total Recognised Gain/(Loss) for the Year		(10,261)	129,291

The Statement of Cash Flows and notes 1 to 17 form part of these financial statements.

Ruain Shilligin

Ruairí Ó hUiginn Council Member

Date 19th July 2023

Davjoe O'Comor

Denjoe O'Connor Council Member

Statement of Financial Position

	Notor	2022	2021
Assets	Notes	÷	e
Fixed Assets: Property, Plant and Equipment	13	3,079,166	2,466,662
Current Assets:		-,- ,	, ,
Cash on Hand and at Bank		5,716,151	5,462,850
Receivables	15	132,292	152,678
Project Receivables	4(a)	622,421	1,151,304
Total Assets		9,550,030	9,233,494
Less Ligbilities			
Pavables - Amounts falling due within one year			
Payables	16	3,085,050	3,085,665
Project Payables	4(a)	2,697,873	2,982,973
Payables - Amounts falling due after one year	16	27,975	27,967
		5,810,898	6,096,605
Assets Less Liabilities Before Retirement Benefits		3,739,132	3,136,889
Deferred Retirement Benefit funding	10.d	50,049,117	77,665,117
Retirement Benefit Obligations	10.c	(50,049,117)	(77,665,117)
		-	-
Net Assets		3,739,132	3,136,889
Financed by:			
Income and Expenditure Account		659,966	670,227
Capital Reserve	14	3,079,166	2,466,662
		7 770 170	7 174 000
		3,/39,132	3,130,089

The Statement of Cash Flows and notes 1 to 17 form part of these financial statements.

Ruain Shlligini

Ruairí Ó hUiginn Council Member

Date 19th July 2023

Darjoe D'Consor

Denjoe O'Connor Council Member

Statement of Cash Flows

	Notes	2022 €	2021 €
Reconciliation of Operating Surplus to Net Cash	110103		
(Outflow)/Inflow from Operating Activities			
Surplus/(Deficit) for the Year		(10,261)	129,291
Increase/(Decrease) in Payables		(607)	491,320
(Increase)/Decrease in Receivables		20,386	152,202
Net Decrease in Research Programmes and Fees		243,783	1,193,411
Depreciation	13	480,737	432,609
Capital Reserve Transfer	14	612,504	(167,250)
Amount Released on Disposal		-	7,904
Net Cash (Outflow)/Inflow from Operating Activities		1,346,542	2,239,487
Cash Flow Statement			
Net Cash (Outflow)/Inflow from Operating Activities		1,346,542	2,239,487
Cash Flow from Financing Activities			
Bank Interest Received	5	-	-
Cash Flow from Investing Activities			
Purchase of Tangible Assets	13	(1,093,241)	(273,263)
(Decrease)/Increase in Cash		253,301	1,966,224
Reconciliation of Net Cash Flow to Movement in Net Funds			
(Decrease)/Increase in Cash		253,301	1,966,224
Net Funds at 1 January		5,462,850	3,496,626
Net Funds at 31 December		5,716,151	5,462,850
		and in hand	and in hand
		€	€
Analysis of Change in Net Funds			
At Beginning of Year		5,462,850	3,496,626
Cash Flows		253,301	1,966,224
At End of Year		5,716,151	5,462,850

The Statement of Cash Flows and notes 1 to 17 form part of these financial statements.

Ruain Shilligini

Ruairí Ó hUiginn Council Member

Date 19th July 2023

Darjoe D'Comor

Denjoe O'Connor Council Member

Notes to the Financial Statements

1. Accounting Policies

The Institute was established under the Institute for Advanced Studies Act, 1940.

Its functions include the provision of facilities for the furtherance of advanced studies and the conduct of research in specialised branches of knowledge. It comprises three Schools - Celtic Studies, Theoretical Physics and Cosmic Physics.

a) Basis of Preparation and Statement of Compliance

Going concern

The Financial statements have been prepared on a going concern basis. The Council has considered the impact of COVID-19 on the operations of the Institute at meetings held in June and December 2020 and December 2021. Throughout the financial period 2022, the senior management of the Institute continued to monitor the impact of COVID-19 on the operations of DIAS.

An assessment on the projected financial impact of COVID-19 on the Institute has been completed to the end of December 2022 and the Council are satisfied that the Institute has sufficient resources to continue in operation for at least 12 months from the signing of the financial statements.

b) Basis of Accounting

This set of financial statements is prepared by the Dublin Institute for Advanced Studies in accordance with accounting standards issued by the Financial Reporting Council, including FRS 102 "The Financial Reporting Standard applicable in the UK and Republic of Ireland" ("FRS 102").

The preparation of financial statements in compliance with FRS 102 requires the use of certain critical accounting estimates. It also requires management to exercise judgement in applying the Institute's accounting policies. (See Note 18).

The financial statements have been prepared on an accruals basis under the historical cost convention and comply with the financial reporting standards of the Financial Reporting Council.

The following accounting policies have been applied:

c) Oireachtas Grants

Income from Oireachtas grants represents accrued income in the year.

d) Fixed Assets: Property, Plant and Equipment

Fixed Assets comprise the furniture, equipment, computers and motor vehicles of the Institute and are shown at cost less accumulated depreciation. The rates of depreciation, calculated on a straight line basis, are as follows:

Furniture & Equipment	10%
Computers	25%
Motor Vehicles	25%

Fixed assets below the capitalisation threshold are charged to the Statement of Income and Expenditure in the year of purchase.

The capitalisation threshold amount is \in 3,000 exclusive of VAT.

The Fixed Assets are made up of exchequer and project funded assets. The depreciation of project funded assets are calculated on a straight line basis as outlined above.

Premises occupied by the Institute are leased from the Office of Public Works.

At each reporting date the Institute assesses whether there is any indication of impairment. If such indication exists, the recoverable amount of the asset is determined which is the higher of its fair value less costs to sell and its value in use. An impairment loss is recognised where the carrying amount exceeds the recoverable amount.

Notes to the Financial Statements (continued)

1. Accounting Policies (continued)

Gains and losses on disposals are determined by comparing the proceeds with the carrying amount and are recognised within the Income and Expenditure Account.

Heritage Assets

The Institute holds and maintains certain heritage assets, such as libraries holding manuscripts, book and pamphlet collections, as well as antique scientific instruments. Included in the list of assets is a book collection and antique astronomical equipment and clocks which are itemised on the contents of insurance.

The Institute conserves these assets for research and for interaction between the Institute and the public.

In accordance with accounting standard FRS102, heritage assets acquired pre 1 January 2007 are not capitalised in the financial statements since reliable estimates of cost or value are not available at a reasonable cost.

There have been no heritage assets acquired subsequent to 1 January 2007, within the thresholds as specified in this policy. The Institute will capitalise any assets acquired after this date at either their cost (in the case of acquisitions made by the Institute) or their fair value (in the case of donations). Donated heritage assets will be capitalised with reference to recent sales of similar objects.

Heritage assets valued at less than €10,000 are not capitalised in the financial statements.

As funds permit and if judged necessary, conservation is carried out on heritage items and the expenditure incurred is recognised in the income and expenditure accounts.

The Institute does not dispose of heritage items, whether acquired, donated or bequeathed.

e) Capital Reserve

The capital reserve represents the unamortised value of income used for the purchase of Fixed Assets from state sources.

Capital income received from non-state sources is recognised in full when the asset is purchased.

f) Library

Expenditure on library books and materials is written off in the year in which it is incurred.

g) Publications

Expenditure on publications is written off in the year in which it is incurred.

h) Superannuation

The Dublin Institute for Advanced Studies operates a defined benefit retirement benefit scheme which is funded annually on a pay as you go basis from monies available to it, including monies provided by the Department of Further and Higher Education, Research, Innovation and Science and from contributions deducted from staff salaries. Staff appointed before 1 January 2013 have pension terms under the relevant DIAS Superannuation Scheme as set out in:

- (a) Dublin Institute for Advanced Studies (Superannuation) Scheme 1947 as amended
- (b) Dublin Institute for Advanced Studies Spouses and Children's Contributory Scheme 1991
- (c) Dublin Institute for Advanced Studies Non-Established Employees (Superannuation) Scheme 1983
- (d) Dublin Institute for Advanced Studies Staff Superannuation (Consolidation) Scheme, 2008 and Dublin Institute for Advanced Studies Staff Superannuation Spouses' and Children's Contributory Pension (Consolidation) Scheme, 2008.

The Dublin Institute for Advanced Studies also operates the Single Public Service Pension Scheme (Single Scheme) which is the defined benefit retirement benefit scheme for pensionable public servants appointed on or after 1 January 2013. Single Scheme member's contributions are paid over to the Department of Public Expenditure and Reform.

h) Superannuation (continued)

As required under circular 28/2016, the Dublin Institute for Advanced Studies also pays Single Scheme employer contributions, at the rate of three times the employee contribution, over to the Department of Public Expenditure and Reform in respect of members of the single scheme engaged on self-financing projects (note 16).

Retirement benefit costs reflect retirement benefits earned by employees in the period and are shown net of staff retirement benefit contributions which are retained by the Dublin Institute for Advanced Studies. An amount corresponding to the retirement benefits charge is recognised as income to the extent that it is recoverable, and offset by grants received in the year to discharge retirement benefit payments.

Actuarial gains or losses arising on scheme liabilities are reflected in the Statement of Comprehensive Income and a corresponding adjustment is recognised in the amount recoverable from the Department of Further and Higher Education, Research, Innovation and Science.

Retirement benefit liabilities represent the present value of future retirement benefit payments earned by staff to date. Deferred retirement benefits funding represents the corresponding asset to be recovered in future periods from the Department of Further and Higher Education, Research, Innovation and Science.

i) Projects

The Dublin Institute for Advanced Studies receives external funding from industry, government bodies and the European Commission.

A chart of accounts is maintained for each project.

Project receipts are applied as project income, at a level that equals the annual expenditure incurred on direct costs and overheads earned by the associated project.

At the end of the life of the project any surplus or deficit balance left on the project is reflected in the financial statements.

The Dublin Institute for Advanced Studies receives overhead income on a number of externally funded projects.

Overhead income from projects is credited to the income and expenditure account in the period in which it is earned.

Depending on the level of overhead expenditure on the project within the period, this may result in a surplus or deficit on overhead income being reflected in the financial statements.

Overhead income is recognised in line with funding arrangements.

j) Payables

Short term payables are measured at the transaction price.

k) Cash and Cash Equivalents

Cash is represented by cash in hand and deposits with financial institutions repayable without penalty on notice of not more than 24 hours. Cash equivalents are highly liquid investments that mature in no more than three months from the date of acquisition and that are readily convertible to known amounts of cash with insignificant risk of change in value.

I) Financial Instruments

The Institute only enters into basic financial instrument transactions that result in the recognition of financial assets and liabilities like trade and other accounts receivable and payable. Basic financial instruments are recorded at transaction price.

Notes to the Financial Statements (continued)

1. Accounting Policies (continued)

m) Holiday Pay

A liability is recognised to the extent of any unused holiday pay entitlement which is accrued at the balance sheet date and carried forward to future periods. This is measured at the undiscounted salary cost of the future holiday entitlement and accrued at the balance sheet date.

n) Operating leases

Rentals payable under operating leases are charged to the Income and Expenditure Account as incurred over the term of the lease.

o) Functional Currency

The Institute's functional and presentational currency is euro.

p) Non Project Grants.

Grants from third parties are recorded in the financial statements using the Accruals Method and are allocated to income so as to match with the related expenditure to which they relate.

q) Judgements in Applying Accounting Policies and Key Sources of Estimation

The preparation of these financial statements requires management to make judgements, estimates and assumptions that affect the application of policies and reported amounts of assets and liabilities, income and expenses. Judgements and estimates are continually evaluated and are based on historical experiences and other factors, including expectations of future events that are believed to be reasonable under the circumstances.

The Institute makes estimates and assumptions concerning the future. The resulting accounting estimates will, by definition, seldom equal the related actual results. The estimates and assumptions that have a significant risk of causing a material adjustment to the carrying amounts of assets and liabilities within the next financial year are discussed below.

Useful Lives of Tangible Fixed Assets

Long-lived assets comprising primarily of Furniture and Equipment, Computers and Motor Vehicles represent a significant portion of total assets. The annual depreciation charge depends primarily on the estimated lives of each type of asset and, in certain circumstances, estimates of residual values. The Council regularly review these useful lives and change them if necessary to reflect current conditions. In determining these useful lives management consider technological change, patterns of consumption, physical condition and expected economic utilisation of the assets. Changes in the useful lives can have a significant impact on the depreciation charge for the financial year.

Actuarial Assumptions in Respect of Defined Benefit Retirement Benefit Schemes

The application of actuarial assumptions relating to defined benefit retirement benefit schemes is incorporated in the financial statements in accordance with FRS 102. In applying FRS 102, advice is taken from independent qualified actuaries. In this context, significant judgement is exercised in a number of areas, including future changes in salaries and inflation, mortality rates and the selection of appropriate discount rates. A defined benefit asset is recorded matching the liability on the basis that the liability is funded by the state.

Provisions

The Institute makes provisions for legal and constructive obligations, which it knows to be outstanding at the period end date. These provisions are generally made based on historical or other pertinent information, adjusted for recent trends where relevant. However, they are estimates of the financial costs of events that may not occur for some years. As a result of this and the level of uncertainty attaching to the final outcomes, the actual out-turn may differ significantly from that estimated.

2. Detailed Analysis of Income & Expenditure for the year ended 31/12/2022

		School of Celtic Studies	School of Theoretical Physics	School of Cosmic Physics	Adminis- tration	2022 Total	2021 Total
INCOME	Notes	€	€	€	€	€	€
Dept.of Further and Higher Education, Research, Innovation							
and Science Grant (Annual) *Net Deferred Funding for	3	1,837,900	1,022,100	2,969,181	2,314,122	8,143,303	7,637,146
Retirement Benefits	10.d	313,116	81,485	563,638	126,508	1,084,747	1,141,770
Sales of Publications		44,700	-	200	-	44,900	52,077
Project Income	4.a	11,910	140,142	3,900,587	116,628	4,169,267	2,595,658
Other	5	6,240	-	41,584	80,000	127,824	33,093
		2,213,866	1,243,727	7,475,190	2,637,258	13,570,041	11,459,744
Transfer (to)/from Capital							
Reserve	14	-	-	-	(612,504)	(612,504)	159,346
Amount released on disposal	14	-	-	-	-	-	7,904
		2,213,866	1,243,727	7,475,190	2,024,754	12,957,537	11,626,994
EXPENDITURE							
Payroll Costs	6	1,232,833	836,781	1,818,957	997,033	4,885,604	4,726,923
*Retirement Benefit Costs	10.b	450,175	1,069,600	906,609	421,427	2,847,811	2,597,207
**Project Costs	4.a	5,625	134,339	2,858,430	-	2,998,394	2,419,927
Library and Book Storage		35,980	38,095	18,022	-	92,097	103,438
Depreciation	13	-	-	-	480,737	480,737	432,609
Rent, Rates and Insurance		-	-	-	215,500	215,500	211,239
General Expenses	8	11,575	13,140	81,164	345,831	451,710	335,935
Travel and Seminar Expenses		24,345	93,776	50,081	6,229	174,431	52,944
Premises Maintenance and Security		-	-	-	303,036	303,036	214,863
Computer and Internet		10 730	957	12 549	61 927	86 163	141 337
Evel Light and Power		-	-	12,547	289 908	289 908	125 777
Postage and Telephone		_	_	_	19 084	19 084	19 262
Stationery		4.726	3.092	5.442	6.382	19.642	11.730
Publications		33,442	-,	1,971	-,	35,413	32,786
Advertising		1,038	-	, 11,259	9,832	22,129	4,238
Minor Office Equipment		5,410	9,111	4,612	27,006	46,139	59,584
Disposal of Asset		-	-	-	-	-	7,904
		1,815,879	2,198,891	5,769,096	3,183,932	12,967,798	11,497,703
SURPLUS/(DEFICIT) FOR YEAR		397,987	(955,164)	1,706,094	(1,159,178)	(10,261)	129,291
Balance at 1 January		1,896,640	(2,724,071)	8,062,704	(6,565,046)	670,227	540,936
Balance at 31 December		2,294,627	(3,679,235)	9,768,798	(7,724,224)	659,966	670,227
2. Detailed Analysis of Income & Expenditure for the year ended 31/12/2022 (continued)

Note (a)

The Net Deferred Funding for Retirement Benefits are allocated on a pro rata basis to the amount paid to pensioners in the year.

The Retirement Benefits Costs are allocated on a pro rata basis to the pension contributions from staff in the year.

Note (b)

Costs directly related to research (e.g., pay, library, computer expenses, travel) have been apportioned to the schools.

Overhead costs such as rent, insurance, utilities and property maintenance have been charged to Administration.

Note (c) Grant

An amount of €8,143,303, (2021 7,637,146) was received from the Department of Further and Higher Education, Research, Innovation and Science. The grant is provided by the Department of Further and Higher Education, Research, Innovation and Science towards liabilities under pay and general non-pay expenses and is drawn down by the Institute on an annual basis.

3. Oireachtas Grant

	2022 €	2021 €
Dept. of Further and Higher Education, Research, Innovation and Science		
Grant for Recurrent Purposes	7,831,000	7,258,416
Supplementary Grant COVID-19	350,000	559,650
Grant for Capital Purposes	284,890	169,080
	8,465,890	7,987,146
Less Supplementary Grant COVID-19 deferred to 2022	(122,587)	(350,000)
Less Grant for capital purpose deferred to 2023.	(200,000)	-
	8,143,303	7,637,146

4. (a) Projects

	2022 €	2021 €
Opening Balances	1,831,677	638,258
Receipts	4,413,042	3,789,077
	6,244,719	4,427,335
Closing Balances (Project Receivables €622,421, Project Payables €2,697,873)	(2,075,452)	(1,831,677)
Applied as Income	4,169,267	2,595,658
Income Allocation		
Administration	116,628	110,011
School of Celtic Studies	11,910	-
School of Theoretical Physics	140,142	118,430
School of Cosmic Physics	3,900,587	2,367,217
	4,169,267	2,595,658
Total Project Income *	4,169,267	2,595,685

Note: *This figure is made up of project Income to Central Admin €116,628, project income to Schools €4,052,639 and capital expenditure on projects of €953,347.

4. (a) Projects (continued)

	Celtic Studies	Theoretical Physics	Cosmic Physics	2022 Total	2021 Total
Project Costs	£	€	€	£	£
*Salaries/Scholarships	-	102,445	2,074,776	2,177,221	2,015,706
Travel					
- Domestic	-	-	30,002	30,002	30,268
- International	-	14,237	183,091	197,328	21,108
-Seminars	3,456	-	83,976	87,432	42,218
Research Collaborations	-	-	147,063	147,063	-
Other	2,169	17,657	339,522	359,348	310,627
Total Project Cost	5,625	134,339	2,858,430	2,998,394	2,419,927

Note (a): *Externally Funded Research Staff and Scholars Numbers (WTE) 47 (2021: 47).

4. (b) Project Detail

	Funding	Opening Balance	Receipts	Recurrent Expenditure	Applied as Income Central Admin Charge	Applied as Income Schools (including Capital)	Closing Balance	Capital
School of Celtic Studies	Authority	t	e	t	5	•	e	e
Caltic Studios Summor School	Various	500	11 /10	5 625		11 010		
Total Celtic Studies	various	500	11 /10	5,025		11 010		-
Total Certic Stadies		500	11,410	5,025	_	11,710	_	
School of Theoretical Physics	5							
XX	SFI	(58,973)	58,975	281	-	2	-	-
SFI Pathway 1	SFI	131,845	76,564	52,193	3,313	56,184	148,912	-
SFI Pathway 2	SFI	135,302	78,559	81,865	5,034	83,956	124,871	
Total Theoretical Physics		208,174	214,098	134,339	8,347	140,142	273,783	-
School of Cosmic Physics								
NGST Project	ESA	102,476	(56,345)	45,912	-	46,131	-	-
Lindsay Scholar	Armagh Obser.	-	3,025	-	-	3,025	-	-
MKID Camera IP	SFI	101,231	-	195,851	11,996	195,931	(106,696)	-
ERC Easy	EC	114,868	-	177,580	9,734	184,940	(79,806)	-
Royal Society Enhancement Award	Royal Soc.	10.872	-	8,488	637	10.235	-	-
HIRES IRC -Laureate Award	IRC	192.278	(27,858)	87,138	4,603	87,464	72,353	-
IRC Scholarship 1	IRC	7.321	28.000	29,166	-	29.166	6.155	-
IRC Scholarship 2	IRC	7.544	28.000	29.367	-	29.367	6.177	-
SSDA	SFI	87.232	322.977	238,868	14,158	235,520	160,531	-
ARIEL- Prodex	ESA	(21,020)	56,345	. 447	-	447	34,878	-
Roval Soc. Engagement	Roval Soc.	-	-	_	-	-	-	-
Royal Society Fellowship 1.	, Royal Soc.	23,171	101,051	142,272	8,567	142,423	(26,768)	-
IRC Scholarship 3	IRC	4,924	28,000	26,273	-	26,273	6,651	_
Stellar EC CSA	EC	107,399	-	46,425	2,336	46,929	58,134	_
RAS	RAS	(2,230)	3,767	1,537	-	1,537	-	_
ESA PRODEX STIX	ESA	(38,870)	-	40,369	420	40,670	(79,960)	-
IRC ULYSSES	IRC	2,500	-	1,614	-	1,410	1,090	-

4. (b) Project Detail (continued)

	Funding Authority	Opening Balance €	Receipts €	Recurrent Expenditure €	Applied as Income Central Admin Charge €	Applied as Income Schools (including Capital) €	Closing Balance €	Capital €
SFI Pathway 3	SFI	134,312	77,987	77,385	4,767	82,762	124,770	-
, Massive Stars Conference	Various	-	87,423	75,280	-	87,423	-	-
LOFAR Support	Various	-	28,990	-	-	100	28,890	-
ESA OSIP	ESA	-	-	64,600	-	64,600	(64,600)	-
RIA CHARLEMONT	RIA	-	1,736	1,735	-	1,736	-	-
SFI Pathway 4	SFI	-	88,756	60,256	3,494	68,563	16,699	5,703
IRC GOIPD/542	IRC	-	29,025	16,541	-	16,542	12,483	-
IRC GOIPD/782	IRC	-	29,025	18,819	-	18,819	10,206	-
IRC Laureate SOLMEX	IRC	-	114,406	-	-	-	114,406	-
SCOTSTEP	Intl Science Council	-	4,572	4,513	-	4,572	-	-
PRE CONFERENCE	Various	-	12,348	7,579	-	12,348	-	-
LOFAR SFI Infrastructure	SFI	-	534,757	-	-	-	534,757	-
Royal Soc Enhance	Royal Soc	-	67,173	31,239	1,936	31,619	33,618	-
, ESA Surround	ESA	-	-	48,982	-	48,982	(48,982)	-
Arcaff	EC	-	453,083	150,894	239	151,613	301,231	-
Total Astrophysics		834,008	2,016,243	1,629,130	62,887	1,671,147	1,116,217	5,703
ICRAG	SFI	(800,768)	776,746	-	-	(24,022)	-	-
ICRAG GeoHazard	SFI	(100,690)	35,529	-	-	-	(65,161)	-
ESA 3D Earth	ESA	22,854	15,000	30,025	-	37,854	-	-
SEA-SEIS	SFI	109,518	87,688	153,593	9,703	231,997	(44,494)	-
GSI Seimic Network Support	GSI	239,138	-	134,929	-	134,929	104,209	-
Eurovolc -Research and Innovation	EC	(31,338)	-	-	-	-	(31,338)	-
Geothermica EC Call- COSEISMIQ	GSI	2,619	-	1,644	164	2,455	-	-
Geo External MT	Various	31,160	(9,094)	15,275	-	15,275	6,791	-
EC-PACIFIC	EC	(97,415)	97,415	862	2	-	(2)	-
SEAI-DIG	SEAI	205,637	9,614	244,892	12,770	251,546	(49,065)	5,094
Geothermica 005 Deep	GSI	48,153	66,653	100,400	2,325	99,971	12,510	-
GSI 2020 sc 049 Short Call	GSI	2,763	15,000	13,382	335	14,386	3,042	-
SPIN-Marie Curie Train. Net.	EC	158,493	6,000	87,680	3,600	76,339	84,554	-
IMPROVE-Marie Curie Train Net.	EC	-	392,570	143,487	4,800	144,629	243,141	-
DIAS-UCD Geothermal	UCD	-	-	-	-	-	-	-
ICRAG 2 Equipment	UCD	85,362	-	34,300	-	85,689	(327)	47,411
SFI Pathway 5	IRC	141,033	83,827	99,200	5,941	100,612	118,307	-
Master Infrastructure	SFI	772,475	85,000	6,708	-	606,729	250,746	600,020
IMARL SUPPORT	Various	-	-	9,402	-	-	-	-
IMARL Infrastructure	Insurance	-	289,453	-	-	289,453	-	289,453
ICRAG 2 Tara Mines	UCD&IND	-	75,000	78,805	4,877	79,653	(9,530)	-
Edinburgh Tomorrow Cities	Univ Edinburgh	-	34,925	40,201	_	40,201	(5,276)	-
SEAI GEONORM	SEAI	-	17,000	22,819	-	27,417	(10,417)	4,598

	Funding Authority	Opening Balance €	Receipts €	Recurrent Expenditure €	Applied as Income Central Admin Charge €	Applied as Income Schools (including Capital) €	Closing Balance €	Capital €
GSI Community Seismology Program	GSI	-	15,000	-	-	-	15,000	-
GSI 2022-SC-029 Hires	GSI	-	14,971	-	-	-	14,971	-
GSI SC023 -Mango	GSI	-	14,994	-	-	-	14,994	-
ICRAG Comprobe	UCD&IND	-	30,000	11,696	877	14,327	14,796	1,068
ICRAG2 JOINT INV	UDC/SFI	-	18,000	-	-	-	18,000	-
Total Geophysics		788,994	2,171,291	1,229,300	45,394	2,229,440	685,451	947,644
Total Cosmic Physics		1,623,002	4,187,534	2,858,430	108,281	3,900,587	1,801,668	953,347
Total Net Balances - DIAS		1,831,676	4,413,042	2,998,394	116,628	4,052,639	2,075,451	953,347

4. (b) Project Detail (continued)

Note: Project receipts are applied as project income, at a level that equals the annual expenditure (recurrent plus capital) and overheads earned by the associated project.

The closing balances above represent overhead earned and advance funding to meet financial commitments in 2023.

The capital column outlines the expenditure on fixed assets during 2022.

5. Other Income

	2022	2021
	€	€
Historical Funds	80,000	-
Other	47,824	33,093
Total	127,824	33,093

6. Remuneration

	Celtic Studies €	Theoretical Physics €	Cosmic Physics €	Admin. €	2022 Total €	2021 Total €
Core Funded Posts						
*Salaries/Wages	1,140,417	699,321	1,654,195	997,033	4,490,966	4,271,493
Covid Extensions	-	-	-	-	-	109,132
Retirement Benefit Costs	-	-	-	-	-	-
**Scholarships	92,416	137,460	164,762	-	394,638	346,298
	1,232,833	836,781	1,818,957	997,033	4,885,604	4,726,923

Note on Core Funded Posts

*Core Staff Numbers (WTE) 53 (2021:53), ECF Numbers (WTE) 61 (2021: 61). **Core Scholars (WTE) 12 (2021: 12).

Note on Externally Funded Posts

Externally Funded Research Staff and Scholars Numbers (WTE) 47 (2021: 47).

Additional Superannuation Contributions of €227,939 (2021: €224,305) were paid to the Dept. of Further and Higher Education, Research, Innovation and Science 2022.

6. Remuneration (continued)

(a) Aggregate Employee Benefits

	Celtic Studies €	Theoretical Physics €	Cosmic Physics €	Admin. €	2022 Total €	2021 Total €
Salaries/Wages	1,080,439	651,319	1,544,690	922,424	4,198,872	3,997,595
Covid Extensions *	-	-	-	-	-	97,175
Overtime	-	-	-	-	-	-
Allowances	-	-	-	-	-	-
Employer's PRSI	59,978	48,002	109,505	74,609	292,094	273,898
Covid Extens. Empl' PRSI*	-	-	-	-	-	11,957
Retirement Benefit Costs	-	-	-	-	-	-
	1,140,417	699,321	1,654,195	997,033	4,490,966	4,380,625

***Note:** A number of projects were due to finish in 2021. Due to the impact of COVID-19, it was necessary to extend the projects and the researcher's contracts in order to complete the project deliverables.

(b) Key Management Personnel

Key management personnel in the Dublin Institute for Advanced Studies include the Registrar/CEO, the three School Directors, the Finance Officer and Higher Executive Officer for whom the total remuneration cost was €772,662 (2021: €739,735) in the year. Key management personnel are in receipt of a salary only. They are not paid any bonus.

Their retirement benefit entitlements do not exceed the standard entitlements in the model public sector defined benefit superannuation scheme.

(c) Registrar and Chief Executive Officer Salary

	2022 Total €	2021 Total €
The Registrar/CEO remuneration package for the financial period was as follows:		
Basic Pay	115,007	109,821
	115,007	109,821

The Registrar & CEO is in receipt of a salary only. She is not paid any bonus. The Registrar's retirement benefit entitlements does not exceed the standard entitlements in the model public sector defined benefit superannuation scheme.

7.	Number of Employees with	Benefits in 2022	that fall within	bands of €10	,000 from
	€60,000 onwards.				

	20	22	2021
€60,000 to €69,999		5	5
€70,000 to €79,999		2	3
€80,000 to €89,999		4	5
€90,000 to €99,999		4	-
€100,000 to €109,999		-	2
€110,000 to €119,999		1	2
€120,000 to €129,999		3	-
€130,000 to €139,999		-	-
€140,000 to €149,999		-	-
€150,000 to €159,999		-	4
€160,000 to €169,999		4	4
€170,000 to €179,999		4	-

The average number of employees (whole-time equivalents) during the year excluding externally funded posts was 53 (2021:53). The table above shows the number of employees whose total employee benefits fell into the respective bands.

8. General Expenses

	Celtic Studies	Theoretical Physics	Cosmic Physics	Admin.	2022 Total	2021 Total
	€	€	€	€	€	€
Miscellaneous	3,966	5,297	39,600	61,622	110,485	63,557
Catering/Lunches	7,271	7,843	15,150	9,145	39,409	3,606
Professional Fees/ Consultancy	-	-	7,795	157,105	164,900	154,380
Equipment Maintenance	338	-	18,091	-	18,429	-
Training	-	-	39	7,980	8,019	6,273
Bank Charges	-	-	-	12,668	12,668	9,329
Board Meeting Expenses	-	-	-	19,320	19,320	-
External Review	-	-	-	-	-	152
Health & Safety	-	-	489	9,024	9,513	12,231
Communications	-	-	-	68,967	68,967	86,407
	11,575	13,140	81,164	345,831	451,710	335,935

9. Leasing

Operating Leases

The premises occupied by the Institute are leased from the Office of Public Works.

The premises include Observatory House Dunsink, 5 Merrion Square, 9-10 Burlington Road and 31 Fitzwilliam Place.

There is a term of 76 years left on the lease for Observatory House and the other leases are renewed on an annual basis.

The commitment on foot of such leases in respect of 2023 is €113,609.

	Annual Rent €
Office of Public Works Leases	
Observatory House Dunsink	330
5 Merrion Square	5,022
9-10 Burlington Road	50,167
31 Fitzwilliam Place	58,090
	113,609

At 31 December 2022 the Institute had the following future minimum lease payments under non-cancellable operating leases for each of the following periods:

	2022	2021
	€	€
Payable within one year	113,609	113,609
Between two and five years	1,320	1,320
After five years	23,430	23,760

Note: The Institute has a licence agreement with the OPW for a stores area located in Fenian Street at a cost of €1,000 per annum.

10. Retirement Benefit Costs

a) General Description of the Schemes

Staff members appointed before 1 January 2013 have pension terms under the relevant DIAS Superannuation Scheme as set out in:

- a) Dublin Institute for Advanced Studies (Superannuation) Scheme 1947 as amended
- b) Dublin Institute for Advanced Studies Spouses and Children's Contributory Scheme 1991
- c) Dublin Institute for Advanced Studies Non-Established Employees (Superannuation) Scheme 1983
- d) Dublin Institute for Advanced Studies Staff Superannuation (Consolidation) Scheme, 2008 and
- e) Dublin Institute for Advanced Studies Staff Superannuation Spouses' and Children's Contributory Pension (Consolidation) Scheme, 2008

The retirement benefits scheme is a defined benefit final salary retirement benefit arrangement with benefits and contributions defined by reference to current "model" public sector scheme regulations. The scheme provides a retirement benefit (eightieths per year of service), a gratuity or lump sum (three eightieths per year of service) and spouse's and children's retirement benefits.

Normal Retirement Age is a member's 65th birthday, and pre 2004 members have an entitlement to retire without actuarial reduction from age 60. Retirement Benefits in payment (and deferment) normally increase in line with general public sector salary inflation.

10. Retirement Benefit Costs (continued)

The valuation used for FRS 102 disclosures has been based on a full actuarial valuation by a qualified independent actuary taking account of the requirements of the FRS in order to assess the scheme liabilities at 31 December 2022.

The Single Public Service Pension Scheme (Single Scheme) is the defined benefit retirement benefit scheme for pensionable public servants appointed on or after 1 January 2013 in accordance with the Public Service Pension Scheme (Single Scheme and Other Provisions) Act 2012. The scheme provides for a retirement benefit and retirement lump sum based on career-average pensionable remuneration and spouse's and children's pensions. The minimum pension age is 66 years (rising in line with State pension age changes). It includes an actuarially-reduced early retirement facility from age 55. Retirement Benefits in payment increase in line with the consumer price index.

The principal actuarial assumptions were as follows:

	2022	2021	2020
Rate of Increase in Salaries	3.25%	3.00%	2.50%
Rate of Increase in Retirement Benefits in Payment	2.75%	2.50%	2.00%
Discount Rate	4.20%	1.20%	.70%
Inflation Rate	2.25%	2.00%	1.50%

The mortality basis adopted allows for improvements in life expectancy over time, so that the life expectancy at retirement will depend on the year in which a member attains retirement age (age 65). The table below shows the life expectancy for members attaining age 65 in 2022 and 2042.

	31/	/12/2022	31/12/2021		
Year of Attaining Age 65	2022	2042	2021	2041	
Life Expectancy–Male	88.3	89.7	88.2	89.6	
Life Expectancy – Female	89.9	91.3	89.8	91.3	

b) Analysis of total retirement benefit costs charged to Expenditure

	2022 (€′000)	2021 (€′000)
Current Service Cost	2,083	2,213
Interest on Retirement Benefit Obligations	945	537
Employee Contributions	(520)	(475)
	2,508	2,275

c) Movement in Net Retirement Benefit Obligations during the financial year

	2022 (€′000)	2021 (€′000)
Retirement Benefit Obligations at 1 January	(77,665)	(77,496)
Current Service Cost	(2,083)	(2,213)
Interest Costs	(945)	(537)
Actuarial Gain/(Loss)	28,701	973
Retirement Benefits Paid in the Year	1,943	1,608
*Retirement Benefit Obligations at 31 December	(50,049)	(77,665)

*Liabilities relating to the Single Scheme amount to €2,502,000 and for the DIAS Scheme amounts to €47,547,000.

10. Retirement Benefit Costs (continued)

d) Deferred Funding for Retirement Benefits

DIAS recognises these amounts as an asset corresponding to the unfunded retirement benefit obligations on the basis of the set of principal actuarial and mortality assumptions set out in a) General Description of the Schemes and a number of past events. These events include the statutory basis for the establishment of the retirement benefit scheme, and the policy and practice in relation to funding public service retirement benefits including contributions by employees and the annual estimates process. While there is no formal agreement regarding these specific amounts with the Department of Further and Higher Education, Research, Innovation and Science, DIAS has no evidence that this funding policy will not continue to meet such sums in accordance with current practice.

The Net Deferred Funding for Retirement Benefit Obligations recognised in Income and Expenditure Account was as follows:

	2022 (€′000)	2021 (€′000)
Funding Recoverable in Respect of Current Year Retirement Benefit Costs	3,028	2,750
State Grant Applied to Pay Pensioners	(1,943)	(1,608)
	1,085	1,142

The deferred funding asset for retirement benefits as at 31 December 2022 amounted to €50.049 million (2021: €77.665 million).

e) History of defined benefit obligations

	2022 (€′000)	2021 (€′000)	2020 (€′000)
Defined Benefit Obligations	50,049	77,665	77,496
Experience (Gains)/Losses on Scheme Liabilities Amount.	(4,036)	(905)	9068
Percentage of Scheme Liabilities.	-8.06%	-1.17%	1.17%

The cumulative actuarial gain recognised in the Statement of Comprehensive Income amounts to €5,415,000 (2021: €9,451,000).

11. Disclosure of Transactions

The Council of the Institute adopts procedures in accordance with guidelines issued by the Department of Finance in relation to the disclosure of interests by Council Members and these procedures have been adhered to by the Council Members during the year. No Council Member has declared an interest.

			Total	Total	Total	Total
	Start	Finish	Remuneration	Expenses	Remuneration	Expenses
Appointed	Date	Date	€	€	€	€
Council Member						
Dr. Peter Heffernan	1/7/20	to 17/6/21	-	-	-	-
Dr. John Hegarty	22/11/21	to 30/6/25	-	-	-	-
Members Appointed by the Governing Boards of Constituent Schools						
Professor A. Deeks	1/8/20	to 30/4/22	-	-	-	-
Professor M. Rogers	1/5/22	to 30/6/25	-	-	-	-
Professor M. Canning	1/8/20	to 30/6/25	-	-	-	-
Professor Mary Fowler	1/8/20	to 30/6/25	-	315	-	-
Professor Peter Goddard	1/8/20	to 30/6/25	-	976	-	-
Professor Máire Ní Mhaonaigh	1/8/20	to 30/6/25	-	377	-	-
Professor Denjoe O' Connor	1/8/20	to 30/6/25	-	-	-	-
Professor Ruairí Ó hUiginn	1/8/20	to 30/6/25	-	-	-	-
Professor Chris Bean	1/8/20	to 30/11/21	-	-	-	-
Professor Tom Ray	1/12/21	to 30/6/25	-	-	-	-
Registrar & CEO						
Dr. Eucharia Meehan *			115,007	-	109,821	1,152
			115,007	1,668	109,821	1,152

12. Council Member and Registrar/CEO Payments 2022

Council Members travel and subsistence payments are paid in accordance with rates set by the Department of Public Expenditure and Reform.

*Registrar & CEO remuneration and expenses

The Registrar & CEO is in receipt of a salary only. She is not paid any bonus. The Registrar's retirement benefit entitlements does not exceed the standard entitlements in the model public sector defined benefit superannuation scheme.

13. Fixed Assets: Property, Plant and Equipment

	Furniture &	Motor		2022	2021
	Equipment	Vehicles	Computers	Total	Total
	€	€	€	€	€
Cost					
Opening Balance 1/1/2022	6,795,414	15,131	2,008,959	8,819,504	9,364,532
Additions*	980,997	-	112,244	1,093,241	273,263
Disposals	(490,908)	-	(409,209)	(900,117)	(818,291)
	7,285,503	15,131	1,711,994	9,012,628	8,819,504
Depreciation					
Opening Balance 1/1/2022	4,617,614	15,131	1,720,097	6,352,842	6,730,620
Charge	369,442	-	111,295	480,737	432,609
Disposals	(490,908)	-	(409,209)	(900,117)	(810,387)
	4,496,148	15,131	1,422,183	5,933,462	6,352,842
Net book value 31/12/2022	2,789,355	-	289,811	3,079,166	2,466,662

Note: *All fixed assets in excess of \notin 3,000 are capitalised in the books of DIAS.

14. Capital Reserve

	2022 €	2021 €
Balance at 1 January	2,466,662	2,633,912
Transfer to Income and Expenditure Account		
Income allocated to acquire fixed assets (Project Funded)	953,347	41,004
Income allocated to acquire fixed assets (Exchq. Funded)	139,894	232,259
Amortisation in line with asset depreciation	(480,737)	(432,609)
Amount released on disposals	-	(7,904)
	612,504	(167,250)
Balance at 31 December	3,079,166	2,466,662

15. Receivables

	2022 €	2021 €
Prepayments	109,677	105,512
Book Sales Receivables	518	529
Sundry	4,381	8,001
Accrued Income	17,716	38,636
	132,292	152,678

16. Payables due within twelve months

	2022	2021
	€	€
Trade Payables	166,087	157,898
Accruals	752,129	639,484
VAT	35,475	18,081
Revenue Payables	217,517	182,932
Payroll Deduction Payables	396	-
Deferred Income 2021 Expenditure	124,443	438,732
Deferred Capital 2022-2023	200,000	-
Retirement Benefit Control Account*	1,337,516	1,169,637
Deferred COVID-19 Grant	251,487	478,901
	3,085,050	3,085,665

Note: *This figure relates to employer contributions for externally funded Research staff. The DIAS is liaising with DES/DFHERIS in relation to the payment of the contributions.

Payables due after twelve months

		2022	2021
		€	€
The following funds are held on deposit.			
These comprise:	Vernam Hull Bequest	25,530	25,522
	Carmody Fund	2,445	2,445
		27,975	27,967

17. Approval of Accounts

The Financial Statements were approved by Council on 20th June 2023.

Dublin Institute for Advanced Studies 10 Burlington Road, Dublin 4 **www.dias.ie**



