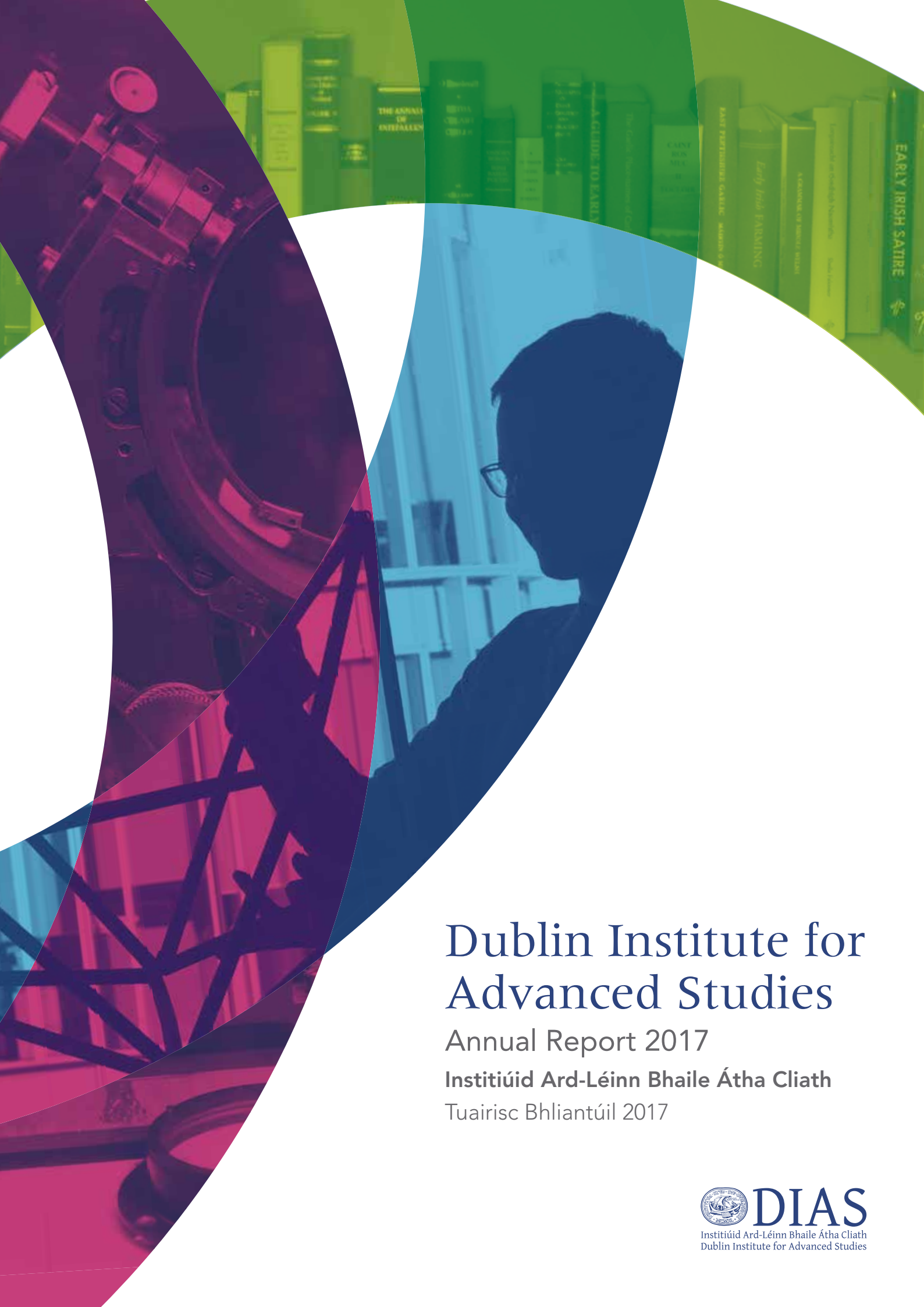

Dublin Institute for Advanced Studies

Annual Report 2017

Institiúid Ard-Léinn Bhaile Átha Cliath

Tuairisc Bhliantúil 2017

DIAS
Institiúid Ard-Léinn Bhaile Átha Cliath
Dublin Institute for Advanced Studies

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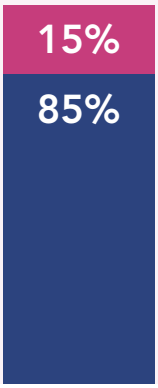
CLÁR

2017

DIAS AT A GLANCE

OUR TEAM

Overview Profile

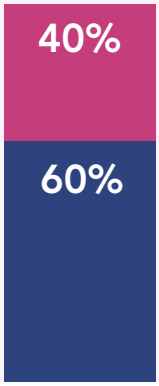


Administration[1]

Research[2]

[1] *Administration + General Technical Support*
[2] *Research + Specialist Technical Support*

Origin of Researchers



Non-EU

EU

Note: Total number of countries = 22

Scholars

Rest of world
75%

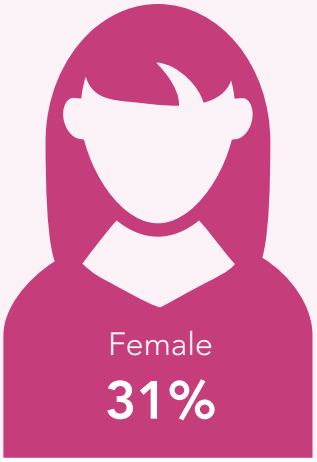
Ireland
25%

Fellows/Project Staff

Rest of world
73%

Ireland
27%

Gender



OUR FINANCIAL RESOURCES

Funding Sources

Oideachais agus Scileanna | Department of Education and Skills

An Roinn Ealaíon, Oidhreachta, Gnóthaí Réigiúnacha, Tuaithe agus Gaeltachta
Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs

An Roinn Gnóthaí Eachtracha agus Trádála
Department of Foreign Affairs and Trade

Geological Survey Ireland
Suirbhéireacht Gheolaíochta Éireann

Roinn Cumarsáide, Gníomhaithe ar son na hAeráide & Comhshaoil
Department of Communications, Climate Action & Environment

IRISH RESEARCH COUNCIL
An Chomhairle um Thaighde in Éirinn

Marine Institute
Foras na Mara

sfi Science Foundation Ireland

European Commission

esa

Funding Expenditure

€6.57m
Oireachtas Grant (Department of Education and Skills)

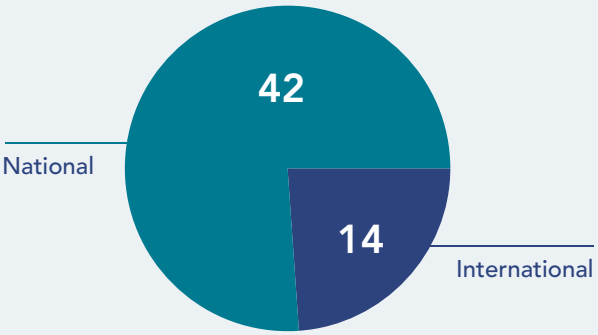
€2.2m
Other Sources

OUR PARTNERS

Island of Ireland Collaborations

NUIG	DIT
TCD	WIT
UCD	AIT
UCC	Irish Astronomical Society
DCU	The Discovery Programme
NUIM	Armagh Planetarium
RIA	National Library of Ireland
QUB	IT Tallaght
UL	IT Tralee

Individual Research Associates



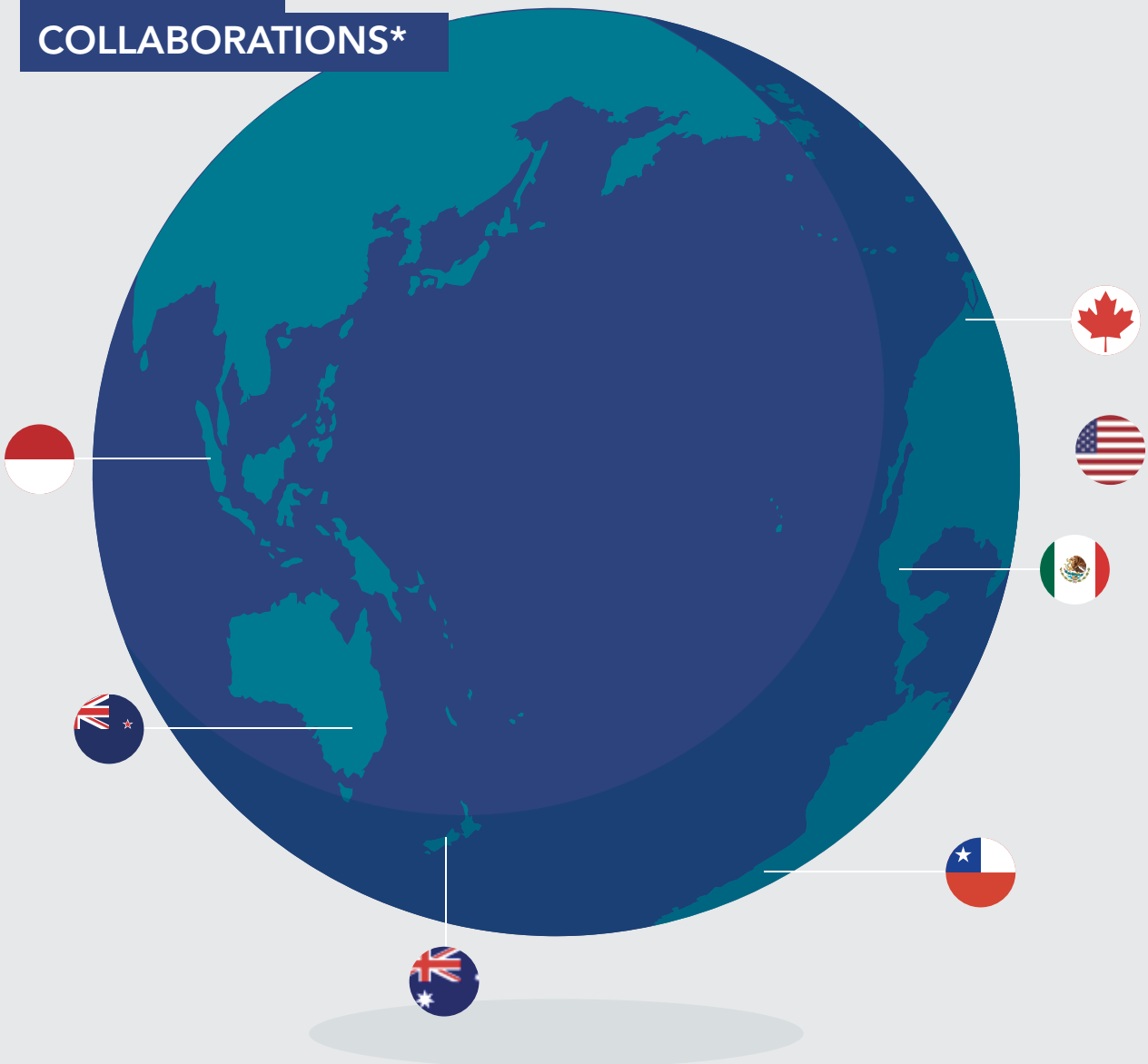
International Research Visitors

115 Research Visitors from **20** Countries

2017

DIAS AT A GLANCE 2017

OUR INTERNATIONAL RESEARCH COLLABORATIONS*



EUROPEAN AND GLOBAL INFRASTRUCTURE PARTICIPATION

esa

H.E.S.S.

RadioNet

EPOS EUROPEANPLATEOBSERVINGSYSTEM

*Project based, does not include European and global infrastructure partners.

Ráiteas an Chathaoirligh

Tá sé de phribhléid agam an Réamhrá a sholáthar do thuarascáil bhliantúil DIAS do 2017. Molaim daoibh léamh tríd an tuarascáil fíorshuimiúil seo. Gan amhras, beidh sibh an-tógtha leis an raon leathan de thaighde socheolaíochta agus eolaíochta a rinne na baill inár dtrí Scoil – an Léann Ceilteach, an Fhisic Chosmach agus an Fhisic Theoiriciúil. Gabhaim buíochas ó chroí leis na scoileanna, le baill an Bhoird a thug a gcuid ama chomh fhaithiúil sin agus le foireann DIAS a sholáthraíonn tacaíocht leanúnach. Tá scóip a ngníomhaíochtaí, i dtéarmaí taighde, foilseachán, comhoibrithe agus for-rochtana poiblí, príomhthopaicí straitéiseacha do DIAS, an-suntasach go deo.

Sa Ráiteas beag seo ní féidir lioma ag tagairt a dhéanamh do roinnt de na tograí agus gníomhaíochtaí eile a rinneadh i rith na bliana eachtaí seo. Tá tuillleadh mionsonraí ar fáil i dtuairiscí na Scoileanna aonair.

Áirítear i dtuarascáil bhliantúil 2017 an rannóg nua Roghbhlúirí, ina luaitear cuid de bhuaicphointí na bliana. Toasíonn Toghbhlúirí leis an bhfoilseachán *Córus Bésgnai – 'An Old Irish Law Tract on the Church and Society'*, in eagar an an Ollamh Liam Breatnach. I rith na bliana, lean Scoil an Léinn Cheiltigh den mhéadú ar thuiscint agus meas ar ár dtraidisiúin fileolaíochta agus teangeolaíochta Ceilteacha.

Tugann Scoil na Fisice Cosmaí agus Scoil na Fisice Teoiriciúla araon tuairisc ar 'eachtra eolaíochta na bliana'. B'í seo an brath de chumasc neodrónréalta i dtonnta mtharraingteacha agus an brath ina dhiaidh sin d'astú leictreamaighnéadach. Teistíméireacht ar ár gcáil sa réimse is ea go bhfuilimid páirteach san fhoireann 3,500 eolaí sa togra mór HESS seo. Sa bhliain 2017 rinneadh an stáisiún LOFAR i mBiorra, Contae Uíbh Fhailí a chomhtháthú sa líonra Eorpach LOFAR. Leanann Roinn na Geoifisice de thionchar a bheith aige ar phríomhréimsí an taighde idirnáisiúnta, ag forbairt agus ag cur i bhfeidhm samhlacha anailíseacha nuálaíocha a thugann léargas nua dúinn ar phróisis na cruinne.

Dr. Eucharia Meehan with Prof. Dervilla Donnelly (Chair of Friends of DIAS and former Chairman of DIAS Council)

Dr. Eucharia Meehan leis an tOllamh Dervilla Donnelly (Cathaoirleach Cairde DIAS agus iar-Chathaoirleach Chomhairle DIAS)

Is é an comhoibriú is mó a thiomáineann dul chun na linne seo san eolaíocht. Mar sin, tá baill DIAS as a bheith ag obair i ndlúthchomhair le heagraíochtaí amhail Institiúid Réalteolaíochta Max Planck, an Institut de Planétologie et d'Astrophysique agus Gníomhaireacht Spáis na hEorpa. Leanfaimid den dlúthchomhar le HESS agus táimid ag tnúth leis an dáta nua leis an Teileascóp Spáis James Webb a láinseáil in 2019. Gné shuntasach eile sa bhliain ab ea óstáil an chéad chruinnithe Oll-Réaltaí ag DIAS.

Táimid bródúil freisin as ár ndlúthchaidreamh le hOllscoileanna na hÉireann. Buaiscphointe suntasach an ea léacht O'Raifeartaigh a thug Fabian Essler ó Oxford, ar an ábhar '*Quantum Master Equations and Integrability*' ag an gcruinniú de chuid an Irish Quantum Foundation, a d'eagraigh DIAS agus Ollscoil Mhá Nuad, Coláiste na Tríonóide BÁC agus an Coláiste Ollscoile, BÁC i gcomhar lena chéile.

Chairman's Statement

It is my privilege to provide the introductory statement to the DIAS annual report for 2017. I invite you to read through this engaging annual report. Undoubtedly, you will be highly impressed by the wide range of the socio-scientific research delivered by the members of our three Schools – Celtic Studies, Cosmic Physics and Theoretical Physics. I wholeheartedly thank the schools, the Board members who give their time so generously and the DIAS staff who provide continuing support. The scope of their activities, in terms of research, publications, collaboration and public outreach, key strategic topics for DIAS, is highly impressive.

In this short Statement I can only allude to some of the projects and other activities that were undertaken during this eventful year. The individual School reports provide further detail.

The 2017 annual report includes the new Snapshots section, featuring some of the highlights of the year. Snapshots commences with the publication, Córus Bésgnai – 'An Old Irish Law Tract on the Church and Society', edited by Professor, Liam Breatnach. In the course of the year, the School of Celtic Studies continues to deepen understanding and appreciation of our fascinating Celtic philological and linguistic traditions.

Both the School of Cosmic Physics and the School of Theoretical Physics report on the 'science event of the year'. This was the detection of a neutron star merger in gravitational waves and the subsequent detection of electromagnetic emission. To be part of the team of 3,500 scientists engaged in this major HESS project is a testament to our reputation in the field. 2017 also saw the integration of LOFAR station at Birr, County Offaly into the European LOFAR network. Geophysics continues to influence key areas of international research, developing and applying innovative analytical models that present us with new insights into Earth processes.

Professor Vincent Cunnane, Chairman of Council and Cecil Keaveney who retired as Registrar in June 2017

An tOllamh Vincent Cunnane, Cathaoirleach na Comhairle agus Cecil Keaveney a d'éirigh as a phost mar Chláraitheoir i mí Meitheamh

Collaboration is the key driver to modern scientific progress. DIAS members are proud to work closely with organisations such as the Max Planck Institute of Astronomy, the Institut de Planétologie et d'Astrophysique and the European Space Agency. We continue close cooperation with HESS and look forward to the new date for the launch of the James Webb Space Telescope in 2019. Another significant feature of the year was the DIAS hosting of the first Massive Stars meeting. We are also proud of our close liaison with Irish Universities. The O'Raifeartaigh lecture presented by Fabian Essler from Oxford, on 'Quantum Master Equations and Integrability' was an outstanding highlight at the Irish Quantum Foundation meeting, jointly organised by DIAS, Maynooth, TCD and UCD.

We continue to focus on our outreach objective and our ambition to contribute to education and public engagement. Last year I stressed our need to improve the depth and breadth of our exposure to the wider public. We are grateful to those groups and individuals who assist in these endeavours. The Irish Astronomical Society provides ongoing support with public open nights and other events held at our Dunsink Observatory. The Observatory is now a recognised focal location of many school and Citizen Science events.

Ráiteas an Chathaoirligh (ar lean)

Leanaimid de dhíriú ar ár gcuspóir for-rochtana agus ar ár n-uaillmhian le cur le hoideachas agus le rannpháirtíocht an phobail. Anuraidh leag mé béim ar ár ngá le feabhas a chuar ar dhoimhne agus leithead ár nochtadh don phobal i gcoitinne. Táimid buíoch as na grúpaí agus na daoine aonair sin a chuidíonn sna hiarrachtaí sin. Cuireann Cumann Réalteolaíochta na hÉireann tacaíocht leanúnach ar fáil le hóicheanta poiblí oscailte agus imeachtaí eile a eagraítear inár Réadlann i nDún Sinche. Is ionad lárnach aitheanta anois í an Réadlann do neart imeachtaí scoile agus Eolaíochta Sluafhoinsithe.

Leanadh den bhfás ar thionchar poiblí i rith na bliana. Bhí rath iontach arís ar an Scoil Samhraidh tríbhliantúil. Tugann an togra *Irish Script on Screen* (ISOS) nuashonruithe anois ar Twitter agus fuair an suíomh gréasáin breis agus 6.4 milliún amas in 2017. Cuireadh fáilte an-mhór roimh an léacht phoiblí a thug Enrico Barausse, Páras ar *"The sound of the Universe: detecting gravitational waves in space with LISA"* ag an gcruinniú IQF.

Níl anseo ach samplaí agus molaim duit na tuairiscí ó na Scoileanna aonair a léamh. Tugann siad mionsonraí fíor-spéisiúla ar ár dtograí taighde agus ar ghníomhaíochtaí eile. Tugann a leabharliostaí cur síos soiléir ar raon na bhfoilseachán a cuireadh ar fáil i rith na bliana agus ar stádas an n-irisí ina bhfoilsítear ár saothar.

Tá áthas orainn le ceapachán an Dr Eucharia Meehan mar Chláraitheoir agus POF. Mar thacaí taighde le taithí ceannaireachta den scoth, cinnteoidh sí go méadofar stádas poiblí mórthaibhseach DIAS. Guíonn muid go léir blianta scoir fhada agus torthúil ar Checil Keaveney agus gabhann muid buíochas leis as a chuid oibre, gan staonadh, mar ár iar-Chláraitheoir.

Ba mhaith linn comhghairdeas a dhéanamh lenár iar-(Chathaoirleach Chomhairle DIAS), an tOllamh Dervilla Donnelly, as Bonn Cunningham ó Acadamh Ríoga na hÉireann a fháil.

Comhgháirdeas leis an tOll. Chris Bean agus an tOll. Felix Aharonian a toghadh ar an Academia Europaea.

Deinimís comhbhrón ar bhás an Dr TK Whitaker a bhí mar Chathaoirleach ar Chomhairle na hInstitiúide ó 1980 go 1995 agus mar bhall de Bhord Rialúcháin Scoil an Léinn Cheiltigh ó 1971 go 1980.

Tá tagairt déanta agam d'ábharthacht agus tábhacht an chomhoibrithe agus ní mór dom mo bhuíochas a ghabháil le baill idirnáisiúnta a thugann an méid sin ama d'ár n-iarrachtaí. Táimid ag tnúth le todhchaí de dhul chun cinn leanúnach de réir mar a chuirimid ár straitéis nua i bhfeidhm agus leanaimid d'ár n-oidhreacht agus d'ár dtodhchaí a fhiosrú.

An Dr. Vincent Cunnane,
Chairman

Chairman's Statement (continued)

Students carrying out research at Dunsink Observatory.
Mic léinn i mbun taighde i Réadlann Dhún Sinche.

Public impact continued its growth during the year. The triennial Summer School was, yet again, a great success. The Irish Script on Screen (ISOS) project now provides current updates on Twitter with the website receiving more than 6.4 million hits in 2017. The public lecture delivered by Enrico Barausse, Paris, on "The sound of the Universe: detecting gravitational waves in space with LISA" at the IQF meeting was very well received.

These are only some examples and I encourage you to read the individual School reports. They offer intriguing detail on our research projects and other activities. Their bibliographies vividly illustrate the range of publications delivered during the year and status of the journals in which our work is published.

We are delighted with the appointment of Dr. Eucharia Meehan as our Registrar and CEO. A research advocate with an outstanding leadership record, we know that she will ensure that DIAS enhances its already impressive public status. We all wish Cecil Keaveney a long and fruitful retirement and thank him for his tireless work as our former Registrar.

We would like to congratulate our former Chairman of DIAS Council, Professor Dervilla Donnelly, on receipt of the Cunningham Medal from the Royal Irish Academy.

Congratulations are also extended to Prof. Chris Bean and Prof. Felix Aharonian on their election to Academia Europaea.

We regret the passing of Dr TK Whitaker who was Chair of Council at DIAS from 1980 to 1995 and was also a member of the Governing Board of the School of Celtic Studies from 1971 to 1980.

I have alluded to the relevance and importance of collaboration and I feel bound to express my gratitude to international members who give so much time to our endeavours. We look forward to a future of ongoing progress as implement our new strategy and continue to explore our heritage and our future.

Dr. Vincent Cunnane,
Chairman

2017

CONNECTING LOCALLY

TWITTER IMPRESSIONS
>500,000

ISOS WEBSITE HITS
>4M

34%

1 2 3 4 5 6

1. Tyrellstown Educate Together students, Dunsink, Science Week.
   Mic léinn ó Oideachas le chéile Baile an Tirialaigh, Dún Sinche, Seachtain Eolaíochta.
2. Maths Week, October 2017.
   Seachtain na Mata, Deireadh Fómhair.
3. Dr Grainne Costigan, Science Week.
   Dr Grainne Costigan, Seachtain Eolaíochta.
4. The Thirty-fifth Hugh M. Fitzpatrick Lecture in Legal Bibliography took place at DIAS Dublin on Tuesday 28th November. The lecture entitled "De Valera and the creation of an independent Irish constitutional tradition" was given by Dr Martin Mansergh. Hugh M Fitzpatrick, the lecture series and founder, pictured with Dr Eucharia Meehan, Registrar & CEO of DIAS, Dr Martin Mansergh and Síle de Valera.
   Thug an Dr Martin Mansergh léacht dar teideal "De Valera and the creation of an independent Irish constitutional tradition" ag an Institiúid ar an Máirt 28ú Samhain mar chuid de léachtaí Hugh M.Fitzpatrick i gclár dlí ba é seo léacht uimhir 35. Hugh M. Fitzpatrick, bunaitheoir na sraith léchtanna leis an Dr Eucharia Meehan, Cláraitheoir agus POF na hInstitiúide le Dr Martin Mansergh agus Síle de Valera.

5. School of Theoretical Physics Public Lecture.
Léacht Phoiblí Scoil an Fhisic Theoiriciúil.

6. Dr. Meehan at the Gender Summit North America.
An Dr. Meehan ag freastal ar an Gender Summit Meiriceá Thuaidh.

Snapshots of 2017

Recent Publications
Foilseacháin le Déanaí

Córus Bésgnai – 'An Old Irish Law Tract on the Church and Society' edited by DIAS professor, Liam Breatnach, was published in May of this year. The book consists of annotated editions and translations of the Old Irish law text Senchas Már as well as the later medieval commentaries.

Tionól is the annual conference hosted at DIAS by our School of Celtic Studies. As part of the 2017 Tionól programme, a posthumously published book by Breandán Ó Buachalla was launched on 16th November. The book, named **'Cnuasach Chléire'** focuses on the Irish of Cape Clear island, the southernmost Gaeltacht region, with a population of just over 125 people, and conveys the richness and particularity of the dialect and the lives once led by islanders. Breandán Ó Buachalla, who died in 2010, was a much-celebrated Celtic Studies scholar.

Foilsíodh **Córus Bésgnai – 'An Old Irish Law Tract on the Church and Society'** arna chur in eagar ag ollamh DIAS, Liam Breatnach, i mBealtaine na bliana seo. Áirítear sa leabhar eagráin anótáilte agus aistriúcháin ar an téacs dlí Sean-Ghaeilge Senchas Már chomh maith leis na tráchtaireachtaí meánaoise níos déanaí.

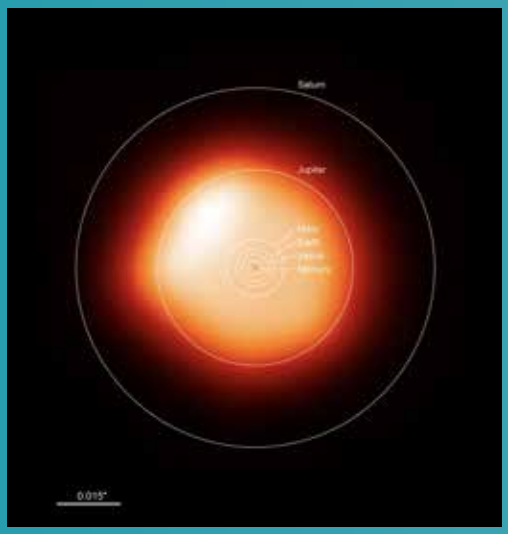
Is é Tionól an chomhdháil bhliantúil a eagraítear Scoil an Léinn Cheiltigh ag DIAS. Mar chuid den chlár do Tionól 2017, an 16 Samhain, seoladh leabhar le Breandán Ó Buachalla a foilsíodh i ndiaidh a bháis. Díríonn an leabhar, dar teideal **'Cnuasach Chléire'** ar Ghaeilge Oileán Chléire, an ceantar Gaeltachta is faide ó dheas, le daonra beagán os cionn 125 duine, agus léirítear ann saibhreas agus leithleachas na canúna agus an saol a bhíodh ag na hoileánaigh tráth. Ba scoláire mór an rá Léinn an Cheiltigh é Breandán Ó Buachalla, a fuair bás sa bhliain 2010.

International Summer School
Scoil Samhraidh Idirnáisiúnta

Fifty undergraduate and postgraduate students from all over the world descended on Dublin in July for the Celtic Studies Summer School, run by the School of Celtic Studies at DIAS. The summer school was officially launched by Mary Mitchell-O'Connor TD, Minister of State at the Department of Education with special responsibility for Higher Education. This summer school takes place every three years and is attended by students from as far afield as the United States, Russia, Finland and Sweden.

Tháinig caoga mac léinn fochéime agus iarchéime ó gach carn den domhan go Baile Átha Cliath i mí Iúil do Scoil Samhraidh an Léinn Cheiltigh, á reáchtáil ag Scoil an Léinn Cheiltigh ag DIAS. Sheol Mary Mitchell-O'Connor TD, Aire Stáit sa Roinn Oideachais le freagracht speisialta as Ardoideachas an scoil samhraidh go hoifigiúil. Bíonn an scoil samhraidh seo ann gach trí bliana agus tagann mic léinn chuici ó thíortha amhail na Stáit Aontaithe, an Rúis, an Fhionlainn agus an tSualainn.

DIAS Astronomer Captures the Most Detailed Image of Another Star Ever Produced
Gabhann Réalteolaí DIAS an Íomhá is Mionsonraithe Riamh de Réalt Eile



Astronomer Dr. Eamon O'Gorman, based at DIAS, led an international team of scientists to produce the most detailed image of the surface of a star – other than the sun – generated at radio wavelengths. The image was taken of Betelgeuse, the famous Red Supergiant located in the constellation Orion, and was captured in Chile in June 2017, using the world's largest radio telescope, ALMA.

Bhí an réalteolaí an Dr. Eamon O'Gorman, lonnaithe in DIAS, i gceannas ar fhoireann idirnáisiúnta d'eolaithe a chruthaigh an íomhá is mionsonraithe riamh de dhromchla réalta – seachas an ghriain – a gineadh ag tonnfhaid raidió. Glacadh an íomhá de Betelgeuse, an t-Ollfhathach Dearg cáiliúil atá lonnaithe sa réaltbhuíon Orion, agus gabhadh í sa tSile i Meitheamh 2017, ag baint úsáide as an radaiteileascóp is mó ar domhan, ALMA.

A New Era in Gravitational Wave Astronomy
Ré Nua sa Réalteolaíocht Toinn Imtharraingthe

Three scientists from the DIAS School of Cosmic Physics contributed to the break-through discovery and interpretation of gravitational waves from the merging of two neutron stars. Professor Felix Aharonian, Professor Luke Drury and Dr. Carlo Romoli are part of the worldwide team that announced their findings in October 2017, following the collision of the two neutron stars on 17th August. Their results mark the beginning of a new era in gravitational wave astronomy.

Bhí ionchur ag triúr eolaithe ó Scoil na Fisice Cosmaí DIAS sa fionnachtain agus léirmhíniú sonrach ar thonnta imtharraingthe ón gcumasc de dhá neodrónréalta. Tá an Tollamh Felix Aharonian, an tOllamh Luke Drury agus an Dr. Carlo Romoli ina mbaill den fhoireann dhomhanda a d'fhógair a dtorthaí i nDeireadh Fómhair 2017, i ndiaidh don dá neodrónréalta tuairteadh an 17 Lúnasa. Is ionann a dtorthaí agus tús le ré nua sa réalteolaíocht toinn imtharraingthe.

Radio Telescope Switched on in Offaly
Radaiteileascóp Curtha ar Siúl in Uíbh Fhailí

In July, DIAS was involved in the official launch of the Irish LOFAR (I-LOFAR) telescope at Birr Castle, Co. Offaly. DIAS is a funding and research partner in the LOFAR project. The I-LOFAR will connect Ireland to the international LOFAR telescope, which has networks across Europe – including stations in Germany, Poland, France, the UK, Sweden and The Netherlands. DIAS will use the I-LOFAR telescope to study the birth of stars and planets. We will also contribute to the complex software required to operate such a telescope across the European continent with our international partners.

I mí Iúil, bhí DIAS páirteach sa seoladh oifigiúil den teileascóp LOFAR Éireannach (I-LOFAR) i gCaisleán Bhiorra, Co. Uíbh Fhailí. Is comhpháirtí maoinithe agus taighde é DIAS sa togra LOFAR. Nascfaidh an teileascóp I-LOFAR Éire leis an teileascóp idirnáisiúnta LOFAR, a bhfuil líonraí aige ar fud na hEorpa – lena n-áirítear stáisiúin sa Ghearmáin, sa Pholainn, sa Fhrainc, sa tSualainn agus san Ísiltír. Bainfidh DIAS úsáid as an teileascóp I-LOFAR chun staidéar a dhéanamh ar bhreith réaltaí agus pláinéad. Beidh ionchur againn freisin sna bogearraí casta atá de dhíth chun teileascóp den chineál sin a oibriú ar fud na hEorpa lenár gcomhpháirtithe idirnáisiúnta.

Irish National Seismic Network
Líonra Seismeach Náisiúnta na hÉireann

DIAS operates the Irish National Seismic Network. Recent seismic events detected by the network include:

- 12.11.2017, M7.3 Iran
- 19.09.2017, M7.1 Mexico
- 08.09.2017, M8.1 Mexico
- 03.09.2017, M6.3 North Korea

Ritheann DIAS Líonra Seismeach Náisiúnta na hÉireann. I measc na n-eachtraí seismeacha a bhrath an líonra le déanaí bhí:

- 12.11.2017, M7.3 An Iaráin
- 19.09.2017, M7.1 Meicsiceo
- 08.09.2017, M8.1 Meicsiceo
- 03.09.2017, M6.3 An Chóiré Thuaidh

Nature publications
Foilsiú san iris *Nature*

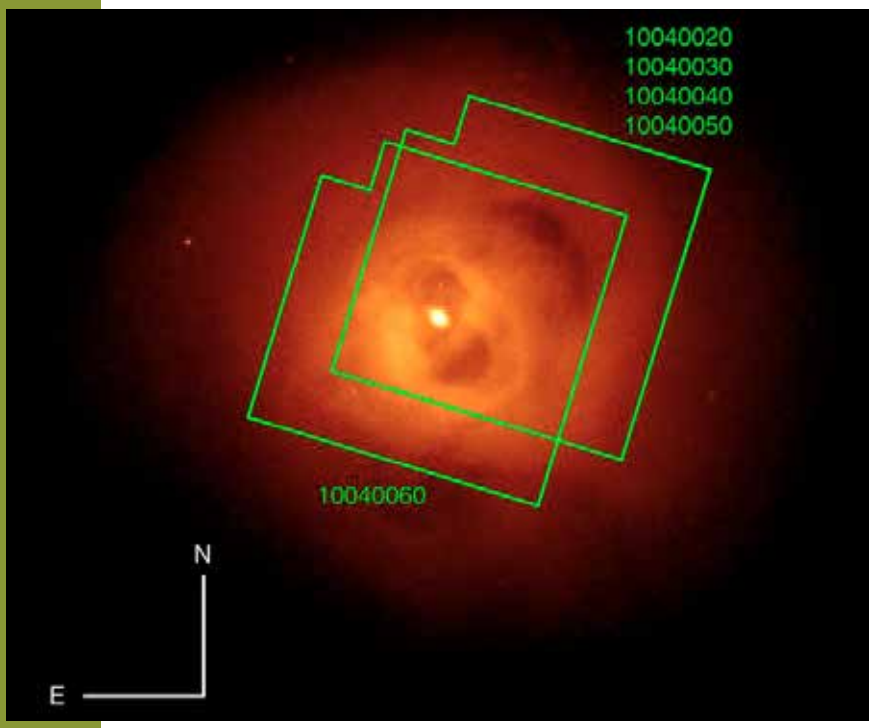
A number of DIAS scholars were published in Nature throughout the year. In October, Professor Felix Aharonian and Dr. Masha Chernyakova (DIAS Research Associate), as members of the Hitomi collaboration, had their article published. The piece was entitled: 'Solar abundance ratios of the iron-peak elements in the Perseus cluster'.

Foilsíodh saothar le roinnt scoláirí DIAS san iris *Nature* le linn na bliana. I mí Dheireadh Fómhair, foilsíodh alt leis an Ollamh Felix Aharonian agus an Dr. Masha Chernyakova (Comhalta Taighde DIAS), mar chomhaltaí de chuibhreannas Hitomi. 'Solar abundance ratios of the iron-peak elements in the Perseus cluster' a bhí mar theideal ar an sliocht.

DIAS astronomer wins ERC Advanced Grant
Gnóthaíonn réalteolaí DIAS Deontas Ardleibhéil ERC

Professor Tom Ray was awarded one of the European Research Council's (ERC) prestigious Advanced Grants to study the birth of stars and planets in April. His proposal, "Ejection Accretion Structures in Young Stellar Objects (YSOs)" with acronym EASY, aims to use the latest observing facilities, such as the James Webb Space Telescope, the European Low frequency radio telescope LOFAR and those of the European Southern Observatory, to improve our understanding of the complex processes involved.

I mí Aibreán bronnadh ceann de Dheontais Ardleibhéil cháiliúla de chuid na Comhairle Eorpaí um Thaighde (ERC) ar an Ollamh Tom Ray chun staidéar a dhéanamh ar bhreith réaltaí agus pláinéad. Féachtar lena thogra, ar a dtugtar, "Ejection Accretion Structures in Young Stellar Objects (YSOs)" a bhfuil an t-acrainm EASY air, úsáid a bhaint as na háiseanna breathnaithe is déanaí, amhail Spásteileascóp James Webb, an radaiteileascóp ísealmhinicíochta Eorpach LOFAR agus na cinn sa an Réadlann Eorpach sa Leathsféar Theas, chun feabhas a chur ar ár dtuiscint ar na próisis chasta atá i gceist.

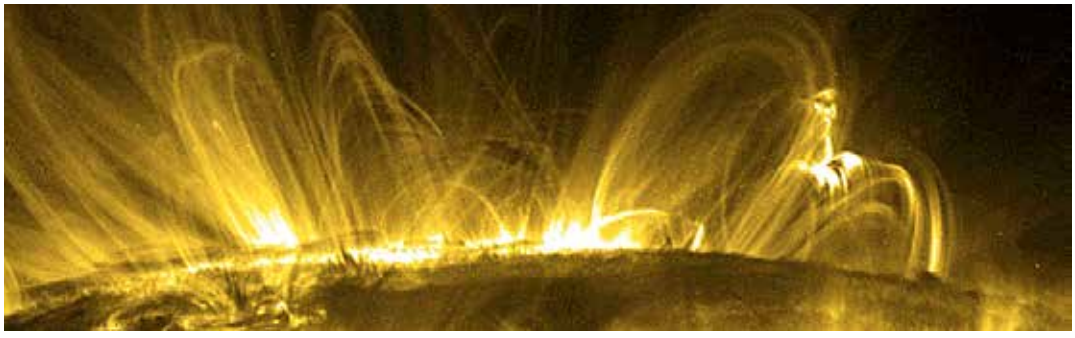


James Webb Space Telescope due for launch in 2018
Spásteileascóp James Webb le lainseáil in 2018

The biggest telescope ever put into space - the James Webb Space Telescope (JWST) – is due for launch in 2018. From 13th - 15th September, DIAS convened the team working on one of its major instruments, MIRI, in Dublin to finalise their plans. DIAS is leading Ireland's engagement with this massive global project and helped build hardware for JWST. It is currently developing software to analyse its data.

Tá an teileascóp is mó riamh a cuireadh sa spás - Spásteileascóp James Webb (JWST) – le lainseáil in 2018. Ón 13 - 15 Meán Fómhair, thóg DIAS an fhoireann atá ag obair ar cheann dá phríomhionstraimí, le chéile i mBaile Átha Cliath chun a bpleananna a chur i gcrích. Tá DIAS i gceannas ar rannpháirtíocht sa togra ollmhór domhanda seo agus chuidíomar le crua-earraí a dhéanamh do JWST. Faoi láthair táimid ag forbairt bogearraí chun anailís a dhéanamh ar a shonraí.

Unveiling How the Sun's Corona is Heated
Nochtadh ar an gCaoi ina nDéanfar Coróin na Gréine a Théamh



In March, astronomers from DIAS were part of a wider team that may have discovered why the Sun's outer tenuous atmosphere (the corona) has a temperature of approximately one million degrees and is so much hotter that the Sun's surface. The team reported on a new discovery made using the Swedish Solar Telescope on La Palma in the Canary Islands. These observations show for the first time the presence of high frequency waves travelling along thin magnetic flux tubes emerging from the Sun.

I mí na Márta, bhí réalteolaithe ó DIAS ina mbaill d'fhoireann níos leithne a fuair amach, b'fhéidir, cén fáth a bhfuil teocht thar ar mhilliún céim ag atmaisféar tanaí seachtrach na Gréine (an choróin) agus é i bhfad níos teo ná dromchla na Gréine. Thug an tuairisc ar fhionnachtain nua a rinneadh ag baint úsáide as Teileascóp Gréine na Sualainne ar La Palma sna hOileáin Chanáracha. Den chéad uair, taispeánann na breathnuithe seo toinn ardmhinicíochta ag taisteal feadh feadán floscanna maighnéadacha tanaí ag teacht amach ón nGriain.

School of Celtic Studies

Scoil an Léinn Cheiltigh

Scoil an Léinn Cheiltigh

TAIGHDE

Lean Liam Breatnach lena chuid oibre ar Ghramadach na Meán-Ghaeilge, agus réitigh sé roinnt páipéar le haghaidh foilsithe. D'oibrigh Ruairí Ó hUiginn ar eagrán den téacs *Oileamhain Chon Culainn agus Oidheadh Chonnlaoich mheic Con Culainn* a ullmhú, agus lean sé ag obair ar ghnéithe de chomhréir na gclásal coibhneasta sa Ghaeilge.

Lean Barry Lewis ag obair ar eagrán de théacs ginealach ar naoimh na Breataine Bige *(Bonedd y Saint)*. Chuir sé eagráin de 12 théacs nach bhfuil ar fáil ach i LS amháin faoi bhráid na foirne tionscnaimh sa Canolfan Uwchefrydiau Cymreig a Cheltaidd in Aberystwyth, agus chríochnaigh sé roinnt alt agus caibidlí leabhair le haghaidh foilsithe.

Lean Aoibheann Nic Dhonnchadha ar a cuid taighde ar théacsanna leighis na Nua-Ghaeilge Moiche.

Lean Michelle O Riordan ag obair ar leabhar ar fhilíocht pholaitiúil na Gaeilge i lár na seachtú haoise déag.

Lean Brian Ó Curnáin ag obair ar ghnéithe de shochtheangeolaíocht agus canúintí na Nua-Ghaeilge, ina measc, monagraf ar Ghaeilge Oirthear na Gaillimhe, agus tras-scríobh agus eagarthóireacht ábhar taifeadta do thionscadal GLÓR.

Chuir Mícheál Hoyne monagraf 'Bardic poems on the Meic Dhiarmada' faoi bhráid Choiste Foilseachán na Scoile, agus glacadh leis le haghaidh foilsithe.

Lean sé ag obair ar a eagrán de dhánta an fhile Seifín Mór, a bhain leis an 15ú haois, agus thosnaigh sé ar eagrán den tráchtas gramadaí *IGT* III-IV.

Lean Marie-Luise Theuerkauf ag obair ar eagrán de dhinnsheanchas Teamhrach agus ar a tionscnamh taighde ar an Dinnsheanchas i Leabhar Buí Leacáin.

D'eagraigh Silva Nurmio dhá chomhdháil sa Scoil: cruinniú bliantúil an ghrúpa taighde Datblygiad yr Iaith/ The Development of Welsh, agus an siompóisiam 'New Approaches to Brittonic Historical Linguistics'. Bhí sí ina comheagraí ar an seimineár bliantúil ar theangeolaíocht na Breatnaise in Gregynog. D'oibrigh sí ar roinnt alt agus caibidil leabhair, agus d'eagraigh sí leabhar atá le cur faoi bhráid foilsitheora faoi Mhárta 2018. Ba rannpháirtí í sa leabhar *Cyflwyniad i Ieithyddiaeth*, téacsleabhar Breatnaise ar an teangeolaíocht, faoi stiúir Laura Arman agus Sarah Cooper, Ollscoil Bangor, agus sa leabhar Mouton Handbooks of Indo-European Typology, in eagar ag Wolfgang Hock, Götz Keydana agus Paul Widmer.

Rinne Sarah Waidler taighde i gcomhair 'Stories of Saints: Medieval Irish Hagiographical Anecdota', a príomhthionscnamh sa Scoil, agus tá sé i gceist aici monagraf a fhoilsiú ar an ábhar seo. D'oibrigh sí freisin ar alt 'The Medieval Cult of Relics in Wales and the Welsh Perceptions of Relics', agus ar eagrán de na beathaí Laidne de Naomh Dáibhí i LSS Éireannacha, i gcomhair an tionscnaimh atá maoinithe ag an AHRC, *Vitae Sanctorum Cambriae: The Latin Lives of the Welsh Saints* (Ollscoil Cambridge agus Canolfan Uwchefrydiau Cymreig a Cheltaidd, Aberystwyth).

Thosnaigh Chantal Kobel ag obair ar eagráin de shraith téacsanna sa LS H 3. 18 (1337) i gColáiste na Tríonóide nár cuireadh in eagar cheana, agus ar chatalóg den lámhscríbhinn féin. D'ullmhaigh sí roinnt alt i gcomhair foilsithe, agus thosnaigh sí ar chatalóg de pháipéir Phroinsias Mhic Cana agus comhfhreagras Dhonnchaidh Uí Chorráin.

FOILSEACHÁIN

Foilsíodh i mbliana *Celtica* 29; Breandán Ó Buachalla, *Cnuasach Chléire*, in eagar ag James McCloskey agus Cathal Goan; Liam Breatnach, Córus Bésgnai. *An Old Irish Law Tract on the Church and Society*, Early Irish Law Series 7; agus Gordon Ó Riain (eag.), Dá Dtrian Feasa Fiafraighidh. *Essays on the Irish Grammatical and Metrical Tradition.*

Chomh maith leis sin cuireadh eagrán digiteach de *Onomasticon Goedelicum* Edmund Hogan, athchóirithe agus ceartaithe ag Donnchadh Ó Corráin ar fáil le híoslódáil ar shuíomh na Scoile.

MEAMRAM PÁIPÉAR RÍOMHAIRE (MPR/ISOS)

Rinne an tionscnamh dul ar aghaidh cothrom faoi stiúir Anne Marie O'Brien, ag leanúint le digitiú lámhscríbhinní agus le huasghrádú an bhunachair ollmhóir de ábhar digiteach atá ar MPR. Ag deireadh na bliana chuaigh MPR beo ar Twitter, rud a thugann eolas do lucht féachana a luaithe is a chuirtear LS nua ar fáil.

Fuair suíomh MPR breis is 6,432,700 amas i gcaitheamh na bliana.

School Of Celtic Studies

RESEARCH

Liam Breatnach continued work on a Grammar of Middle Irish, and on preparing a number of papers for publication. Ruairí Ó hUiginn worked on preparing an edition of the text *Oileamhain Chon Culainn agus Oidheadh Chonnlaoich mheic Con Culainn* and continued to work on aspects of the syntax of relative clauses in Irish.

Barry Lewis continued work on edition of medieval Welsh saints' genealogies. He submitted editions of 12 single-manuscript texts to the project team at CAWCS, and a number of articles and book-chapters for publication.

Aoibheann Nic Dhonnchadha continued research on Early Modern Irish medical texts.

Michelle O Riordan continued work on a book on Irish political poetry in the mid-seventeenth century.

Brian Ó Curnáin continued work on various aspects of Modern Irish sociolinguistics and dialect studies, including the preparation of a monograph on East Galway Irish, and the transcription and editing of recorded materials for the GLÓR project.

Mícheál Hoyne submitted critical editions of nine Classical Modern Irish poems to DIAS, and the volume has been accepted for publication. He continued to work on his critical edition of the poems of the mysterious fifteenth-century poet Seifín, which will be submitted as a book to DIAS at the end of 2018. He began editing the Classical Modern Irish grammatical tract *IGT* III-IV.

Marie-Luise Theuerkauf continued work on editing the *dindshenchas* of Temair (Tara), and her research on the *Dindshenchas* in the Yellow Book of Lecan.

Silva Nurmio organised two conferences at DIAS: the annual meeting of the Datblygiad yr Iaith/The Development of Welsh research group, and the symposium New Approaches to Brittonic Historical Linguistics. She was also a co-organiser of the annual Welsh Linguistics Seminar (Gregynog, Wales). She worked on a number of articles and a book chapter, and also edited a book to be submitted for publication by March 2018. She became a contributor to two collaborative book projects, Cyflwyniad i ieithyddiaeth [Introduction to linguistics], a Welsh-language introduction to linguistics, coordinated by Laura Arman & Sarah Cooper, Bangor University, and Mouton Handbooks of Indo-European Typology, ed. Wolfgang Hock, Götz Keydana & Paul Widmer.

Sarah Waidler conducted research for 'Stories of Saints: Medieval Irish Hagiographical Anecdota', her main project at DIAS, which she hopes to publish as a monograph. She also worked on an article 'The Medieval Cult of Relics in Wales and the Welsh Perceptions of Relics', and on an edition, transcription and translation of the Latin Lives of St David of Wales in Irish manuscripts for the AHRC-funded project *Vitae Sanctorum Cambriae: The Latin Lives of the Welsh Saints* (University of Cambridge and Centre for Advanced Welsh and Celtic Studies, Aberystwyth).

Chantal Kobel began editing and translating a series of hitherto unedited texts preserved in TCD MS H 3. 18 (1337), and also began cataloging this manuscript. She prepared a number of articles for publication, and began cataloging the papers of Proinsias Mac Cana, as well as the correspondence of Donnchadh Ó Corráin.

PUBLICATIONS

The year 2017 saw the publication of Celtica 29, Breandán Ó Buachalla, *Cnuasach Chléire*, ed. by James McCloskey and Cathal Goan, Liam Breatnach, *Córus Bésgnai. An Old Irish Law Tract on the Church and Society,* Early Irish Law Series 7, and Gordon Ó Riain (ed.), Dá Dtrian Feasa Fiafraighidh. *Essays on the Irish Grammatical and Metrical Tradition.*

In addition, a digital edition of Edmund Hogan's *Onomasticon Goedelicum*, revised and corrected by Donnchadh Ó Corráin, was made available to download on the School's website.

IRISH SCRIPT ON SCREEN (ISOS)

The Irish Script on Screen (ISOS) project made steady progress during the year under the direction of Anne Marie O'Brien. With continued work on digitisation of manuscripts and upgrading the huge database and archive of digitised material held by ISOS. At the close of year ISOS went live on Twitter which now allows viewers current updates when manuscripts go live. There were more than 6,432,700 hits to the Irish Script On Screen website during the year.

In the annual digitisation at the Royal Irish Academy, the Book of the Ó Lochlainns, MS E iv 3 (18th cent) and MS 23 D 4 (17th cent) were digitised. A large Latin-English-Gaelic Dictionary from Marsh's Library, MS Z 3.1.13, went live on the ISOS site.

The existing collaboration between the School of Celtic Studies/ ISOS and the National Library of Scotland was continued and saw the completion of a further five manuscripts, Adv. MS 72.2.3, Adv. MS 72.2.11, Adv. MS 72.2.13, Adv. MS 72.5.1 and MS 1669.

Scoil an Léinn Cheiltigh (ar lean)

I mbliana cuireadh ar fáil ar an suíomh lín dhá lámhscríbhinn i nAcadamh Ríoga na hÉireann, chomh maith leis na catalóga cuí, eadhón, LS E iv 3 'Leabhar Ó Lochlainn' (18ú haois) agus LS 23 D 4 (17ú haois). Freisin cuireadh ar fáil Foclóir mór Laidin-Béarla-Gaeilge i Leabharlann Marsh, LS Z 3.1.13, agus cúig lámhscríbhinn i Leabharlann Náisiúnta na hAlban, Adv. 72.2.3, Adv. 72.2.11, Adv. 72.2.13, Adv. 72.5.1 agus LS 1669.

Cuireadh an dá lámhscríbhinn deireannacha sa bhailiúchán i Leabharlann Uí Raghallaigh in DCU, LS II agus LS IV, ar fáil ar an suíomh, ionas go bhfuil an bailiúchán ar fad anois digithe, agus deireadh tagtha leis an bpáirtíocht idir Coláiste Phádraig agus MPR. Táimid buíoch de fhoireann na leabharlainne as ucht a gcomhoibrithe.

Thosnaigh an dara céim den pháirtíocht le Leabharlann Óstaí an Rí, inar rinneadh digitiú ar ocht lámhscríbhinn breise, eadhón, LS 9, LS 20, LS 24, LS 26, LS 28, LS 29, LS 40, agus LS 41. Baineann siad ar fad leis an 18ú haois, agus téacsanna gramadaí agus reiligiúnacha, agus scéalta, srl. atá iontu.

Rinneadh réamh-phlé le Leabharlann Taighde na Lámhscríbhinní agus na gCartlann i gColáiste na Tríonóide faoi dhigitiú a dhéanamh ar a thuilleadh de na lámhscríbhinní sa bhailiúchán sa bhliain dár gcionn.

BIBLEAGRAFAÍOCHT

Lean Alexandre Guilarte lena chuid oibre ar *Bibliography of Irish Linguistics and Literature (BILL)* a chur i dtoll a chéile, ag cur líon mór iontrálacha nua isteach do altanna, leabhair agus monagraif ar staidéir acadúla cuí. Chomh maith leis sin lean sé ag obair ar leagan amach agus uasghrádú an tsuímh lín.

Lean sé ag obair ar liostú sistéimeach léirmheasanna, agus leathnaíodh réimse na n-irisí go *Studia Celtica, Speculum, Innes Review, The Scottish Historical Review*, agus tuilleadh eile.

I bpáirt le foireann na leabharlainne, d'aimsigh sé agus réitigh sé bearnaí sna bailiúcháin, maidir le hirisí ar nós *EMANIA, Dúiche Néill, Irisleabhar Mhá Nuad*, agus irisí eile.

Chomh maith leis sin, sholáthair sé iontrálacha ar fhoilseacháin sa Léann Ceilteach do imleabhar 49/1–2, i gcomhair na tréimhse Eanáir-Nollaig 2015 (le foilsiú i 2018), den *International Medieval Bibliography*, in eagar ag an Institute for Medieval Studies, University of Leeds agus foilsithe ag Brepols.

LÉANN LÁMHSCRÍBHINNÍ

Lean an tOllamh Liam Breatnach ag stiúradh eagráin dioplómaitiúil den lámhscríbhinn ó thús na 15ú haoise déag *An Leabhar Breac*, agus le tionscnamh, ina bhfuil baill foirne agus scoláirí páirteach, chun catalóg nua a sholáthar do Leabhar Buí Leacáin.

LEABHARLANN

Leanadh le catalógú reatha agus siarghabhálach ar an leabharlann. Leanadh le sealbhú i gcomhair réimsí ábhair a bhí ábhartha do riachtanais thaighde na Scoile.

Déileáladh le breis is 250 ceist taighde agus leabharliosta ó bhaill na Scoile agus ó chuairteoirí, agus le beagnach 50 iasacht idirleabharlainne.

Eisíodh nuashonruithe rialta ar shealbhú a rinneadh le déanaí agus ar thréimhseacháin reatha (idir cló agus ar-líne).

Tugadh breis is 2100 cuairt ar an leabharlann.

Coiste na Leabharlainne

Tháinig an Coiste le chéile i mBealtaine agus i nDeireadh Fómhair, 2017. Tugann an coiste comhairle ar pholasaí na leabharlainne, cur chun cinn na leabharlainne, agus forbairt agus cur i gcrích athraithe straitéiseacha. Is iad baill an choiste Liam Breatnach, Ruairí Ó hUiginn, Aoibheann Nic Dhonnchadha, Alexandre Guilarte agus an Leabharlannaí, Margaret Irons.

Comhdhálacha agus Seimineáir

Rinne Margaret Irons cur i láthair ag an rannóg Leabharlanna Acadúla agus Speisialta de chomhdháil bhliantúil Chumann Leabharlann na hÉireann ar an 16ú agus 17ú Feabhra 2017, faion teideal: Better together: your village and your voice

http://www.aslibraries.com/parallel-and-workshop-speakers

Taisclann Institiúideach

Thosnaigh an leabharlann ar thaisclann institiúideach de fhoilseacháin taighde a fhorbairt. Cuirfidh an taisclann taighde fhoireann na Scoile os comhair an phobail.

Bronntanais

Bhíothas buíoch as bronntanais a fháil ó na daoine seo leanas:

An tOllamh Johan Corthals, Universität Hamburg

MSOMIT 2017: manuscript sources to Old and Middle Irish tales/Johan Corthals.

Polina Mamchenkova

Atlantica 13.

An tOllamh Liam Breatnach

The Irish pearl : a cultural, social and economic history/John Lucey.

School Of Celtic Studies (continued)

The partnership between St Patrick's College and Irish Script On Screen came to a close with the last two manuscripts, LS II and LS IV, going live on the ISOS site, so that the complete collection of Gaelic Manuscripts held at the O'Reilly Library DCU is now fully digitised. We thank the staff in the Cregan Library at St Patrick's College for their involvement with the digitisation of these holdings, thus playing a significant role in the ISOS initiative.

The second phase began with King's Inns and saw a further eight manuscripts digitised, MS 9, MS 20, MS 24, MS 26, MS 28, MS 29, MS 40, and MS 41. All are eighteenth-century manuscripts containing a mixture of grammar, religious matter, tales etc.

Discussions took place with the Manuscripts and Archives Research Library, Trinity College Dublin, with a view to undertaking further digitisation of the Library's Irish language holdings for inclusion on the ISOS website in the following year.

BIBLIOGRAPHY

During 2017 Alexandre Guilarte continued to work on the compilation of the *Bibliography of Irish Linguistics and Literature (BILL)*, entering, describing and analysing publications on early and modern Irish philology, and focusing on books and monographs while ensuring information on periodical titles is maintained up-to-date.

He also continued to systematically extract reviews on Irish studies publications, a line of work which has been extended to titles such as *Studia Celtica, Speculum, Innes Review, The Scottish Historical Review,* and many others.

In collaboration with the librarians he detected and remedied gaps in the library collections, solving issues that concerned titles such as *EMANIA, Dúiche Néill, Irisleabhar Mhá Nuad*, and others.

Finally, he contributed entries on Celtic Studies publications to appear in vol. 49, 1-2 for Jan-December 2015 (forthcoming in 2018) of the International Medieval Bibliography edited by the Institute for Medieval Studies, University of Leeds, and published by Brepols.

MANUSCRIPT STUDIES

Professor Liam Breatnach continued direction of a diplomatic edition of the early 15th-century manuscript *Leabhar Breac*, and a project involving staff and scholars of the School to produce a new catalogue of the contents of the Yellow Book of Lecan.

LIBRARY

Acquisitions continued in subject areas relevant to the research needs of the School and in keeping with the acquisitions policy of the library.

Over 250 research and bibliographical queries from visitors and members of the School were dealt with.

Approximately 50 inter-library loans were ordered, consulted and returned to the lending institution.

Regular updates on recent accessions and current periodicals (both print and online) were issued.

Over 2100 visits were made to the library.

Library Committee

The Committee met in May and October 2017.

The Library Committee advises on library policies, promotion of the library and on development and implementation of strategic changes.

Committee members are Liam Breatnach, Ruairí Ó hUiginn, Aoibheann Nic Dhonnchadha, Alexandre Guilarte and Margaret Irons.

Conferences and Seminars

Margaret Irons presented at the Academic & Special Libraries section of the Library Association of Ireland's annual conference on 16th & 17th February 2017.

Title: Better together: your village and your voice

http://www.aslibraries.com/parallel-and-workshop-speakers

Institutional Repository

The library began work on developing an Institutional Repository of research publications. The repository will showcase the research output of professors, staff and scholars of the Institute.

Donations

Donations were gratefully received from the following:

Prof. Johan Corthals, Universität Hamburg

MSOMIT 2017: manuscript sources to Old and Middle Irish tales/Johan Corthals.

Polina Mamchenkova

Atlantica 13.

Prof. Liam Breatnach

The Irish pearl : a cultural, social and economic history/John Lucey.

Prof. Ruairí Ó hUiginn

Various titles.

Prof. Ailbhe Ó Corráin

The dark cave and the divine light: verses on the human condition by Giolla Brighde Ó hEódhasa.

Prof. Emeritus Anders Ahlqvist, University of Sydney

Various journal titles.

Scoil an Léinn Cheiltigh (ar lean)

An tOllamh Ruairí Ó hUiginn

Teidil éagsúla.

An tOllamh Ailbhe Ó Corráin

The dark cave and the divine light : verses on the human condition by Giolla Brighde Ó hEódhasa.

An tOllamh Emeritus Anders Ahlqvist, Ollscoil Sydney

Irisí éagsúla.

Matthias Egeler, Ludwig-Maximilians-Universität München

Islands in the west : classical myth and the medieval Norse and Irish geographical imagination/Matthias Egeler.

An tOllamh Donnchadh Ó Corráin †, Coláiste na hOllscoile, Corcaigh

Teidil éagsúla.

Daniel Buchner, Curach Bhán publications

Teidil éagsúla.

An tOllamh Matthew James Driscoll, Ollscoil Copenhagen

Sixty-Six Manuscripts From the Arnamagnan Collection/MJ Driscoll.

Mirrors of virtue : manuscript and print in late pre-modern Iceland/MJ Driscoll.

Cuairteoirí idirnáisiúnta ar an Leabharlann

Melita Cataldi, Ollscoil Torino, An Iodáil

Thomas Charles-Edwards, Jesus College, Oxford, Sasana

Piero de Gennaro, Ollscoil Torino, An Iodáil

Anders Ahlqvist, Ollscoil Sydney, An Astráil

Margo Griffin-Wilson, Ollscoil Cambridge, Sasana

Markku Filppula, Ollscoil Oirthear na Fionnlainne

Helen Imhoff, München, An Ghearmáin

Seth Koproski, Ollscoil Cornell, New York, SAM

James McCloskey, Ollscoil California, SAM

Tomás Ó Cathasaigh, Ollscoil Harvard, Massachusetts, SAM

Pádraig Ó Néill, Ollscoil North Carolina, SAM

Murray-Luke Peard, Ollscoil Sydney, An Astráil

Jan Erik Rekdal, Ollscoil Oslo, An Ioruaidh

Paul Russell, Ollscoil Cambridge, Sasana

Richard Sharpe, Ollscoil Oxford, Sasana

Mary Valante, Ollscoil Appalachian State, North Carolina, SAM

Joseph Nagy, Ollscoil California, Los Angeles. SAM

Jacqueline Borsje, Ollscoil Amsterdam, An Ísiltír

Patrick Sims-Williams, Ollscoil Aberystwyth, An Bhreatain Bheag

Катерина Деревянченко, Ollscoil Moscow, An Rúis

Mikael Males, Ollscoil Oslo, An Ioruaidh

Robin Chapman Stacey, Ollscoil Washington, SAM

Marged Haycock, Ollscoil Aberystwyth, An Bhreatain Bheag

TIONÓL 2017

Tharraing Tionól na bliana seo lucht éisteachta an-leathan arís i mbliana, le painéal idirnáisiúnta cainteoirí, agus lean sé ón 17ú go dtí an 19ú de mhí na Samhna. Rinneadh freastal an-ard, suas le nócha duine sa lucht éisteachta. Tugadh na páipéir seo leanas (san ord inar cuireadh i láthair iad) ar an Déardaoin an 16ú: Séamas De Barra, 'Teaboid Gállduf, údar Teagasc Criostuí/Catechismus (An Bhruiséil 1639)'; Feena Tóibín, 'Dubhghlas de hÍde: learning curve'; Kenneth Ó Donnchú, 'Fa thionnas sa mbaile shíos: cúlra agus bunús an dáin Freagra ar et cetera Philip'; Christopher Lewin, 'Progress and desiderata in Manx historical linguistics'; Art Hughes, 'H. Wagner's Linguistic Atlas and Survey of Irish Dialects: reflections and some practical applications in mid-Donegal (pts 82-83)'; Peadar Ó Muircheartaigh, 'Lucerna Linguae? Lucerna Fidelium (1676) as a dialectal source'.

Tugadh na páipéir seo leanas ar an Aoine an 17ú: Nicole Volmering, 'The Prose Preface to the *Féilire Óengusso*: scribes, editors and text arrangement'; Chantal Kobel, '*Bruiden Senbicc uí Ébricc*: a medieval Irish text lost to obscurity'; Rebecca Shercliff, 'Female voices in Tochmarc Ferbe'; Joan Gallagher, 'Chwedyl Iarlles y Ffynnawn as "Romance"?'; Jacqueline Borsje, 'Mary's saliva'; Brendan Meighan, 'Irish identity and the development of the High-Kingship 847-919'; Éamonn Ó Ciosáin, 'Foclóireacht na Briotáinise 1464-2017, spriocanna agus saothair; Breton lexicography, purpose and practice'; Iwan Wmffre, 'Hanoiou-lec'h Breiz Izel: The Western Brittany Place-Name Project'; Paul Russell, '*Rustica imbecillitas*: Breton personal names in charters'; Andrea Palandri, 'The Irish adaptation of Marco Polo's Travels: mapping the route to Ireland'; Ksenia Kudenko, 'The symphony of vernacular and Latin traditions in *Tochmarc Moméra*'.

School Of Celtic Studies (continued)

Matthias Egeler, Ludwig-Maximilians-Universität München

Islands in the west : classical myth and the medieval Norse and Irish geographical imagination/Matthias Egeler.

Prof. Donnchadh Ó Corráin †, University College Cork

Various titles.

Daniel Buchner, Curach Bhán publications

Various titles.

Prof. Matthew James Driscoll, University of Copenhagen

Sixty-Six Manuscripts From the Arnamagnan Collection/MJ Driscoll.

Mirrors of virtue : manuscript and print in late pre-modern Iceland/MJ Driscoll.

International visitors to the library

Melita Cataldi, University of Torino, Italy

Thomas Charles-Edwards, Jesus College Oxford, England

Piero de Gennaro, University of Turin, Italy

Anders Ahlqvist, University of Sydney, Australia

Margo Griffin-Wilson, Cambridge University, England

Markku Filppula, University of Eastern Finland, Finland

Helen Imhoff, Münich, Germany

Seth Koproski, Cornell University, New York, USA

James McCloskey, University of California, USA

Tomás Ó Cathasaigh, Harvard University, Massachusetts, USA

Pádraig Ó Néill, University of North Carolina, USA

Murray-Luke Peard, University of Sydney, Australia

Jan Erik Rekdal, University of Oslo, Norway

Paul Russell, University of Cambridge, England

Richard Sharpe, University of Oxford, England

Mary Valante, Appalachian State University, North Carolina, USA

Joseph Nagy, University of California, Los Angeles. USA

Jacqueline Borsje, University of Amsterdam, The Netherlands

Patrick Sims-Williams, Aberystwyth University, Wales

Катерина Деревянченко, Moscow University, Russia

Mikael Males, University of Oslo, Norway

Robin Chapman Stacey, University of Washington, USA

Marged Haycock, University of Aberystwyth, Wales

TIONÓL 2017

This year's Tionól, extended from the afternoon of Thursday the 16th of November to the afternoon of Saturday the 18th, and attracted a very wide audience, with an international panel of speakers. Attendance was high, with audiences reaching ninety people. The following papers were delivered on Thursday 17th: Séamas De Barra, 'Teaboid Gállduf, údar Teagasc Criostuí/Catechismus (An Bhruiséil 1639)'; Feena Tóibín, 'Dubhghlas de hÍde: learning curve'; Kenneth Ó Donnchú, 'Fa thionnas sa mbaile shíos: cúlra agus bunús an dáin Freagra ar et cetera Philip'; Christopher Lewin, 'Progress and desiderata in Manx historical linguistics'; Art Hughes, 'H. Wagner's Linguistic Atlas and Survey of Irish Dialects: reflections and some practical applications in mid-Donegal (pts 82-83)'; Peadar Ó Muircheartaigh, 'Lucerna Linguae? Lucerna Fidelium (1676) as a dialectal source'.

The following were delivered on Friday the 17th: Nicole Volmering, 'The Prose Preface to the *Féilire Óengusso:* scribes, editors and text arrangement'; Chantal Kobel, '*Bruiden Senbicc uí Ébricc*: a medieval Irish text lost to obscurity'; Rebecca Shercliff, 'Female voices in Tochmarc Ferbe'; Joan Gallagher, 'Chwedyl Iarlles y Ffynnawn as "Romance"?'; Jacqueline Borsje, 'Mary's saliva'; Brendan Meighan, 'Irish identity and the development of the High-Kingship 847-919'; Éamonn Ó Ciosáin, 'Foclóireacht na Briotáinise 1464-2017, spriocanna agus saothair; Breton lexicography, purpose and practice'; Iwan Wmffre, 'Hanoiou-lec'h Breiz Izel: The Western Brittany Place-Name Project'; Paul Russell, '*Rustica imbecillitas*: Breton personal names in charters'; Andrea Palandri, 'The Irish adaptation of Marco Polo's Travels: mapping the route to Ireland'; Ksenia Kudenko, 'The symphony of vernacular and Latin traditions in *Tochmarc Moméra*'.

The following were delivered on Saturday the 18th: Exequiel Monge, 'Staying on God's good side: the fluid identity of the Céli Dé'; Caoimhín Breatnach, 'Hand H in *Lebor na hUidre*: the case against a multiplicity of scribes'; Jacopo Bisagni, 'The newly discovered Irish computus in Laon, Bibliothèque Municipale, MS 422'; Daniel Watson, 'Natural Law as inspiration in early Irish literature'; Niamh Wycherley, 'Latin and Irish words for "graveyard" in Medieval Ireland'; Patrick Sims-Williams, 'John Rhys (1840-1915) and early Irish inscriptions'; Philip Healy, 'Pledging and compensation payments in *Di Gnímaib Gíall*'; Riona Doolan, 'The transmission of later medieval legal commentaries'; Alice Taylor, '*Confodlat .i. is cæin fodailid*:

Scoil an Léinn Cheiltigh (ar lean)

Tugadh na páipéir seo leanas ar an Satharn an 18ú: : Exequiel Monge, 'Staying on God's good side: the fluid identity of the Céli Dé'; Caoimhín Breatnach, 'Hand H in *Lebor na hUidre*: the case against a multiplicity of scribes'; Jacopo Bisagni, 'The newly discovered Irish computus in Laon, Bibliothèque Municipale, MS 422'; Daniel Watson, 'Natural Law as inspiration in early Irish literature'; Niamh Wycherley, 'Latin and Irish words for "graveyard" in Medieval Ireland'; Patrick Sims-Williams, 'John Rhys (1840-1915) and early Irish inscriptions'; Philip Healy, 'Pledging and compensation payments in *Di Gnímaib Gíall';* Riona Doolan, 'The transmission of later medieval legal commentaries'; Alice Taylor, '*Confodlat .i. is cæin fodailid*: etymological glossing of prefixes in early Irish law'; Mikael Males, 'Insular grammatical thought in Old Norse literature'; Damian McManus, 'Baying beagles and hunting hounds: the "hunt" as reflected in Classical Irish verse'.

Thug an tOllamh Thomas Charles-Edwards an Léacht Poiblí Reachtúil a reáchtáladh i gcomhar leis an Tionól i gColáiste na Tríonóide, Baile Átha Cliath ar an Aoine an 17ú Samhain, faoin teideal 'Early Irish law and the laws of Western Europe, 400-800'. Bhí freastal an-mhaith ar an léacht seo, agus tá taifead den léacht seo ar fáil anois ar shuíomh gréasáin na Scoile.

COMHDHÁIL DHÁ LÁ AR DINDSHENCHAS ÉRENN

D'eagraigh an Dr Marie-Luise Theuerkauf an chomhdháil seo san Institiúid ar an 31ú Márta agus 1ú Aibreán 2017, le 19 cainteoir agus thart ar 50 duine i láthair.

Tugadh na páipéir seo leanas ar an Aoine, an 31ú: Nollaig Ó Muraíle (NUIG), '*Dindṡenchas Érenn* – Outline of Versions, Recensions and Contents'; John Carey (UCC), 'The Memory Palace of Fintan mac Bóchrai'; Liam Breatnach (DIAS), 'Dublin in the *Dindṡenchas*'; Kevin Murray (UCC), 'The Poetry in the Rennes *Dindṡenchas*'; Marie-Luise Theuerkauf (DIAS), 'The Dindṡenchas in RIA MS D ii 2'; Claire Collins (UCD), 'The Many Deaths of Tigernmas'; Mark Gibbard (NUIG), 'Dynastic Affiliations in the Metrical *Dindṡenchas*: Túathal Techtmar and the Influence of Origin Legends'; Patricia Kelly (UCD), 'On the alleged dindṡenchas passage in *Esnada Tige Buchet*'; Clodagh Downey (NUIG), 'Making the there here and the then now: place and positioning in *dindṡenchas*'; Ruairí Ó hUiginn (DIAS), '*Lebor na hUidre* and *Dindṡenchas Érenn*'.

Tugadh na páipéir seo leanas ar an Satharn an 1ú: Gearóid Trimble (Foras na Gaeilge), 'Henry Morris's *Táin Bó Cuailnge*'; Greg Darwin (Harvard), '*Ard na Riag de na deadaich*: Tradition, memory, and continuity in northern Mayo.'; Anne Connon (Ohio Dominican University), 'Switching *Dindṡenchas* in *Acallam na Senórach*'; Kay Muhr (Ulster), 'Place-name elements in *Dindṡenchas* texts'; Matthias Egeler (Munich/UCC), 'Áth Lúain and the Norse Reception of Irish Place-Lore'; Ranke de Vries (St Francis Xavier), 'Disease and Medical Conditions in the *Dindṡenchas*'; Joey McMullen (Centenary Univ.), 'Land-changing Feats in *Tochmarc Étaíne* and the dindṡenchas of Ráth Ésa'; Joe Wolf (Harvard), 'Problematizing the Use of *dindṡenchas* texts Carmun and Tailtiu as Historical Evidence for the Early Irish *óenach*'; Joseph

Dindṡenchas Érenn conference
Comhdháil Dindṡenchas Érenn

Nagy (Harvard), 'An Odd Death for a Pig in the *dindṡenchas* of Mag Léna'.

COMHDHÁIL DHÁ LÁ AR CHUR CHUIGE NUA MAIDIR LE TEANGEOLAÍOCHT STAIRIÚIL NA BREATNAISE, BRIOTÁNAISE AGUS COIRNISE

D'eagraigh an Dr Silva Nurmio an chomhdháil seo san Institiúid ar an 31ú Lúnasa agus 1ú Meán Fómhair 2017, le 19 cainteoir agus thart ar 50 duine i láthair.

Tugadh na páipéir seo leanas ar an Déardaoin, an 31ú: Kerstin Plein, 'The interaction of verbal agreement, semantics and information structure in Middle Welsh subject initial main clauses'; Ricarda Scherschel, 'Comparing agreement in Welsh and Breton: a parallel-text approach'; Silva Nurmio, 'Hybrid controllers and agreement in Welsh'; Britta Irslinger, 'Middle Welsh ym-verbs in antipassive constructions'; Bob Borsley, 'More on the Welsh of Jesus and Job: an HPSG

etymological glossing of prefixes in early Irish law'; Mikael Males, 'Insular grammatical thought in Old Norse literature'; Damian McManus, 'Baying beagles and hunting hounds: the "hunt" as reflected in Classical Irish verse'.

The Statutory Public Lecture, held in conjunction with the Tionól, was delivered in TCD by Professor Thomas Charles-Edwards, Jesus College, Oxford, under the title 'Early Irish law and the laws of Western Europe, 400-800', on Friday the 17th of November at 8.00 p.m. This was a very well-attended lecture, and a recording is now available on the School's website.

TWO-DAY SYMPOSIUM ON DINDSHENCHAS ÉRENN

Dr Marie-Luise Theuerkauf organised this symposium at DIAS on Friday, 31 March and Saturday, 1 April, 2017. It featured 19 speakers and had an audience in excess of 50 people.

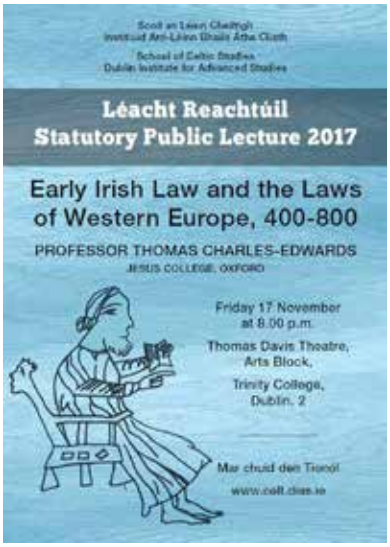
The following lectures were given on Friday the 31st: Nollaig Ó Muraíle (NUIG), '*Dindṡenchas Érenn* – Outline of Versions, Recensions and Contents'; John Carey (UCC), 'The Memory Palace of Fintan mac Bóchrai'; Liam Breatnach (DIAS), '*Dublin in the Dindṡenchas*'; Kevin Murray (UCC), 'The Poetry in the Rennes Dindṡenchas'; Marie-Luise Theuerkauf (DIAS), 'The *Dindṡenchas* in RIA MS D ii 2'; Claire Collins (UCD), 'The Many Deaths of Tigernmas'; Mark Gibbard (NUIG), 'Dynastic Affiliations in the Metrical *Dindṡenchas*: Túathal Techtmar and the Influence of Origin Legends'; Patricia Kelly (UCD), 'On the alleged *dindṡenchas* passage in Esnada Tige Buchet'; Clodagh Downey (NUIG), 'Making the there here and the then now: place and positioning in dindṡenchas'; Ruairí Ó hUiginn (DIAS), '*Lebor na hUidre* and *Dindṡenchas Érenn*'.

The following were given on Saturday the 1st: Gearóid Trimble (Foras na Gaeilge), 'Henry Morris's *Táin Bó Cuailnge*'; Greg Darwin (Harvard), '*Ard na Riag de na deadaich*: Tradition, memory, and continuity in northern Mayo.'; Anne Connon (Ohio Dominican University), 'Switching Dindṡenchas in Acallam na Senórach'; Kay Muhr (Ulster), 'Place-name elements in *Dindṡenchas* texts'; Matthias Egeler (Munich/UCC), 'Áth Lúain and the Norse Reception of Irish Place-Lore'; Ranke de Vries (St Francis Xavier), 'Disease and Medical Conditions in the *Dindṡenchas*'; Joey McMullen (Centenary Univ.), 'Land-changing Feats in *Tochmarc Étaíne* and the *dindṡenchas* of Ráth Ésa'; Joe Wolf (Harvard), 'Problematizing the Use of *dindṡenchas* texts Carmun and Tailtiu as Historical Evidence for the Early Irish *óenach*'; Joseph Nagy (Harvard), 'An Odd Death for a Pig in the *dindṡenchas* of Mag Léna'.

TWO-DAY SYMPOSIUM ON NEW APPROACHES TO BRITTONIC HISTORICAL LINGUISTICS

Dr Silva Nurmio organised this symposium at DIAS on Thursday 31 August and Friday, 1 September 2017. It featured 19 speakers and had an audience of approximately 50 people.

The following lectures were given on Thursday the 31st: Kerstin Plein, 'The interaction of verbal agreement, semantics and information structure in Middle Welsh subject initial main clauses'; Ricarda Scherschel, 'Comparing agreement in Welsh and Breton: a parallel-text approach'; Silva Nurmio, 'Hybrid controllers and agreement in Welsh'; Britta Irslinger, 'Middle Welsh ym-verbs in antipassive constructions'; Bob Borsley, 'More on the Welsh of Jesus and Job: an HPSG approach to Middle Welsh finite clauses'; Peredur Webb-Davies:



School of Celtic Studies Statutory Public Lecture 2017 poster

Léacht Reachtúil Scoil an Léinn Cheiltigh

Grammaticalization of *mynd i* 'go to' in Welsh: a corpus linguistic study of historical change'; Mélanie Jouitteau, 'Syntactic portrait of an emergent Breton dialect: Standard Breton'; Anders Jørgensen, 'Dialect variation in Middle Breton'; David Willis, 'Using multidimensional scaling to track Middle Welsh dialects'; Pavel Iosad, 'Bridging the gap: Tenseness and length in Brythonic vowels'; Iwan Rees, 'Length and quality in Welsh mid vowels: new data from Mid-Wales and some possible implications for historical linguistics';

The following lectures were given on Friday the 1st: Paulus van Sluis, 'Stops in Early Welsh: phonology and orthography'; Stefan Schumacher, 'The treatment of word-initial s-clusters in early medieval British Celtic languages'; Stefan Dedio, 'Establishing verbal domains in early British'; Elena Parina, 'Syntax of adjectives in Middle Welsh religious texts'; Marieke Meelen, 'Towards a historical Welsh treebank'; Stefan Dedio & Paul Widmer, 'Estimating the impact of contact on morphological change North-

Scoil an Léinn Cheiltigh (ar lean)

approach to Middle Welsh finite clauses'; Peredur Webb-Davies: Grammaticalization of *mynd i* 'go to' in Welsh: a corpus linguistic study of historical change'; Mélanie Jouitteau, 'Syntactic portrait of an emergent Breton dialect: Standard Breton'; Anders Jørgensen, 'Dialect variation in Middle Breton'; David Willis, 'Using multidimensional scaling to track Middle Welsh dialects'; Pavel Iosad, 'Bridging the gap: Tenseness and length in Brythonic vowels'; Iwan Rees, 'Length and quality in Welsh mid vowels: new data from Mid-Wales and some possible implications for historical linguistics'.

Tugadh na páipéir seo leanas ar an Aoine, an 1ú: Paulus van Sluis, 'Stops in Early Welsh: phonology and orthography'; Stefan Schumacher, 'The treatment of word-initial s-clusters in early medieval British Celtic languages'; Stefan Dedio, 'Establishing verbal domains in early British'; Elena Parina, 'Syntax of adjectives in Middle Welsh religious texts'; Marieke Meelen, 'Towards a historical Welsh treebank'; Stefan Dedio & Paul Widmer, 'Estimating the impact of contact on morphological change North-Western Europe'; Bernhard Bauer, 'Close encounters of the linguistic kind: the Celtic glossing tradition'; Holly Kennard, 'Changes in Breton stress patterns: the case of monosyllabic nouns'.

DATBLYGIAD YR IAITH

D'eagraigh Silva Nurmio cruinniú bliantúil an ghrúpa taighde Datblygiad yr Iaith/The Development of Welsh, ar an 20ú agus 21ú Iúil. Seo leanas an clár:

20ú Iúil: Peredur Webb-Davies, 'Possessive constructions in Welsh'; Elise Bell, 'What we can learn about L2 acquisition from Welsh in Argentina'; Robert Mayr & Jonathan Morris, 'Welsh influence on bilinguals' English: Results of a speech perception test'; Silva Nurmio, 'Mass and collective nouns in Welsh: fieldwork results'; Silva Nurmio, 'Derivational networks in Welsh'.

21ú Iúil: David Willis, 'Syntactic Atlas of the Welsh Dialects: a demonstration'; Gwen Awbery, 'Dialect variation in Welsh phonology - trying to push back before 1700'; Bob Borsley, 'More on the Welsh of Jesus and Job: An HPSG approach to Middle Welsh finite clauses'; 'Skye Anderson, Diana Archangeli, Elise Bell, Heddwen Brooks, Andrew Carnie, Michael Hammond, Diane Ohala, Adam Ussishkin, Peredur Webb-Davies & Andy Wedel, 'The Arizona-Wales mutation grant: preliminary results'.

SEIMINEÁIR

D'eagraigh Liam Breatnach seimineár ar dhánta Sean-Ghaeilge, ina measc an dán ón 9ú haois dár tús *A Choimmdiu nél*.

D'eagraigh Barry Lewis seimineáir dár teideal 'Texts on the poet in late-medieval Wales' ó Dheireadh Fómhair go Nollaig.

SCOIL SAMHRAIDH I DTEANGA AGUS LITRÍOCHT NA GAEILGE AGUS NA BREATNAISE

D'éirigh go breá leis an Scoil Samhraidh i mbliana, le beagnach 60 duine ag freastal ó gach aird den domhan. Lean an Scoil ón 3ú go dtí an 14ú Iúil agus sheol Mary Mitchell-O'Connor, Aire Stáit sa Roinn Oideachais an scoil. Cuireadh na cúrsaí seo leanas ar fáil:

9.30 – 11.00
A. Introduction to Classical Modern Irish, An Dr Mícheál Hoyne (Scoil an Léinn Cheiltigh).

B. Middle Welsh, An tOllamh Barry Lewis (Scoil an Léinn Cheiltigh).

11.30 – 13.00
A. Introduction to Old Irish, An tOllamh David Stifter (Ollscoil Mhá Nuad).

B. Old Irish Law Texts, An tOllamh Liam Breatnach (Scoil an Léinn Cheiltigh).

14.30 – 15.30
Contemporary Irish Syntax, An tOllamh James McCloskey (Ollscoil California, Santa Cruz).

16.00 – 17.00
Mediaeval Lordship and Gaelic Literary Tradition, An tOllamh Ruairí Ó hUiginn (Scoil an Léinn Cheiltigh).

LÉACHTAÍ

Chuir baill foirne páipéir agus léachtaí i láthair ag comhdhálacha agus ag ionaid náisiúnta agus idirnáisiúnta mar seo a leanas:

Liam Breatnach: 'Metrical Tracts in the Book of Uí Maine', Comhdháil ar Leabhar Ua Maine, Acadamh Ríoga na hÉireann, 3ú Márta.

'Dublin in the Dindshenchas', Comhdháil ar *Dhindshenchas Érenn*, Scoil an Léinn Cheiltigh, 31ú Márta.

Ruairí Ó hUiginn: 'Heroes and ancestors in the Book of Uí Mhaine', Comhdháil ar Leabhar Ua Maine, Acadamh Ríoga na hÉireann, 3ú Márta.

'Lebor na hUidre and Dindsheanchas Érenn', Comhdháil ar *Dhindshenchas Érenn*, Scoil an Léinn Cheiltigh, 31 Márta.

'Pádraig Ó Fiannachta: Foilsitheoir', Léachtaí Cholm Cille, An Daingean, 12ú Aibreán.

Western Europe'; Bernhard Bauer, 'Close encounters of the linguistic kind: the Celtic glossing tradition'; Holly Kennard, 'Changes in Breton stress patterns: the case of monosyllabic nouns'.

DATBLYGIAD YR IAITH

Silva Nurmio organised the annual meeting of the Datblygiad yr Iaith/The Development of Welsh research group, held on the 20th and 21st of July. The programme was:

20 July: Peredur Webb-Davies, 'Possessive constructions in Welsh'; Elise Bell, 'What we can learn about L2 acquisition from Welsh in Argentina'; Robert Mayr & Jonathan Morris, 'Welsh influence on bilinguals' English: Results of a speech perception test'; Silva Nurmio, 'Mass and collective nouns in Welsh: fieldwork results'; Silva Nurmio, 'Derivational networks in Welsh'.

21 July: David Willis, 'Syntactic Atlas of the Welsh Dialects: a demonstration'; Gwen Awbery, 'Dialect variation in Welsh phonology - trying to push back before 1700'; Bob Borsley, 'More on the Welsh of Jesus and Job: An HPSG approach to Middle Welsh finite clauses'; 'Skye Anderson, Diana Archangeli, Elise Bell, Heddwen Brooks, Andrew Carnie, Michael Hammond, Diane Ohala, Adam Ussishkin, Peredur Webb-Davies & Andy Wedel, 'The Arizona-Wales mutation grant: preliminary results'.

SEMINARS

Liam Breatnach gave a seminar on early Irish verse texts, including the ninth-century poem beginning *A Choimmdiu nél*.

Ruairí Ó hUiginn held a weekly seminar on the text *Oileamhan Chon Culainn* from January to May, and also gave an introductory course on Early Modern Irish from January to May.

Barry Lewis gave a seminar on 'Texts on the poet in late-medieval Wales' from October to December.

SUMMER SCHOOL IN MEDIAEVAL AND MODERN IRISH AND WELSH LANGUAGE AND LITERATURE

The triennial Summer School held from the 3rd to the 14th of July 2017 was again a great success, with almost 60 persons in attendance from all over the world. It was launched by Mary Mitchell-O'Connor, Minister of State at the Department of Education with special responsibility for Higher Education. The following courses were offered:

9.30 – 11.00
A. Introduction to Classical Modern Irish, Dr Mícheál Hoyne (DIAS).

B. Middle Welsh, Professor Barry Lewis (DIAS).

11.30 – 13.00
A. Introduction to Old Irish, Professor David Stifter (Maynooth University).

B. Old Irish Law Texts, Professor Liam Breatnach (DIAS).

14.30 – 15.30
Contemporary Irish Syntax, Professor James McCloskey (University of California, Santa Cruz).

16.00 – 17.00
Mediaeval Lordship and Gaelic Literary Tradition, Professor Ruairí Ó hUiginn (DIAS).

LECTURES

Liam Breatnach:'Metrical Tracts in the Book of Uí Maine', Conference on the Book of Uí Mhaine, Royal Irish Academy, 3 March.

'Dublin in the Dindṡenchas', Conference on *Dindshenchas Érenn*, DIAS, 31 March.

Ruairí Ó hUiginn: 'Heroes and ancestors in the Book of Uí Mhaine', Conference on the Book of Uí Mhaine, Royal Irish Academy, 3 March.

'Lebor na hUidre and *Dindsheanchas Érenn*', Conference on Dindshenchas Érenn, DIAS, 31 March.

'Pádraig Ó Fiannachta: Foilsitheoir', Léachtaí Cholm Cille, An Daingean, 12 April.

'New politics, new law', Burren Law School, Ballyvaughan, Co. Clare, 29 April.

'Pronouns, particles and prototonic verbs', Colloquium on Variation and Change in the Syntax and Morphology of Medieval Celtic Languages, Maynooth University, 13 October.

Celtic Studies Summer School
Scoil Samhraidh Scoil an Léinn Cheiltigh

Scoil an Léinn Cheiltigh (ar lean)

'New politics, new law', Scoil Dlí na Boirne, Baile Uí Bheacháin, An Clár, 29ú Aibreán.

'Pronouns, particles and prototonic verbs', Collóiciam ar éagsúlacht agus athrú i gcomhréir agus deilbhíocht teangacha Ceilteacht na Meánaoiseanna, Ollscoil Mhá Nuad, 13ú Deireadh Fómhair.

'Tóruigheacht Dhiarmada agus Gráinne: characters, themes and history', seimineár bliantúil de Chumann na Scríbheann nGaedhilge, Coláiste na hOllscoile, Corcaigh, 11ú Samhain 2017.

Barry Lewis: 'Celtic (Irish)', ag an gceardlann 'Literary Beginnings', Coláiste Pembroke, Cambridge, 2ú Meitheamh 2017.

'Churches in Wales before 1100: A Survey of the Written Sources', ag an gceardlann 'Early Christian Churches and Landscapes', Chester, 2ú Lúnasa 2017.

Aoibheann Nic Dhonnchadha: 'An Irish medical treatise on vellum and paper from the 16th century', ag 'The Paper Manuscript: A colloquium of the Department of Modern Irish', 26–27ú Bealtaine, 2017, Leabharlann Boole, Coláiste na hOllscoile, Corcaigh.

Michelle O Riordan: 'Divisive unities in seventeenth-century Ireland', seimineár staire Choláiste na hOllscoile, Corcaigh, Márta 2017.

Brian Ó Curnáin: 'Science and Illusion in Minority Sociolinguistics', Ollscoil Aberystwyth, 3ú Bealtaine 2017.

'Beartas Úr agus an Taisce Ghaelach', Oireachtas na Gaeilge, Cill Áirne, 4ú Samhain 2017.

Mícheál Hoyne: 'Als der Dichtung ihre Farbe gestohlen wurde: der irische Hofdichter in Zeiten der Wirtschaftskrise (ca. 1200 – ca. 1650)', aoi-léacht ag an Philipps-Universität i Marburg (Eanáir).

'Classical Modern Irish poems on the Í Cheallaigh', Comhdháil ar Leabhar Ua Maine, Acadamh Ríoga na hÉireann, Márta.

'Metre' agus 'TCD MSS', ceardlann ar fhilíocht na scol, Coláiste na Tríonóide, Baile Átha Cliath, Bealtaine 2017.

Marie-Luise Theuerkauf: 'Two Poems Relating to *Tochmarc Étaíne'*, Roinn na Sean- agus na Meán-Ghaeilge, Coláiste na hOllscoile, Corcaigh, Feabhra 2017.

'The *Dindshenchas* in the Book of Uí Mhaine', Comhdháil ar Leabhar Ua Maine, Acadamh Ríoga na hÉireann, Márta 2017.

'The *Dindshenchas* in Royal Irish Academy MS D ii 2', Comhdháil ar *Dhindshenchas Érenn*, Scoil an Léinn Cheiltigh.

Silva Nurmio: 'Mass and collective nouns in Welsh: fieldwork results', cruinniú bliantúil an ghrúpa taighde Datblygiad yr Iaith/The Development of Welsh, Scoil an Léinn Cheiltigh, 7–8ú Aibreán.

'Mass nouns in Welsh', seimineár bliantúil ar theangeolaíocht na Breatnaise, Gregynog, 20–21ú Iúil.

'Hybrid controllers and agreement in Welsh', ag New Approaches to Brittonic Historical Linguistics, Scoil an Léinn Cheiltigh, 31ú Lúnasa.

'Grammatical number in the typological space: a case study in Welsh', ag an 25ú comhdháil bhliantúil den Surrey Morphology Group, Ollscoil Surrey, 8–9ú Meán Fómhair.

Rannpháirtí Breatnaise ag an gceardlann ar an tionscnamh 'Cross-linguistic research into derivational networks', Danišovce, an tSlóvaic, 27–29ú Aibreán.

Sarah Waidler: 'Stories of Saints: 'Independent' Anecdotes of Irish Saints in Twelfth-Century Manuscripts', seimineár taighde na roinne Anglo-Saxon, Norse and Celtic, Ollscoil Cambridge, Bealtaine 2017.

'Stories Short and Long: Anecdotes about Saints and the Lives of Saints', seimineár taighde na Sean-Ghaeilge agus an Léinn Cheiltigh, Ollscoil Mhá Nuad, Samhain 2017.

Chantal Kobel: '*Bruiden Senbicc uí Ébricc*: a medieval Irish text lost to obscurity', Tionól, Scoil an Léinn Cheiltigh, 17ú Samhain.

CÚRSAÍ A MÚINEADH

Thug Liam Breatnach cúrsa ar théacsanna dlí Sean-Ghaeilge, ag Scoil Samhraidh Scoil an Léinn Cheiltigh, 3-14ú Iúil 2017.

Thug Ruairí Ó hUiginn cúrsa dár teideal 'Mediaeval Lordship and Gaelic Literary Tradition' ag Scoil Samhraidh Scoil an Léinn Cheiltigh, 3-14ú Iúil 2017, agus thug sé máistir-rang do mhic léinn iarchéime in Acadamh Ríoga na hÉireann a eagraíodh faoi choimirce Choiste Náisiúnta Léann na Gaeilge, Márta 2017.

Thug Barry Lewis cúrsa ar an Meán-Bhreatnais, ag Scoil Samhraidh Scoil an Léinn Cheiltigh, 3-14ú Iúil 2017.

Thug Michelle O Riordan cúrsa dár teideal 'History of Christianity in Mediaeval Europe', modúl sa chéad sheimeastar, Scoil na Diagachta, Fealsúnachta agus Ceoil, Ollscoil Chathair Bhaile Átha Cliath.

School Of Celtic Studies (continued)

'*Tóruigheacht Dhiarmada agus Gráinne*: characters, themes and history', Annual Seminar of the Irish Texts Society, University College Cork, 11 November 2017.

Barry Lewis: 'Celtic (Irish)', at the workshop 'Literary Beginnings', Pembroke College, Cambridge, 2 June 2017.

'Churches in Wales before 1100: A Survey of the Written Sources', at the workshop 'Early Christian Churches and Landscapes', Chester, 2 August 2017.

Aoibheann Nic Dhonnchadha: 'An Irish medical treatise on vellum and paper from the 16th century', at 'The Paper Manuscript: A colloquium of the Department of Modern Irish', 26–27 May, 2017, The Boole Library, University College, Cork.

Michelle O Riordan: 'Divisive unities in seventeenth-century Ireland', at the UCC History Seminar, March 2017.

Brian Ó Curnáin: 'Science and Illusion in Minority Sociolinguistics', University of Aberystwyth, 3 May 2017.

'Beartas Úr agus an Taisce Ghaelach', Oireachtas na Gaeilge, Killarney, 4 November 2017.

Mícheál Hoyne: 'Als der Dichtung ihre Farbe gestohlen wurde: der irische Hofdichter in Zeiten der Wirtschaftskrise (ca. 1200 – ca. 1650)', guest lecture at Philipps-Universität in Marburg (January).

'Classical Modern Irish poems on the Í Cheallaigh', RIA Conference on the Book of Uí Mhaine (March).

'Metre' and 'TCD MSS' at TCD Bardic Poetry Workshop (May).

Marie-Luise Theuerkauf: 'Two Poems Relating to *Tochmarc Étaíne*', Department of Early and Medieval Irish, UCC, February 2017.

'The *Dindshenchas* in the Book of Uí Mhaine', at the Book of Uí Mhaine conference, Royal Irish Academy, March 2017.

'The *Dindshenchas* in Royal Irish Academy MS D ii 2', at the '*Dindshenchas Érenn*' Conference, School of Celtic Studies.

Silva Nurmio: 'Mass and collective nouns in Welsh: fieldwork results', at Datblygiad yr Iaith/The Development of Welsh annual meeting, DIAS, 7–8 April.

'Mass nouns in Welsh', at Welsh Linguistics Seminar annual meeting, Gregynog, 20–1 July.

'Hybrid controllers and agreement in Welsh', at New Approaches to Brittonic Historical Linguistics, DIAS, 31 Aug–1 Sept.

'Grammatical number in the typological space: a case study in Welsh', at the 25th anniversary conference of the Surrey Morphology Group, University of Surrey, 8–9 Sept.

Welsh contributor to the workshop on the project 'Cross-linguistic research into derivational networks', Danišovce, Slovakia, 27–29 April.

Sarah Waidler: 'Stories of Saints: 'Independent' Anecdotes of Irish Saints in Twelfth-Century Manuscripts', Anglo-Saxon, Norse and Celtic (ASNC) Research Seminar, University of Cambridge, May 2017.

'Stories Short and Long: Anecdotes about Saints and the Lives of Saints', Early Irish and Celtic Studies Research Seminar, Maynooth University, November 2017.

Chantal Kobel: '*Bruiden Senbicc uí Ébricc*: a medieval Irish text lost to obscurity'. Tionól, DIAS, 17th November.

COURSES TAUGHT

Liam Breatnach gave a course on Old Irish law texts at the School of Celtic Studies Summer School, Dublin, 3-14 July 2017.

Ruairí Ó hUiginn gave a course on Mediaeval Lordship and Gaelic Literary Tradition at the School of Celtic Studies Summer School, Dublin, 3-14 July 2017, and gave at masterclass for postgraduate students in the Royal Irish Academy, March 2017, organised under the aegis of Coiste Náisiúnta Léann na Gaeilge.

Barry Lewis gave a course on Middle Welsh at the School of Celtic Studies Summer School, Dublin, 3-14 July 2017.

Michelle O Riordan: 'History of Christianity in Mediaeval Europe', first semester module in School of Theology, Philosophy and Music, Dublic City University. external co-reader for doctoral thesis in the same department.

Mícheál Hoyne: First Year course 'Ceart na Teanga' in Department of Irish TCD. Taught the course on Early Modern Irish at the DIAS Summer School, 3–14 July 2017.

Marie-Luise Theuerkauf taught a second-year module entitled 'Between Mythology and History' in the autumn of 2017.

Silva Nurmio: 'Introduction to Middle Welsh Language and Literature', Maynooth University.

Sarah Waidler: Second-year undergraduate course 'Ireland Encounters Scandinavia: The Viking Age', Department of Early Irish, Maynooth University.

Chantal Kobel taught a module on palaeography at Maynooth University.

EDITING

Liam Breatnach was co-editor with Damian Mc Manus of *Ériu* volume 67.

Scoil an Léinn Cheiltigh (ar lean)

Thug Mícheál Hoyne an cúrsa chéad bhliana 'Ceart na Teanga' i Roinn na Gaeilge, Coláiste na Tríonóide, Baile Átha Cliath, agus thug sé an cúrsa ar an Nua-Ghaeilge Mhoch, ag Scoil Samhraidh Scoil an Léinn Cheiltigh, 3-14ú Iúil 2017.

Mhúin Marie-Luise Theuerkauf modúl sa dara bliain dár teideal 'Between Mythology and History' sa bhFómhar, 2017.

Thug Silva Nurmio an cúrsa 'Introduction to Middle Welsh Language and Literature', Ollscoil Mhá Nuad.

Thug Sarah Waidler cúrsa sa dara bliain dár teideal 'Ireland Encounters Scandinavia: The Viking Age', Roinn na Sean-Ghaeilge, Ollscoil Mhá Nuad.

Mhúin Chantal Kobel modúl ar an phailéagrafaíocht, Roinn na Sean-Ghaeilge, Ollscoil Mhá Nuad.

EAGARTHÓIREACHT

Bhí Liam Breatnach ina chomheagarthóir le D. Mc Manus ar *Ériu* imleabhar 67.

Bhí Ruairí Ó hUiginn ina chomheagarthóir ar of *Annexing Irish Names to the English Tongue*, by M. Ó Mainnín. The Walsh Lecture 2 (Maigh Nuad, 2017). Chomh maith leis sin, bhí sé ina chomheagarthóir ar na hirisí *Celtica* 29, i bpáirt le Barry Lewis agus *Bliainiris* 11, i bpáirt le Liam Mac Cóil.

Bhí Barry Lewis ina chomheagarthóir ar Celtica 29.

Bhí Aoibheann Nic Dhonnchadha ina comheagarthóir (le Pádraig Ó Macháin) ar *An Linn Bhuí: Iris Ghaeltacht na nDéise* 21 (2017).

Lean Mícheál Hoyne ar obair eagarthóireachta ar imeachtaí Comhdháil Chuimhneacháin Eleanor Knott (Coláiste na Tríonóide, BÁC, 28 Aibreán 2016), imeachtaí na Comhdhála Lae ar na Dánta Grádha (Institiúid Ard-Léinn BÁC, 17 Meán Fómhair 2016) , agus lámhleabhar nua ar fhilíocht na scol.

Thosaigh Marie-Luise Theuerkauf ar obair eagarthóireachta ar imeachtaí na comhdhála ar *Dindshenchas Érenn*, a d'eagraigh sí i 2017.

Chabhraigh Sarah Waidler le coincheap, dearadh, bunachar agus obair eagarthóireachta don suíomh lín : R. Gallagher, J. Key, M. Ní Mhaonaigh, H. Oxenham, S. Waidler agus M. Williams 'Mapping Conversion: A Database of Conversion Episodes in Medieval Insular Hagiography' (2016, tugtha suas chun dáta i 2017, le míorúiltí as beathaí naomh na Breataine Bige), http://www.asnc.cam.ac.uk/mapping/

Lean Chantal Kobel ar obair eagarthóireachta ar imeachtaí Comhdháil Chuimhneacháin Eleanor Knott (Coláiste na Tríonóide, BÁC, 28 Aibreán 2016).

SCRÚDÚCHÁN SEACHTRACH AGUS BALLRAÍOCHT CHOISTÍ

Bhí Liam Breatnach ina bhall de bhord eDIL (Coláiste na Ríona, Béal Feirste, agus Ollscoil Cambridge).

Bhí Ruairí Ó hUiginn mar scrúdaitheoir seachtrach sa Ghaeilge in Ollscoil Uladh, agus ina bhall den choiste scrúdaithe ar dhá thráchtas PhD in Ollscoil Utrecht, an Ísiltír (Meitheamh 2017).

Bhí sé ina bhall de bhord eDIL, ina bhall seachtrach de phainéal ceapacháin léachtóra i gColáiste na hOllscoile, Corcaigh (Bealtaine 2017), ina bhall de Choiste Náisiúnta Léann na Gaeilge, agus ina bhall de Choiste Leabharlainne Acadamh Ríoga na hÉireann,

Bhí sé freisin ina Chathaoirleach ar Choiste na Logainmneacha 2016 (Ceapachán Rialtais), agus ina Chathaoirleach ar Choistí Bainistíochta agus Eagarthóireachta *Foclóir Stairiúil na Nua-Ghaeilge/Historical Dictionary of Modern Irish* (Acadamh Ríoga na hÉireann).

Bhí Barry Lewis ina bhall de Bhord Eagarthóireachta *Proceedings of the Harvard Celtic Colloquium*, agus ina bhall den Bhord Comhairleach don tionscnamh 'Cult of Saints in Wales', agus ina phiarmheasúnóir i gcomhair *Ériu* agus Cló Ollscoile na Breataine Bige. Bhí sé ina scrúdaitheoir seachtrach ar thráchtas PhD i Scoil na nDaonnachtaí agus na hEolaíochta Sóisialta, Ollscoil Deisceart na Breataine Bige Breatnaise (Viva 24 Samhain 2017).

Bhí Aoibheann Nic Dhonnchadha ina ball den Fhochoiste Leabharlainne, Leabharlann de Hindeberg, Coláiste na Rinne, agus de bhord eagarthóireachta CELT.

Bhí Michelle O Riordan ina léitheoir seachtrach ar thráchtas PhD i Scoil na Diagachta, Fealsúnachta agus Ceoil, Ollscoil Chathair Bhaile Átha Cliath, rannpháirtí agus léitheoir do LÉAMH.ORG, agus ina ball de chomhchoiste Foilseachán Ábhar Spioradálta agus *An Timire*.

FOILSEACHÁIN

Liam Breatnach: *Córus Bésgnai. An Old Irish Law Tract on the Church and Society*, Early Irish Law Series 7 (Dublin Institute for Advanced Studies 2017) xii + 346.

School Of Celtic Studies (continued)

Ruairí Ó hUiginn was co-editor of *Annexing Irish Names to the English Tongue*, by M. Ó Mainnín. The Walsh Lecture 2 (Maynooth, 2017), as well as co-editor of the journals, *Celtica* 29 (2017) and *Bliainiris* 11 (2017).

Barry Lewis was co-editor (with Ruairí Ó hUiginn) of Celtica 29 (2017).

Aoibheann Nic Dhonnchadha was joint editor (with Pádraig Ó Macháin) of *An Linn Bhuí: Iris Ghaeltacht na nDéise*, volume 21 of which was published in 2017.

Mícheál Hoyne continued co-editing the proceedings of the Eleanor Knott Memorial Conference (2016), the DIAS Symposium on the Dánta Grádha (2016) and a new Handbook of Irish Bardic Poetry.

Marie-Luise Theuerkauf began editing the proceedings of the 'Dindshenchas Érenn' conference she organised in early 2017.

Sarah Waidler assisted with concept, design, database, final edits and wrote content for the website for: R. Gallagher, J. Key, M. Ní Mhaonaigh, H. Oxenham, S. Waidler and M. Williams 'Mapping Conversion: A Database of Conversion Episodes in Medieval Insular Hagiography' (2016, updated 2017 with miracles added from the Lives of the Welsh saints), http://www.asnc.cam.ac.uk/mapping/

Chantal Kobel continued co-editing the proceedings for the Eleanor Knott Conference held in TCD in 2016.

EXTERNAL EXAMINING AND MEMBERSHIP OF COMMITTEES

Liam Breatnach was a member of the Advisory Committee eDIL (QUB and Cambridge University)

Ruairí Ó hUiginn was External Examiner in Irish at Ulster University, and a member of the examination committee for two PhD theses at Utrecht University, the Netherlands (June 2017).

He was a member of the Advisory Committee eDIL (QUB and Cambridge University), external member of an appointments panel for a lectureship in Irish at UCC (May 2017), served on Coiste Náisiúnta Léann na Gaeilge, and was a member of the Royal Irish Academy's Library Committee. He was Chair of Coiste na Logainmneacha/Place-names Committee (Government Appointment), and Chair of the Management and Editorial Committees of Foclóir Stairiúil na Nua-Ghaeilge/Historical Dictionary of Modern Irish (Royal Irish Academy).

Barry Lewis was a member of the editorial board, *Proceedings of the Harvard Celtic Colloquium*, of the Advisory Board, Cult of saints in Wales project, CAWCS, and an ad hoc peer-reviewer for Ériu and the University of Wales Press. He was also external examiner for a PhD thesis in the School of Humanities and Social Sciences, University of South Wales (viva 24 November 2017).

Aoibheann Nic Dhonnchadha was a members of the Editorial Board of CELT, and of An Fochoiste Leabharlainne, Leabharlann de Hindeberg, Coláiste na Rinne.

Michelle O Riordan was an external co-reader for a doctoral thesis in the School of Theology, Philosophy and Music, Dublic City University, a contributor and reader for LÉAMH.ORG, and a member of the joint committee of Foilseachán Ábhar Spioradálta and An Timire.

PUBLICATIONS BY MEMBERS OF STAFF

Liam Breatnach: *Córus Bésgnai. An Old Irish Law Tract on the Church and Society*, Early Irish Law Series 7 (Dublin Institute for Advanced Studies 2017) xii + 346.

'The *Trefocal Tract*: An Early Middle Text on Poetics', in Gordon Ó Riain (ed.), Dá Dtrian Feasa Fiafraighidh. *Essays on the Irish Grammatical and Metrical Tradition* (Dublin 2017) 1–65.

Ruairí Ó hUiginn: Review of D. Edel, *Inside the Táin*, CMCS 74 (Winter 2017), 107–9.

Review of É. Ó Tuathail, *Scéalta Mhuintir Luinigh, Celtica* 29 (2017), 312–15.

Barry Lewis: 'A Possible Provenance for the Old Cornish Vocabulary', CMCS 73 (Summer 2017) 1–14.

Articles on 'Cywyddwyr', 'Guto'r Glyn', 'Iolo Goch', 'Lewys Glyn Cothi', 'Siôn Cent' and 'Tudur Aled' for Siân Echard et al. (eds), *The Encyclopedia of Medieval Literature in Britain*, 4 vols (Hoboken, NJ, 2017).

Review of Alexander Falileyev, *Llawlyfr Hen Gymraeg* (Caerfyrddin, 2016), in ZCP 64 (2017) 469–72.

Brian Ó Curnáin: Review of Raymond Hickey, *The Sound Structure of Modern Irish*, in *Journal of Celtic Linguistics* 18 (2017) 155–201.

Mícheál Hoyne: 'Why resumption? Resumptive pronouns in prepositional relative clauses [in Irish]' in Erich Poppe, Karin Stüber and Paul Widmer (eds), *Referential properties and their impact on insular Celtic syntax* (Münster 2017), 69–99.

'Early Modern Irish miscellanea: 1. Corrigendum and a note on *comparatio compendiaria*. 2. A detail of vowel-shortening in hiatus in Classical Modern Irish. 3. *Áoi trasgartha*. 4. A rhyming example of nom. pl. *dee* in Classical Modern Irish', *Ériu* 67 (2017).

Scoil an Léinn Cheiltigh (ar lean)

'The *Trefocal Tract*: An Early Middle Text on Poetics', in Gordon Ó Riain (ed.), Dá Dtrian Feasa Fiafraighidh. *Essays on the Irish Grammatical and Metrical Tradition* (Dublin 2017) 1–65.

Ruairí Ó hUiginn: Léirmheas ar D. Edel, *Inside the Táin*, CMCS 74 (Winter 2017), 107–9.

Léirmheas ar É. Ó Tuathail, *Scéalta Mhuintir Luinigh*, *Celtica* 29 (2017), 312–15.

Barry Lewis: 'A Possible Provenance for the Old Cornish Vocabulary', CMCS 73 (Summer 2017) 1–14.

Ailt ar 'Cywyddwyr', 'Guto'r Glyn', 'Iolo Goch', 'Lewys Glyn Cothi', 'Siôn Cent' agus 'Tudur Aled' do Siân Echard et al. (eds), *The Encyclopedia of Medieval Literature in Britain*, 4 vols (Hoboken, NJ, 2017).

Léirmheas ar Alexander Falileyev, *Llawlyfr Hen Gymraeg* (Caerfyrddin, 2016), in ZCP 64 (2017) 469–72.

Brian Ó Curnáin: Léirmheas ar Raymond Hickey, *The Sound Structure of Modern Irish, in Journal of Celtic Linguistics* 18 (2017) 155–201.

Mícheál Hoyne: 'Why resumption? Resumptive pronouns in prepositional relative clauses [in Irish]' in Erich Poppe, Karin Stüber and Paul Widmer (eds), *Referential properties and their impact on insular Celtic syntax* (Münster 2017), 69–99.

'Early Modern Irish miscellanea: 1. Corrigendum and a note on comparatio compendiaria. 2. A detail of vowel-shortening in hiatus in Classical Modern Irish. 3. Áoi trasgartha. 4. A rhyming example of nom. pl. *dee* in Classical Modern Irish', *Ériu* 67 (2017).

Choctaw Nation visit
Cuairt na Náisiún Choctaw

Marie-Luise Theuerkauf: 'Tristan and Early Modern Irish Romance: James Carney's Ur-Tristan Revisited', in John Carey (ed.) *The Matter of Britain in Medieval Ireland: Reassessments*. Irish Texts Society Subsidiary Series 29 (2017)

'A Note of Sect.o.f.n.', *Celtica* 29 (2017) 76–89.

'The Death of Boand and the Recensions of *Dindshenchas Érenn*', *Ériu* 67 (2017)

Silva Nurmio: 'The typology and development of number suppletion in adjectives', *Diachronica* 34(2), 127–174.

'Collective nouns in Welsh: a noun category or a plural allomorph?' *Transactions of the Philological Society* 115 (1), 58–78.

Sarah Waidler: Léirmheas ar J. Carey, K. Murray and C. Ó Dochartaigh (eds), *Sacred Histories: A Festschrift for Máire Herbert,* in *Celtica* 29 (2017) 308–12.

GNÍOMHAÍOCHTAÍ EILE

D'eagraigh Ruairí Ó hUiginn, i bpáirt le Elizabeth Boyle, Ollscoil Mhá Nuad, agus Siobhán Fitzpatrick, Acadamh Ríoga na hÉireann, comhdháil ar Leabhar Ua Maine in Acadamh Ríoga na hÉireann, 2–3ú Márta 2017.

Cuireadh roinnt agallamh faoi pholasaí teanga ar Bhrian Ó Curnáin ar an teilifís, agus scríobh sé alt don *Irish Times* ar an ábhar céanna.

Labhair Mícheál Hoyne ar Raidio na Life faoin Scoil Samhraidh, 2017.

IMEACHTAÍ EILE

Thug an tOllamh M.J. Driscoll as Ollscoil Copenhagen léacht dár teideal 'Iceland's Medieval Manuscripts' ar an Aoine an 28ú Aibreán i Halla Léachta Institiúid Ard-Léinn BÁC.

Ar an 20ú Meitheamh bhí cruinniú suimiúil agus rathúil ag baill Scoil an Léinn Cheiltigh and ionadaithe den Náisiún Choctaw, cruinniú a eagraíodh ar iarratas ón Roinn Gnóthaí Eachtracha agus Trádála.

Marie-Luise Theuerkauf: 'Tristan and Early Modern Irish Romance: James Carney's Ur-Tristan Revisited', in John Carey (ed.) *The Matter of Britain in Medieval Ireland: Reassessments*. Irish Texts Society Subsidiary Series 29 (2017) 'A Note of Sect.o.f.n.', *Celtica* 29 (2017) 76–89.

'The Death of Boand and the Recensions of *Dindshenchas Érenn'*, *Ériu* 67 (2017)

Silva Nurmio: 'The typology and development of number suppletion in adjectives', *Diachronica* 34(2), 127–174.

'Collective nouns in Welsh: a noun category or a plural allomorph?' *Transactions of the Philological Society* 115 (1), 58–78. This article was a runner-up for the Robins Prize of the Philological Society in 2015.

Sarah Waidler: Review of J. Carey, K. Murray and C. Ó Dochartaigh (eds), *Sacred Histories: A Festschrift for Máire Herbert*, in *Celtica* 29 (2017) 308–12.

OTHER ACTIVITIES AND ACHIEVEMENTS

Ruairí Ó hUiginn organised, with Elizabeth Boyle, Maynooth University, and Siobhán Fitzpatrick, RIA, a conference on the Book of Uí Mhaine in the Royal Irish Academy, March 2–3, 2017.

Brian Ó Curnáin gave a number of television interviews on Irish language policy, and published an article in the Irish Times on the same topic.

Mícheál Hoyne spoke on Raidio na Life in Dublin concerning the 2017 DIAS Summer School.

OTHER EVENTS

Professor M.J. Driscoll of Copenhagen University gave a lecture on 'Iceland's Medieval Manuscripts' on Friday the 28th of April 2017 in the DIAS Lecture Hall.

On the 20th of June members of the School of Celtic Studies had an interesting and successful meeting with representatives of the Choctaw Nation, organised at the request of the Department of Foreign Affairs and Trade.

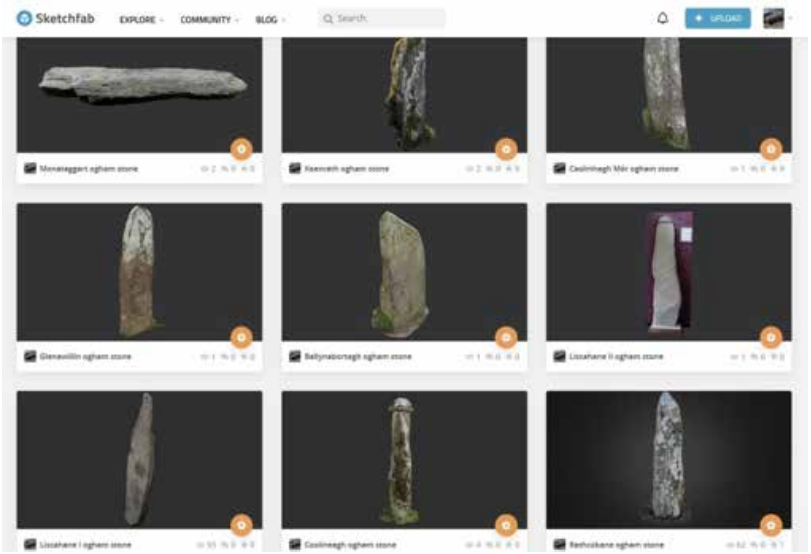
OGHAM IN 3D

Report on the 2017 OGHAM IN 3D project programme

The National Monuments Service, Dept. of Culture, Heritage and the Gaeltacht, continued to support the Ogham in 3D project in 2017 for the final year of a two year project. In addition to continuing the digitisation of ogham stones, the work included assessing the ogham records of the Archaeological Survey of Ireland and updating these where necessary by the Principal Investigator (Nora White). Ogham in 3D field work this year was funded through a research grant awarded to the Principal Investigator from the Cork Historical and Archaeological Society. The grant covered much of the travel, accommodation and subsistence expenses for the visiting and 3d recording of 17 ogham stones in East, North, Mid and West Cork.

The Ogham in 3D project also contributed in 2017 to Irish 101: *An Introduction to Irish Language and Culture* (https://www.futurelearn.com/courses/irish-language), Dublin City University's first MOOC (massive open online course), launched 23rd January 2018.

In October 2017, Nora White was accepted onto the panel of the Heritage in Schools scheme (http://www.heritageinschools.ie/), which will bring our earliest written Irish, the ogham alphabet, ogham stones and the work of the Ogham in 3D project to primary schools around the country.



Scoil an Léinn Cheiltigh (ar lean)

OGHAM IN 3D

Tuairisc ó Nora White: Sa bhliain 2017 bhronn an tSeirbhís Séadchomharthaí Náisiúnta, an Roinn Ealaíon, Oidhreachta agus Gaeltachta tuilleadh tacaíochta airgeadais don tionscadal OGHAM IN 3D, le haghaidh an dara bliain de thionscnamh dhá bhliain. Chomh maith le leanúint ar dhigitiú cloch oghaim, cuid de obair na bliana seo ab ea athbhreithniú a dhéanamh ar thaifid Oghaim Suirbhé Seandálaíochta na hÉireann agus iad a thabhairt suas chun dáta nuair ba ghá.

Maoiníodh obair pháirce i mbliana trí dheontas taighde a fuair an Príomhthaighdeoir ó Chumann Staire agus Seandálaíochta Chorcaí. Chlúdaigh an deontas cuid mhaith de na costaisí taistil agus lóistín a bhain le turasanna go dtí 17 cloch oghaim i gContae Chorcaí.

Chuir an tionscnamh Ogham in 3D ábhar ar fáil do Irish 101: An Introduction to Irish Language and Culture (https://www.futurelearn.com/courses/irish-language), an chéad chúrsa ar líne oscailte ollmhór ó Ollscoil Chathair Bhaile Átha Cliath, a seoladh ar an 23ú Eanáir 2018.

I nDeireadh Fómhair 2017, ceapadh Nora White ar phainéal na scéime Oidhreacht sna Scoileanna (http://www.heritageinschools.ie/), a chuirfidh eolas faoi na clocha oghaim ar fáil i mbunscoileanna ar fud na tíre.

Rinneadh dul chun cinn maidir le Tionscadal Caomhnú Eaglais agus Clocha Oghaim An Chnuic Bhuí, Co. Phort Láirge. D'éirigh leis an tionscadal maoiniú airgid breise a fháil on gComhairle Oidhreachta i 2017, chun measúnú agus suirbhé a dhéanamh ar an suíomh. Le tacú leanúnach ó Adopt a Monument Ireland agus Comhairle Contae Phort Láirge, táthar ag súil le oibreacha daingnithe a thosú ar an eaglais mheánaoiseach seo i 2018.

Rinneadh forbairt i mbliana ar an tionscadal Corca Dhuibhne 3D, agus tá breis mionsamhlacha 3D ar fáil anois ar an suíomh: http://www.corcadhuibhne3d.ie/.

Cuireadh alt eile faoin tionscadal le Isabel Bennett, Nora White agus Gary Devlin faoi bhráid an *Journal of the Kerry Archaeological and Historical Society.*

Foilseacháin

Nora White (2016): 'Ogham stones from a souterrain in Rathkenny, Co. Kerry', *Celtica* 29.

Isabel Bennett, Nora White, & Gary Devlin (2018): 'Helping the stones to speak: the Corca Dhuibhne 3d community project' in the *Journal of the Kerry Archaeological and Historical Society* Series 2, 17.

Páipéir chomhdhála, cur i láthair:

11 Eanáir 2017, Gailearaí Ealaíne Crawford, Corcaigh. Léacht Chumann Staire agus Seandálaíochta Chorcaí: 'The Story of Ogham in Cork'.

5 Aibreán 2017, Institiúid Teicneolaíochta Phort Láirge, léacht Chomhdháil na nDéise: 'Ogham in 3D and Waterford's Ogham stones'.

19 Meán Fómhair 2017, Sraith léachtaí Fómhair, Comhairle Cathrach Chorcaí: 'Signs and Symbols of Urban Cork': 'The Stone Corridor - Cork City's Ogham Collection'.

23 Meán Fómhair 2017, Mainistir Ghleann Stail, Co Luimnigh Comhdháil an American Society of Irish Medievalists: 'Layout, Carving and Epigraphy of Ogham in Ireland'.

21 Samhain 2017, Cumann Staire Tamhlachta: 'Ogham, trees and 3d technology'.

School Of Celtic Studies (continued)

This year also saw much progress on the Knockboy/Seskinan Church and Ogham Stones Conservation Project. The Principal Investigator was successful in a further funding application from the Heritage Council, which covered the cost of a Conservation Assessment and a 3d Photgrammetric Survey of the seven ogham stones and church ruin. This community outreach project was also successful in the Adopt a Monument Ireland Scheme for 2017. With the continued support of Adopt a Monument Ireland and Waterford County Council, it is hoped to begin consolidation works in 2018 to ensure the preservation of this unique, ogham-lintelled, Medieval parish church.

The Corca Dhuibhne 3d community outreach project in Co. Kerry also developed further this year with more 3d models created and added to their website: http://www.corcadhuibhne3d.ie/. Another article on the project, by Isabel Bennett, Nora White and Gary Devlin, was submitted for publication to the Journal of the Kerry Archaeological and Historical Society.

Publications by Principal Investigator

Nora White (2016): 'Ogham stones from a souterrain in Rathkenny, Co. Kerry' in *Celtica* Vol. XXIX (Dublin Institute for Advanced Studies).

Isabel Bennett, Nora White and Gary Devlin (2018): 'Helping the stones to speak: the Corca Dhuibhne 3d community project' in the *Journal of the Kerry Archaeological and Historical Society* Series 2, Vol. 17.

Lectures/Presentations by Principal Investigator

11th Jan 2017, Crawford Art Gallery, Cork city. Cork Historical and Archaeological Society lecture: 'The Story of Ogham in Cork'.

5 Apr 2017, Waterford Institute of technology, Comhdháil na nDeise lecture: 'Ogham in 3D and Waterford's Ogham stones'.

19th Sept 2017, Cork City Council Autumn Lecture Series 'Signs and Symbols of Urban Cork': 'The Stone Corridor - Cork City's Ogham Collection'.

23rd Sept 2017, Glenstal Abbey, Co. Limerick, paper at the Conference of the American Society of Irish Medievalists: 'Layout, Carving and Epigraphy of Ogham in Ireland'.

21st Nov 2017, Tallaght Historical Society lecture: 'Ogham, trees and 3d technology'.

Medieval parish church of Seskinan, Knockboy, Co. Waterford. 3D image of one of six ogham stones re-used in the construction of the church. This ogham lintel was obscured by ivy since at least the 1940s.

Eaglais Seisceannáin Co. Phort Láirge. Íomha 3D de chlocha Oghaim a cuireadh ag obair i mballa Eaglaise. Bhí an lindéar Oghaim seo ceilte ag eidhneán ó 1940.


Corona

School of Cosmic Physics

Scoil na Fisice Cosmaí

Scoil na Fisice Cosmaí

Réalteolaíocht agus Réaltfhisic

Sprioc 1: Eolas agus léargais nua a fháil trí bhuntaighde agus scoláireacht ardleibhéil

Gan amhras b'í eachtra na bliana an brath de chumasc neodrónréalta i dtonnta mtharraingteacha agus an brath ina dhiaidh sin d'astú leictreamaighnéadach. Ar ámharaí an tsaoil, tharla an eachtra i réigiún den spéir agus ag am nuair a bhí sé inrochtana do theileascóip gáma-gha ardfhuinnimh H.E.S.S. a bhreathnaigh air mar thargaid deise laistigh de chúig uair a' chloig ach nach bhfaca dada. Mar sin féin, cuir sé seo ar chumas H.E.S.S. teorainneacha uasta a chur ar an astú gáma-gha ardfhuinnimh ón gcumasc agus d'fhág go rabhamar inár mbaill d'fhoireann domhanda de bhreis agus 3500 eolaí páirteach san fheachtas il-tonnfhad. Mar a tharla sé, b'é an cuibhreannas H.E.S.S., a bhfuil DIAS ina bhall de, an chéad réadlann ar talamh a bhí ábalta an fhoinse a bhreathnú de bharr an tsuímh geografaigh atá aige i ndeisceart na hAfraice.

Lean J. Mackey dá chomhar le V.V. Gvaramadze, N. Langer, T. Haworth agus comhghleacaithe i dtogra ina rinne siad an chéad bhrath ar bholgán gaoithe réaltaí thar réalta B aonair príomh-sheicheamh (Gvaramadze et al., 2017, MNRAS,466,1857). Bhí an samhaltú ríomhaireachta ar an réaltnéal séidte ag an ngaoth agus a shínithe breathnaitheacha ríthábhachtach chun an maíomh seo a dhéanamh. Tá sé seo suntasach toisc go bhfuil cinntí breathnaitheach ar láidreacht na ngaoth réaltacha ó réalta B an-éiginnte agus go bhfuil tuartha teoiriciúla an-deacair. Mar thoradh ar an mbolgán gaoithe a bhrath go díreach agus a mhéid agus a fhuinneamh a thomhas tugtar srian láidir agus neamhspleách ar fhuinneamh na gaoithe.

Nascann an obair seo go breá le roinn torthaí suntasacha a fuair Felix Aharonian agus a chomhghleacaithe. Ag féachaint ar dháileadh gathach astú gáma-gha ardfhuinnimh thar roinnt gaolmhaireachtaí óga OB tá fianaise faighte acu a léiríonn luasghéarú suntasach gathanna cosmacha i gcumaisc réaltaí den chineál sin. Tugann sé seo le tuiscint go m'fhéidur nach mór leasú a dhéanamh ar an tuairim a nglactar léi i gcoitinne, go ndéantar formhór na ngathanna cosmacha réaltracha breathnaithe a luasghéarú in iarsmaí ollnóva aonair agus go mb'fhéidir gurb iad gaotha réaltacha láidre ó oll-réaltaí i mbraislí óga an phríomhfhoinse, go háirithe mórthimpeall ar fhuinnimh PeV. Ina theannta sin, tá sé ag teacht go maith lena bhfuair Grúpa Foirmithe Réaltaí DIAS amach cúpla bliain ó shin gur féidir le réalta óga ar mhais íseal, fiú, a bheith ina bhfoinsí do ghathanna cosmacha ísealfuinnimh (Ainsworth et al. 2014).

Rinne J. Mackey forbairt ar a obair roimhe seo ag déanamh staidéir ar scealla réaltaí mórthimpeall ar ollfhathaigh dhearga, lean ríomh cathain is féidir le scealla dá leithéid foirmiú réaltaí a óstáil (Szecsi et al., 2018, á chur i gcló, leagan réamhchló ar fáil ag arXiv:1711.04007). Rinne sé imscrúdú ar éabhlóid réaltaí an-ollmhór i Réaltbhraislí Cruinneogacha ar mhiotalacht íseal, agus fuair sé amach gur féidir le réaltaí na 2 glúine foirmiú i ndlúthscealla mórthimpeall ar ollfhathaigh. Ina thennta sin, is féidir le patrúin fliúirse ceimice na réalt a fhoirmítear ar an mbealach seo bheith ag meaitseáil leo siúd atá ag an daonraí ilréaltacha a fhaightear i Réaltbhraislí Cruinneogacha. B'fhéidir go gcuideoidh an obair seo go mór le réiteach ar an bhfaidhb atá ann le fada maidir leis an gcaoi inar foirmíodh réaltbhraislí cruinneogacha.

DIAS Scholar wins 2017 Earnshaw Medal
Bhuaigh Scoláire ó Institiúid Árd- Léinn an Bonn Earnshaw

School Of
Cosmic Physics

Astronomy and Astrophysics

Goal 1: Discovery of new knowledge and insights through advanced fundamental research and scholarship

The science event of the year was undoubtedly the detection of a neutron star merger in gravitational waves and the subsequent detection of electromagnetic emission. Fortunately, the event occurred in a region of the sky and at a time when it was accessible to the H.E.S.S. high-energy gamma-ray telescopes which observed it as a target of opportunity within five hours but saw nothing. Nevertheless, this enabled H.E.S.S. to place upper limits on the high-energy gamma-ray emission from the merger and made us part of the world-wide team of over 3500 scientists involved in the multi-wavelength campaign. The H.E.S.S. consortium, of which DIAS is a member, was in fact the first ground-based observatory to be able to observe the source due to its favourable geographical location in Southern Africa.

J. Mackey continued his collaboration with V.V. Gvaramadze, N. Langer, T. Haworth and co-workers in a project where they made the first detection of a stellar-wind bubble around a single main-sequence B star (Gvaramadze et al., 2017, MNRAS,466,1857).

The computer modelling of the wind-blown nebula and its observational signatures was key to making this claim. This is significant because observational determinations of the strength of stellar winds from B stars are very uncertain and theoretical predictions are very difficult. Detecting the wind bubble directly and measuring its size and energy gives a powerful and independent constraint on the wind strength.

This work links nicely to some remarkable results obtained by Felix Aharonian and his coworkers. Looking at the radial distribution of high-energy gamma-ray emission around several young OB associations they have found evidence pointing to significant cosmic ray acceleration in such star clusters.

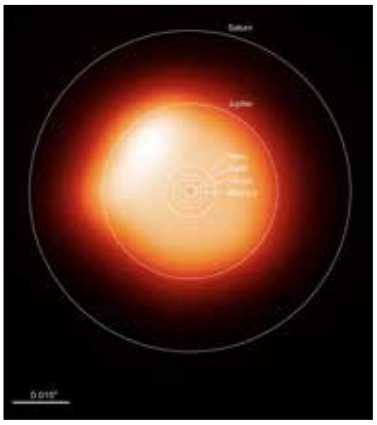
This suggests that the generally accepted idea, that the bulk of the observed Galactic cosmic rays are accelerated in individual supernova remnants, may need revision and that strong stellar winds from massive stars in young clusters may in fact be the dominant source, especially around PeV energies. Moreover, it also dovetails with the discovery by the DIAS Star Formation Group a few years ago that even low mass young stars may be sources of low energy cosmic rays (Ainsworth et al. 2014).

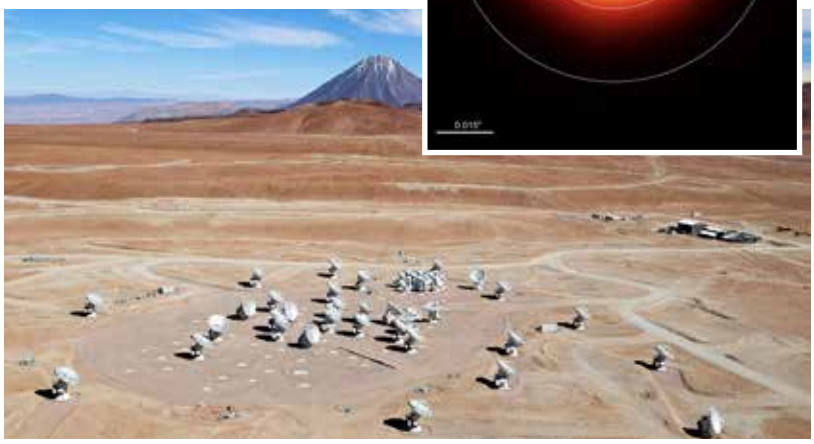
J. Mackey built on his previous work studying circumstellar shells around red supergiants, to calculate when such shells can host star formation (Szecsi et al., 2018, in press, preprint at arXiv:1711.04007).

He investigated evolution of very massive stars in low-metallicity Globular Clusters, and found that 2nd generation stars can form in dense shells around supergiants. Furthermore, the chemical abundance patterns of the stars formed in this way can match those of the multiple stellar populations found in Globular Clusters. This work may prove to be a significant contribution to the long-standing problem of how Globular Clusters formed.

Internationally acclaimed photo of the "Star Betelgeuse" (taken by Dr. O' Gorman, DIAS)

Pictiúr le moladh idirnáisiúnta don 'Star Betelgeuse'(Dr O Gorman,DIAS)





Hess Radio Telescope Array in Namibia (DIAS Lead Partner)

Hess Radio Telescope Array in Namibia (i bpáirt le DIAS)

Scoil na Fisice Cosmaí (ar lean)

Bhrath an Grúpa Foirmithe Réaltaí réalta óg ag minicíochtaí raidió an-íseal den chéad uair ag baint úsáide as LOFAR (Colm Coghlan et al. 2017). Ní hamháin gur oscail sé seo "fuinneog" nua ar bhreith réaltach ach freisin fuair siad amach gur chas an speictream raidió thart, a chuir ar a gcumas neart ghaoth ianaithe an réalta a thomhas. Rud nua eile ab ea an brath d'fhuilleamh diosca eipeasóideach i réad réaltach óg ardmhaise ag Alessio Caratti o Garatti et al a foisíodh san iris *Nature Physics*. Tacaíonn an tátal seo leis an tuairim chonspóideach gur féidir le réaltaí ollmhóra foirmiú ar bhealach atá an-chosúil le réaltaí ar mhais íseal. Mar chríoch, rinne Eamon O'Gorman et al. breathnuithe ALMA a réitigh atmaisféar an ollfhathaigh dhearg Betelgeuse.

Rinne Spásteileascóp James Webb (JWST) beagnach 100 lá de thástáil chrióigineach ag Lárionad Spáis Johnson i Houston, Texas. D'éirigh go maith leis na tástálacha go léir lena n-áirítear na cinn sin a bhain leis an Ionstraim Mheán-Infreadhearg (MIRI) a bhfuil baint ag DIAS léi. Tá moill curtha ar lainseáil JWST, áfach, ó Dheireadh Fómhair 2018, ar dtús go dtí Earrach 2019 agus anois go 2020. Tá an clár ama comhaontaithe JWST, ina bhfuil DIAS páirteach go mór, aontaithe. Gheobhaidh Patrick Kavanagh agus Martin Topinka oiliúint chun obair ar an láthair sa Seomra Rialaithe san Institiúid Eolaíochta Spásteileascóip i dtaca le hoibríochtaí JWST. Bhaul Cuibhreannas um Ionstraim Mheán-Infreadhearg (MIRI) JWST i mBaile Átha Cliath i Meán Fómhair chun athbhreithniú a dhéanamh ar an dul chun cinn.

I ndiaidh dianstocaireachta ag Tom Ray agus Paul Callanan (Coláiste na hOllscoil, Corcaigh) thar ceann phobal réalteolaíochta na hÉireann, agus le tacaíocht ríthábhachtach ó Joe Hogan ón tionscal, d'fhógair Rialtas na hÉireann go raibh sé ar intinn aige dul isteach sa Réadlann Eorpach sa Leathsféar Theas. Leis an gcinneadh seo, baintear amach aidhm a bhí ag Scoil na Fisice Cosmaí le fada agus tugtar aghaidh ar bhearna thromchúiseach i struchtúr taighde na hÉireann atá ann ó cuireadh deireadh leis an gcomhaontú La Palma idir DIAS agus an Ríocht Aontaithe. Meastar go dtarlóidh aontachas foirmiúil ag druidim le deireadh na bliana 2018 agus ceadóidh sé rochtain ag réalteolaithe na hÉireann ar chuid de na háiseanna réalteolaíochta ar talamh is fearr ar domhan.

I ndiaidh athbhreithnithe ar na 3 misean atá á meas do shliotán M4 ESA (lainseáil thart ar 2025), chinn an coiste comhairleach ábhartha ARIEL a mholadh, misean a fhiosróidh na hatmaisféir atá ag cúpla céad eiseapláinéad. Comh-Phríomhthaighdeoir is ea Tom Ray agus tá sé ar intinn go gcuirfidh DIAS scoiltirí léis agus scagairí ar fáil agus go bhforbróimid na bogearraí do thorthaí brathadóra i gcomhar le JPL. Cuireadh an cinneadh deiridh ón gCoiste Polasaí Eolaíochta (SPC) maidir le ARIEL a ghlacadh ar athló go dtí Márta 2018 ach tá sé sin dearbhaithe anois.

Ó dheireadh mhí Iúil 2017, tá stáisiún LOFAR na hÉireann i mBiorra, Contae Uibh Fhailí comhtháite leis an gcuid eile de líonra LOFAR na hEorpach atá lárnaithe san Isiltír. Tá tús curtha le gnáthbhreathnuithe lena n-áirítear roinnt príomhchlár eolaíochta a bhfuil baint ag an tír seo leo. Bhí comhalta iardhochtúireachta LOFAR (an Dr Simon Purser, a bhí in Ollscoil Leeds roimhe), mac léinn PhD (Anton Freeney-Johanssen) agus eolaí tacaíochta LOFAR (an Dr Oisin Creaner, a bhí in Institiúid Teicneolaíochta Bhaile Átha Cliath roimhe seo) lonnaithe in DIAS faoi dheireadh na bliana 2017.

Tá comhaontú sroichte i bprionsabal leis an Institiúid Taighde sa Réaltfhisic agus Pláinéadeolaíocht (IRAP) atá lonnaithe i Toulouse le rochtain a cheadú do DIAS ar shonraí ón Suirbhé Oidhreachta SPIRou (SLS). Sa suirbhé seo, a éileoidh cúpla céad ar Theileascóp Haváí Cheanada agus na Fraince (CFHT) thar ceithre bliana déanfar tomhas ar na réimsí maighnéadacha agus a dtimpeallachtaí. Ina theannta sin, ligfear dúinn brath a dhéanamh ar phleainéid de mhais an Domhain mórthimpeall ar réaltaí de chineál M (na réaltaí is coitianta sa Réaltra). Cuideoidh ranníocaíocht airgeadais DIAS leis an maoiniú do chiar minicíochta léasair (LFC) le cur isteach i SPIRou. Mar thoradh air seo beidh cruinneas luais níos airde fós (codán de mhéadar in aghaidh an soicind) ná mar a samhlaíodh ar dtús i sonraíochtaí na hionstraime.

Mar ullmhúchán do dhul ar scoir Luke Drury i Meitheamh na bliana 2018 bhunaigh an Bord Stiúrtha coiste cuardaigh agus roghnúcháin chun cuardach a dhéanamh d'iarrthóir ag obair i i réimse na n-eiseapláinéad agus/nó na fisice gréine agus fógraíodh an post i Meitheamh 2017. Is ionann é seo agus scoilt ón mbéim láidir a bhíodh ann ar an réaltfhisic ardfhuinnimh agus tá sé ceaptha le naisc a fhorbairt le hobair na Rannóige Geofisice chomh maith le forbairt a dhéanamh ar an gcnuasach láidir de shaothar atá déanta ag an ngrúpa foirmiú réalta. Rinneadh an gearrliostú agus bhí agallaimh ann faoi dheireadh na bliana.

The Star Formation Group detected a young star at very low radio frequencies for the first time using LOFAR (Colm Coghlan et al. 2017). Not only did this open up a new "window" on stellar birth but they also found the radio spectrum turned over, allowing them to measure the strength of the star's ionised wind. Another first was the detection of episodic disk accretion in a high-mass young stellar object by Alessio Caratti o Garatti et al which appeared in Nature Physics. This finding supports the controversial idea that massive stars may form in a very similar way to their low mass brethren. Finally Eamon O'Gorman et al. carried out ALMA observations that resolved the atmosphere of the red giant Betelgeuse.

The James Webb Space Telescope (JWST) completed almost 100 days of cryogenic testing at the Johnson Space Center in Houston, Texas. All tests went well including those involving the Mid-Infrared Instrument (MIRI) in which DIAS is involved. The launch of JWST has however been delayed from October 2018, first to Spring 2019 and now to 2020. The JWST guaranteed time program, in which DIAS is substantially involved, has been agreed upon. Patrick Kavanagh and Martin Topinka will receive training to work on site at the Space Telescope Science Institute Control Room in connection with JWST operations. The JWST Mid-Infrared Instrument (MIRI) Consortium met in Dublin in September to review progress.

Following intensive lobbying by Tom Ray and Paul Callanan (UCC) on behalf of the Irish astronomical community, and with crucial support from industry in the person of Joe Hogan, the Irish Government announced its intention to join the European Southern Observatory. This fulfils a long-standing ambition of the School of Cosmic Physics and addresses a serious deficit in Ireland's research infrastructure which has existed since the ending of the La Palma agreement between DIAS and the UK. Formal accession is expected to take place towards the end of 2018 and will allow access by Irish astronomers to some of the best ground-based astronomical facilities in the world.

Following a review of the 3 missions being considered for ESA's M4 slot (launch around 2025), the relevant advisory committee decided to recommend ARIEL, a mission that will explore the atmospheres of several hundred exoplanets. Tom Ray is Co-Principal Investigator and the intention is that DIAS will contribute beam splitters and filters as well as develop the detector readout software in association with JPL. The final decision on adopting ARIEL from the Science Policy Committee (SPC) was deferred until March 2018 but is now confirmed.

Since the end of July 2017, the Irish LOFAR station at Birr, County Offaly, has been integrated into the rest of the European LOFAR network centred in the Netherlands. Routine observations have begun including a number of key science programs with Irish involvement. A LOFAR postdoctoral fellow (Dr Simon Purser, formerly of the University of Leeds), PhD student (Anton Freeney-Johanssen) and LOFAR support scientist (Dr Oisin Creaner, formerly Dublin Institute of Technology) were in place in DIAS by the end of 2017.

An agreement has been reached in principle with the Toulouse based Research Institute in Astrophysics and Planetology (IRAP) to allow DIAS access to data from the SPIRou Legacy Survey (SLS). This survey, requiring several hundred nights on the Canada France Hawaii Telescope (CFHT) over four years will measure the magnetic fields of young stars and their environments. In addition, it will also allow us to detect Earth-massed planets around M-type stars (the most common stars in the Milky Way). The DIAS financial contribution will help fund a laser frequency comb (LFC) for insertion into SPIRou. This will result in even higher velocity precision (a fraction of a metre per second) than originally envisaged in the instrument's specifications.

In preparation for the retirement of Luke Drury in June 2018 the Governing Board set up a search and selection committee to look for a candidate working in the areas of exoplanets and/or solar physics and advertised the position in June 2017. This represents a break from the previous strong emphasis on high-energy astrophysics and is intended to build links to the work of the Geophysics Section as well as to build on the strong track record of the star-formation group. The shortlisting and interviews were completed by the end of the year.

Felix Aharonian was honoured by election to membership of the Academia Europaea.

Luke Drury was appointed by ALLEA, the All European Academies group, on the nomination of the Royal Irish Academy, to be a member of its working group looking at the issue of Trust in Science.

Goal 2: Internationalisation of our research and collaborations

Through Jonathan Mackey's IRC funded project on the "Evolution and Explosion of Massive Stars" we invited a number of international speakers and participants to the workshops held in DIAS (25-26 May 2017) and Armagh Observatory and Planetarium (10-11 August 2017).

Invited review speakers:

- Sylvia Ekström (Geneva) reviewing the evolution of massive stars and challenges we face in understanding this;

Scoil na Fisice Cosmaí (ar lean)

Sprioc 2: Idirnáisiúnú ar ár dtaighde agus comhair

Trí thogra Jonathan Mackey, maoinithe ag IRC, ar "Éabhlóid agus Pléascadh Réaltaí Ollmhóra" thugamar cuireadh do roinnt cainteoirí agus rannpháirtithe idirnáisiúnta teacht chuig na ceardlanna a eagraíodh in DIAS (25-26 Bealtaine 2017) agus Réadlann agus Pláinéadlann Ard Mhacha (10-11 Lúnasa 2017).

Cainteoirí athbhreithnithe ar tugadh cuireadh dóibh:

- Sylvia Ekström (An Ghinéiv) ag caint faoi éabhlóid réaltaí ollmhóra agus dúshláin atá romhainn chun é seo a thuiscint;
- Ben Davies (Learpholl) ag caint faoinár dtuiscint ar réalta Ollfhathaigh Dhearga;
- Robert Izzard (Cambridge) ag plé córas réaltaí déacha;
- Debora Sijacki (Cambridge) ag caint faoin gcaoi ina bhfuil réaltaí ollmhóra agus ollnóvaí tábhachtach do shamhaltaí cosmeolaíochta d'fhoirmiú réaltraí;
- Tom Ray (DIAS) ag caint linn faoi na deiseanna ag teacht le Spásteileascóp James Webb an bhliain seo chugainn; agus
- Takashi Moria (NOA sa tSeapáin) ag caint faoin na naisc atá á dhéanamh againn idir ollnóvaí agus a réaltaí sinsir.

Do chruinniú Ard Mhacha thugamar cuireadh dóibh seo a leanas:

- Nir Shaviv (Iosrael) ag caint faoi réaltaí ollmhóra in aice le teorainn na seasmhachta;
- Dan Whalen (Portsmouth) ag caint faoi éabhlóid na réaltaí sárollmhóra agus a dtitim go dúphoill;
- Nancy Elias Rosa (an Iodáil) ag caint faoi ollnóvaí a idrighníomaíonn le dlúthghás mórthimpeall, agus rudaí a bhfuil cuma ollnóva orthu ach nach ollnóvaí iad; agus
- Allard Jan van Marle (Páras) ag caint faoi cháithníní neamtheirmeacha (gathanna cosmacha) agus a luasghéarú i gcroití.

Eagraíodh ceardlann i DIAS ón 7-8 Meán Fomhair ar Bhrathadóirí Ionduchtaithe Cinéiteach Micreathoinne (MKIDanna) agus tugadh cuireadh do na hoibrithe idirnáisiúnta is mó sa réimse bheith i láthair. Fuair an cheardlann tacaíocht ó SFI trí dheontas chuig Tom Ray. I measc na gcaointeoirí bhí ann:

Peter Day (Caltech) maidir le hIonduchtú Cinéiteach Neamhlíneach,

Jochem Baselmans (SRON) maidir le MKIDanna ar Réadlanna Spáis Todhchaí,

Erik Shirkoff (Chicago) maidir le Speictreascópacht Ar-Shlis ag baint úsáid as MKIDanna,

Omid Noroozian (National Radio Astronomy) maidir le Comhaireamh-Fótóin le hAthshonadóirí KID,

Philip Mauskopf (Arizona State University) maidir le Leictreonaic Léamh don Chéad Ghlúin Eile,

Brad Johnson (Columbia), maidir le MIDanna Ilchróacha do Staidéar Polarúcháin CMB,

Simon Doyle (Cardiff) maidir le MUSCAT – Ceamara Contanaim bunaithe ar KID,

Kieran O'Brien (Durham) maidir le KIDSpec; an Speictreagraf Induchtaithe Cinéiteach do réalteolaíocht optach/IR,

Pieter de Visser (SRON) maidir le Dinimic Cuasacháithníní

Jason Austermann (NIST) maidir le Brathadóirí Ionduchtaithe Ciníteach Ilsrathacha Ti TiN do Polaraiméadracht Toinn Fo-Mhiliméadair agus Miliméadair,

Jonas Zmuidzinas (Caltech/JPL) maidir le KIDanna: Dúshláin agus Deiseanna.

IMTHARRAINGT

Lean DIAS dá chomhoibriú le hInstitiúid Réalteolaíochta Max (MPIA) i Heidelberg agus an Institut de Planétologie et d'Astrophysique (IPAG) i Grenoble maidir leis an trasnamhéadar neas-infreadhearg don chéad ghlúin eile GRAVITY lonnaithe ag an suíomh Paranal de chuid ESO. D'áirigh sé seo cuidiú ó bhaill foirne DIAS sa choimisiúnú agus luathbhreathnuithe ar réaltaí óga chun inniúlachtaí na hionstraime a ríomh.

RadioNet

Rinneadh ball den líonra ardleibhéil pobail AE RadioNet de DIAS in éineacht le Coláiste na Tríonóide, Baile Átha Cliath, mar aitheantas ar a rannpháirtíocht i dtogra LOFAR na hÉireann. Cuireann RadioNet polasaí Eorpach um aerspás oscailte chun cinn don réalteolaíocht raidó agus faigheann sé tacaíocht trí mhaoiniú H2020. Go háirithe, le maoiniú RadioNet, cuideoidh DIAS le bogearraí a fhorbairt d'fhoirmiú léasacha LOFAR optamacha nuair a bhíonn spriocanna réalteolaíochta ag airdí éagsúla.

School of Cosmic Physics (continued)

- Ben Davies (Liverpool) reviewing our understanding of Red Supergiant stars;
- Robert Izzard (Cambridge) discussing binary star systems;
- Debora Sijacki (Cambridge) reviewing how massive stars and supernovae are important for cosmological simulations of galaxy formation;
- Tom Ray (DIAS) telling us about the opportunities coming with the James Webb Space Telescope next year; and
- Takashi Moria (NOA Japan) reviewing the connections we are beginning to make between supernovae with their progenitor stars.

For the Armagh meeting we invited:

- Nir Shaviv (Israel) discussing very massive stars near the limit of stability;
- Dan Whalen (Portsmouth) reviewing the evolution of supermassive stars and their collapse to black holes;
- Nancy Elias Rosa (Italy) reviewing supernovae that interact with surrounding dense gas, and things that look like supernovae but aren't; and
- Allard Jan van Marle (Paris) discussing non-thermal particles (cosmic rays) and their acceleration in shocks.

A workshop on Microwave Kinetic Inductance Detectors (MKIDs) was held in DIAS from 7th-8th September to which all the leading international workers in the field were invited. The workshop was supported by SFI through a grant to Tom Ray. Speakers included:

Peter Day (Caltech) on Non-linear Kinetic Inductance,

Jochem Baselmans (SRON) on MKIDs on Future Space Observatories,

Erik Shirkoff (Chicago) on On-chip Spectroscopy using MKIDs,

Omid Noroozian (National Radio Astronomy Observatory) on Photon-Counting with KID Resonators,

Philip Mauskopf (Arizona State University) on Next Generation Readout Electronics,

Brad Johnson (Columbia) on Multi-Chroic MKIDs for CMB Polarization Studies,

Simon Doyle (Cardiff) on MUSCAT – a KID-based Continuum Camera,

Jonas Zmuidzinas (Caltech/ JPL) on KIDs: Challenges and Opportunities,

Kieran O'Brien (Durham) on KIDSpec; the Kinetic Inductance Detector SPEctrograph for optical/ IR astronomy,

Pieter de Visser (SRON) on Quasiparticle Dynamics

Jason Austermann (NIST) on Ti TiN Multilayer Kinetic Inductance Detectors for Sub Millimeter and Millimeter Wave Polarimetry,

Jonas Zmuidzinas (Caltech) on KIDS: Challenges and Opportunities

GRAVITY

DIAS continued its collaboration with the Max Planck Institute of Astronomy (MPIA) in Heidelberg and the Institut de Planétologie et d'Astrophysique (IPAG) in Grenoble on the next generation near-infrared interferometer GRAVITY based at the ESO Paranal site. This included assistance by DIAS personnel in the commissioning and early observations of young stars to determine the instruments capabilities.

RadioNet

DIAS became a member of the EU advanced community network RadioNet, along with Trinity College Dublin, in recognition of its involvement in the Irish LOFAR project. RadioNet promotes a European open sky policy for radio astronomy and is supported through H2020 funding. In particular DIAS, with RadioNet funding, will help develop software for optimal LOFAR beam forming when astronomical targets are at varying altitude.

ARIEL

We will be responsible for all beam splitters and filters on the Atmospheric Remote-sensing Infrared Exoplanet Large-survey (ARIEL). ARIEL has been developed by a consortium of European institutes based in the UK, France, Italy, the Netherlands, the Czech Republic, Poland, Belgium, Austria, Denmark, Portugal as well as Ireland. This, of course, will strengthen our international links but in particular we will be working particularly closely with the University of Prague and the Rutherford Appleton Laboratories in Oxford, as collectively we are responsible for the so-called common optics.

Felix Aharonian continued as a member of the Scientific Advisory Committee of the APPEC Astroparticle Physics European Consortium; as chair of the International Advisory Council of the UCCUB Institute of Sciences of the Cosmos, University of Barcelona; and as a member of the Science Advisory Committee of AHEAD, Integrated Activities for the High-Energy Astrophysics Domain of Horizon 2020.

Luke Drury continued as a member of the Science Steering Committee of PRACE, the European Partnership for Advanced Computing; as a member of the Euro-ICSU management group

Scoil na Fisice Cosmaí (ar lean)

ARIEL

Beimid freagrach as na scoiltirí léis agus scagairí ar fad ar an Suirbhé Mór Eiseaplainéid Cianbhrath Infreadhearg (ARIEL). Tá ARIEL forbartha ag cuibhreannas d'institúidí Eorpacha sa Ríocht Aontaithe, an Fhrainc, an Iodáil, an Ísiltír, Poblacht na Seice, an Pholainn, an Bheilg, an Ostair, an Danmhairg, an Phortaingéil agus Éire. Ar ndóigh, láidreoidh sé seo ár naisc idirnáisiúnta ach beimid ag obair go dlúth le hOllscoil Phrág agus Saotharlanna Rutherford Appleton in Oxford go háirithe, toisc go bhfuilimid le chéile freagrach as na hoptaic choitianta, mar a thugtar orthu.

Lean Felix Aharonian de bheith ina bhall de Choiste Comhairleach Eolaíochta an chuibhreannais APPEC (Astroparticle Physics European Consortium); mar chathaoir ar an gComhairle Chomhairleach d'Institiúid Eolaíochtaí an Chosmais UCCUB, Ollscoil Barcelona; agus mar bhall de Choiste Comhairleach Eolaíochta AHEAD, Gníomhaíochtaí Comhtháite don Réimse Réaltfhisice Ardfhuinnimh de Horizon 2020.

Lean Luke Drury de bheith ina bhall den Choiste Stiúrtha Eolaíochta do PRACE (European Partnership for Advanced Computing); mar bhall den ghrúpa bainistíochta Euro-ICSU d'Acadaimh Eorpacha; agus mar Chathaoirleach ar Lárionad Barr Horizon 2020 E-CAM.

Lean Tom Ray mar Chathaoirleach ar Choiste Eolaíochtaí Fisice, Ceimice agus Matamaitice de chuid Acadamh Ríoga na hÉireann; mar bhall de Bhord Réadlann agus Plainéadlann Ard Mhacha agus mar bhall den Choiste Stiúrtha e-MERLIN sa Ríocht Aontaithe;

Sprioc 3: Ceannairí taighde a mhealladh, a choinneáil agus a chothú

Thosaigh beirt mhac léinn PhD tograí in 2017 sa réaltfhisic ríomhaireachta ag obair le J. Mackey: Sam Green agus Maria Moutzouri. Tá siad ag obair ar ionsamhlúcháin de réaltnéalta tiomáinte ag gaoth agus scaird timpeall ar réaltaí ollmhóra, agus ag déanamh breathnuithe bréige í na sonraí ionsamhlúcháin is féidir a chur i gcomparáid le breathnuithe. Tá S. Green ag díriú ar astú X-gha agus infreadhearg ó bholgáin gaoithe, agus tá M. Moutzouri ag déanamh imscrúdaithe ar astú raidió neamtheirmeach agus próisis ghaolmhara luasghéaraithe cáithníní.

Nascann an taighde seo obair J. Mackey ar réaltaí ollmhóra le láidreachtaí reatha taighde DIAS sa réaltfhisic: déanfar tuarthaí d'astú infreadhearg a thástáil ag Spásteileascóp James Webb (grúpa an Ollaimh Ray), agus tá ríomhanna d'astú X-gha agus luasghéarú cáithníní nasctha le réaltfhisic ardfhuinnimh, áit a bhfuil an-saineolas ag DIAS le is na hOllaimh Drury agus Aharonian. Déanfar tuarthaí d'astú raidió neamhtheirmeacha a thástáil le breathnuithe leis an líonra LOFAR de theileascóp raidió lena n-áirítear an t-eagar nuabhunaithe I-LOFAR i mBiorra, a chuideoidh le tairbhe iomlán a bhaint as an gcuid thábhachtach seo d'infreastruchtúr réalteolaíochta na hÉireann.

Sa bhliain 2017 freisin seoladh an Grúpa nua um Brathadóirí Ionduchtaithe Cinéiteach Micreathoinne (MKIDanna) le tacaíocht ó SFI.

Mheall sé seo saineolaithe idirnáisiúnta chomh maith le saineolaithe náisiúnta: an Dr Gerhard Ulbricht (a bhí in Ollscoil California, Santa Barbara roimhe), an Dr Ivan Colantoni (a bhí in Ollscoil na Róimhe roimhe), agus Colm Bracken (a bhí sa Choláiste na hOllscoil, BÁC). Ina theannta sin ceapadh beirt mhac léinn PhD chuig an ngrúpa in 2017: Eoin Baldwin (Coláiste na hOllscoile, Corcaigh) agus Mario De Lucia (Ollscoil Naples). Tá an togra seo á rith i gcomhar leis an Lárionad CRANN i gColáiste na Tríonóide BÁC agus Ollscoil Mhá Nuad. Tógfar na brathadóirí réalteolaíochtaí nuae seo i CRANN agus déanfar iad a thástáil inár saotharlann crióiginice in DIAS ag teochtaí faoi bhun 100 mK. Ag druidim le deireadh 2017, ordaíodh an córas crióiginice riachtanach ó Entropy i Munich mar thoradh ar thairiscint Eorpach. Measfar go ndéanfar é a sheachadadh i Meitheamh na bliana 2018.

Le maoiniú ón gComhairle Eorpach um Thaighde (Deontas Ardleibhéil dár teideal *Ejection Accretion Structures in YSOs (EASY)*), Líon Tom Ray dhá phost nua iardhochtúireachta in 2017: an Dr Alessio Caratti o Garatti le hobair ar GRAVITY agus an Dr Simon Purser (a bhíodh in Ollscoil Leeds tráth) le staidéar a dhéanamh ar réaltaí óga ag baint úsáide as LOFAR agus an Eagar An-Mhór Janksy (JVLA). Ceapadh dhá scoláireacht ghaolmhara freisin: Anton Feeney-Johansson (iarchéimí TCD) agus Camille Stock (MSc sa Réaltfhisic, St Andrews). Chláraigh an bheirt mhac léinn i Scoil na Fisice i gColáiste na Tríonóide, BÁC.

of European Academies; and as Chair of the Horizon 2020 Centre of Excellence E-CAM.

Tom Ray continued as Chair of the Royal Irish Academy's Physical Chemical and Mathematical Sciences Committee; a member of the Armagh Observatory and Planetarium Board and as a member of the e-MERLIN Steering Committee in the UK.

Goal 3: Attracting, retaining and cultivating research leaders

Two PhD students started projects in 2017 in computational astrophysics working with J. Mackey: Sam Green and Maria Moutzouri. They are working on simulations of wind- and jet-driven nebulae around massive stars, and making synthetic observations from the simulation data that can be compared with observations. S. Green is focussing on X-ray and infrared emission from wind bubbles, whereas M. Moutzouri is investigating non-thermal radio emission and related particle-acceleration processes.

This research links the massive stars work of J. Mackey with current strengths of DIAS astrophysics research: predictions for infrared emission will be tested by the upcoming James Webb Space Telescope (Prof. Ray's group), and calculations for X-ray emission and particle acceleration link into high-energy astrophysics where DIAS is very well represented by Profs. Drury and Aharonian. Predictions for non-thermal radio emission will be tested by observations with the LOFAR network of radio telescopes including the newly installed I-LOFAR array in Birr, helping to make full use of this key piece of Irish astronomy infrastructure.

2017 also saw the launch of the new SFI-supported Microwave Kinetic Inductance Detector (MKIDs) Group. This attracted international as well as national talent: Dr Gerhard Ulbricht (formerly of the University of California, Santa Barbara), Dr Ivan Colantoni (formerly of the University of Rome), and Colm Bracken (formerly University College Dublin). In addition two PhD students were appointed in 2017 to the group: Eoin Baldwin (University College Cork) and Mario De Lucia (University of Naples). This project is in collaboration with the CRANN Centre in Trinity College Dublin and the Maynooth University. These new astronomical detectors will be manufactured in CRANN and tested in our cryogenics lab in DIAS at temperatures below 100 mK. Towards the end of 2017, the required cryogenic system was ordered from Entropy in Munich following on from a European tender. It is expected to be delivered in June 2018.

With funding from the European Research Council (Advanced Grant entitled *Ejection Accretion Structures in YSOs (EASY)),* Tom Ray filled two new postdoctoral positions in 2017: Dr Alessio Caratti o Garatti to work on GRAVITY and Dr Simon Purser (formerly of the University of Leeds) to study young stars using LOFAR and the Janksy Very Large Array (JVLA). Two associated studentships were also appointed: Anton Feeney-Johansson (TCD graduate) and Camille Stock (MSc in Astrophysics, St Andrews). Both students registered in the School of Physics in TCD.

Donna Rodgers-Lee was awarded a PhD by Trinity College Dublin for her research into disks around young stars. This included both observational work based on data from the Herschel Space Observatory and computational simulations on the growth of the magneto-rotational instability in disks. She subsequently obtained a postdoctoral position at the University of Hertfordshire.

Carlo Romoli was awarded a PhD from Dublin City University for his work on processing data from the H.E.S.S. large CT5 telescope to investigate flaring activity in AGNs and other sources. He was subsequently offered a postdoctoral position in MPK Heidelberg.

Goal 4: Strengthening the disciplines nationally

Massive Stars meetings:

In 2016 a number of new Astronomy and Astrophysics research groups were set up in Ireland to study massive stars, their evolution, and explosion. J. Mackey obtained funding from the IRC New Foundations programme to run a series of meetings linking these researchers to their Northern Irish colleagues at research centres for the evolution (Armagh Observatory and Planetarium, AOP) and explosion (Queens University Belfast) of stars. These meetings aimed to enable knowledge exchange, build collaborations, help group leaders to develop complementary themes of research, and strengthen North-South collaboration in education and public engagement projects. A website was set up at https://www.dias.ie/eestars/ with information relating to the meetings.

The first meeting was held at the Dublin Institute for Advanced Studies on the 25th and 26th of May 2017, with 44 participants from Ireland and overseas. It was great to see the breadth of research being undertaken in the country, and the potential for collaboration and growth. The second meeting took place on the 10th and 11th of August 2017 at AOP, and focused on getting input from international colleagues about the current state of the art and upcoming developments in research, with 33 participants. We discussed both the technical aspects of research and how to build the research base and

Scoil na Fisice Cosmaí (ar lean)

Bhain Donna Rodgers-Lee céim PhD amach ó Choláiste na Tríonóide BÁC as a taighde ar dhioscaí timpeall ar réaltaí óga. D'áirigh sé seo obair bhreathnaithe bunaithe ar shonraí ó Réadlann Spáis Herschel agus ionsamhlúchán ríomhaireachta ar fhás éagobhsaíochta maighéada-rothlaí i ndioscaí. Ina dhiaidh sin fuair sí post iardhochtúireachta in Ollscoil Hertfordshire.

Bhain Carlo Romoli céim PhD amach ó Ollscoil Chathair Bhaile Átha Cliath as a chuid oibre ar shonraí a phróiseáil ó theileascóp mór CT5 H.E.S.S. chun staidéar a dhéanamh ar ghníomhaíocht bladhmtha in AGNann agus foinsí eile. Ina dhiaidh sin tairgeadh post iardhochtúireachta dó in MPK Heidelberg.

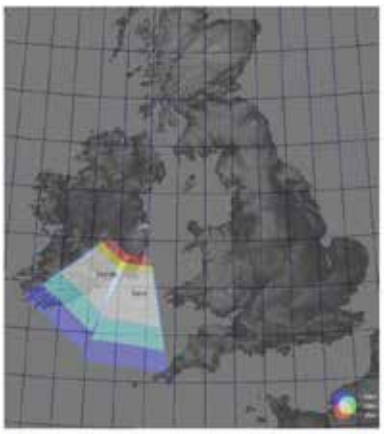
Sprioc 4: Na disciplíní a láidriú go náisiúnta

Cruinnithe faoi Réaltaí Ollmhóra:

Sa bhliain bunaíodh roinnt grúpaí taighde nua Réalteolaíochta agus Réaltfhisice in Éirinn chun staidéar a dhéanamh ar réaltaí ollmhóra, a n-éabhlóid, agus pléascadh. Fuair J. Mackey maoiniú ón gclár IRC New Foundations le sraith de chruinnithe a eagrú chun na taighdeoirí seo a nascadh lena gcomhghleacaithe i dTuaisceart Éireann ag lárionaid taighde ar éabhlóid réalatí (Réadlann agus Pleainéadlann Ard Mhacha, AOP) agus pléascadh réaltaí (Ollscoil na Banríona Béal Feirste). Bhí sé d'aidhm ag na cruinnithe seo cuidiú le malartú eolais, comhair a fhorbairt, cuidiú le ceannairí grúpaí téamaí taighde comhlántacha a fhorbairt, agus comhar Thuaidh-Theas a neartú i dtograí oideachais agus rannpháirtíochta poiblí. Bunaíodh suíomh gréasáin ag https://www.dias.ie/eestars/le heolas maidir leis na cruinnithe.

Tionóladh an chéad chruinniú ag Institiúid Ard-Léinn Bhaile Átha Cliath an 25 agus 26 Bealtaine 2017, le 44 rannpháirtí ó Éirinn agus thar lear. B'iontach an rud léargas a fháil ar leithead an taighde atá ar siúl sa tír, agus an cumas le comhar agus fás. Bhí an dara cruinniú ann an 10 agus 11 Lúnasa 2017 ag AOP, agus díríodh ar ionchur a fháil o chomhghleacaithe idirnáisiúnta faoi fhorbairtí reatha agus faoi fhorbairtí atá ag teacht sa taighde, le 33 rannpháirtí. Phléamar gnéithe teicniúla an taighde agus freisin conas an bonn taighde a fhorbairt agus ár bpobal a fhás. Bhí an-rath ar na cruinnithe i dtéarmaí aird a dhíriú ar an méid taighde atá á dhéanamh i mbeagnach gach ollscoil ar oileán na hÉireann, agus i dtéarmaí daoine a thabhairt le chéile chun caidreamh a bhunú lena chéile. Bhí dhá ócáid for-rochtana poiblí againn freisin a bhí nasctha leis na cruinnithe: Oíche Oscailte amháin i Réadlann Dhún Sinche (cainteoir: Erkki Kankare ó Ollscoil na Banríona Béal Feirste), agus Oíche Oscoilte amháin ag AOP (cainteoir: Erin Higgins ó AOP).

I ndiaidh na gcruinnithe seo, bhí J. Mackey i gceannas ar thogra le roinnt comhghleacaithe go ndéanfaí óstáil ar an gcéad chruinniú eile ar Réaltaí Ollmhóra de chuid an Aontais Idirnáisiúnta Réalteolaíochta (IAU) in 2020. Tá sé seo roghnaithe ag an gCoimisiún um Réaltaí Ollmhóra mar an togra is fearr a cuireadh isteach agus mar sin, cé go bhfuil roinnt cinntí ardleibhéil le glacadh, tá dóchas againn go dtiocfaidh an cruinniú idirnáisiúnta cáiliúil seo go hÉirinn 2020.



Ablation layer coverage by the Dunsink Observatory.

faoi láthair is iad na teileascóip sa Réadlann Eorpach sa Leathsféar Theas (ESO) sa tSile na cinn is fearr ar domhan chun staidéar a dhéanamh ar réaltaí ollmhóra, mar sin má thógtar an chomhdháil ardiomrá seo chun na hÉireann cuideofar le feasacht ar ESO a ardú agus le haird a dhíriú ar na torthaí ardchaighdeáin a tháirgeann pobal taighde na hEireann ag baint úsáide as áiseanna ESO.

For-rochtain/Oideachas:

Táimid an-bhuíoch dár gcomhpháirtí réalteolaíochta amaitéarach, Cumann Réalteolaíochta na hÉireann (IAS), as a dtacaíocht leanúnach le hoicheanta oscailte poiblí agus imeachtaí eile a reachtáiltear ag Réadlann Dhún Sinche DIAS. Lena gcuid eolais faoi spéir na hóiche agus a ndíograis chun é seo a chur in iúl don phobal, trí chainteanna/plé agus trí theileascóip a bhunú ag ab Réadlann, cuirtear go mór le saibhreas thaithí na gcuairteoirí ar ár n-imeachtaí.

grow our community. The meetings were a great success in terms of highlighting how much research is being done in almost every university on the island of Ireland, and in bringing people together to engage with each other. We also held two public outreach events associated with the meetings: one Open Night at Dunsink Observatory (speaker: Erkki Kankare of Queen's University Belfast), and one Open Night at AOP (speaker: Erin Higgins of AOP).

Following these meetings, J. Mackey led a proposal with some colleagues to host the next Massive Stars Meeting of the International Astronomical Union (IAU) in 2020. This has been selected by the Massive Stars Commission as the best submitted proposal and so, while there are still a number of higher-level decisions to be taken, we are hopeful that this prestigious international meeting will now come to Ireland in 2020. The telescopes of the European Southern Observatory (ESO) in Chile are currently the best in the world for studying massive stars, so bringing this high-profile international conference to Ireland will help to raise awareness of ESO and showcase the high-quality results that the Irish research community produces using ESO facilities.

Outreach/Education:

We are very grateful to our amateur astronomy partner, the Irish Astronomical Society (IAS), for their ongoing support with public open nights and other events held at DIAS Dunsink Observatory. Their knowledge of the night sky and enthusiasm to communicate this to the public, both through talks/discussions and through setting up telescopes at the Observatory, greatly enriches the experience of visitors for our events.

As in previous years, DIAS Dunsink Observatory enthusiastically contributed to National Science Week (12-19th November) with events for schools and the general public. The outreach events were supported by a small grant from SFI to bring in Seanie Morris for two days of rocket workshops, public talks, and Big Bear Planetariums for a day of astronomy learning for schools using a mobile planetarium.

Transition Year Science Week at DIAS Dunsink Observatory:

We started TY Science Week at DIAS Dunsink Observatory at the end of February 2017, based around the SFI-funded meteor cameras and radio antenna installed on the Observatory grounds. These detectors automatically scan the sky and record shooting stars, or meteors, when they come into the field of view, and are detecting over 2200 meteors per year (plus many birds, bats, airplanes and satellites). We had a group of 5 students from Castleknock and the wider Dublin and Kildare areas, and plan to increase this to 15-20 for 2018. A very positive development is that some of the DIAS PhD students are beginning to take on leadership roles in developing the teaching and learning materials for the week, notably Sam Green.

The Transition Year students learn how day-to-day scientific research is done by finding out about meteors and looking at what is recorded by the detectors. Analysing these data, the students use the maths and physics they have learned in school to determine where meteors entered Earth's atmosphere, how fast they were travelling, and where they came from in the Solar System. At the end of the week they present a poster with their findings to the staff of the DIAS Astrophysics Section. There is a strong citizen science emphasis through the NEMETODE network of meteor observers in Ireland and the UK, and through contributions from members of our partner amateur astronomy societies.

The radio antenna is tuned to the GRAVES transmitter in France, and detects radio waves reflected from the meteors back to Earth. Equipment for the cameras and antenna can be purchased off-the-shelf and is used by members of the NEMETODE network of meteor observers in the UK and Ireland. It is developing into a successful professional-amateur collaboration, that has the potential for useful scientific advances as well as education and engagement activities. We also plan to link in to the established meteor observing programme at Armagh Observatory.

Citizen Science Engagement:

We have received very positive feedback about our Citizen Science approach to public engagement and education at DIAS Dunsink Observatory. This adds a different dimension to the TY Week experience, and also allows us to engage better with our amateur astronomy partners, the Irish Astronomical Society (IAS) and the Irish Federation of Astronomical Societies (IFAS).

On the 21st of October 2017 we hosted the NEMETODE Meteor workshop at DIAS Dunsink Observatory, with talks by William Stewart, Michael O'Connell, Mike Foylan, Sam Green, Jonathan Mackey about meteor observing, citizen science, and education. This was followed by hands-on tutorials led by William Stewart and Michael O'Connell on analysis methods, techniques and introduction to software.

Scoil na Fisice Cosmaí (ar lean)

Mar a tharla i mblianta roimhe, ghlac Réadlann Dhún Sinche DIAS páirt go fonnmhar sa tSeachtain Náisiúnta Eolaíochta (12-19 Samhain) le himeachtaí do scoileanna agus don phobal i gcoitinne. Fuair na imeachtaí for-rochtana tacaíocht le deontas beag ó SFI chun Seanie Morris a thabhairt isteach do dhá lá de cheardlanna roicéid agus cainteanna poiblí, agus Pláinéadlanna Big Bear do lá foghlama réalteolaíochta do scoileanna le plainéadlann shoghluaiste.

School of Cosmic Physics Statutory Public Lecture 2017. Prof. Giovanna Timelti, UCL

Léacht Reachtuil Scoil na Fisice Cosmaí 2017. An tOll.Giovanna Timelti, UCL

Seachtain Eolaíochta na hIdirbhliana ag Réadlann Dhún Sinche DIAS:

Thosaíomar Seachtain Eolaíochta na hIdirbhliana ag Réadlann Dhún Sinche DIAS ag deireahd Feabhra 2017, bunaithe ar na ceamaraí dreigí agus aeróg raidió maoinithe ag SFI atá suiteáilte ar thailte na Réadlainne. Déanann na brathadóirí seo scanadh go huathoibríoch ar an spéir agus taifeadadh ar réaltaí reatha, nó dreigí, nuair a thagann siad isteach sa raon amhairc, agus tá siad ag brath breis agus 2200 dreige in aghaidh na bliana (móide neart éan, ialtóg, eitleán agus saitilítí). Bhí grúpa 5 scoláire againn ó Chaisleán Cnucha agus áiteanna eile i mBaile Átha Cliath agus Cill Dara, agus méadófar air seo go 15-20 do 2018. Forbairt an-dearfach is ea go bhfuil roinnt de na mic léinn PhD in DIAS ag glacadh le róil ceannaireachta san fhorbairt ar na hábhair teagaisc agus foghlama don tseachtain, go háirithe Sam Green.

Foghlaimíonn scoláirí na hIdirbhliana faoin gcaoi ina ndéantar taighde eolaíochta ó lá go lá trína fháil amach faoi dhreigí agus féachaint cad a thaifeadann na brathadóirí. Ag déanamh anailíse ar na sonraí seo, baineann na scoláirí úsáid as an mata agus an fhisic atá foghlama acu ar scoil lena ríomh cén áit a tháining dreigí isteach in atmaisféar an Domhain, cé chomh tapa is a bhí siad ag taisteal, agus cad as a dtáinig siad sa Ghrianchóras. Ag deireadh na seachtaine cuireann siad póstaer i láthair lena dtorthaí chuig foireann Rannóg Réaltfhisice DIAS. Tá béim láidir ar eolaíocht an phobail trí líonra NEMETODE na mbreathnóirí dreigí in Éirinn agus sa Ríocht Aontaithe, agus trí ionchur ó bhaill dár gcumainn réalteolaíochta amaitéaracha.

Tá an aeróg raidió tiúnáilte leis an tarchuradóir GRAVES sa Fhrainc, agus brathann sé tonnta raidió frithchaite ó na dreigí ar ais chuig an Domhan. Is féidir trealamh do na ceamaraí agus don aeróg a cheannach ón seilf agus baineann baill líonra NEMETODE na mbreathnóirí dreigí in Éirinn agus sa Ríocht Aontaithe úsáid as. Tá sé seo ag forbairt mar chomhoibriú rathúil gairmeach-amaitéarach, a bhfuil sé de chumas aige dul chun cinn eolaíochta úsáideach a dhéanamh chomh maith le gníomhaíochtaí oideachais agus rannpháirtíochta.

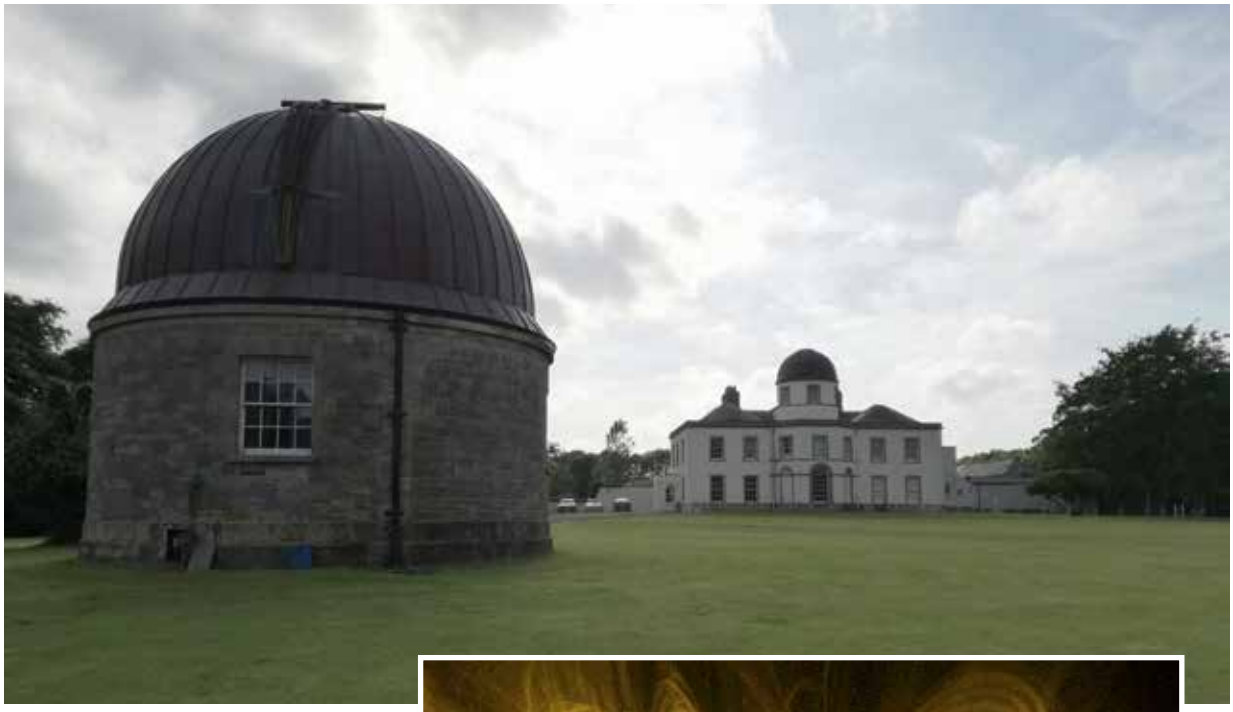
Tá sé ar intinn againn freisin nascadh isteach sa chlár breathnaithe dreigí atá bunaithe cheana ag Réadlann Ard Mhacha.

Rannpháirtíocht le hEolaíocht an Phobail:

Tá aiseolas an-dearfach faighte againn faoinár gcur chuige um Eolaíocht an Phobail i dtaca le rannpháirtíocht an phobail agus oideachas ag Réadlann Dhún Sinche DIAS. Cuireann sé seo gné éagsúil le heispéireas Sheachtain na hIdirbhliana, agus ligeann sé dúinn freisin caidramh níos fearr a bheith againn lenár gcomhpháirtithe réalteolaíochta amaitéaracha, Cumann Réalteolaíochta na hÉireann (IAS) agus Cónaidhm Éireannach na gCumann Réalteolaíochta (IFAS).

An 21 Deireadh Fómhair 2017 rinneamar óstáil ar an gceardlann dreigí NEMETODE ag Réadlann Dhún Sinche DIAS, le cainteanna ó William Stewart, Michael O'Connell, Mike Foylan, Sam Green, Jonathan Mackey maidir le breathnú dreigí, eolaíocht an phobail, agus oideachas.

School of Cosmic Physics (continued)



Solarfest
Solarfest

Sun's Corona
Corona na gréine

We plan that this will become an annual focal event for the community, helping to build up the national meteor observing coverage so that we have a network that is observing meteors over the whole of Ireland and surrounding seas.

Solarfest was run again on the 16-18th of June and for once we had great weather with blazing sunshine, allowing for lots of solar observing. The free event consisted of a public open evening on Friday 16th June, an all-day public event on Saturday 17th June and an afternoon family event on Sunday 18th June. DIAS hosted a Media Studies intern from DCU, Hannah Dunne, who helped to promote and report on the event for her work placement as part of her course at DCU. The day was very well attended and there was considerable focus on the solar eclipse in August 2017. Many participants were planning to travel to America to witness the eclipse.

International Dark Matter Day on 31 October was marked by a joint presentation from Luke Drury and Werner Nahm (School of Theoretical Physics) discussing the mystery of dark matter and the evidence for its existence.

Unfortunately due to status red weather warning the annual Hamilton Walk had to be cancelled in 2017.

Scoil na Fisice Cosmaí (ar lean)

Ina dhiaidh sin bhí ranganna teagaisc praiticiúla faoi stiúr William Stewart agus Michael O'Connell maidir le modhanna anailíse, teicnící agus bunchúrsa bogearraí. Tá sé ar intinn againn go mbeadh sé seo ina mhórimeacht bliantúil don phobal, acg cuidiú le forbairt a dhéanamh ar an gclúdach náisiúnta de bhreathnuithe dreigí sa chaoi is go mbeidh líonra againn atá ag breathnú dreigí os cionn iomlán na hÉireann agus na farraigí mórthimpeall.

Ritheadh an fhéile Solarfest arís an 16-18 Meitheamh agus an uair seo bhí aimsir iontach againn le scaladh gréine, a cheadaigh neart breathnuithe gréine. San imeacht seo, a bhí saor in aisce, bhí oíche oscailte phoiblí Dé hAoine 16 Meitheamh, ócáid lae phoiblí Dé Sathairn 17 Meitheamh agus ócáid teaghlaigh san iarnóin, Dé Domhnaigh 18 Meitheamh. Rinne DIAS óstáil ar intéirneach Staidéar na Meán ó OCBÁC, Hannah Dunne, a chuidigh linn an ócáid a chur chun cimm agus tuairisciú air dá socrúchán oibre mar chuid dá cúrsa ag OCBÁC. Bhí tinreamh maith ann ar an lá agus bhí fócas suntasach ar urú na gréine i Lúnasa 2017. Bhí neart rannpháirtithe ag beartú taisteal go Meiriceá chun an t-urú a fheiceáil.

Rinneadh Lá Idirnáisiúnta Damhna Dorcha an 31 Deireadh Fómhair a mharcáil le comh-chur i láthair uaim féim agus Werner Nahm (Scoil na Fisice Teoiriciúla) ag caint faoi rúndiamhar an damhna dorcha agus an fhianaise go bhfuil sé ann.

Ar an drochuair, mar thoradh ar fholáireamh aimsire le stádas dearg, bhí orainn an Siúlóid Hamilton bhliantúil a chur ar ceal in 2017.

Appendix A - seminars given in the Astronomy and Astrophysics Section in 2017

25 January, Dr Carlos del Burgo, INAOE Mexico, Characterization of stars (with and without planets) from absolute flux spectrophotometry obtained with the Hubble Space Telescope

15 February, Dr Nate Bastian, Liverpool University, The Puzzle of Multiple Populations in Globular Clusters

1 March, Dr Luca Matra, University of Cambridge, Exocometary gas in debris disks

27 March, Donna Rodgers-Lee, Presentation as part of her PhD defence, Protoplanetary Disc Evolution

29 March, Dr Ernst de Mooij, Dublin City University, Characterising Alien Worlds: studying the atmospheres of exoplanets

10 April, Dr. Kim-Vy Tran, Texas A&M University, From the FOURGE to the FIRE: Tracking Galaxy Evolution Over 12 Billion Years

2 June, Dr Graeme Wong, University of Western Sydney, The Mopra Southern Galactic Plane CO survey

8 June, Dr Federico Urban, NICPB Tallinn, Searching for UHE Galactic Protons, and all things UHECRs, with Telescope Array

26 July, Dr Ray Jayawardhana, University of York, Characterizing Exoplanets from the Ground and from Space

14 August, Dr. Alexandra Kozyreva, Tel Aviv University, Diversity of pair-instability supernovae

20 September, Dr John Regan, Dublin City University, Formation and Growth of the first Black Holes

3 October, Prof Roberto Maiolino, University of Cambridge, The multiple routes of galaxy transformation

25 October, Dr. Giovanni Rosotti, University of Cambridge, Studying planet formation in the era of ALMA

15 November, Dr. Morgan Fraser, University College Dublin, The golden age of transient astronomy

5 December, Prof. Andrea Ferrara, Scuola Normale Superiore, The Interstellar Medium of High Redshift Galaxies

Appendix B Presentations in 2017 (* denotes significant one)

Felix Aharonian

*27 Feb "Nature's Extreme Accelerators", Rosenblum Lecture, Hebrew University; Jerusalem.

28 Feb "Scientific Objectives of high energy gamma-ray astronomy", Keynote talk at the workshop "High Energy Astrophysics", Racah Institute of Physics, Jerusalem.

10 May "Probing the Origin of Cosmic Rays", Seminar at the Excellence Center "Prizma", University of Mainz.

14 Jun "Gamma Ray Physics in Space", Lecture at the International School of Space Science", L'Aquila, Italy.

*15 Sep "Concluding Remarks", Summary Talk at the 6th International Meeting "High Energy Phenomena in Relativistic Outflows"; Moscow.

*3 Nov. "Exploring the Nonthermal Universe with High Energy Gamma Rays", talk on occasion of election as Honorary Member of the Ioffe Physical-Technical Institute; St. Petersburg.

Luke Drury

2 Mar - Festrede for the 70th birthday of Heinz Voelk, MPIK Heidelberg, "The Chemistry of Cosmic Rays."

10 Mar - Seminar in University of Newcastle "Cosmic Ray Acceleration and Magnetic Field Amplification in Shocks".

* 29 May - 2 June, Ginzburg centenary conference, Lebedev Institute, Moscow. Invited talk "The Origin of Cosmic Rays; 50 years on"

* 12-19 July ICRC Busan s. Korea, invited plenary talk "Galactic Cosmic Rays - Theory and Interpretation"

15-17 Sep, German Irish Conference, Limerick, "German as a language of science and German speakers in DIAS".

* 16-18 October, GRAPPA@5 meeting Amsterdam, invited talk "Open questions in particle acceleration theory"

* Dec 3-8, TEXAS conference, Cape Town, invited plenary talk "Physics of Cosmic Rays".

Tom Ray

14 March South African Astronomical Observatory (SAAO) Cape Town, invited talk "Preparing Your Observing Program for the James Webb Space Telescope"

16 March Square Kilometer Array Headquarters in South Africa, invited talk on "The James Webb Space Telescope"

30 June European Week of Astronomy and Space Science (EWASS) in Prague, invited talk on "Jets and Outflows: A JWST Perspective"

22 September Celebrating Professor David Williams' (University College London) 80th Birthday, Royal Astronomical Society in London, "Chemistry of the Interstellar Medium Using JWST"

15 December Celebrating Professor Sam Falle's (University of Leeds) 70th Birthday, Outflows from Young Stars: What Have We Learnt in the Last Decade"

Andrew Taylor

*12-19 July ICRC Busan s. Korea, invited plenary talk "UHECR sources and transport"

Scoil na Fisice Cosmaí (ar lean)

Astronomy and Astrophysics Bibliography of Publications 2017

1. Publications in peer-reviewed journals

These papers are in the ADS private library http://adsabs.harvard.edu/cgi-bin/nph-abs_connect?library&libname=Ref2017&libid=4794ca7845.

1. H.E.S.S. Collaboration, et al.: First limits on the very-high energy gamma-ray afterglow emission of a fast radio burst. H.E.S.S. observations of FRB 150418 *Astronomy and Astrophysics* (2017) **597** A115.
2. Drury, Luke O.'C. & Strong, Andrew W.: Power requirements for cosmic ray propagation models involving diffusive reacceleration; estimates and implications for the damping of interstellar turbulence *Astronomy and Astrophysics* (2017) **597** A117.
3. Coughlan, Colm P., et al.: A LOFAR Detection of the Low-mass Young Star T Tau at 149 MHz *The Astrophysical Journal* (2017) **834** 206.
4. Huang, Z., et al.: Explosive events in active region observed by IRIS and SST/CRISP *Monthly Notices of the Royal Astronomical Society* (2017) **464** 1753-1761.
5. Lau, J. C., et al.: Interstellar gas towards the TeV °-ray sources HESS J1640-465 and HESS J1641-463 *Monthly Notices of the Royal Astronomical Society* (2017) **464** 3757-3774.
6. Taylor, Andrew M. & Giacinti, Gwenael: Cosmic rays in a galactic breeze *Physical Review* D (2017) **95** 023001.
7. H.E.S.S. Collaboration, et al.: Characterizing the °-ray long-term variability of PKS 2155-304 with H.E.S.S. and Fermi-LAT *Astronomy and Astrophysics* (2017) **598** A39.
8. Romoli, C., Taylor, A.M., & Aharonian, F.: Cut-off characterisation of energy spectra of bright fermi sources: Current instrument limits and future possibilities *Astroparticle Physics* (2017) **88** 38-45.
9. Vig, S., et al.: Dust and gas environment of the young embedded cluster IRAS 18511+0146 *Astronomy and Astrophysics* (2017) **599** A38.
10. O'Gorman, E., Harper, G. M., & Vlemmings, W.: Detection of thermal radio emission from a single coronal giant *Astronomy and Astrophysics* (2017) **599** A47.
11. Antoniucci, S., et al.: X-shooter spectroscopy of young stellar objects. VI. H I line decrements *Astronomy and Astrophysics* (2017) **599** A105.
12. Aharonian, F. A., et al.: Hitomi Constraints on the 3.5 keV Line in the Perseus Galaxy Cluster *The Astrophysical Journal* (2017) **837** L15.
13. Contreras Peña, C., et al.: A population of eruptive variable protostars in *VVVMonthly Notices of the Royal Astronomical Society* (2017) **465** 3011-3038.
14. Contreras Peña, C., et al.: Infrared spectroscopy of eruptive variable protostars from VVV *Monthly Notices of the Royal Astronomical Society* (2017) **465** 3039-3100.
15. Caratti o Garatti, A., et al.: Disk-mediated accretion burst in a high-mass young stellar object *Nature Physics* (2017) **13** 276-279.
16. Srivastava, Abhishek Kumar, et al.: High-frequency torsional Alfvén waves as an energy source for coronal heating *Scientific Reports* (2017) **7** 43147.
17. Alcalá, J. M., et al.: X-shooter spectroscopy of young stellar objects in Lupus. Accretion properties of class II and transitional objects *Astronomy and Astrophysics* (2017) **600** A20.
18. H.E.S.S. Collaboration, et al.: Gamma-ray blazar spectra with H.E.S.S. II mono analysis: The case of PKS 2155-304 and PG 1553+113 *Astronomy and Astrophysics* (2017) **600** A89.
19. Yang, Rui-zhi & Aharonian, Felix: Diffuse °-ray emission near the young massive cluster NGC 3603 *Astronomy and Astrophysics* (2017) **600** A107.
20. Moscadelli, L., et al.: Extended CH_3OH maser flare excited by a bursting massive YSO *Astronomy and Astrophysics* (2017) **600** L8.
21. Pinilla, P., et al.: AMulti-wavelength Analysis of Dust and Gas in the SR 24S Transition Disk *The Astrophysical Journal* (2017) **839** 99.

School of Cosmic Physics (continued)

22. Gvaramadze, V. V., et al.: IRAS 18153-1651: an H II region with a possible wind bubble blown by a young main-sequence B star *Monthly Notices of the Royal Astronomical Society* (2017) **466** 1857-1867.

23. Pérez-Sánchez, A. F., et al.: Deep into the Water Fountains. The case of IRAS 18043-2116 *Astronomy and Astrophysics* (2017) **601** A68.

24. Acero, F., et al.: Prospects for Cherenkov Telescope Array Observations of the Young Supernova Remnant RX J1713.7-3946 *The Astrophysical Journal* (2017) **840** 74.

25. Aharonian, F. A., Barkov, M. V., & Khangulyan, D.: Scenarios for Ultrafast Gamma-Ray Variability in AGN *The Astrophysical Journal* (2017) **841** 61.

26. Bayo, Amelia, et al.: First Millimeter Detection of the Disk around a Young, Isolated, Planetary-mass Object *The Astrophysical Journal* (2017) **841** L11.

27. Bozzetto, Luke M., et al.: Statistical Analysis of Supernova Remnants in the LargeMagellanic Cloud **The Astrophysical Journal Supplement Series** (2017) **230** 2.

28. Cesaroni, R., et al.: Chasing discs around O-type (proto) stars: Evidence from ALMA observations *Astronomy and Astrophysics* (2017) **602** A59.

29. Gravity Collaboration, et al.: First light for GRAVITY: Phase referencing optical interferometry for the Very Large Telescope Interferometer *Astronomy and Astrophysics* (2017) **602** A94.

30. O'Gorman, E., et al.: The inhomogeneous submillimeter atmosphere of Betelgeuse *Astronomy and Astrophysics* (2017) **602** L10.

31. Gravity Collaboration, et al.: Accretion-ejection morphology of the microquasar SS 433 resolved at sub-au scale *Astronomy and Astrophysics* (2017) **602** L11.

32. Aharonian, Felix, Sun, Xiao-na, & Yang, Rui-zhi: Energy distribution of relativistic electrons in the young supernova remnant G1.9+0.3 *Astronomy and Astrophysics* (2017) **603** A7.

33. Beuther, H., et al.: Fragmentation and disk formation in high-mass star formation: The ALMA view of G351.77-0.54 at 0.06" resolution *Astronomy and Astrophysics* (2017) **603** A10.

34. Liu, Ruo-Yu, Rieger, F.M., & Aharonian, F. A.: Particle Acceleration inMildly Relativistic Shearing Flows: The Interplay of Systematic and Stochastic Effects, and the Origin of the Extended High-energy Emission in AGN Jets *The Astrophysical Journal* (2017) **842** 39.

35. Bykov, A. M., et al.: Cherenkov gamma-ray telescopes: Past, present, future. The ALEGRO project *Journal of Technical Physics* (2017) **62** 819-836.

36. de Wilt, P., et al.: Dense molecular gas at 12 mm towards Galactic TeV gamma-ray sources *Monthly Notices of the Royal Astronomical Society* (2017) **468** 2093-2113.

37. Crocker, Roland M., et al.: Diffuse Galactic antimatter from faint thermonuclear supernovae in old stellar populations *Nature Astronomy* (2017) **1** 0135.

38. Vlemmings,W. H. T., et al.: Magnetically aligned dust and SiOmaser polarisation in the envelope of the red supergiant VY Canis Majoris *Astronomy and Astrophysics* (2017) **603** A92.

39. Caselli, P., et al.: NH_3 (10-00) in the pre-stellar core L1544 *Astronomy and Astrophysics* (2017) **603** L1.

40. Harper, G. M., et al.: An Updated 2017 Astrometric Solution for Betelgeuse *The Astronomical Journal* (2017) **154** 11.

41. Sano, H., et al.: Discovery ofMolecular and Atomic Clouds Associated with theMagellanic Superbubble 30 Doradus C *The Astrophysical Journal* (2017) **843** 61.

42. Waisberg, I., et al.: Submilliarcsecond Optical Interferometry of the High-mass X-Ray Binary BP Cru with VLTI/GRAVITY *The Astrophysical Journal* (2017) **844** 72.

43. Massi, M., Migliari, S., & Chernyakova, M.: The black hole candidate LS I +61°0303 *Monthly Notices of the Royal Astronomical Society* (2017) **468** 3689-3693.

Scoil na Fisice Cosmaí (ar lean)

44. Manara, C. F., et al.: X-shooter study of accretion in Chamaeleon I. II. A steeper increase of accretion with stellar mass for very low-mass stars? *Astronomy and Astrophysics* (2017) **604** A127.

45. Reid, A., et al.: Chromospheric Inversions of aMicro-flaring Region *The Astrophysical Journal* (2017) **845** 100.

46. Petroff, E., et al.: A polarized fast radio burst at low Galactic latitude *Monthly Notices of the Royal Astronomical Society* (2017) **469** 4465-4482.

47. Taylor, Andrew M.: Active galactic nuclei horizons from the gamma-ray perspective *New Astronomy Reviews* (2017) **78** 16-25.

48. Manara, C. F., et al.: An extensive VLT/X-shooter library of photospheric templates of pre-main sequence stars *Astronomy and Astrophysics* (2017) **605** A86.

49. Pinilla, P., et al.: Millimeter Spectral Indices and Dust Trapping By Planets in Brown Dwarf Disks *The Astrophysical Journal* (2017) **846** 70.

50. Chernyakova, M., et al.: Study of orbital and superorbital variability of LSI +61° 303 with X-ray data *Monthly Notices of the Royal Astronomical Society* (2017) **470** 1718-1728.

51. Popescu, C. C., et al.: A radiation transfer model for the Milky Way: I. Radiation fields and application to high-energy astrophysics **MonthlyNotices of the Royal Astronomical Society** (2017) **470** 2539-2558.

52. H. E. S. S. Collaboration, et al.: Measurement of the EBL spectral energy distribution using the VHE γ-ray spectra of H.E.S.S. blazars *Astronomy and Astrophysics* (2017) **606** A59.

53. Tazzari, M., et al.: Physical properties of dusty protoplanetary disks in Lupus: evidence for viscous evolution? *Astronomy and Astrophysics* (2017) **606** A88.

54. Melandri, A., et al.: Colour variations in the GRB 120327A afterglow *Astronomy and Astrophysics* (2017) **607** A29.

55. Abbott, B. P., et al.: Multi-messenger Observations of a Binary Neutron Star Merger *The Astrophysical Journal* (2017) **848** L12.

56. Zdziarski, Andrzej A., Malyshev, Denys, Chernyakova, Maria, & Pooley, Guy G.: Highenergy gamma-rays from Cyg X-1 *Monthly Notices of the Royal Astronomical Society* (2017) **471** 3657-3667.

57. Rodgers-Lee, D., Taylor, A. M., Ray, T. P., & Downes, T. P.: The ionizing effect of lowenergy cosmic rays from a class II object on its protoplanetary disc *Monthly Notices of the Royal Astronomical Society* (2017) **472** 26-38.

58. Hitomi Collaboration, et al.: Solar abundance ratios of the iron-peak elements in the Perseus cluster *Nature* (2017) **551** 478-480.

59. Gravity Collaboration, et al.: The wind and the magnetospheric accretion onto the T Tauri star S Coronae Australis at sub-au resolution *Astronomy and Astrophysics* (2017) **608** A78.

60. Abdalla, H., et al.: TeV Gamma-Ray Observations of the Binary Neutron Star Merger GW170817 with H.E.S.S. *The Astrophysical Journal* (2017) **850** L22.

61. Vlemmings,Wouter, et al.: The shock-heated atmosphere of an asymptotic giant branch star resolved by ALMA *Nature Astronomy* (2017) **1** 848-853.

2. Preprints posted to arXiv

DIAS supports the arXiv preprint repository as part of its commitment to open-access publication of our research outputs. These preprints are in the ADS private library http://adsabs.harvard.edu/cgi-bin/nph-abs_connect?library&libname=Preprint2017&libid=4794ca7845

1. H. E. S. S. Collaboration, et al.: The population of TeV pulsar wind nebulae in the H.E.S.S. Galactic Plane Survey.

2. Shetye, J., et al.: High-frequency transverse oscillations and intensity perturbations in spicular-type events.

3. H. E. S. S. Collaboration, et al.: Systematic search for very-high-energy gamma-ray emission from bow shocks of runaway stars.

4. H. E. S. S. Collaboration, et al.: Characterising the VHE diffuse emission in the central 200 parsecs of our Galaxy with H.E.S.S.
5. Wykes, Sarka, et al.: UHECR propagation from Centaurus A.
6. Hitomi Collaboration, et al.: Search for Thermal X-ray Features from the Crab nebula with Hitomi Soft X-ray Spectrometer.
7. MAGIC Collaboration, et al.: Constraints on particle acceleration in SS433/W50 from MAGIC and H.E.S.S. observations.
8. Hitomi Collaboration, et al.: Hitomi X-ray studies of Giant Radio Pulses from the Crab pulsar.
9. Tibaldo, L., et al.: The Vela X pulsar wind nebula through the eyes of H.E.S.S. and Suzaku.
10. Taylor, Andrew M., Sanchez, David, Cerruti, Matteo, & on behalf of the H. E. S. S. collaboration: Extragalactic Observations with HESS: Past and Future.
11. Angüner, E. O., et al.: Very high energy emission from the hard spectrum sources HESS J1641-463, HESS J1741-302 and HESS J1826-130.
12. O'C. Drury, Luke: Galactic Cosmic Rays - Theory and Interpretation.
13. Garcia Lopez, R., et al.: The wind and the magnetospheric accretion onto the T Tauri star S Coronae Australis at sub-au resolution.
14. Fernández-Barral, A., et al.: Gamma rays from microquasars Cygnus X-1 and Cygnus X-3.
15. Acero, F., et al.: Cherenkov Telescope Array Contributions to the 35th International Cosmic Ray Conference (ICRC2017).
16. H. E. S. S. Collaboration, et al.: Contributions of the High Energy Stereoscopic System (H.E.S.S.) to the 35th International Cosmic Ray Conference (ICRC), Busan, Korea.
17. Yang, Rui-zhi, de OñaWilhelmi, Emma, & Aharonian, Felix: Diffuse gamma-ray emission in the vicinity of young star clusterWesterlund 2.
18. Hitomi Collaboration, et al.: Measurements of resonant scattering in the Perseus cluster core with Hitomi SXS.
19. Hitomi Collaboration, et al.: Atmospheric gas dynamics in the Perseus cluster observed with Hitomi.
20. Stecklum, B., et al.: Infrared variability, maser activity, and accretion of massive young stellar objects.
21. Szécsi, Dorottya,Mackey, Jonathan, & Langer, Norbert: Supergiants and their shells in young globular clusters.
22. Stecklum, B., et al.: Tracing accretion variability of high-mass YSOs via light echoes.

3. Other publications

These miscellaneous publications are in the ADS private library http://adsabs.harvard.edu/cgi-bin/nph-abs_connect?library&libname=NonRef2017&libid=4794ca7845

1. Barkov,Maxim V., Aharonian, Felix, & Khangulyan, Dmitriy V.: Ultrafast VHE Gamma-Ray Flares of IC 310 *New Frontiers in Black Hole Astrophysics* (2017) **324** 157-163.
2. Gabici, Stefano, Aharonian, Felix A., Moulin, Emmanuel, & Viana, Aion: Acceleration of particles up to PeV energies at the galactic centre *New Frontiers in Black Hole Astrophysics* (2017) **324** 317-321.
3. Aharonian, Felix, Hofmann, Werner, & Rieger, Frank: Preface: 6th International Symposium onHigh EnergyGamma-Ray Astronomy *6th International SymposiumonHigh Energy Gamma-Ray Astronomy* (2017) **1792** 010001.
4. Taylor, Andrew M.: New developments in AGN gamma-ray astrophysics *6th International Symposium on High Energy Gamma-Ray Astronomy* (2017) **1792** 020016.
5. Tsuji, Naomi, et al.: Chandra and NuSTAR observations of supernova remnant RX J1713.7-3946 *6th International Symposium on High Energy Gamma-Ray Astronomy* (2017) **1792** 040003.
6. Parsons, R. D., et al.: The galactic centre viewed with H.E.S.S. *6th International Symposium on High Energy Gamma-Ray Astronomy* (2017) **1792** 040005.

Scoil na Fisice Cosmaí (ar lean)

7. Bogovalov, S. V., Aharonian, F., &Khangulyan,D.: Formation of the pulsed TeV gammaray emission at the light cylinder *6th International Symposium on High Energy Gamma-Ray Astronomy* (2017) **1792** 040010.

8. Voisin, F., et al.: ISM studies towards several PWNe *6th International Symposium on High Energy Gamma-Ray Astronomy* (2017) **1792** 040011.

9. Klepser, S., et al.: New insights into pulsar wind nebula evolution with H.E.S.S. I and II *6th International Symposium on High Energy Gamma-Ray Astronomy* (2017) **1792** 040012.

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School of Cosmic Physics (continued)

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Scoil na Fisice Cosmaí (ar lean)

Geoifisic

Sprioc 1: Eolas agus léargais nua a fháil trí bhuntaighde agus scoláireacht ardleibhéil

Lean rannóg na geoifisice dá hobair lárnach le hanailís ar shonraí geoifisiciúla, ríomhaireacht agus forbairtí modheolaíochta a chur i bhfeidhm chun léargais nua a fháil ar phróisis an Domhain ag raon de scálaí ama agus spáis. Tá acmhainn shuntasach teicneolaíochta nua curtha againn freisin agus bhogamar chuig réimsí teorann nua, ó thaobh na geografaíochta de.

Tá Brian O'Reilly agus an grúpa anailíse imchuach tar éis a gcuid oibre a leathnú chuig imchuach iargúlta Hatton amach ó chósta thiar an hÉireann ag féachaint le tuiscint níos fearr a fháil ar a bhfoirmiú. Tagann sé seo i ndiaidh comhoibrithe ildisciplínigh idirnáisiúnta rathúil a ghabh struchtúir srutha sreabhán scála in imchuach Porcupine, ag cur feabhais lenár dtuiscint ar an gcaoi ina shíneann screamh an Domhain agus ina ndéanann acmhainní geolaíochta imirce agus carnadh ar an bhfodhromchla. Tá an obair seo ag teacht go teann leis togra na bliana 2017 de chuid Sergei Levedev atá maoinithe ag SFI/GSI/Foras na Mara (€1.25 milliún), SEA-SEIS *(Structure, Evolution And SEISmic hazard off the Irish offshore)*. Faoi cheannas DIAS, tógfaidh an togra le chéile freisin comhoibrithe ó Shuirbhéireacht Gheolaíochta na hÉireann, Ollscoil Oxford agus GFZ Potsdam. Is féidir SEA-SEIS a bheith ann freisin mar thoradh ar bhronnadh an ghradaim choimisiúnaithe iMARL Infreastruchtúr Muirí (€2.9 milliún) in 2017 le Chris Bean. De chéad uair riamh, tógfaidh SEA-SEIS droichead lenár dtuiscint ar réigiún an Atlantaigh Thuaidh – an Artaigh.

Tá an grúpa Leictreamaighnéadach (EM) fós an-ghníomhach in dhá réimse (i) modheolaíocht a fhorbairt chun deascáin mianraí a bhrath agus (ii) modheolaíocht a fhorbairt chun gníomhaíocht hidriteirmeach bolcán a mheas. Príomhréimse den taighde idirnáisiúnta is ea í seo toisc gur fadhb gan réiteach fós is ea an t-idirdhealú idir insní magma agus gníomhaíocht hidriteirmeach sa mheasúnú ar ghuais. Mar thoradh ar an iarracht seo glacadh le príomhpháipéar san iris *Geophysical Journal International* bunaithe ar shonraí DIAS a fuarthas sna hAsóir. Bhí comhar idirnáisiúnta i gceist anseo le hOllscoil na nAsór, ISTERRE Ollscoil Grenoble Alps agus Ollscoil Cologne.

Maoiníodh imeachtaí an Ghrupa go príomha trí chomhaltacht aonair SFI le Duygu Kiyan agus maoiniú ón gcomhlacht mianadóireachta idirnáisiúnta, Glencore.

Rinneadh fionnachtana agus léargais shuntasacha DIAS maidir leis an gcaoi ina n-oibríonn bolcáin idir an chuid dheiridh den 2016 agus deireadh 2017. Foilsíodh dhá phríomhpháipéar i ngrúpa Chris Bean, ceann amháin acu san iris *Scientific Report*, an ceann eile san iris *Nature Geoscience*. Tá sé léiriteh ag an saothar seo go bhfuil an 2 km uasta de shreabh an Domhain níos laige go mór ná mar a ceapadh roimhe seo, rud a bhfuil tionchair bhunúsacha aige ar thosú brúchta agus ar nádúr na seismeachta réamhtheachtaí. Tá na torthaí nua seo anois mar chuid de thogra nua maoinithe ag an Eoraip (EUROVOLC, ag tosú go luath in 2018) ag féachaint le feabhas a chur ar réamhaisnéisiú brúchta ag réadlanna.

Chruthaigh grúpa Zdenek Martinec samhail nua do stoirmeacha maighnéadacha maighnéadaisféaracha bunaithe ar shonraí maighnéadacha saitilíte Swarm. Léirigh siad nach mór athmhachnamh a dghéanamh ar an tsamhail atá bunaithe ar ESA agus a úsáidtear go forleathan, agus tá samhail nua DIAS molta acu. Mar is dual nuair a mholtar rud nua i bhfianaise an chleachtais reatha, chuaigh an saothar trí dhianphróiseas athbhreithnithe, ach tá an tsamhail mholta glcatha le foilsiú san iris *Geophysical Journal International*.

Gradam:

Bhuaigh Nicolas Luca Celli (mac léinn PhD le Lebedev), an Duais don Léacht is Fearr ó Mhac Léinn ag Cruinniú Taighde Geolaíochta na hÉireann (IGRM) 2017 a bhí ann i gColáiste na Tríonóide, BÁC an 4-6 Márta.

Tá post buna dáimhe glactha ag Eva Eibl (mac léinn PhD agus scoláire iardhochtúireachta le Bean) in Ollscoil Potsdam. Bhaigh sí gradam Chomhaltacht Marie Curie freisin agus post iardhochtúireachta in Ollscoil Cambridge.

D'fhág Charlotte Botter (scoláire iardhochtúireachta le Fullea) a post iardhochtúireachta le DIAS chun post léachtóireachta a ghlacadh in Ollscoil Leeds.

Geophysics

Goal 1: Discovery of new knowledge and insights through advanced fundamental research and scholarship

The geophysics section continued its core work in applying geophysical data analysis, computation and methodological developments to gain new insights into Earth processes at a range of temporal and spatial scales. We also added very significant new technological capability and have moved to new frontier areas, geographically.

Brian O' Reilly and the basin analysis group have expanded their work to the remote Hatton basin west of Ireland in an effort to better understand their formation. This follows a successful multi-disciplinary international collaboration which captured crustal scale fluid flow structures in the Porcupine basin, improving our understanding of how the Earth's crust stretches and how georesources migrate and accumulate in the sub-surface.

This work is a tight fit with Sergei Levedev's SFI/GSI/Marine Institute 2017 funded project (€1.25 Million), SEA-SEIS (Structure, Evolution and SEISmic hazard off the Irish offshore). Led by DIAS the project will also bring together collaborators from the Geological Survey Ireland, University of Oxford and GFZ Potsdam. In turn SEA-SEIS is made possible by the 2017 commissioned iMARL Marine Infrastructure award (€2.9 Million) to Chris Bean. SEA-SEIS will bridge our understanding of the North-Atlantic – Arctic region, for the first time.

The Electro-Magnetic (EM) group is still very active in two areas (i) developing methodology for the detection of mineral deposits and (ii) developing methodology for quantifying hydro-thermal activity of volcanoes. This is a key area of research internationally as discriminating between magma influx and hydrothermal activity is an outstanding problem in hazard estimation. This effort led to the acceptance of a key paper in *Geophysical Journal International* based on DIAS data acquired in the Azores.

The comprised interdisciplinary collaboration with the University of the Azores, ISTERRE University Grenoble Alps and the University of Cologne.

The Group's activities were primarily funded through an individual SFI fellowship to Duygu Kiyan and funding from the international mining company, Glencore.

Significant DIAS discoveries and insights were made into how volcanoes work between late 2016 to end 2017. Two key papers were published by Chris Bean's group, one in Scientific Report, the other in *Nature Geoscience*. This work has demonstrated that the upper 2 km of the Earth's crust is substantially weaker than previously thought which has fundamental knock on effects on eruption initiation and the nature of precursory seismicity.

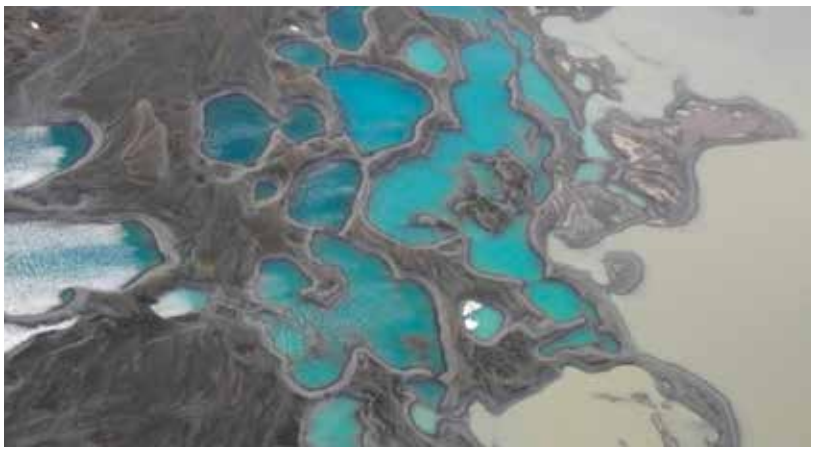
These new findings now form part of a newly funded European project (EUROVOLC, early 2018 start) aimed at improving eruption forecasting at observatories.

Zdenek Martinec's group constructed a new model for magnetospheric magnetic storms based on Swarm satellite magnetic data.

They showed that the existing widely used ESA-based model needs to be reconsidered and have proposed a new DIAS model. As expected when proposing something new in the light of current practice, the work encountered a tough review process, however the proposed model has been accepted for publication in Geophysical Journal International.

Awards:

Nicolas Luca Celli (Lebedev PhD student), won the Best Student Talk Prize at the 2017 Irish Geological



Sediments make the colour - Dr. Eva Eibl photo on EGU Blogs

Griangraf an Dr. Eva Eibl ar EGU Blogs dár teideal. Déanann dríodraigh an dath

Scoil na Fisice Cosmaí (ar lean)

Bhaigh Andrea Licciardi (mac léinn PhD le N. Piana Agostinetti) gradam "Scothphóstaer na Mac Léinn agus Gradam PICO" ag cruinniú Aontas Eorpach na Geo-Eolaíochta (EGU), 2017 do phóstaer PICO dar teideal *"Crustal anisotropy along the North Anatolian Fault Zone from receiver functions"*

Toghadh Chris Bean ina bhall den *Academia Europaea* in 2017

Sprioc 2: Idirnáisiúnú ar ár dtaighde agus comhair

Leanadh den tsraith ceardlainne idirnáisiúnta faoi Imchuach Porcupine a thosaigh DIAS in 2016 agus eagraíodh iad sa lárionad iCRAG sa Choláiste Ollscoile, BÁC. Bhí tinreamh maith ann (~80 duine) de pháirtithe ón tionsclaíocht, ón rialtas agus ón sa lucht acadúil ó tír seo agus ó thíortha thar lear. Tá sé beartaithe imeachtaí dá leithéid a eagrú go blaintúil.

Laistigh de chuibhreannas *3D-Earth* Ghníomhaireacht Spáis na hEorpa (ESA), chruthaigg rannpháirtithe DIAS, faoi cheannas Javier Fullea, Zdenek Martinec agus Sergei Lebedev, na príomheilimintí den Ionsamhlóir *3D Earth*. Beidh sé seo ar phríomhthoradh an togra, a cheadaíonn taiscéalaíocht ar struchtúr domhain an Domhain ag baint úsáide as tacair sonraí móra nua saitilíte agus talún le samhaltú uimriúil féin-leanúnach agus aisiompú.

Bhí an scoil samhraidh de chuid an chuibhreannais idirnáisiúnta COST TIDES (*TIme DEpendent Seismology*), ina bhfuil 27 tír Eorpach páirteach, ar siúl in Ollscoil Oxford faoi cheannas fheidhmeannas an chuibhreannais (a bhfuil Chris Bean ina bhall de). Bhí seisear ó DIAS ag freastal ar an Scoil, lena n-áirítear Sergei Lebedev a thug ceann de na léachtaí ag an Scoil samhraidh.

Tá maoiniú piarbhreathnaithe idirnáisiúnta ó Shuirbhéireacht Gheolaíochta na hÉireann tugtha do Martin Möllhoff i gcomhar le Chris Bean chun córas monatóireachta réad-ama nuálaíoch a fhorbairt don bholcáin Hekla san Ioslainn.

Is í Oifig Meitéareolaíochta na hÍoslainne an príomhpháirtí áitiúil agus tá taighdeoirí sa chuibhreannas ó Ollscoil na hÍoslainne agus Shuirbhéireacht Gheolaíochta na Breataine (BGS). Cuireann an diantimpeallacht aimsire bac ar thomhais réad-ama ó cheann ceann na bliana - anseo tá coincheap nua cáblaí forbartha againn chun monatóireacht réad-ama a dhéanamh ó cheann ceann na bliana.

Lean an grúpa Leictreamhaighnéadach (EM) dá láithreacht idirnáisiúnta lenár gcomhoibrithe, go háirithe i réimse an íomháu bolcáin, le fócas ar leith ar bholcáin na nAzór. Is mionpháirtí coibríoch é freisin le hOllscoil Dhún Éideann in RIFTVOLC, staidéar ar an stóras magma thar an Limistéar na Scoilte Aetóipí mar atá in íomhánna ó mhaighnéadaitheallúraigh 3-T.

Chuir DIAS stáisiún iomlán Maighnéadaitheallúrach le Réadlann Geoifisice Met Éireann ar Oileán Dairbhre do GFZ Potsdam, i nDeireadh Fómhair 2017.

Tá DIAS ag comhoibriú le Coláiste na Tríonóide BÁC agus a chomhpháirtithe idirnáisiúnta trí thogra nua maoinithe ag Suirbhéireacht Gheolaíochta na hÉireann chun bunachar nua digiteach a chruthú de shonraí leictreamhaighnéadacha (EM).

Thosaigh sé ag deireadh 2017 agus é de phríomhaidhm aige tuiscint a fháil agus samhaltú a dhéanamh ar na réimsí EM in Éirinn a chruthaítear ag stoirmeacha gréine agus a n-idirghníomhaíocht le teicneolaíocht daonna.

Bhí rannóg Geoifisice DIAS mar chompháirtí i 6 iarratas ar thograí AE in 2017, is ionann sin agus gné láidir idirnáisiúnta dár gcomhoibrithe togra.

Chuaigh Chris Bean isteach sa chuibhreannas idirnáisiúnta *Krafla Magma Testbed* (KMT), ag freastal ar chruinniú pleanála ag an *Institut de Physique du Globe de Paris (IPGP)*. Is é an aidhm atá leis leas a bhaint go díreach as Magma mar fhoinse teasa gheoiteirmach. Is í an Íoslainn an láthair tástála Eolaíochta & Teicneolaíochta do mhodheolaíocht a mbeidh tionchar domhanda aige, nuair a fhorbraítear í.

Comhdhálacha/Seisiúin a eagraíodh

- *Integrated geophysical-petrological modelling of the crust and upper mantle at multiple scales*. Tionólaí: Nils Holzrichter Co-Conveners: Eldar Baykiev, Mattia Guerri, Alexandra Guy, Bart Root. *Comhthionól Ginearálta EGU 2018.*
- *Unravelling the Earth subsurface structure from seismic imaging and interpretation, geological observations, and numerical experiments - seisiún* PICO. Tionólaí: Charlotte Botter, Comhthionólaithe: Guillaume Duclaux, David Iacopini, Andreia Plaza-Faverola. *Comhthionól Ginearálta EGU 2018.*

Research Meeting (IGRM) that took place at Trinity College Dublin on March 4-6.

Eva Eibl (Bean PhD student/Post Doc) has taken up a permanent faulty position at the University of Potsdam. She also won a Marie Curie Fellowship award and Post Doctoral position at the University of Cambridge.

Charlotte Botter (Fullea Post Doc) left her post doctoral positional at DIAS to take a lectureship position in Leeds University

Andrea Licciardi (N. Piana Agostinetti PhD student) won an "Outstanding Student Poster and PICO Award" at the European Geoscience Union meeting (EGU), 2017 for a PICO-poster entitled "Crustal anisotropy along the North Anatolian Fault Zone from receiver functions"

Chris Bean was elected a member of *Academia Europaea* in 2017

Goal 2: Internationalisation of our research and collaborations

The international workshop series on the Porcupine Basin initiated by DIAS in 2016 was continued and hosted in the iCRAG centre in UCD. It was well attended (~80 individuals) by partners from industry, government and academia from home and overseas. It is planned to hold similar events annually.

Within European Space Agency (ESA) 3D-Earth consortium, the DIAS participants, led by Javier Fullea, Zdenek Martinec and Sergei Lebedev, have constructed the key elements of the 3D Earth Simulator. This will be the main result of the project, enabling exploration of deep Earth structure using a combination of large new satellite and terrestrial datasets with self-consistent numerical modelling and inversion.

Andrea Licciardi wins outstanding Student presentation at EGU 2017
Bhuaigh Andrea Licciardi duais sár léirithe na mac Léinn ag EGU

The summer school of the international COST action consortium TIDES (TIme DEpendent Seismology), bringing together 27 European member countries, took place the University of Oxford led by the consortium executive (of which Chris Bean is a member). Six participants of the School attended from DIAS, including Sergei Lebedev who gave one of the lectures at the summer School.

Martin Möllhoff in collaboration with Chris Bean has been awarded internationally peer reviewed Geological Survey Ireland funding to develop an innovative real-time monitoring system for Hekla Volcano in Iceland. The Iceland Met Office is the local key partner and the consortium includes researchers from the University of Iceland and the British Geological Survey (BGS). The extreme weather environment has been a barrier to year-round real-time measurements, here we have developed a new cabled system concept to year-round real-time monitoring.

The Electro Magnetic (EM) group continued its international presence with our collaborators, particularly in the area of volcano imaging, with a specific focus on the volcanoes of the Azores. It is also a minor collaborating partner with the University of Edinburgh in RIFTVOLC, a study of the magma storage across the main Ethiopian Rift Zone as imaged by 3-D magnetotellurics.

DIAS added a full Magnetotelluric station to Met Eireann's Geophysical Observatory in Valentia for GFZ Potsdam, in October 2017.

DIAS is collaborating with TCD and its international partners though a new project funded by the Geological Survey Ireland to create new digital database of electromagnetic (EM) data. It commenced in late 2017 with key aim of understanding and modelling the EM fields in Ireland caused by solar storms and their interaction with human technology.

Scoil na Fisice Cosmaí (ar lean)

- EGU2017: *Ambient seismic noise techniques: sources, monitoring, and imaging*
  Tionólaithe: Christoph Sens-Schönfelder, Chris Bean, Anne Obermann, Martin Schimmel, Céline Hadziioannou
- EGU2017: Volker Rath tionólaí. Seisiún PICO GM 4.5 ar *"Geophysical Imaging of Volcanoes"*

Sprioc 3: Ceannairí taighde a mhealladh, a choinneáil agus a chothú

Bhí fás sa Rannóg i mbeagnach gach ceann de na réimsí a luaitear thuas, in 2017. Tharla an fás is suntasaí i réimse na tsamhaltaithe Teirmimheicniúil, faoi cheannas Javier Fullea. Tá an fás seo bunaithe ar dheontas forbartha SFI ERC do Javier agus áirítear maoiniú comhaltachta breise IRC don ghrúpa.

Sprioc 4: Na disciplíní a láidriú go náisiúnta

Comhaontuithe Nua:

Tháinig Roinn na Fisice i gColáiste na Tríonóide BÁC isteach mar shuíomh rannpháirtíochta sa chlár Seismeolaíocht sna Scoileanna atá comhordaithe ag DIAS, agus an Dr Nigel Carroll i gceannas ansin.

Chuaigh rannóg na Geoifisice DIAS isteach i gcomhaontú 5 bliana le Suirbhéireacht Gheolaíochta na hÉireann (GSI) le comh-mhaoiniú a dhéanamh ar oibriú Líonra Náisiúnta Seismeach na hÉireann (INSN). Leanfaidh INSN de bheith á oibriú agus á chothabháil ag DIAS - ceadóidh maoiniú breise ó GSI dúbláil ar mhéid Chrua-earraí an Líonra agus clúdóidh sé tacaíocht theicniúil bhreise. Tógadh suíomh gréasáin nua in 2017, www.insn.ie

Léachtaí speisialta & Cúrsaí:

Thug an Dr. Lif Lund Jacobsen, ollamh cúnta le Cartlann Náisiúnta na Danmhairge agus údar, léacht dar teideal "Danish scientist Inge Lehmann and the rise of international seismology, 1925-1970". Léiríonn is ea saol oibre Lehmann ar chuid de na hathruithe bunúsacha a tharla ar ann taighde seismeolaíochta le linn a saol agus tugadh cur síos ar thús agus ar fhorbairt na seismeolaíochta nua-aimseartha agus ról pholaitíocht an Chogaidh Fhuair ann.

Tharla an Modúl Bliantúil d'Fhochéimithe sa Gheoifisic Fheidhmithe, á eagrú agus á reáchtáil ag DIAS, in Aibreán 2017, i nDún Sinche. Clúdaíonn an cúrsa speictream iomlán na dteicnící geoifisiciúla agus cuirtear ar fáil é do mhic léinn sna domhaneolaíochtaí ó Choláiste na Tríonóide BÁC agus an Coláiste Ollscoile BÁC. Tá sé ar fáil do mhic léinn mar mhodúl creidiúnaithe ag an dá eagraíocht. Bíonn ionchur ann ó ar fud na bpobal iardhochtúireachta agus PhD Geoifisice in DIAS, le Colin Hogg ag feidhmiú mar chomhordaitheoir.

Tá cuireadh tugtha do Zdenek Martinec téacsleabhar a ullmhú ar Mheicnic Chontanaim. Foilseofar é ag Springer International Switzerland. Dréachtábhar curtha isteach Meán Fómhair 2017.

Rinne foireann, mic léinn PhD agus scoláirí iardhochtúireachta maoirsiú ar ár dtaispeántas beo faoi "Seismicity & seismic event detection" ag an dtaispeánta iCRAG 2017. Ócáid a bhí díriteh ar an tionscal ab ea iCRAG 2017 sa Staid Aviva an 20 Aibreán. Bhí 210 duine páirteach ann, a raibh 54 díobh fostaithe go díreach sa tionscal.

Thug Nicola Piana Agostinetti Gearrchúrsa (15-17 Bealtaine, 2017 ag Cearnóg Mhuirfean) ar "Bayesian inferences via Monte Carlo sampling of solutions: from simple tools to complex algorithms"

Cuireadh cúrsa praiticiúil ar an uirlis a forbraíodh le déanaí 'Airborne Electromagnetic Data Inversion Toolbox' do Ghrúpa Oibre Thogra Tellus de chuid Suirbhéireacht Gheolaíochta na hÉireann an 14 Márta - Volker Rath agus Duygu Kiyan.

Ionchur do lárionaid náisiúnta taighde & tionscnaimh náisiúnta:

Rinne líonra Seismeach Náisiúnta na hÉireann taifeadadh ar an séú tástáil núicléach de chuid na Cóiré Thuaidh an 3 Meán Fómhair 2017. Mheas Suirbhéireacht Gheolaíochta na Stát Aontaithe go raibh an pléascadh cothrom le crith talún Mag 6.3 agus thuairisc go raibh an dara crith talún níos lú ann ag an suíomh, cúpla nóiméad ina dhiaidh sin, rud a míníodh mar thitim chuas an phléasctha.

Príomhrannpháirtí is ea DIAS sa lárionad iCRAG de chuid SFI (Lárionad na hÉireann don Taighde sa Gheo-eolaíocht Fheidhmeach). Táimid i gceannas ar an gclár Geoifisice sa lárionad agus tá réimsí gníomhaíochta nua curtha againn le déanaí le iCRAG (eadhon Geohazards). Trí dhámhachtain infreastruchtúir náisiúnta SFI bhunaigh rannóg Geoifisice DIAS iMARL, an tSaotharlann Mhuirí €2.9 milliún do Thaighde Geochórais (www.imarl.ie).

School of Cosmic Physics (continued)

DIAS geophysics was a partner in 6 EU project applications, in 2017, representing a strong international dimension to our project collaborations.

Chris Bean joined the Krafla Magma Testbed (KMT) international consortium, attending a planning meeting at the Institut de Physique du Globe de Paris (IPGP). The aim is to directly tap into Magma as a geothermal heat source. Iceland is the Science & Technology test site for methodology that should have global impact, once developed.

Conferences/Sessions organised

- Integrated geophysical-petrological modelling of the crust and upper mantle at multiple scales. Convener: Nils Holzrichter Co-Conveners: Eldar Baykiev, Mattia Guerri, Alexandra Guy, Bart Root. *EGU General Assembly 2018.*
- Unravelling the Earth subsurface structure from seismic imaging and interpretation, geological observations, and numerical experiments - PICO session. Convener: Charlotte Botter, Co-Conveners: Guillaume Duclaux, David Iacopini, Andreia Plaza-Faverola. *EGU General Assembly 2018.*
- EGU2017: Ambient seismic noise techniques: sources, monitoring, and imaging Conveners: Christoph Sens-Schönfelder, Chris Bean , Anne Obermann , Martin Schimmel , Céline Hadziioannou
- EGU2017: Volker Rath convener. PICO session GM 4.5 on "Geophysical Imaging of Volcanoes"

Goal 3: Attracting, retaining and cultivating research leaders

The Section has experience net growth in numbers in almost all of the areas listed above, in 2017. The stand out growth has been in the area of Thermo-Mechanical modelling, led by Javier Fullea. This growth is seeded by a SFI ERC development grant to Javier and includes additional IRC fellowship funding to the group.

Goal 4: Strengthening the disciplines nationally

New Agreements:

TCD Physics Department joined as a participating location in the DIAS coordinated Seismology in Schools programme, led there by Dr Nigel Carroll.

DIAS geophysics entered into a 5 year agreement with the Geological Survey Ireland (GSI) to jointly fund the running of the Irish National Seismic Network (INSN). The INSN will continue to be operated and maintained by DIAS, additional funding from GSI will allow for the doubling of the size of the Network Hardware and will cover additional technical support. A new web site was built in 2017, www.insn.ie

Special lectures & Courses:

Dr. Lif Lund Jacobsen, assistant professor at Danish National Archive and author, gave a lecture entitled "Danish scientist Inge Lehmann and the rise of international seismology, 1925-1970". Lehmann's career reflects some of the fundamental changes that seismological research underwent during her lifetime and provided an account of the beginning and development of modern seismology and the role of Cold War politics in it.

The annual Applied Geophysics Undergraduate Module organised and run by DIAS took place in April 2017, at Dunsink. The course covers the full spectrum of geophysical techniques and is offered to earth science students from TCD and UCD. It is available to students as a credited module by both organisations. Contributions are made from across the DIAS Geophysics postdoctoral & PhD communities, with Colin Hogg acting as coordinator.

Zdenek Martinec has been invited to prepare a text book on Continuum Mechanics. It will be published by Springer International Switzerland. Draft content submitted September 2017.

DIAS staff, PhDs and Postdocs oversaw our live display on "Seismicity & seismic event detection" at the iCRAG 2017 showcase. iCRAG 2017 was an industry facing event held at Aviva Stadium on April 20th. It had 210 participants, 54 of whom were directly employed in industry.

Nicola Piana Agostinetti delivered a short course (May 15th-17th, 2017 at Merrion Square) on "Bayesian inferences via Monte Carlo sampling of solutions: from simple tools to complex algorithms"

A hands-on course on the recently developed 'Airborne Electromagnetic Data Inversion Toolbox' was given to the Tellus Project Working Group of the Geological Survey Ireland on the March 14th by Volker Rath and Duygu Kiyan.

Contribution to national research centres & national initiatives:

The Irish National Seismic sixth network, recorded the North Korean nuclear test on 3 September 2017. The US Geological Survey estimated that the blast was equivalent to an earthquake of Mag 6.3 reported that the initial event was followed by a second, smaller, earthquake at the site, several minutes later, which was characterised as a collapse of the blast cavity.

Scoil na Fisice Cosmaí (ar lean)

Comhoibríochtaí eile neamh-IAL, rannpháirtíocht agus ionchur le plé ar bith faoi pholasaí

Tugadh cuireadh do DIAS, agus d'fhreastal ar, fáiltiú in ambasáid Cheanada, arna óstáil ag ambasadóir Cheanada, do shíniú an chomhoantaithe nua NAPSA (North Atlantic Petroleum Systems Assessment) idir rialtais na hÉireann agus Cheanada. Mairfidh an comhaontú athnuaite seo ar feadh tréimhse cúig bliana agus tá DIAS ar cheann de na príomhfhorais taighde.

Rinne Tom Blake ionchur le plé faoi pholasaí ag an gcruinniú den Ghrúpa Oibre Teicniúil B ag CTBTO sa Vín i Márta agus Lúnasa 2017, agus tugadh cuireadh dó páirt a ghlacadh in athbhreithniú ar Fheidhmiúlacht Foirne Cigireachta Ar an Láthair, & Ceardlann sa Loighic Cuardaigh, Samhain 2017 eargraithe ag an Rannán OSI, CTBTO an Vín.

Gníomhaíochtaí For-rochtana

Tá ab clár Seismeolaíocht sna Scoileanna ag tabhairt eolais do scoileanna rannpháirteacha faoin dul chun cinn atá á dhéanamh ag an Turgnamh InSight go Mars. Samhlaítear go mbainfidh roinnt scoileanna úsáid as sonraí seismeach Mars nuair a chuirtear ar fáil iad i Márta 2019.

Ghlac Chris Bean páirt in imeacht comhchomhairliúcháin do Thíreolaíocht na Sraithe Sóisearaí eagraithe ag an gComhairle Náisiúnta Curaclaim agus Measúnachta. Bhí sé i bhfoirm seisiún fócasghrúpa, a eagraíodh san Óstán Ashling (an tÓstán Aisling mar a bhí), an 6 Aibreán 2017.

Culture Night Geophysics Section
Chultúr Rannóg na Geoifisice

Rannpháirtíocht i dTaispeántas Eolaithe Óga BT 2017 i gCumann Ríoga Bhaile Átha Cliath.

An 22 Bealtaine, 2017, chuir DIAS fáilte roimh dhá ghrúpa de scoláirí meánscoile chuig Uimhir 5 Cearnóg Mhuirfean. Bhí na scoláirí ó Lycée Français d'Irlande Bhaile Átha Cliath, roinnt acu as Éirinn, roinnt as an bhFrainc, as roinnt eile ar tíortha eile ar fud an domhain.

- 26 Bealtaine 2017: Lá Oscailte ag stáisiún Taighde Comhshaoil Rosemount, an Coláiste Ollscoile BÁC - rinne M. Möllhoff cur i láthair faoin suiteáil sheismeach agus infreafhuaime chuig uachtarán an Choláiste Ollscoile BÁC agus daoine eile.
- 20 Iúil: Agallamh raidió le RTÉ Morning Ireland faoin léacht i bhFéile na Fiosrachta in Amharclann Scabhat Smock dar teideal 'Journey to the Centre of the Earth' (Bean)
- 21 Iúil: Léacht 'Journey to the Centre of the Earth' sa phríomhspás (lán, 170 páistí agus tuismitheoirí) ag Féile na Fiosrachta in Amharclann Scabhat Smock, Baile Átha Cliath. Chris Bean agus Hannah McCann **(grianghraf iniata)**
- 22 Meán Fómhair 2017: Oíche Chultúir - Is éard a bhí san ócáid Gheoifisice event seisiún 35-45 nóiméad á athdhéanamh in aghaidh na huaire. I ngach seisiún bhí caint ghinearálta faoi chreathanna talún agus geoghuaiseacha eile á leanúint ag léiriú ar an gcóras monatóireachta réad-ama do chreathanna talún. Thosaigh na seisiúin ag 17:00, 18:00, 19:00, 20:00 agus 21:00. D'fhreastal 150 duine ar an iomlán ar an léacht agus na seisiúin taispeántais (11 sa chéad seisiún go 35 sa seisiún deiridh) agus tháinig thart ar 80 eile isteach sa halla tosaigh i rith an tráthnóna le haghaidh comhrá. Mar a tharla anuraidh bhí scuainí ann go luath do na seisiúin agus bhí orm líon na ndaoine ag freastal ar na seisiúin a mhéadú.

School of Cosmic Physics (continued)

DIAS is a key participant in the SFI iCRAG centre (Irish Centre for Research in Applied Geoscience). We lead the Geophysics programme in the centre and have recently added new activity areas to iCRAG (namely Geohazards). Through an SFI national infrastructure award DIAS geophysics established iMARL, the €2.9 million insitu Marine Laboratory for Geosystems Research (www.imarl.ie).

Other non-HEI collaborations, engagement & contribution to any policy discussions

DIAS was invited to and attended a reception in the Canadian embassy, hosted by the Canadian ambassador, for the signing of a new NAPSA (North Atlantic Petroleum Systems Assessment) agreement between the Irish and Canadian governments. This renewed agreement will run for a period of five years and DIAS is one of the key leading research bodies.

Tom Blake contributed to policy discussions at Technical Working Group B meeting at CTBTO in Vienna in March & Aug 2017, and was invited to participate in a review of the On Site Inspection Team Functionality, & Search logic Workshop Nov 2017 organised by the OSI Division, CTBTO Vienna.

Outreach activities

The Seismology in Schools programme has been informing participating schools about the progress of the InSight Experiment to Mars. It is envisaged some schools will use the Mars seismic data when it becomes available in March 2019.

Chris Bean participated in a consultation event for Junior Cycle Geography organised by the National Council for Curriculum and Assessment.

Culture Night Geophysics Section, visitors
Cuairteoirí ag oíche Chultúr Rannóg na Geoifisice

It took the format of a focus group session, held in the Ashling Hotel (formerly Aisling Hotel), on April 6th 2017.

BT Young Scientists Exhibition 2017 participation at Royal Dublin Society.

On May 22, 2017, DIAS welcomed two groups of Secondary-school students to 5 Merrion Square. The students were from Dublin's Lycée Français d'Irlande, some of whom were Irish, some French, and others from other countries around the world.

Martin Mollhoff talks Earthquakes with the School students.

- 26th May 2017: Open Day at UCD Rosemount Environmental Research station - M. Möllhoff presented seismic and infrasound installation to UCD president and others.
- 20th July: Radio interview with RTE Morning Ireland about the Festival of Curiosity talk in the Smock Alley Theatre entitled 'Journey to the Centre of the Earth' (Bean)
- 21st July: 'Journey to the Centre of the Earth' Talk in the main space (full, 170 children & parents) at the Festival of Curiosity in Smock Alley theatre, Dublin. Chris Bean and Hannah McCann (photo included)
- 22nd September 2017: Culture Night - The Geophysics event consisted of a repeating 35 -45 minute session every hour. Each session consisted of a general talk on earthquakes and other geohazards followed by a demonstaration of the real time earthquake monitoring system. Sessions started at 17:00, 18:00, 19:00, 20:00 and 21:00. A total of 150 people attended the talk and demonstration sessions (11 in first session to 35 in last) and about 80 more came into the front hall on and off over the course of the evening for a chat. As with last year the queues started forming early for the sessions and we had to increase the numbers attending the sessions.

Scoil na Fisice Cosmaí (ar lean)

- Blake, T. - Agallaimh sna meáin le RTÉ agus Today FM maidir le seismeachas in Éirinn agus ar fud an domhain.
- Blake, T. - Agallamh as Gaeilge ar BBC Thuaisceart Éireann maidir le creathanna talún i nDún na nGall.
- Bean, Nollaig 2017 – Agallamh stiúideo ar chlár "Futureproof" Newstalk.
- Bean, Agallamh ar RTÉ Morning Ireland maidir leis an ócáid d'Fhéile na Fiosrachta.
- Bean, 14 Samhain, Agallamh ar Dublin City Radio maidir le himeachtaí Sheachtain na hEolaíochta.

Léacht Phoiblí Reachtúil

Tharla Léacht Phoiblí Reachtúil Scoil na Fisice Cosmaí Déardaoin an 19 Deireadh Fómhair 2017. D'eagraigh Rannóg na Geoifisice í agus rinneadh í a óstáil i Scoil na Fisice sa Choláiste Ollscoile, BÁC.

Thug na tOllamh Giovanna Tinetti ón gColáiste Ollscoile Londain (UCL) léacht dar teideal *"Brave new worlds: the planets in our galaxy"*. Bhí an léacht an-spreagúil agus bhí an-rath uirthi le neart ceisteanna ina dhiaidh ón lucht éisteacha, san amharclann agus freisin ag an bhfáiltiú ina dhiaidh sin.

Leithdháileadh 350 ticéad (os cionn líon iomlán na n-áiteanna) saoir in aisce trí Eventbrite. Bhí an aimsir an-dona ar an oíche agus bhí thart ar 250 i láthair.

School of Cosmic Physics (continued)

- Blake, T. - Media interviews with RTE and Today FM regarding seismicity in Ireland and around the world.
- Blake, T. - BBC Northern Ireland Interview in Irish regarding earthquakes in Donegal.
- Bean, December 2017 – Studio interview on Newstalk's futureproof programme.
- Bean, RTE morning Ireland interview on Festival of Curiosity event.
- Bean, Nov 14th, Dublin City Radio interview on Science Week events.

Statutory Public Lecture

The School of Cosmic Physics Statutory Public Lecture took place on Thursday 19th October, 2017. It was organised by the Geophysics Section and hosted by the School of Physics at UCD. Professor Giovanna Tinetti from University College London (UCL) gave a lecture entitled *"Brave new worlds: the planets in our galaxy"*. The lecture was stimulating and very well received with plenty of post-lecture questions from the audience, both in the theatre and at a subsequent reception.

350 (beyond full capacity) tickets were distributed free of charge via Eventbrite. Weather was very bad on the night resulting in an estimated 250 attendees.

Scoil na Fisice Cosmaí (ar lean)

Publications

Peer reviewed papers

1. Agius, M.R., S. Lebedev, 2017. Complex, multilayered azimuthal anisotropy beneath Tibet: evidence for co-existing channel flow and pure-shear crustal thickening. *Geophys. J. Int,* 210(3), 1823-1844.
2. Cammarano, F., and M. Guerri, 2017. Global thermal models of the lithosphere. Geophys. J. Int. 210, 56-72.
3. Delhaye, R., V. Rath, A.G. Jones, M.R. Muller and D. Reay, 2017. Correcting for static shift of magnetotelluric data with airborne electromagnetic measurements: a case study from Rathlin Basin, Northern Ireland, Solid Earth, 8, 637-660, doi:10.5194/se-8-637-2017.
4. Eibl, E.P.S., C.J. Bean, I. Jónsdóttir, A. Höskuldsson, T. Thordarson, D. Coppola, T. Witt, T. R. Walter, 2017. Multiple Coincident Eruptive Seismic Tremor Sources During the 2014-2015 Eruption at Holuhraun, Iceland, Journal of Geophysical Research: Solid Earth 122, DOI: 10.1002/2016JB013892.
5. Eibl, E.P.S., I. Lokmer, C.J. Bean, E. Akerlie, 2017. Helicopter Location and Tracking using Seismometer Recordings, Geophysical Journal International 209 (2): 901-908, DOI: 10.1093/gji/ggx048.
6. Eibl, E.P.S., C.J. Bean, K.S. Vogfjörd, Y. Ying, I. Lokmer, M. Möllhoff, G.S. O'Brien, F. Pálsson, 2017. Tremor-rich shallow dyke formation followed by silent magma flow at Bárdarbunga in Iceland, Nature Geoscience 10 (4), 299-304, DOI: 10.1038/NGEO2906.
7. Einspigel, D., and Z. Martinec, 2017. Time-domain modeling of global ocean tides generated by the full lunisolar potential. Ocean Dynamics, 67, 165–189.
8. Fullea, J., 2017. On joint modelling of electrical conductivity and other geophysical and petrological observables to infer the structure of the lithosphere and underlying upper mantle. Surveys in Geophysics 38, 963-1004.
9. Jones, A.G., J.C. Afonso, and J. Fullea, 2017. Geochemical and geophysical constrains on the dynamic topography of the Southern African Plateau. Geochemistry, Geophysics, Geosystems 18, 3556-3575.
10. Kiyan D., V. Rath and R. Delhaye, 2017. An inversion toolbox for frequency- and time-domain airborne electromagnetic data from surveys in Ireland. EAGE, Near Surface Geoscience Conference & Exhibition, Second European Airborne Electromagnetics, Malmo, Sweden, 3-7 September, doi:10.3997/2214-4609.201702178.
11. Lebedev, S., A.J. Schaeffer, J. Fullea, and V. Pease, 2017. Seismic tomography of the Arctic region: inferences for the thermal structure and evolution of the lithosphere. *In* Pease, V. & Coakley, B. (eds.) *Circum-Arctic Lithosphere Evolution.* Geological Society, London, Special Publications, 460, SP460-10.
12. Le Pape, F., A.G. Jones, M.W. Jessell, S. Perrouty, L.A. Gallardo, L. Baratoux, C. Hogg, L. Siebenaller, A. Touré, P. Ouiya and G. Boren, 2017. Crustal structure of southern Burkina Faso inferred from magnetotelluric, gravity and magnetic data, Precambrian Research, 300, 261-272.
13. Licciardi, A. and N. Piana Agostinetti, 2017. Sedimentary basin exploration with receiver functions: seismic structure and anisotropy of the Dublin Basin (Ireland), *Geophysics*, 82 (4), doi:10.1190/geo2016-0471.1.
14. Pellet, L., P. Christodoulides, S. Donne, C.J. Bean, F. Dias, 2017. Pressure induced by the interaction of water waves with nearly equal frequencies and nearly opposite directions, Theoretical and Applied Mechanics Letters (7) 3, 138-144, DOI: 10.1016/j.taml.2017.04.002.
15. Piana Agostinetti, N., A. Licciardi, D. Piccinini, F. azzarini, G. Musumeci, G. Saccorotti and C. Chiarabba, 2017. Discovering geothermal supercritical fluids: a new frontier for seismic exploration, *Scientific Reports*, 7, 14592, doi:10.1038/s41598-017-15118-w.
16. Piana Agostinetti, N., G. Giacomuzzi, and C. Chiarabba, 2017. Seismic swarms and diffuse fracturing within Triassic evaporites fed by deep degassing along the low-angle Alto Tiberina normal fault (central Apennines, Italy), *J. Geophys. Res.,* 122, 308-331, doi:10.1002/2016JB013295.
17. Prada, M., F. Lavoué, B. O'Reilly, S. Lebedev, Y.O. Yuan, C. Gras, 2017. High-resolution seismic velocity structure of the shallow Porcupine Basin from traveltime tomography and waveform inversion of long-streamer data. In *AAPG/SEG ICE Extended Abstracts*, London, 2017.
18. Prada, M., L. Watremez, C. Chen, B.M. O'Reilly, T.A. Minshull, T.J. Reston, P. Shannon, D. Klaeschene, G. Wagner and V. Gaw, 2017. Crustal strain-dependent serpentinisation in the Porcupine Basin, offshore Ireland. Earth and Planetary Science Letters, 474, 148-159. http://dx.doi.org/10.1016/j.epsl.2017.06.040.

19. Ravenna, M., S. Lebedev, 2017. Bayesian inversion of surface-wave data for radial and azimuthal shear-wave anisotropy, with applications to central Mongolia and west-central Italy. *Geophys. J. Int.*, ggx497, https://doi.org/10.1093/gji/ggx497.

20. Vanicek, P., P. Novak, M. Sheng, R. Kingdon, J. Janak, I. Foroughi, Z. Martinec, and M. Santos, 2017. Does Poisson's downward continuation give physically meaningful results? Studia Geophys. Geod., 61, 412–428.

21. Watremez, L., M. Prada., T. Minshull., B. O'Reilly., C. Chen., T. Reston., P. Shannon., G. Wagner., V. Gaw., D. Klaeschen., R. Edwards and S. Lebedev, 2017. Deep structure of the Porcupine Basin from wide-angle seismic data. In: Bowman, M. & Levell, B. (eds) Petroleum Geology of NW Europe: 50 Years of Learning – Proceedings of the 8th Petroleum Geology Conference Geological Society, London, Petroleum Geology Conference series, 8. First published online 27 October 2016. https://dx.doi.org/10.1144/PGC8.26.

Standard conference abstracts

1. Arroucau, P., J. Grannell, S. Lebedev, C. Bean, M. Möllhoff, C. Horan, T. Blake, 2017. Towards a better characterization of Ireland's seismicity. Talk, 5 March, 2017. 60th Irish Geological Research Meeting, TCD, 3-5 March 2017.

2. Arroucau, P., J. Grannell, S. Lebedev, C. Bean, M. Möllhoff, C. Horan, T. Blake, 2017. New earthquake detections in Ireland from waveform template matching by cross-correlation. Talk, 6 April, British Seismology Meeting (BSM2017), 5th-7th April 2017, Reading Town Hall, UK.

3. Arroucau, P., J. Grannell, S. Lebedev, C.J. Bean, M. Möllhoff, T. Blake and C. Horan 2017, April. New, low magnitude earthquake detections in Ireland and neighbouring offshore basins by waveform template matching. In EGU General Assembly Conference Abstracts (Vol. 19, p. 16501).

4. Arroucau, P., S. Lebedev, C.J. Bean, J. Grannell, 2017. High resolution seismic tomography imaging of Ireland with quarry blast data, Talk, AGU Fall Meeting, New Orleans, 11-15 December, 2017.

5. Baykiev, E., M. Guerri and J. Fullea, 2017. The lithospheric structure beneath Ireland and surrounding areas from integrated geophysical-petrological modelling of magnetic and other geophysical data, AGU Fall Meeting 2017, New Orleans, USA.

6. Bean, C.J., J. Thun, E.P.S. Eibl, P.M. Benson, P. Rowley, I. Lokmer, L. Cauchie, 2017. Near Field Observations of Seismicity in Volcanic Environments: A Read-Made Field Laboratory, AGU Fall Meeting 2017, New Orleans, USA.

7. Bean, C.J., et al, Emergent Research at iCRAG, iCRAG Industry Conference 2017.

8. Bean, C.J., et al, Geophysics Platform, iCRAG Mid Term Site Review, 2017.

9. Bean, C.J., et al, Observed Temporal Changes in Noise Sources and Seismic Wavepaths, Invited Seminar at ETH, France, 2017.

10. Bean, C.J., I. Lokmer, Shallow seismicity in volcanic system: what role does the edifice play? EGU (European Geosciences Union), Vienna, Austria, April 2017.

11. Bianchi, I., M. Miller, N. Piana Agostinetti, and L. O'Driscoll, 2017. The lithosphere structure beneath the central Mediterranean from S receiver functions, Geophysical Research Abstracts, 19, EGU2017-18896-1, EGU General Assembly.

12. Bonadio, R., W.H. Geissler, M. Ravenna, S. Lebedev, W. Jokat, M. Jegen, C. Sens-Schönfelder, K. Baba, 2017. Structure of the lithosphere-asthenosphere system in the vicinity of the Tristan da Cunha hot spot as seen by surface waves. Talk, 4 March, 2017. 60th Irish Geological Research Meeting, TCD, 3-5 March 2017.

13. Bonadio, R., W.H. Geissler, M. Ravenna, S. Lebedev, N.L. Celli, W. Jokat, M. Jegen, C. Sens-Schönfelder and K. Baba, April 2017. Structure of the lithosphere-asthenosphere system in the vicinity of the Tristan da Cunha hot spot as seen by surface waves. In EGU General Assembly Conference Abstracts (Vol. 19, p. 16520).

14. Bonadio, R., W.H. Geissler, M. Ravenna, S. Lebedev, W. Jokat, M. Jegen, C. Sens-Schönfelder, K. Baba, 2017. Asthenospheric Temperature and Lithospheric Thickness Beneath the Tristan da Cunha Hotspot From Probabilistic Inversion of Surface-Wave Dispersion Data and Petrological Modeling, Poster, AGU Fall Meeting, New Orleans, 11-15 December, 2017.

15. Bonadio, R., W. Geissler, S. Lebedev, J. Fullea, M. Ravenna, N. Celli, W. Jokat, C. Sens-Schönfelder, K. Baba, 2017. Hotspot From Probabilistic Inversion of Surface-Wave Dispersion Data and Petrological Modeling. AGU Fall Meeting, 2017, New Orleans, USA.

Scoil na Fisice Cosmaí (ar lean)

16. Botter, Ch., M. Prada Dacasa, J.Fullea, 2017. Thermodynamic, geophysical and rheological modeling of the lithosphere underneath the North Atlantic Porcupine Basin (Ireland). AGU Fall Meeting 2017, New Orleans, USA.
17. Celli, N., S. Lebedev, A. Schaeffer, C. Gaina, 2017. Waveform Tomography of the North Atlantic Region. Talk, 4 March, 2017. 60th Irish Geological Research Meeting, TCD, 3-5 March 2017.
18. Celli, N., S. Lebedev, A. Schaeffer, C. Gaina, 2017. Waveform tomography of the South Atlantic, Africa and South America. Talk, 12 July, 2017. Training school of the EU COST Action TIDES (Time Dependent Seismology). Oxford, 10-14 July, 2017.
19. Celli, N., S. Lebedev, A. Schaeffer, M. Ravenna, C. Gaina, 2017. Imaging the lithosphere and underlying mantle of the South Atlantic, South America and Africa using waveform tomography with massive datasets, Talk, AGU Fall Meeting, New Orleans, 11-15 December, 2017.
20. Chiarabba, C., G. Giacomuzzi and N. Piana Agostinetti, 2017. Velocity Gradient Across the San Andreas Fault and Changes in Slip Behavior as Outlined by Full non Linear Tomography, AGU Fall Meeting, New Orleans, USA.
21. Chiarabba, C., N. Piana Agostinetti, and I. Bianchi, 2017. Lithospheric structure and kinematic decoupling across the Pollino range, Geophysical Research Abstracts, 19, EGU2017-7669, EGU General Assembly.
22. Craig, D., C.J. Bean, S. Donne, F. Le Pape, M. Möllhoff, 2017. Microseism Source Distribution Observed from Ireland, (2017) EGU (European Geosciences Union), Vienna, Austria, April 2017.
23. Craig, D., et al, 2017. Mapping of Noise Source Areas and Trialling of Noise Correlation Methods in the Marine Environment, Offshore Ireland, iCRAG Mid Term Site Review, 2017.
24. Craig, D., 2017. Microseism Source Distribution Observed from Ireland, Atlantic Ireland Conference, Dublin, 2017.
25. Diferia, G. F. Cammarano, N. Piana Agostinetti, C. Gao, L. Boschi and I. Molinari, 2017. Seismic and thermodynamics constraints on temperature and composition of the Italian crust, AGU Fall Meeting, New Orleans, USA.
26. Donne, S. et al, 2017. Monitoring the Northeast Atlantic Wave Climate Using Land Based Seismic Signals, Ireland, Invited Talk at Met Eireann, Dublin, Ireland, 2017.
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School of Theoretical Physics

Scoil na Fisice Teoiriciúla

Scoil na Fisice Teoiriciúla

1. Taighde agus eolas nua

Cuireadh tús le dhá réimse taighde go luath sa 20ú haois atá fós ríthábhachtach lenár linn féin: an fhisic chandamach agus treoir gheoiméadrach na himtharraingthe. Leanfaidh an fhisic chandamach de thionchar mór a bheith aige ar ár saol laethúil, ach is í ár mian chun tuisceana is mó a shásaítear ag staidéar ar dhúphoill agus cosmeolaíocht. Measaimid go ndéanfar an dá réimse a chumasc amach anseo, mar sin déanaimid an dá cheann a chothú i Scoil na Fisice Teoiriciúla.

Is é an chéad chuspóir mór eile san fhisic chandamach ríomh candamach a bhaint amach. Is iad Manin sa Rúis agus Feynman sna Stáit Aontaithe i 1980 a d'fhógair, neamhspleách óna chéile, go mb'fhéidir go mbeadh ríomh níos cumhachtaí ann ná mar a d'fhéadfadh gnáthríomhairí a dhéanamh, ach téann an smaoineamh níos faide siar ná sin. Leag Einstein béim ar an struchtúr ábhartha sa mheicníocht chandamach i litir a scríobh sé chuig Schrödinger i 1935. Spreag an litir sin Schrödinger le 'haiteas' candamach a léiriú leis an gcat cáiliúil. Tá an cat beo agus marbh ag an am céanna, a fhad is nach bhfuil aon duine ag féachaint air. Chun cur síos a dhéanamh ar an tréith seo ar bhealach matamaiticiúil, d'fhorbair Schrödinger coincheap an fhostaithe. Ó 1970, tugtar díleanúnachas ar scrios an fhostaithe trí fhéachaint ar an gcat. Sa bhliain 1935 ba cleachtadh acadúil an staidéar, ach sa lá atá inniu ann táthar ag iarraidh cáithníní fostaithe chun ábhair nua, drugaí nua agus neart eile a dhearadh. Cuirfidh an tAontas Eorpach thar ar bhilliún euro ar fáil in 2018-2028 don togra sin, ar a dtugtar clár suaitheanta Eorpach um theicneolaíochtaí candamacha.

Beidh tábhacht le ríomh candamach do thodhchaí na tíre. Thóg sé deich mbliana orainn aitheantas a fháil ar an scéal sin, ach i ,í na Samhna 2016 fuair ár gcomhalta Schrödinger Graham Kells Gradam Forbartha Gairme ó SFI chun obair a dhéanamh sa réimse seo. Idir an dá linn tá sé i gceannas ar ghrúpa taighde leis an mac léinn iardhochtúireachta Shane Dooley agus mic léinn PhD Luuk Coopmans agus Kevin Kavanagh, agus maoiniú ceithre bliana acu uile. Tá sé ina chomh-mhaoirseoir freisin ar mhac léinn ag OÉ Má Nuad in éineacht le Joost Slingerland ó Mhá Nuad, iarchomhalta na scoile a bhfuil spéiseanna an-ghaolmhar aige. Sa chéad chéim eile cuirfear tuilleadh daoine óga ar an eolas faoi thréithe ollmhóra agus beaga na ríomhaireachta candamaí, ag baint úsáide as na hardáin ríomhaireachta candamaí a chuireann Google agus IBM ar fáil.

Tá formhór na staideanna fostaithe leochaileach, toisc go bhfuil neart bealaí ag an nádúr le díleanúnachas a bhaint amach. Bealach amháin a bheadh ann chun an fhadhb seo a réiteach ná cosaint an-éifeachtach ag na staideanna seo ar thionchar seachtrach. Seo é an cur chuige a ghlacann formhór na bpáirtithe leasmhara, IBM agus Google san áireamh. B'fhéidir go mbeidh fadhb na hinnealtóireachta chomh deacair is atá don chomhleá núicléach mar fhoinse cumhachta, áfach. San STP measaimid gur mó na féidearthachtaí a bhaineann leis an ríomh candamach toipeolaíoch. Leis an gcur chuige seo tá sé ar intinn obair le faisnéis chandamach atá istigh i ngeoiméadracht fhadraoin agus i bhfolach ó aon iarracht locáilte í a fheiceáil. Ar chúiseanna doimhne matamaiticiúla ní mór d'fhaisnéis den chineál sin a bheith ann i gcórais atá íonghlan a dhóthain de staideanna candamacha codánacha Hall, á n-iompar ag cuasacháithníní speisialta. I gcóras déthoiseach den chineál sin dhéanfaí ríomh go simplí trí na cuasacháithníní a rothlú timpeall ar a chéile ag fad sábháilte. Faoi láthair is beag iarrachtaí atá ann chun an smaoineamh seo a leanúint, toisc nach mór do na staideanna candamacha codánacha Hall teochtaí an-íseal a bheith ann agus go raibh sé deacair an íonacht riachtanach a bhaint amach. B'fhéidir go bhfuil mais chriticiúil ann fós de thaighdeoirí a bhfuil suim acu sa chur chuige seo, ach níor mhór na hacmhainní sna Stáit Aontaithe agus san Eoraip a chur le chéile. Luamar an smaoineamh nuair a thug Tommaso Calarco, ceannaire ar an gclár suaitheanta Eorpach um theicneolaíochtaí candamacha, cuairt ar Bhaile Átha Cliath i Meán Fómhair 2017, ach dúirt sé linn gur beag spás atá sa tionscnamh Eorpach do chomhoibríochtaí den chineál sin.

School of Theoretical Physics

1. Research and new knowldege

Two fields of research were started in the early 20th century, but remain crucial in our time: quantum physics and the geometric theory of gravity. Quantum physics will continue to have a large impact on our daily lives, whereas a study of black holes and cosmology mainly satisfies our wish to understand. We expect that the two areas will merge in the future, so we cultivate both at the School of Theoretical Physics.

The next big aim in quantum physics is the realisation of quantum computation. In 1980 the possibility of more powerful computations beyond the capacity of ordinary computers was independently announced by Manin in Russia and Feynman in the USA. This idea, however, has deeper roots. The relevant structure in quantum mechanics was emphasised by Einstein in a letter to Schrödinger written in 1935. The letter motivated Schrödinger to illustrate quantum 'weirdness' with his famous cat. The cat is simultaneously alive and dead, as long as noone is looking. To describe this feature in a mathematical way, Schrödinger developed the concept of entanglement. Since 1970, the destruction of entanglement by looking at the cat is called decoherence. In 1935 the study was an academic exercise, but today one wants to use entangled particles for the design of new materials, new drugs and much more. The European Union will provide about one billion euro from 2018-2028 for the project, entitled the European Quantum Technologies Flagship Programme.

Quantum computation is important for the future of the country. It took us ten years to get that recognised, but in November 2016 our Schrödinger fellow Graham Kells obtained a Career Development Award from SFI to work in this area. Meanwhile he leads a research group with postdoc Shane Dooley and PhD students Luuk Coopmans and Kevin Kavanagh, all with funding for four years. He also co-supervises a student at NUI Maynooth with Joost Slingerland (NUI Maynooth), a former fellow of our school with closely related interests. The next step is to familiarise more young people with the great and small features of quantum computation, using the simulated quantum computation platforms provided by Google and IBM.

Most entangled states are fragile, since nature has many ways to achieve decoherence. One way to solve this problem would be a very efficient shielding of these states from outside influence. This is the approach followed by most stakeholders, including IBM and Google. The engineering problem may be as difficult as it is for nuclear fusion as a power source, however. At STP we consider topological quantum computation more promising. In this approach one intends to work with quantum information that is contained in long-range geometry and hidden from any localised attempt to see it. For deep mathematical reasons such information must exist in sufficiently pure systems of fractional quantum Hall states, carried by special quasi-particles. Calculation in such a two-dimensional system would be performed by simply moving the quasi-particles around each other at a safe distance. Currently there is not much effort in pursuing this idea, since the fractional quantum Hall states need very low temperatures and the required purity proved difficult to achieve. There may still be a critical mass of researchers interested in this approach, provided that the resources in the US and Europe come together. We raised the idea when Tommaso Calarco, a leader of the European Quantum Technologies Flagship Programme, who visited Dublin in September 2017; however, he informed us that the European initiative provides little room for such cooperations.

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Thus, we can only follow Microsoft and the current trend to use one-dimensional systems (wires) instead of two-dimensional ones. In wires the existence of suitable quasi-particles has been experimentally confirmed.

Scoil na Fisice Teoiriciúla (ar lean)

Mar sin, níl de rogha againn ach dul le Microsoft agus an nós reatha le húsáid a bhaint as córais aontoiseacha (sreangáin) seachas cinn dhéthoiseacha. I sreangáin, tá deimhniú turgnamhach déanta gurb ann do chuasacháithníní oiriúnacha. Tá na príomhthaighdeoirí Eorpacha atá páirteach sa taighde seo fostaithe ag Microsoft. In aon toise amháin níl aon bhealach le cáithníní a bhogadh timpeall a chéile, áfach. Beidh gá le lasca, mar atá do thraenacha ar ráillí, agus b'fhéidir go mbeidh na lasca seo ina gcúis le díleanúnachas. Beidh gá le tuiscint mhionsonrach mhicreascópach ar na cuasacháithníní chun staidéar a dhéanamh ar ab bhfadhb seo. Rinne Graham Kells agus a ghrúpa dul chun cinn maith chun an tuiscint sin a fháil. Tá aitheantas idirnáisiúnta bainte amach aige agus nótáladh páipéar a raibh sé ina chomhúdar air mar 'Rogha an Eagarthóra' in eagrán Mheithimh 2017 de *Physical Review B*. Scrúdaíonn an páipéar na castachtaí a bhaineann le fisic na gcuasacháithníní ábhartha i sreangáin. Bíonn a gcuid airíonna, agus a mbeithsine féin, fiú, ag brath go láidir ar pharaiméadair an chórais, tuairim a bhfuil an-tábhacht léi, ar ndóigh, I mí Lúnasa 2017 rinne páipéar eile le Graham staidéar ar struchtúr spásúil agus ilcháithníní na gcuasacháithníní den chineál sin i slabhra Kitaev le hidirghníomhaíochtaí áitiúla. Arís, bhí an iompraíocht an-chasta go deo, le codarsnacht shuntasach idir thionchar an easoird idir dhá réigiún i spás paraiméadair.

Traidisiún láidir in STP is ea an staidéar ar an ngaol idir an imtharraingt agus na fórsaí eile, ceist a ndearna Schrödinger foilsiú ina leith agus é ina stiúrthóir ar STP. Ní mór gluaiseacht níos faide amach ón tsamhail chaighdeánach, ach léirigh an t-imbhuailteoir mór hadróin nach ann d'fhisic nua shuntasach, fiú ag na fuinnimh is airde atá inrochtana faoi láthair. Faoi láthair ní thaispeánann ach an damhna dorcha sa chruinne go dosheánta go bhfuil fisic nua ann atá fós le haimsiú. Beidh dul chun cinn críochnúil ag brath ar tuilleadh breathnuithe, b'fhéidir cheana féin sna breathnuithe d'íogaireacht níos airde ar radaíocht domhan imtharraingthe ag LIGO/VIRGO ag tosú go luath in 2019. Faoi láthair ní féidir linn ach scrúdú a dhéanamh ar fhéidearthachtaí matamaiticiúla nua agus léargas nua struchtúrtha a fháil ar theoiricí seanbhunaithe. D'aimsigh an comhalta Schrödinger Leron Borsten breis tacaíochta don smaoineamh gur féidir teoiricí imtharraingthe a fháil trí theoiricí dhá thomhas a chumasc i 3, 4, 6 nó 10 dtoise. Do thrí thoise tá foirm an chumaisc ag teacht le foirm na n-ailgéabar roinnte i gcearnóg draíochta Freudenthal. Do thoisí níos airde leathnaíonn an chearnóg amach chuig pirimid, ar a thug Borsten agus a chomhúdair pirimid dhraíochta.

Mar thoradh ar an gcumhacht mhéadaithe ríomhaireachta atá ar fáil anois, is féidir tástálacha i bhfad níos déine a dhéanamh ar shean-tograí i dtaca le imtharraingt chandamach. Baineann na cinn is tábhachtaí le déachtaí a nascann imtharraingt agus teoiric tomhais ar thaobh amháin, agus maitrísí agus scannáin ar an taobh eile. Bhain grúpa Denjoe O'Connor amach neart torthaí sa dá réimse seo, le roinnt foilseachán in 2017, lena n-áirítear páipéir le Denjoe, Yuhma Asano, Samuel Kovacik agus Veselin Filev. Go háirithe, rinneadh staidéar ar phas-trasdulta sa tsamhail maitríse BMN. Tugann trasdul amháin sféire shoiléire, tugann ceann eile an chéim M5-scannán a bhfuiltear ag súil leis ó M-theoiric. Fuair Veselin post le déanaí i Acadamh Eolaíochtaí na Bulgáire, ach leanann sé dá chomhoibriú le Denjoe. Tacaíonn a gcuid ríomhanna leis na tuairimí maidir le déacht, ach d'ardaigh easpa na sárshiméadrachta ag fuinnimh LHC ceisteanna maidir le hábharthacht fhisiciúil na M-theoirice. Mar sin, mhéadaigh ar an tábhacht atá le cur chuige roghnach le himtharraingt chandamach le tacar cúisíoch. In éineacht le comhoibrithe eile, tá foilsiú déanta ag Denjoe sa réimse seo freisin. Is iad na torthaí suntasacha ná tairiseach cosmeolaíoch ag teacht chun cinn agus méid bheag an chórais atá imleor chun an freagra ceart a fháil. Scrúdaigh an comhalta IRC Kovacik féidearthacht níos coimhthíche agus mhol aonpholaigh mhaighnéadacha neamhchómhalartacha mar fhéidearthachtaí do dhamhna dorcha. D'fhoilsigh an comhalta IRC Dionigi Benincasa saothar maidir le tacair chúisíocha ó thaobh na faisnéise candamaí de, is é sin eantrópacht fostaithe na réimsí candamacha.

Cuirean ár scoil timpeallacht chairdiúil ar fáil freisin do chomhaltaí níos sine, a bhfuil smaointe acu nach bhfuil chomh coimthíoch sin ach a mhairfidh níos faide, b'fhéidir. Léirigh Charles Nash in obair mhatamaiticiúil in éineacht le Denjoe go bhfuil samhlacha démhéire ar ghraif nó laitísí gaolta le K-theoiric ar an tóras. In éineacht lenár gcuairteoir rialta Eugen Radu ón bPortaingéil, d'fhoilsigh Tigran Tchrakian ceithre pháipéar ar skyrmions, cuilithí agus dúphoill i láthair na n-idirghníomhaíochtaí Higgs

School of Theoretical Physics (continued)

Microsoft has hired the leading European researchers who are involved in these investigations. In one dimension there is no way to move particles around each other, however. To achieve this, one requires switches, as used for trains on rails. This switching may then lead to decoherence.

A detailed microscopic understanding of the quasi-particles is necessary to study this problem. Graham Kells and his group made good progress in achieving that understanding. He has obtained international recognition and a paper co-authored by him was noted as the 'Editor's Suggestion' in the June 2017 issue of Physical Review B. The paper explores the complexities of the physics of the relevant quasi-particles in wires. Their properties and even their existence depend strongly on the parameters of the system, an observation of obvious importance.

In August 2017 a further paper by Graham investigated the spatial and multiparticle structure of such quasi-particles in a Kitaev chain with local interactions. Again the behaviour was remarkably complex, with a striking contrast of the effect of disorder between two regions in parameter space.

A strong tradition at STP is the study of the relationship between gravity and the other forces, a subject on which Schrödinger was published while he was director of STP. One needs to move beyond the standard model, but the Large Hadron Collider shows that there is no major new physics even at the highest currently accessible energies. For the moment only the dark matter in the universe shows uncontrovertibly that new physics is waiting to be found. Decisive progress will depend on more observations, perhaps already in the higher sensitivity observations of gravitational radiation by LIGO/VIRGO – starting in early 2019. At present all we can do is explore new mathematical possibilities to gain new structural insights in established theories.

Schrödinger fellow Leron Borsten found further support for the idea that gravitational theories can be obtained by combining two gauge theories in either 3,4,6 or 10 dimensions. For three dimensions the form of the combination agrees with that of division algebras in Freudenthal's magic square. For higher dimensions this square extends to a pyramid, dubbed the 'magic pyramid' by Borsten and his co-authors.

The increased computing power available now allows much more stringent tests of old proposals concerning quantum gravity. The most important ones concern dualities that relate gravity and gauge theory on one hand, and matrices and membranes on the other. Denjoe O'Connors group had success in both of these fields, with several publications in 2017, including papers by Denjoe, Yuhma Asano, Samuel Kovacik and Veselin Filev. In particular, phase transitions in the BMN matrix model were investigated. One transition yields fuzzy spheres, another the M5-brane phase expected from M-theory. Veselin recently got a position at the Bulgarian Academy of Sciences, but continues his collaboration with Denjoe.

Their calculations support the duality conjectures, but the lack of supersymmetry at LHC energies raised a question mark concerning the physical relevance of M-theory. Thus an alternative approach by causal set quantum gravity gained relevance. Denjoe and co-collaborators have published in this subject area also. Results showing the emergence of a cosmological constant and the small system size which is sufficient to get the correct answer, have been striking.

School of Theoretical Physics Statutory Public Lecture, Prof. Luciano Rezzolla

Léacht Reachtúil Scoil na Fisice Teoiriciúla, An tOll. Luciano Rezolla

IRC fellow Kovacik investigated a more exotic possibility and suggested non-commutative magnetic monopoles as dark matter candidates. IRC fellow Dionigi Benincasa published work on causal sets from the point of view of quantum information, namely the entanglement entropy of quantum fields.

Our school also provides a congenial environment for older associates, whose ideas are less exotic but may well live longer. Charles Nash has showed in mathematical work, together with Denjoe, that dimer models on graphs or lattices are related to K-theory on the torus.

agus Chern-Simons. Rinne Brian Dolan airíonna teirmidinimiciúla dúpholl a dhíorthú, ag leanúint líne smaointeoireachta a thosaigh Stephen Hawking.

Tá an líne taighde teirmidinimiciúil seo ar cheann de na príomhchúiseanna leis an gcreideamh go ndéanfar fiosruithe ar fhisic chandamach agus imtharraingt a chumasc sa deireadh thiar thall. Tá naisc dhoimhne idir coincheap na heantrópachta agus tomhas na faisnéise, rud a mhíníonn an tábhacht, nach bhfuil laghdaithe, atá le teirmidinimic san fhisic. Sa réimse seo, leathnaigh Tony Dorlas cruthúnas Dobruschin ar staid uathúil Gibbs do chórais laitíse le hidirghníomhaíochtaí oiriúnacha chuig rang i bhfad níos leithne, bunaithe ar thuiscint mhatamaiticiúil níos soiléire ar an gcruthú.

Oibríonn an scoláire Marianne Leitner agus Werner Nahm ar thuiscint ar theoiric réimse candamach Eoiclídeach atá níos inrochtana do mhatamaiticeoirí. Is í an uirlis bhunúsach an fheidhm rannach ar spásann le geoiméadracht threallach. Den chuid ba mhó, rinneadh staidéar ar theoiricí réimse candamacha ar spás réidh, ach tugann an taithí le teoirid na dteaghrán agus, thar aon ní eile, déacht AdS/CFT, le tuiscint gur féidir tuiscint níos fearr a fháil trí chúlraí cuartha a ligean isteach. Sa nádúr, maireann réimsí candamacha ar chúlraí cuartha ar aon nós, cé go bhfuil na cuarthaí beag. Dar le Einstein, tugtar an réimse fuinnimh-móimintim ag an díorthach i dtaca leis an méadrach. Le ginearálú ar choincheap an díorthaigh chun ionsá de phaistí beaga le toipeolaíocht threallach, is féidir réimsí uile teoirice a fháil. Sa teanga seo déantar feidhmeanna rannacha a phiocadh amach i measc na bhfeidhmeanna go léir ar spás na méadrach ar an mbealach céanna ina ndéantar iltéarmaigh a phe dhíorthaigh neamhspleácha. Cheana féin, do na samhlacha íosta in dhá dhminsean tugann an cur chuige seo torthaí suntasacha nua matamaiticiúla, a cuireadh i láthair ag ceardlann mhatamaiticiúil in Oberwolfach. Dála an scéil, bhain an léacht díreach ina dhiaidh sin a thug Stavros Garoufalidis agus Don Zagier le “suimeanna Nahm” agus cuireadh i láthair torthaí a dhearbhaigh tuairim a léirigh Nahm breis agus cúig bliana déag ó shin.

Ní féidir leis an tóir ar bhuneolas nua cur orainn dearmad a dhéanamh go bhfuil an domhan á chur i dtreo na géarchéime tromchúisí ag an duine daonna. I bhformhór na dtíortha tá eolas faoin bhfisic chandamach agus éabhlóid ina chuid den oideachas caighdeánach, ach tá tuilleadh de dhíth. Tá an t-athrú aeráide i réigiúin na mol ag teacht chomh daongean sin le tuartha a rinneadh sa chéad deireanach go bhfuil an ghné seo den athrú aeráide oiriúnach do leabhair scoile, freisin. Is é an rud atá i bhfad níos éiginnte ná an tionchar amach anseo aran tsochaí daonna, fadhb sa chomhéadan idir an eolaíocht agus na daonnachtaí. Measann Nahm go bhfuil samplaí stairiúla ann, a bhféadfadh staidéar orthu cuidiú le hullmhú d’eachtraí níos faide amach sa chéad seo. I ndiaidh chríoch thobann na hoighearaoise deiridh lean athruithe san aeráid ar feadh roinnt mílte bliain, agus bhuail na trí cinn dheireanacha na stáit luaithe sa Mheaspatáim agus san Éigipt. Bhí a dtréimhsí sin ag teacht go garbh le réanna dorcha cáiliúla i stair na dtíortha seo, a raibh sé mar thréithe acu, mar shampla, gur tharla imircí móra agus gur tréigeadh na cathracha go léir i ndeisceart na Measpatáime ar feadh tréimhse fada. Níl an nasc seo idir aeráid agus stair shóisialta réidh le cur sna leabhair scoile fós - go háirithe, ní mór níos mó ná comtharlú garbh san am a léiriú. Fiú inniu, deir Wikipedia go bhfuil éiginnteachtaí an-mhór ann do dhátaí stairiúla roimh 1000 BC. Rinne taighde le Nahm, a foilsíodh sa bhliain 2013, cinneadh ar an gcroineolaíocht cheart Shean-Bhablónach ag baint úsáide as deindreacroineolaíocht agus breathnuithe ar Véineas agus urú gréine. B’fhéidir gur bliain chinniúnach ab ea 2017 do ghlacadh an toradh toisc, san iris Journal of Ancient Egyptian Interconnections ghlac na speisialtóirí is mó ó Cornell agus Harvard le gné Véinis ar a laghad (imleabhar 13, lgh. 70-81). Ach le bheith slán ó thaobh an eolais eolaíochta a nglactar leis, áfach, ní mór ceist an uraithe gréimse a réiteach freisin. Sa chroinic bhloghach Aisiarach ina luaitear an t-urú tá roinnt iontrálacha faoi ríocht Eshnunna, céile comhraic le Babalóin Hammurabi, a d’fhéadfadh an nasc ceilte le croineolaíocht na Babalóine a nochtadh. Mar sin tá staidéar déant ag Nahm ar stair Eshnunna agus roinnt nótaí foilsithe aige faoi. Is é an príomhbhac ar réiteach deiridh ar an gceist neamhinrochtaineacht an ábhair i neart músaem sa Neasoirthear, go príomha agus ní go hiomlán mar gheall ar an gcogadh a leanann ar aghaidh.

2. Na disciplíní a láidriú go náisiúnta

I bhfianaise na spéise atá ag bpobal i bhfisceoirí ar nós Einstein agus Schrödinger, spéis atá leanúnach agus tuillte go maith, tá sé tábhachtach cur síos inrochtana agus cruinn a thabhairt ar a gcuid

School of Theoretical Physics (continued)

Together with our frequent visitor Eugen Radu from Portugal, Tigran Tchrakian published four papers on skyrmions, vortices and black holes in the presence of Higgs and Chern-Simons interactions.

Brian Dolan derived thermodynamic properties of black holes, following a line of thought initiated by Stephen Hawking.

This thermodynamical line of research is one of the major reasons for the conviction that investigations into quantum physics and gravity eventually will merge. The concept of entropy and the measurement of information have deep links, a fact that explains the undiminished importance of thermodynamics in physics.

In this area, Tony Dorlas extended Dobruschin's proof of a unique Gibbs state for lattice systems with suitable interactions to a much broader class, based on a clearer mathematical understanding of the construction.

Scholar Marianne Leitner and Werner Nahm worked on an understanding of Euclidean quantum field theory that is more accessible to mathematicians. The basic tool is the partition function on spaces with arbitrary geometry.

Mostly, quantum field theories were studied on flat space, but the experience with string theory and above all AdS/CFT duality suggests that a better understanding can be gained by admitting curved backgrounds. In nature, quantum fields exist on curved backgrounds, though the curvatures are small. According tio Einstein, the energy-momentum field is given by the derivative with respect to the metric. By generalising the concept of derivative to involve insertion of small patches with arbitrary topology one can obtain all fields of a theory.

In this language the partition functions are singled out among all functions on the space of metrics in the same way as polynomials are singled out among all smooth functions: they allow the smallest number of independent derivatives. This approach has already achieved striking new mathematical results in the study of minimal models in two dimensions, which were presented at a mathematical workshop in Oberwolfach. Incidentally, the following talk by Stavros Garoufalidis and Don Zagier concerned "Nahm sums" and presented results which confirm a conjecture made by Nahm more than fifteen years ago.

The pursuit of new basic knowledge cannot make us forget that humanity is steering the planet into a severe crisis. In most countries knowledge of quantum physics and evolution is part of standard education, but more is needed. Climate change in the polar regions corresponds so closely to predictions made in the last century that it could conceivably be taught at elementary level. What is much less certain is the coming impact on human society, a problem on the interface between science and the humanities. Nahm thinks that there are historical precedents, whose study may help to prepare for events later in this century. After the abrupt end of the last ice age swings in climate continued for several millenia, and the last three of them hit the early civilisations of Mesopotamia and Egypt.

Their timing roughly coincides with well-known dark ages in the history of these civilisations, characterised for example by large scale migrations and the long-term abandonment of all cities in Southern Mesopotamia. This connection between climate and social history is not yet for elementary study, however. In particular, one needs more than a rough coincident in time. Even today, Wikipedia proclaims very large uncertainties for historical dates before 1000 b.c.

Research by Nahm published in 2013 determined the correct Old Babylonian chronology using dendrochronology and observations of Venus and a solar eclipse. 2017 may have been crucial for the acceptance of the result, since in the Journal of Ancient Egyptian Interconnections and the leading specialists from Cornell and Harvard accepted at least the Venus aspect (vol 13, p. 70-81).

To reach the stable waters of accepted scientific knowledge, the issue of the solar eclipse must be resolved too, however. The fragmentary Assyrian chronicle that mentions the eclipse has several entries about the kingdom of Eshnunna, a rival of Hammurabi's Babylon, which may yield the missing link to Babylonian chronology. Therefore, Nahm has studied the history of Eshnunna and has published several notes about it. The major obstacle to a final resolution of the issue is the inaccessibility of the material in several museums in the Near East, mainly but not entirely due to the ongoing war.

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saothair. Tá formhór atá scríofa ina leith míchruinn nó inrochtana do speisaltóirí amháin. Mar sin tá an-mheas ar thaighde ár gcomhalta Cormac O'Raifeartaigh (Institiúid Teicneolaíochta Phort Láirge) agus is fiú tacú leis. Sa bhliain 2017 scríobhadh an t-alt *"One Hundred Years of the Cosmological Constant: from 'Superfluous Stunt' to Dark Energy"* le Cormac, M. O'Keeffe, W. Nahm agus S. Mitton agus ghlac an iris *European Physical Journal H (Historical Perspectives on Contemporary Physics)* leis.

Chun taighde na hÉireann ar an bhfisic chandamach a láidriú, cuidíonn STP gach bliain le cruinniú Fhundúireacht Chandamach na hÉireann (IQF), á chomheagrú ag an gColáiste Ollscoile, BÁC, Ollscoil Mhá Nuad, Coláiste na Tríonóide BÁC agus muid féin. Bhí cruinniú IQF 2017 ar siúl an 25-26 Bealtaine i Má Nuad. Thug Yuhma Asano agus Marianne Leitner cainteanna. Is í léacht Uí Raifeartaigh buaicphointe an chruinnithe agus í maoinithe againne go traidisiúnta. In 2017 b'é Fabian Essler ó Oxford a thug an léacht, ar an ábhar *"Qauntum Master Equations and Integrability"*.B'é Enrico Barausse, Paris, a thug an léacht phoiblí ar an ábhar *"The sound of the Universe: detecting gravitational waves in space with LISA"*.

B'é an brath de radaíocht imtharraingthe ó chumasc neodrónréalta an eachtra fisice ba mhó in 2017, agus scríobhadh go forleathan faoi tháirgeadh óir agus eilimintí troma eile in imbhuailtí den chineál sin. Tugadh Léacht Reachtúil Bhliantúil ár scoile an 15 Nollaig ag Luciano Rezzolla, Comhalta Sinsearach in Inistitiúid Ard-Léinn Frankfurt (FIAS) agus príomhthaighdeoir sa ghrúpa a bhrath agus a rinne anailís ar an eachtra. Bhí an-suim ag an bpobal ann.

2. Strengthening the disciplines nationally

In view of the ongoing, and well-deserved, public interest in physicists like Einstein and Schrödinger, it is important to give accessible and accurate accounts of their work. Much of what is written about them is either not accurate or is only accessible to specialists.

Thus, the research of our associate Cormac O'Raifeartaigh (Waterrford Institute of Technology) is much appreciated and deserving of our support. In 2017 the article *"One Hundred Years of the Cosmological Constant: from 'Superfluous Stunt' to Dark Energy"* by Cormac, M. O'Keeffe, W. Nahm and S. Mitton was written and accepted by the European Physical Journal H (Historical Perspectives on Contemporary Physics).

To strengthen Irish research on quantum physics, STP contributes every year to the Irish Quantum Foundation meeting, jointly organised by DIAS, UCD, Maynooth and TCD. The 2017 IQF meeting (May 25-26) took place in Maynooth. Yuhma Asano and Marianne Leitner of STP gave talks. The O'Raifeartaigh lecture is the scientific highlight of the meeting and traditionally financed by DIAS. In 2017 it was given by Fabian Essler from Oxford, on *"Quantum Master Equations and Integrability"*. The public lecture was given by Enrico Barausse, Paris, on "The sound of the Universe: detecting gravitational waves in space with LISA".

The detection of gravitational radiation from a neutron star merger was the major physics event of 2017, and the production of gold and other heavy elements in such collisions was very widely written about. The annual Public Statutory Lecture of our school was given on December 15 by Luciano Rezzolla, Senior Fellow at the Frankfurt Institute of Advanced Studies (FIAS) and a leading researcher in the group which detected and analyzed the event. Public interest was high.

Scoil na Fisice Teoiriciúla (ar lean)

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3. **Borsten, L.** And Marrani, A. (2017) "A kind of magic": Insight Piece for CQG+, companion website to the Journal of Classical and Quantum Gravity, IOP.

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2. **Kováčik, S.** (2017) "Magnetic monopoles in noncommutative quantum mechanics" : Given at the XXVth International Conference on Integrable Systems and Quantum Symmetries, Czech Technical University, Prague, Czech Republic. 6-10 June 2017.
3. **Kováčik, S.** (2017) "Sir Hamilton and the story of making things up" : Given during Hamilton Week, Dunsink Observatory, DIAS, Dublin. 18 October 2017.
4. **Kováčik, S.** (2017) "Magnetic monopoles in (noncommutative) quantum mechanics" : Given at Noncommutative Field Theory and Gravity workshop, EISA, Corfu, Greece. 16-23 September 2017.
5. **Kováčik, S.** (2017) "Microscopic black holes" : Given at Elementary Particles Summer School, Svit, Slovakia. 10-17 September 2017.
6. **Kováčik, S.** (2017) "Testing gauge/gravity conjecture on computer" : Given at Comenius University, Bratislava, Slovakia. 4 April 2017.
7. **Leitner, M.** (2017) "Algebra and Number Theory Seminar" : Given at University College Dublin. 21 September 2017.
8. **Leitner, M.** (2017) "CFTs on higher genus Riemann surfaces by sewing and by differential equations of Gauss-Manin type" : Given at IQF Meeting 2017, University College Dublin. 25-26 May 2017.

School of Theoretical Physics (continued)

9. **Tchrakian, D. H.** (2017) "Chern-Simons Gravities (CSG) and Gravitational Chern-Simons (GCS) densities in all dimensions" : Given at XVII International Conference on Symmetry Methods in Physics (Symphys XVII), Yerevan, Armenia, 09-15 July 2017.
10. **Tchrakian, D. H.** (2017) "Topological properties of gauge Higgs and Skyrme field theories" : Given at JINR Summer School, Joint Institute for Nuclear Research, Tsaghkadzor, Armenia. July 2017.
11. **Tchrakian, D. H.** (2017) "Higgs--Chern-Simons gravities and gravitational Higgs—Chern-Simons densities" : Given at 1st Joint FAR/ANSEF-ICTP and RDP-VW Summer School in Theoretical Physics, Yerevan, Armenia. August 2017.
12. **Asano, Y.** (2017) "Emergent five-sphere in the BMN matrix model" : Given at the XXVth International Conference on Integrable Systems and Quantum symmetries, Czech Technical University, Prague, Czech Republic. 9 June 2017.
13. **Asano, Y.** (2017) "Transverse Five-branes in Matrix model" : Given at IQF Meeting 2017, University College Dublin. 25-26 May 2017.
14. **Borsten, L.** (2017) "M-theory: The Road from Dunsink to Eleven-Dimensions" : Given at Trinity College Dublin. 19 October 2017.
15. **Borsten, L.** (2017) "Are all supergravity theories Yang-Mills squared" : Given at the Nordic Institute for Theoretical Physics, Stockholm University, Sweden. 10 April 2017.
16. **Borsten, L.** (2017) "Twin supergravities from the double copy" : Given at the Institute of Mathematics, University of Oxford, UK. 27 February 2017.
17. **O'Connor, D.** (2017) "Testing Gauge/Gravity Duality with Membrane Matrix Models " : Given at Quantum Spacetime '17, University of Porto, Portugal. 2 February 2017.
18. **O'Connor, D.** (2017) "Membrane Matrix Models and non-perturbative tests of gauge/gravity" : Given at the Isaac Newton Institute , Cambridge, UK. 21 February 2017.
19. **O'Connor, D.** (2017) "Membrane Matrix Models and non-perturbative tests of gauge/gravity" : Given at the Institute for Nuclear Research and Nuclear Energy, Sofia, Bulgaria. 4 May 2017.
20. **O'Connor, D.** (2017) "Quantised relativistic membranes and non-perturbative checks of gauge/gravity duality" : Given at the XXVth International Conference on Integrable Systems and Quantum symmetries, Czech Technical University, Prague, Czech Republic. 8 June 2017.
21. **O'Connor, D.** (2017) "The Phase Diagram of the BMN Matrix Model" : Given at the Workshop on Testing Fundamental Physics Principles, EISA, Corfu, Greece. 22-28 September 2017.

Preprints (unpublished articles)

1. **Leitner, M.** (2017) "An Algebraic Approach to Minimal Models in CFTs".
2. **Leitner, M.** and **Nahm, W.** (2017) "Rational CFTs on Riemann surfaces".
3. Glaser, L., **O'Connor, D.** and Surya, S. (2017) "Finite Size Scaling in 2d Causal Set Quantum Gravity ".
4. Feehan, P. (2017) "Optimal Lojasiewicz-Simon Inequalities and Morse-Bott Yang-Mills Energy Functions ".
5. **Borsten, L.** and Marrani, A. (2017) "A Kind of Magic".
6. Anastasiou, A., **Borsten, L.**, Duff, M. J., Marrani, A., Nagy, S. and Zoccali, M. (2017) "Are All Supergravity Theories Yang-Mills Squared?".
7. **Borsten, L.** (2017) "On D=6, =(2,0) and =(4,0) Theories".
8. **Feehan, P.** (2017) "Resolution of Sngularities and Geometric Proofs of the Lojasiewicz Inequalities".
9. **Kováčik, S.** and Presnajder, P. 2017) "Magnetic Monopoles Symmetries in Noncommutative Space".
10. **Filev, V. G.** and **O'Connor, D.** (2017) "Quantised Relativistic Membranes and Non-perturbative Checks of Gauge/Gravity Duality".
11. **Leitner, M.** (2017) "The (2,5) Minimal Model on Degenerating Genus Two Surfaces".
12. Belenchia, A., **Benincasa, D.**, Letizia, M. and Liberati, S. (2017) "On the Entanglement Entropy of Quantum Fields in Causal Sets".
13. **Asano, Y.**, Ishiki, G., Shimasaki, S. and Terashima, S. (2017) "Spherical Transverse M5-Branes from the Plane Wave Matrix Model".
14. Anastasiou, A., **Borsten, L.**, Duff, M. J., Marrani, A., Nagy, S. and Zoccali, M. (2017) "The Mile High Magic Pyramid".

Some of the International Visitors to Theoretical Physics in 2017

Adam Hlozny - Comenius University in Bratislava

Alessio Marrani - Centro FERMI, Rome

Alexei Rebenko - Institute of Mathematics, Tereshchenkivska, Kiev

Andreas Aaserud - University of Cardiff

Astrid Eichhorn - University of Heidelberg

Christian Saemann - Heriot Watt University, Edinburgh

David Evans - University of Cardiff

Dragan Prekrat- Institute of Physics Belgrade

Eoin O Colgain - University of Surrey

Fatima Laytimi - University of Lille

Giovanni Felder - ETH Zurich

Jason Twamley - Macquarie University, Sydney

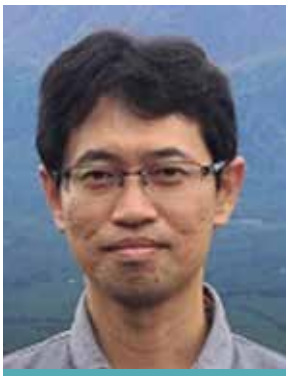
Paul Feehan - Rutgers, New Jersey

Piotr Tourkine - CERN, Zurich

Roberto Bondesan - University of Oxford

Valentin Zagrebnov - Université d'Aix-Marseille

Yakov Shnir - BLTP JINR, Moscow



Yoshifumi Hyakutake - Ibaraki University, Japan

Institute Staff

Council of the Institute

Chairman

V. Cunnane

Ex-Officio Members

A. Deeks, President, UCD

P. Prendergast, Provost, TCD

M. Daly, President, RIA (to March)

M. Kennedy, President, RIA (from March)

Members Appointed by the Governing Boards of Constituent Schools

G. Wrixon

A. Jaffe

A. Ahlqvist

W. Nahm

R. Ó hUiginn (from 21 November)

C. Bean (from 21 November)

L. Breatnach (to 21 November)

L. Drury (to 21 November)

Governing Board of the School of Celtic Studies

Chairman

A. Ahlqvist

Senior Professor

L. Breatnach

R.Ó hUiginn

Appointed Members

M. Ní Mhaonaigh

U. Mac Gearailt

R Chapman Stacey

D. Stifter

M. Haycock

Governing Board of the School of Theoretical Physics

Chairman

A. Jaffe

Senior Professors

T. Dorlas

D. O'Connor

W. Nahm

Appointed Members

P. Knight

D. Zagier

A. Taormina

H. Braun

S. Ryan

Governing Board of the School of Cosmic Physics

Chairman

G. Wrixon

Senior Professors

L. Drury

C. Bean

Appointed Members

E. Meehan (to 17 May)

A. Watson

J. Bell Burnell (to 13 November)

K. Verbruggen

L. Maraschi

Administrative Staff of the Institute 2017

Registrar
Cecil Keaveney (to 16 June)
Eucharia Meehan (from 18 May)

Finance Officer
Grace Forkin

Senior Administrative Officer
Mary Burke

Assistant Finance Officer
Ronan Byrne

Clerks
Helena Moynihan
Edmond Barrett (to 3 February)
Mary Brennan
Zara McAdam (from 20 February)
Fiona Seery (temporary) (from 14 June to 8 Sept.)
Orna O'Beirne (temporary) (from 2 October)

Head of IT
Dmitri Grigoriev

Senior Systems Administrator
Jean-François Bucas

Systems Administrator
Philippe Grange

Support Staff
Colette Doyle
Karen Earley
Patrick Wynne
Stephen McCullagh (part-time)

Staff and Scholars of the School of Celtic Studies 2017

Senior Professor
L. Breatnach (Director to 31 August)
R. Ó hUiginn (Director from 1 September)

Professor
B. Lewis

Assistant Professors
A. Nic Dhonnchadha
M. O Riordan (Publications Officer)

Dialectologist
B. Ó Curnáin

Assistant Librarian
M. Irons

Library Assistant
Ó. Ní Chanainn

School Administrator
E. Nic Dhonncha

Technical Staff
ISOS
A.M. O'Brien

IT Support
A. McCarthy (part-time)

Bibliographer
A. Guilarte

Bergin Fellow
M. Hoyne (Ireland) (from 1 August)

Irish Research Council Government of Ireland Fellow
P. O Muircheartaigh (Ireland) (from 1 October)

Scholars
M. Hoyne (Ireland) (to 31 July)
S. Nurmio (Finland)
M. Theuerkauf (Germany)
S. Waidler (USA/UK)
C. Kobel (Switzerland) (from 1 August)

Ogham in 3D Principal Investigator
N. White (to 30 September)

Professor Emeritus
M. Ó Murchú
F. Kelly
P. Breatnach

Institute Staff (continued)

Staff and Scholars of the School of Theoretical Physics 2017

Senior Professors

W. Nahm (Director)

T. Dorlas

D. O'Connor

Librarian/School Administrator

G. Rogers (from 2 May)

Scholars

B. Savoie (France) (to 16 March)

Y. Asano (Japan)

S. Kovacik (Slovakia) (to 30 September)

M. Leitner (Germany) (from 1 January)

L. Coopmans (Holland) Externally funded (from 1 September)

K. Kavanagh (Ireland) Externally funded (from 1 September)

Schroedinger Fellows

G Kells (Ireland)

L. Borsten (Holland)

Irish Research Council Government of Ireland Fellows

D. Benincasa (Italy) Irish Research Council (from 1 October)

S. Kováčik (Slovakia) Irish Research Council (from 1 October)

Project Staff

S. Dooley (Ireland) SFI Project (from 1 September)

Staff and Scholars of the School of Cosmic Physics 2017

Senior Professors

L. Drury (Director)

C. Bean

Professors

T. Ray

F. Aharonian

Z. Martinec

Assistant Professors

S. Lebedev

B. O'Reilly

Schroedinger Fellows

A. Taylor-Castillo (U.K.) (to 30 June)

V. Rath (Germany)

Director of Observational Seismology

T. Blake

Senior Technical Assistants

C. Horan

M. Smyth

Technical Assistants

E. Flood

A. Grace

L. Collins

C. Hogg

Clerical Staff

A. Sewielska

Scholars

T. Farrell (Ireland)

C. Romoli (Italy) (to 31 July)

R. Delhaye (France/New Zealand) (from 1 January)

A. Licciardi (Italy) (to 28 February)

M. Ravenna (Italy)

D. Einspigel (Czech Republic) (to 31 August)

R. Bonadio (Italy)

N. Celli (Italy)

M. Koutoulaki (Greece)

R. Fedriani (Spain)

E. Eibl (Germany) (to 30 November)

J. Grannell (Ireland)

G. Poggiali (Italy) (to 31 January)

G. Maggio (Italy)

C. Gomez Garcia (Spain) (from 1 January)

S. Subasic (Croatia) (from 1 January)

L. Berdi (Hungary) (from 16 January)

S. Green (U.K.) (from 1 January)

D. Rodgers-Lee (Ireland) (from 1 February to 28 February)

S. Donne (Ireland) (from 1 June)

M. de Lucia (Italy) (from 1 September)

E. Baldwin (Ireland) (from 1 September)

A. Feeney-Johansson (Ireland) (from 1 September)

M. Moutzouri (Greece) (from 1 October)

C. Stock (U.S.A) (from 16 October)

Project Staff

N. Piana Agostinetti (Italy) SFI project (to 30 April)

F. le Pape (France) SFI project

M. Prada (Spain) SFI project

A. Caratti o Garatti (Italy) MIRI project (to 30 April) ERC project (from 2 October)

R. Garcia Lopez (Spain) EU Individual Marie Curie Fellowship

J. Fullea (Spain) EU Marie-Curie (to 28 February) ESA project (from 1 March)

P. Arroucau (France) SFI project (to 31 May), GSI (from 1 June-20 December)

E. O'Gorman (Ireland) Irish Research Council (to 30 September)

D. Craig (Ireland), SFI project

J. Mackey (Ireland) Royal Society/SFI

F. Lavoué (France) SFI project

M. Topinka (Czech Republic) MIRI project

P. Kavanagh (Ireland) MIRI project

G. Tomar (India) SFI project

C. Blease (Ireland) Irish Research Council (to 30 September)

M. Guerri (Italy) SFI Project (from 16 January)

D. Kiyan (Turkey) SFI Project (from 1 January to 31 December)

C. Botter (France) SFI Project (from 1 March to 31 December)

E. Baykiev (Russian Federation) SFI Project (from 1 April)

B. Mather (Australia) Irish Research Council (from 15 June)

C. Bracken (Ireland) SFI Project (from 1 June)

G. Ulbricht (Germany) SFI Project (from 19 June)

I. Colantoni (Italy) SFI Project (from 1 July)

K. Jaxybulatov (Kazakhstan) (SFI Project) (from 30 October)

S. Purser (U.K.) (ERC Project) (from 27 November)

Professor Emeritus

P. Readman

D. O'Sullivan

A. Thompson

A. Jones

Vacation Students

H. Dunne (17 May to 16 June)

C. Clark (8 June to 31 August)

R. Kavanagh (19 June to 31 August)

T. Hamidou Diallo (from 27 June to 30 August)

D. Sheridan (from 13 November)

Dublin Institute for Advanced Studies

FINANCIAL STATEMENTS

for year ended 31 December 2017

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 Education and Skills and is responsible for ensuring good governance and performs this task by setting strategic objectives and targets and taking strategic decisions on all key business issues. The regular day-to-day management, control and direction 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, and must ensure that all 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 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 2017.

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 and meet on a bi-annual basis the table below details the appointment period for current members:

Council Member	Role	Date Appointed
		1 July 2015 to 30 June 2020
Dr. Vincent Cunnane	Chairman	
Deeks, Presid. UCD	Ex-Officio Member	
P. Prendergast, Prov., TCD	Ex-Officio Member	
M. Daly, President, RIA	Ex-Officio Member	To March 2017
M. Kennedy, President, RIA	Ex-Officio Member	From March 2017
Prof. G. Wrixon	Appointed by Gov. Board	
Prof. A. Jaffee	Appointed by Gov. Board	
Prof/ A. Ahlqvist	Appointed by Gov. Board	
Prof. W. Nahm	Appointed by Gov. Board	
Prof. R.Ó hUiginn	Appointed by Gov. Board	From 21 November 2017
Prof. C. Bean	Appointed by Gov. Board	From 21 November 2017
Prof. L. Drury	Appointed by Gov. Board	To 21 November 2017
Prof. L. Breatnach	Appointed by Gov. Board	To 21 November 2017

The Council has established an Audit and Risk Committee.

The Audit and Risk Committee comprises four Board 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 a couple of times a year and formally in writing annually.

The members of the Audit and Risk Committee are: Mr. Dermot Byrne, Chairman, Prof. Dervilla Donnelly, Prof. Ann Breslin and Mr. John Boland. In 2017 the Audit and Risk Committee met on four occasions.

Schedule of Attendance, Fees and Expenses

A schedule of attendance at the Council and Audit and Risk Committee meetings for 2017 is set out below including the fees and expenses received by each member.

2017	Council	Audit & Risk Committee	Fees 2017 €	Expenses €
No. of Meetings	2	4		
Dr. V. Cunnane (Ch)	2		-	928
Prof. G. Wrixon	2		-	460
Prof. A. Jaffee	1		-	1,228
Prof. A. Ahlqvist	2		-	7,108
Prof. W. Nahm	2		-	-
Prof. L. Drury	2		-	-
Prof. L. Breatnach	2		-	-
Prof. C. Bean	-		-	-
Prof. R. Ó hUiginn	1		-	-
Mr. D. Byrne (Ch)		4	-	-
Prof. A. Breslin		4	-	-
Prof. D. Donnelly		4	-	-
Mr. J. Boland		1	-	-
			-	9,824

Governance Statement and Council Members' Report (continued)

Key Personnel Changes

Two members of Council resigned during the year. Professor Luke Drury and Professor Liam Breatnach resigned from their positions with effect from 21st November 2017. Professor Chris Bean and Professor Ruairi Ó hUiginn were appointed as members of Council from 21st November 2017.

Mr. John Boland was appointed as a member of the Audit and Risk Committee from 28th August 2017.

Mr. Cecil Keaveney, Registrar, retired on 16th June 2017. Dr. Eucharia Meehan commenced her appointment as Registrar on 18th May 2017.

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

The Council is responsible for ensuring that the Institute has complied 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:

Employee Short-Term Benefits Breakdown

Employees' short-term benefits in excess of €60,000 are categorised into the following bands:

Range		Number of employees	
From	To	2017	2016
€60,000 -	€69,000	2	1
€70,000 -	€79,000	7	7
€80,000 -	€89,000	1	1
€90,000 -	€99,000	-	2
€100,000 -	€109,000	3	2
€110,000 -	€119,000	-	-
€120,000 -	€129,000	-	-
€130,000 -	€139,000	7	6

Note: for the purposes of this disclosure, short-term employee benefits in relation to services rendered during the reporting period include salary, but exclude employer's PRSI.

Consultancy Costs

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

	2017 €	2016 €
Recruitment	38,576	5,106
Legal Fees	18,946	19,054
Financial/actuarial	36,519	22,858
Public Relations	7,780	-
Other	24,325	33,196
Total Consultancy Costs charged to the Income and Expenditure	**126,146**	**80,214**

Travel and Subsistence Expenditure

Travel and Subsistence Expenditure is categorised as follows:

	2017 €	2016 €
Domestic		
- Council	1,388	1,950
- Employees	17,206	6,791
- Academic Visitors	1,394	423
- Project	69,449	78,627
International		
- Council	8,336	9,090
- Employees	58,900	45,614
- Academic Visitors	22,592	24,764
- Project	109,084	150,267
Total		

Hospitality Expenditure

The Income and Expenditure includes the following hospitality expenditure:

	2017 €	2016 €
Staff Hospitality	3,124	564
Client Hospitality	10,311	9,850
Total	**13,435**	**10,414**

Statement of Compliance

The Institute has complied with the requirements of the Code of Practice for the Governance of State Bodies (2016), as published by the Department of Expenditure and Reform in August 2016, with the following exceptions:

1) A copy of the annual plan and budget will be circulated and approved by Council in 2018.

2) The Council will complete a Board Effectiveness and Evaluation Review in November 2018.

Vincent Cunnane
Chairman

27 June 2018

Eucharia Meehan
Registrar

27 June 2018

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 Education & Skills with the concurrence of the Minister for Finance.

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.

Ruairí Ó hUiginn
Council Member

Chris Bean
Council Member

27 June 2018

Statement on Internal Control

Responsibility for Internal Control

On behalf of the Council of the Institute we acknowledge our responsibility for ensuring that an effective system of internal controls is maintained and operated.

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 manner.

Key Control Procedures

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.

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.

The Audit Committee continues to review internal control matters and issues raised by the Comptroller and Auditor General. In 2017, the Audit Committee met on four occasions.

In addition, the 2017 report on internal control systems as provided by the Internal Auditor has been made available to Members of Council.

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.

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 Committee and the Comptroller and Auditor General in his management letter or other reports.

The Institute does not have a formal written fraud policy in place, but this will be adddressed in 2018.

Statement on Internal Control (continued)

Annual Review of Controls

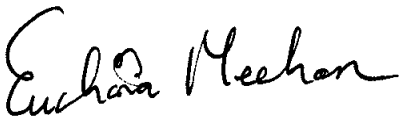
We confirm that in the year ended 31st December 2017, Council conducted a review of the effectiveness of the internal controls of the Institute. We confirm that the Institute has an appropriate system of internal and financial control in place.

Internal Control Issues

No weaknesses in internal control were identified in relation to 2017 that require disclosure in the financial statements. We confirm that in the year ended 31st December 2017, DIAS is in compliance with current procurement rules and guidelines.

Signed on behalf of the Council of the Institute

Vincent Cunnane
Chairman - Council of the Institute



Eucharia Meehan
Registrar

27 June 2018

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

Opinion on financial statements

I have audited the financial statements of the Dublin Institute for Advanced Studies for the year ending 31 December 2017 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 2017 and of its income and expenditure for 2017 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 the statement of responsibilities of the Council, the statement on internal control and a governance statement and Council members' report. 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 that regard.

Colette Drinan
For and on behalf of the
Comptroller and Auditor General

29 June 2018

Appendix to the report

Responsibilities of Council members

The statement of responsibilities of the Council sets out the Council members' responsibilities. The Council members are responsible for

- the preparation of 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 ability of the Institute 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.

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 State bodies in relation to their management and operation. I report if there are 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 there is 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.

I also 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.

Statement of Income and Expenditure and Retained Revenue Reserves

	Notes	2017 €	2016 €
Income	2		
Oireachtas Grant		6,566,000	6,256,000
Net deferred funding for retirement benefits	12.c	811,160	990,526
Sales of Publications		42,095	38,973
Projects	3	2,238,227	1,939,156
Project Overhead Income		78,356	107,847
Other	4	10,702	7,476
		9,746,540	9,339,978
Transfer from Capital Reserve	6	11,654	272,823
		9,758,194	9,612,801
Expenditure	2		
School of Celtic Studies		1,675,927	1,063,960
School of Theoretical Physics		1,633,748	850,644
School of Cosmic Physics		4,046,186	3,403,608
Administration		2,342,113	4,172,849
		9,697,974	9,491,061
Surplus for the year		**60,220**	**121,740**
Balance at 1 January		912,837	791,097
Balance at 31 December		**973,057**	**912,837**

Statement of Comprehensive Income		2017 €	2016 €
(Deficit)/Surplus for the year		60,220	121,740
Experience (losses)/gains on retirement benefit obligations		(518,000)	765,000
Changes in assumptions underlying the present value of retirement benefit obligations		13,000	(6,371,000)
Actuarial Gain/(Loss) on Retirement Benefit Obligations	**12.b**	**(505,000)**	**(5,606,000)**
Adjustment to Deferred Retirement Benefit Funding		**505,000**	**5,606,000**
Total Recognised Gain for the Year		**60,220**	**121,740**

The Statement of Cash Flows and notes 1 to 20 form part of these financial statements.

Ruairí Ó hUiginn
Council Member

27 June 2018

Chris Bean
Council Member

27 June 2018

Statement of Financial Position

	Notes	2017 €	2016 €
Assets			
Fixed Assets: Property, Plant and Equipment	5	815,653	827,307
Current Assets:			
Cash on Hand and at Bank		6,185,822	6,062,056
Receivables	8	721,753	268,081
Project Receivables	3(a)	214,064	339,592
Total Assets		**7,937,292**	**7,497,036**
Less Liabilities			
Payables - Amounts falling due within one year			
Payables	7	928,077	530,957
Project Payables	3(a)	4,565,458	4,744,168
Payables - Amounts falling due after one year	7	655,047	481,767
		6,148,582	**5,756,892**
Assets Less Liabilities Before Retirement Benefits		**1,788,710**	**1,740,144**
Deferred Retirement Benefit funding	12.c	59,123,000	57,807,000
Retirement Benefit Obligations	12.b	(59,123,000)	(57,807,000)
		0	**0**
Net Assets		**1,788,710**	**1,740,144**
Financed by:			
Income and Expenditure Account		973,057	912,837
Capital Reserve	6	815,653	827,307
		1,788,710	**1,740,144**

The Statement of Cash Flows and notes 1 to 20 form part of these financial statements.

Ruairí Ó hUiginn
Council Member

27 June 2018

Chris Bean
Council Member

27 June 2018

Statement of Cash Flows

	Notes	2017 €	2016 €
Reconciliation of Operating Surplus to Net Cash Inflow from Operating Activities			
Surplus for the Year		**60,220**	**121,740**
Interest Received	4	(603)	(2,402)
Increase/(Decrease) in Payables		570,400	(25,346)
(Increase) in Receivables		(453,672)	(2,779)
Net Increase in Research Programmes and Fees		(53,182)	167,815
Depreciation	5	284,451	367,873
Capital Reserve Transfer	6	(11,654)	(272,823)
Loss on Disposal		-	3,421
Net Cash Inflow from Operating Activities		**395,960**	**357,499**
Cash Flow Statement			
Net Cash Inflow from Operating Activities		395,960	357,499
Cashflow from Financing Activities			
Bank Interest Received	4	603	2,402
Cashflow from Investing Activities			
Purchase of Tangible Assets	5	(272,797)	(98,471)
Increase in Cash		**123,766**	**261,430**
Reconciliation of Net Cash Flow to Movement in Net Funds			
Increase in Cash		123,766	261,430
Net Funds at 1 January		6,062,056	5,800,626
Net Funds at 31 December		**6,185,822**	**6,062,056**

Analysis of Change in Net Funds	Cash at bank and in hand €	Cash at bank and in hand €
At Beginning of Year	6,062,056	5,800,626
Cash Flows	123,766	261,430
At End of Year	**6,185,822**	**6,062,056**

The Statement of Cash Flows and notes 1 to 20 form part of these financial statements.

Ruairí Ó hUiginn
Council Member

27 June 2018

Chris Bean
Council Member

27 June 2018

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 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 19).

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:

b) Oireachtas Grants

Income is shown on a cash received basis.

c) 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 and Equipment	10%
Computers	25%
Motor Vehicles	25%

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.

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. The Institute conserves these assets for research and for public events.

In accordance with accounting standard FRS102, heritage assets acquired pre 1 January 2007 are not capitalised in the financial statements because it is considered that no meaningful value can be attributed to them owing to the lack of information on the original cost and the fact that these assets are not readily realisable. In addition, external valuation cannot be obtained at a reasonable cost.

There have been no heritage assets acquired subsequent to 1 January 2007. All preservation and conservation costs are expensed as incurred.

d) Capital Reserve

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

1. Accounting Policies (continued)

e) Library

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

f) Publications

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

g) 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 Education and Skills and from contributions deducted from staff salaries.

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.

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 Education and Skills.

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 Education and Skills.

h) 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. Income and expenditure on projects is reflected in the financial statements in the year to which they relate. A surplus or deficit on a project is reflected in the financial statements when realised.

i) Receivables

Short term receivables are measured at transaction price, less any impairment.

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.

l) 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.

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.

2. Detailed Analysis of Income & Expenditure for the year ended 31/12/2017

	Notes	School of Celtic Studies €	School of Theoretical Physics €	School of Cosmic Physics €	Adminis-tration €	2017 Total €	2016 Total €
INCOME							
Dept. of Education and Skills Grant (Annual)		1,611,420	969,532	2,339,860	1,645,188	6,566,000	6,256,000
*Net Deferred Funding for Retirement Benefits	12.c	255,676	54,281	350,038	151,166	811,160	990,526
Sales of Publications		42,095	-	-	-	42,095	38,973
Project Income	3.a	53,127	86,329	2,098,771	-	2,238,227	1,939,156
Project Overhead Income		-	-	-	78,356	78,356	107,847
Other	4	603	8,360	1,096	643	10,702	7,476
		1,962,921	1,118,502	4,789,765	1,875,353	9,746,540	9,339,978
Transfer from Capital Reserve		-	-	-	11,654	11,654	272,823
		1,962,921	1,118,502	4,789,765	1,887,007	9,758,194	9,612,801
EXPENDITURE							
Payroll Costs	9	1,064,972	794,830	1,493,564	775,989	4,129,355	3,756,498
*Retirement Benefit Costs	12.a	440,983	656,745	677,912	480,753	2,256,393	2,378,027
Project Costs	3.a	45,810	69,312	1,690,828	-	1,805,950	1,852,150
Library and Book Storage		37,248	65,206	32,102	-	134,556	151,514
Depreciation	5	-	-	-	284,451	284,451	367,873
Rent, Rates and Insurance		-	-	-	200,819	200,819	206,345
General Expenses	10	13,054	1,933	34,817	191,974	241,778	183,674
Travel and Seminar Expenses		17,249	28,467	72,487	5,789	123,992	97,541
Premises Maintenance and Security		-	-	-	169,895	169,895	166,443
Computer and Internet Expenses		1,126	14,610	38,055	74,623	128,414	130,805
Fuel Light and Power		-	-	-	121,752	121,752	121,912
Postage and Telephone		-	-	-	21,373	21,373	23,171
Stationery		7,349	1,347	2,577	8,012	19,285	14,851
Publications		46,627	-	-	-	46,627	21,593
Advertising		578	-	-	5,181	5,759	369
Minor Office Equipment		931	1,298	3,844	1,502	7,575	14,874
Disposal	6	-	-	-	-	0	3,421
		1,675,927	1,633,748	4,046,186	2,342,113	9,697,974	9,491,061
SURPLUS/(DEFICIT) FOR YEAR		**286,994**	**(515,246)**	**743,579**	**(455,107)**	**60,220**	**121,740**
Balance at 1 January		254,834	105,338	1,959,115	(1,406,450)	912,837	791,097
Balance at 31 December		**541,828**	**(409,908)**	**2,702,694**	**(1,861,557)**	**973,057**	**912,837**

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 Net Deferred Funding for Retirement Benefits Costs are allocated on a pro rata basis to the pension contributions from staff in the year.
Note (b) The total overheads earned on projects in 2017 amounted to €356,349, Administration has been credited with €78,356 of the project overhead earned.
Note (c) 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 (d) Grant An amount of 6,566,000, (2016 6,256,000) was received from the Department of Education and Skills. The grant is provided by the Department of Education and Skills towards liabilities under pay and general non-pay expenses and is drawn down by the Institute on an annual basis.

3. (a) Projects

	2017 €	2016 €
Opening Balances	4,404,578	4,236,763
Receipts	2,185,045	2,106,971
	6,589,623	6,343,734
Closing Balances (Project Receivables €214,064, Project Payables €4,565,458)	(4,351,396)	(4,404,578)
Applied as Income	2,238,227	1,939,156
Income Allocation		
School of Celtic Studies	53,127	37,990
School of Theoretical Physics	86,329	7,088
School of Cosmic Physics	2,098,771	1,894,078
	2,238,227	1,939,156
Total Project Income	2,238,227	1,939,156

Project Costs

	Celtic Studies €	Theoretical Physics €	Cosmic Physics €	2017 Total €	2016 Total €
Payments to Partners/Associates	-	-	-	-	186,947
* Salaries/Scholarships	35,159	57,991	1,259,268	1,352,418	1,161,488
Travel					
– Domestic	-	1,258	68,191	69,449	78,627
– International	-	1,658	107,426	109,084	150,267
Other	10,651	8,405	255,943	274,999	274,821
Total Project Cost	45,810	69,312	1,690,828	1,805,950	1,852,150

Note
Externally Funded Research Staff and Scholars Numbers (WTE) 51 (2016: 34).
For information on core staff and scholar numbers, go to page 16.

3. (b) Project Detail

	Funding Authority	Opening Balance €	Receipts €	Recurrent Expenditure €	Applied as Income (including Capital) €	Closing Balance €	Capital €
School of Celtic Studies							
Irish Script on Screen		14,587	-	-	-	14,587	-
Celtic Summer School		3,553	11,070	10,651	14,623	-	-
Ogham	Dept. Arts	(1,720)	30,000	24,935	28,280	-	-
Peadar O Muircheartaigh IRC Fellowship	IRC	-	21,353	10,224	10,224	11,129	
Total Celtic Studies		**16,420**	**62,423**	**45,810**	**53,127**	**25,716**	**-**

3. (b) Project Detail (continued)

	Funding Authority	Opening Balance €	Receipts €	Recurrent Expenditure €	Applied as Income (including Capital) €	Closing Balance €	Capital €
School of Theoretical Physics							
Bethe Ansatz	SFI	8,402	-	196	8,402	-	-
T.Tchrakian	SFI	4,118	-	2,320	4,118	-	-
G. Kells	SFI	129,780	-	45,650	52,663	77,117	7,726
S Kovacik IRC Fellowship	IRC	-	22,947	10,293	10,293	12,654	-
D Benincasa IRC Fellowship	IRC	-	22,948	10,853	10,853	12,095	-
Total Theoretical Physics		**142,300**	**45,895**	**69,312**	**86,329**	**101,866**	**7,726**
School of Cosmic Physics							
Nam Conference	A. Observ'tory	4,769	-	-	-	4,769	-
KM3Net -PP	EC	-	-	-	-	-	-
NGST Project	ESA	150,883	46,296	171,720	171,720	25,459	-
EASY T. Ray 2014	SFI	15,273	51,228	22,254	66,501	-	44,039
E.O' Gorman Fellow	IRC	12,167	22,947	34,112	35,114	-	-
Horizon 2020 Catalyst MKID	SFI	15,002	-	17,449	17,449	(2,447)	-
J Mackey Royal Society Fellowship	Royal Society	(12,482)	122,404	68,878	89,587	20,335	-
IRC New Horizons DIAS/UCD	IRC	19,838	-	38,782	40,875	(21,037)	-
MKID Camera IP Tray	SFI	260,335	-	160,367	233,165	27,170	64,833
R Garcia Lopez Dig Deep EC Fellowship	EC	108,688	-	30,179	47,071	61,617	1,874
J Mackey Science Week Grant	SFI	313	103	416	416	-	-
Maria Koutoulaki IRC Scholarship	IRC	6,733	24,000	21,814	21,814	8,919	-
J Mackey IRC New Foundations	IRC	10,000	-	10,039	10,000	-	-
Radionet EC Project	EC	-	53,889	6,586	5,222	48,667	3,743
T Ray ERC Easy	EC	-	648,582	63,243	84,633	563,949	11,279
Total Astrophysics		**591,519**	**969,449**	**645,839**	**823,567**	**737,401**	**125,768**

3. (b) Project Detail (continued)

	Funding Authority	Opening Balance €	Receipts €	Recurrent Expenditure €	Applied as Income (including Capital) €	Closing Balance €	Capital €
Geophysics Schools Seismology	Various	9,592	-	2,383	2,383	7,209	-
CTBTO	Dept. For. Affairs	5,322	-	2,457	2,457	2,865	-
GIANICE 11	SFI	14,524	7,538	4,427	22,062	-	12,302
SIRG E2174	SFI	(4,983)	56,397	27,984	51,414	-	-
ESA UWB Grant	ESA	16,071	-	2,103	7,103	8,968	5,000
IRECCSEM	SFI	(8,716)	27,821	19,072	19,105	-	-
Structure and Seismicity of Ireland's Crust	SFI	128,538	110,402	105,688	118,226	120,714	3,173
PIPCO	Industry	26,335	-	9,680	26,335	-	2,698
Winterc-3D Fullea Fellow	EC	(47,226)	65,753	18,524	18,527	-	-
4DARTIC	Industry	24,072	-	14,272	24,072	-	10,000
ICRAG	SFI	193,338	214,693	456,896	548,979	(140,948)	18,743
Shallow Crust Fellow	SFI	8,790	9,318	18,107	18,108	-	-
V. Rath GSI Short Call	GSI	1,500	-	1,500	1,500	-	-
iMARL Infrastructure	SFI	2,956,176	-	-	5,105	2,951,071	5,105
Geo External Services	Various	-	51,500	22,751	22,751	28,749	
ERC Development iTHERC	SFI	262,791	-	143,586	178,649	84,142	14,476
NIAP-PassVel	Marine Institute	9,976	-	-	-	9,976	-
Duygu Kiyan Fellowship	SFI	58,239	-	59,822	64,691	(6,452)	-
IRC Geotherm	IRC	-	69,996	32,458	37,525	32,471	2,534
ESA 3D Earth	ESA	-	20,000	63,179	63,179	(43,179)	-
GSI Fellowship P Arroucau	GSI	-	44,757	37,110	39,825	4,932	-
SEA-SEIS	SFI	-	154,218	-	-	154,218	-
GSI Shortcall HERSK M. Molhoff	GSI	-	12,400	-	-	12,400	-
GSI Shortcall C. Bean 2017-SC-046	GSI	-	12,485	2,990	3,208	9,277	-
GSI Seimic Network Support	GSI	-	250,000	-	-	250,000	-
Total Geophysics		**3,654,339**	**1,107,278**	**1,044,989**	**1,275,204**	**3,486,413**	**74,031**
Total Cosmic Physics		**4,245,858**	**2,076,727**	**1,690,828**	**2,098,771**	**4,223,814**	**199,799**
Total Net Balances - DIAS		**4,404,578**	**2,185,045**	**1,805,950**	**2,238,227**	**4,351,396**	**207,525**

Note
Project receipts are applied as project income, at a level that equals the annual expenditure incurred and overheads earned by the associated project. The closing balances above represent overhead earned to date and advance funding to meet financial commitments in 2018. The capital column outlines the expenditure on fixed assets during 2017.

4. Other Income

	2017 €	2016 €
Bank Interest	603	2,402
Fees and Grants	7,040	1,885
Other	3,059	3,189
Total	**10,702**	**7,476**

5. Fixed Assets: Property, Plant and Equipment

Cost	Furniture & Equipment €	Motor Vehicles €	Computers €	Total €
Opening Balance 1/1/2017	3,822,259	15,131	2,295,351	6,132,741
Additions*	132,845	-	139,952	272,797
Disposals	-	-	(3,456)	(3,456)
	3,955,104	15,131	2,431,847	6,402,082
Depreciation				
Opening Balance 1/1/2017	3,163,369	5,417	2,136,648	5,305,434
Charge	199,871	3,780	80,800	284,451
Disposals	-	-	(3,456)	(3,456)
	3,363,240	9,197	2,213,992	5,586,429
Net book value 31/12/2017	591,864	5,934	217,855	815,653
Net book value 31/12/2016	658,890	9,714	158,703	827,307

Note
* All fixed assets in excess of €1,000 are capitalised in the books of DIAS.

6. Capital Reserve

	2017 €	2016 €
Balance at 1 January	827,307	1,100,130
Transfer to Income and Expenditure Account		
Income allocated to acquire fixed assets (Project Funded)	207,525	85,373
Income allocated to acquire fixed assets (Exchequer Funded)	65,272	13,098
Amortisation in line with asset depreciation	(284,451)	(367,873)
Amount released on disposals		(3,421)
	(11,654)	(272,823)
Balance at 31 December	**815,653**	**827,307**

7. Payables due within twelve months

	2017 €	2016 €
Trade Payables	229,360	101,232
Accruals	432,092	255,263
VAT	117,703	35,713
Revenue Payables	148,922	138,749
	928,077	530,957

Payables due after twelve months		2017 €	2016 €
The following funds are held on deposit.			
These comprise:	Vernam Hull Bequest	25,272	25,247
	Carmody Fund	2,461	2,461
	Retirement Benefit Control Account	627,314	454,059
		655,047	481,767

8. Receivables

	2017 €	2016 €
Prepayments	703,160	144,651
Book Sales Receivables	3,292	3,872
Sundry	15,301	13,340
Debtor Miscellaneous	-	106,218
	721,753	268,081

9. Remuneration

	Celtic Studies €	Theoretical Physics €	Cosmic Physics €	Admin. €	2017 Total €	2016 Total €
Core Funded Posts						
* Salaries/Wages	965,473	720,686	1,351,053	658,572	3,695,784	3,417,040
Retirement Benefit Costs	-	-	-	117,417	117,417	49,395
** Scholarships	100,000	73,992	142,510	-	316,502	288,314
Honoraria	(500)	152	-	-	(348)	1,749
	1,064,973	794,830	1,493,563	775,989	4,129,355	3,756,498

Note on Core Funded Posts
* Core Staff Numbers (WTE) 51.5 (2016:50.5), ECF Numbers (WTE) 55 (2016: 55).
** Core Scholars (WTE) 13 (2016: 14).
For information on externally funded researchers, go to page 13.

Pension levy deductions of €214,857 (2016: €224,492) were paid to the Department of Education and Skills during 2017.

Key Management Remuneration
Key management personnel include the Registrar and the senior management team for whom the total remuneration cost was €621,910 (2016 €599,765) in the year.

9. Remuneration (continued)

(a) Aggregate Employee Benefits

	Celtic Studies €	Theoretical Physics €	Cosmic Physics €	Admin. €	2017 Total €	2016 Total €
Salaries/Wages	910,486	656,915	1,281,269	608,383	3,457,053	3,182,121
Overtime	-	-	-	-	-	-
Allowances	-	-	-	-	-	-
Employer's PRSI	54,987	63,771	69,784	50,189	238,731	234,919
Retirement Benefit Costs	-	-	-	117,417	117,417	49,395
	965,473	720,686	1,351,053	775,989	3,813,201	3,466,435

10. General Expenses

	Celtic Studies €	Theoretical Physics €	Cosmic Physics €	Admin. €	2017 Total €	2016 Total €
Miscellaneous	6,365	1,019	16,154	19,330	42,868	50,211
* Promotions/Lunches	5,064	914	7,113	11,039	24,130	14,944
Professional Fees/ Consultancy	-	-	-	126,146	126,146	80,214
Training	1,625	-	11,550	1,780	14,955	5,955
Bank Charges	-	-	-	1,636	1,636	1,140
* Board Meeting Expenses	-	-	-	23,510	23,510	26,771
Health & Safety	-	-	-	8,533	8,533	4,439
	13,054	1,933	34,817	191,974	241,778	183,674

Note*
Hospitality Expenditure in 2017 totalled €13,435

10. (a) Professional Fees/Consultancy Costs

	2017 Total €	2016 Total €
Recruitment Costs	38,576	5,106
Publicity costs	7,780	-
Internal/External Audits	31,230	22,858
Governance Review	5,289	-
Legal Fees	18,946	19,054
Other Reviews and General Consultancies	24,325	33,196
	126,146	80,214

11. 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 81 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 2018 is €113,609.

Office of Public Works Leases	**Annual Rent €**
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 2017 the Institute had the following future minimum lease payments under non-cancellable operating leases for each of the following periods:

	2017 €	**2016 €**
Payable within one year	113,609	113,609
Between two and five years	990	990
After five years	25,410	25,740

12. Retirement Benefit Costs

a) Analysis of total retirement benefit costs charged to Expenditure

	2017 (€'000)	**2016 (€'000)**
Current Service Cost	1,396	1,226
Interest on Retirement Benefit Obligations	999	1,280
Employee Contributions	(139)	(128)
	2,256	2,378

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

	2017 (€'000)	**2016 (€'000)**
Retirement Benefit Obligations at 1 January	(57,807)	(51,210)
Current Service Cost	(1,396)	(1,226)
Interest Costs	(999)	(1,280)
Actuarial (Loss)/Gain	(505)	(5,606)
Retirement Benefits Paid in the Year	1,584	1,515
Retirement Benefit Obligations at 31 December	(59,123)	(57,807)

12. Retirement Benefit Costs (continued)

c) 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 assumptions described above 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 Education and Skills, DIAS has no evidence that this funding policy will not continue to meet such sums amount in accordance with current practice.

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

	2017 (€'000)	2016 (€'000)
Funding Recoverable in Respect of Current Year Retirement Benefit Costs	2,395	2,506
State Grant Applied to Pay Pensioners	(1,584)	(1,515)
	811	991

The deferred funding asset for retirement benefits as at 31 December 2017 amounted to €59.123 million (2016: €57.807 million).

d) History of defined benefit obligations

	2017 (€'000)	2016 (€'000)	2015 (€'000)
Defined Benefit Obligations	59,123	57,807	51,210
Experience (Gains)/Losses on Scheme Liabilities Amount.	518	(765)	(1,256)
Percentage of Scheme Liabilities.	0.88%	(1.32%)	(2.50%)

The cumulative actuarial (gain)/loss recognised in the Statement of Comprehensive Income amounts to €7,643,000 (2016: €7,138,000).

e) General Description of the Schemes

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. 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 2017.

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.

12. Retirement Benefit Costs (continued)

e) General Description of the Schemes (continued)

The principal actuarial assumptions were as follows:

	2017	2016	2015
Rate of Increase in Salaries	2.75%	2.50%	2.50%
Rate of Increase in Retirement Benefits in Payment	2.25%	2.00%	2.00%
Discount Rate	2.00%	1.75%	2.50%
Inflation Rate	1.75%	1.50%	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 2017 and 2037.

	31/12/2017		31/12/2016	
Year of Attaining Age 65	2017	2037	2016	2036
Life Expectancy - Male	87.3	89.9	87.3	89.9
Life Expectancy - Female	88.7	90.9	88.7	90.9

13. 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.

14. Disclosure of Council Members/Registrar Salary, Fees and Expenses

		Total Remuneration 2017 €	Total Expenses 2017 €	Total Remuneration 2016 €	Total Expenses 2016 €
Council Member					
Dr Vincent Cunnane		-	928	-	1,285
Members Appointed by the Governing Boards of Constituent Schools					
Professor Gerry Wrixon		-	460	-	665
Professor Arthur Jaffe		-	1,228	-	942
Professor Anders Ahlqvist		-	7,108	-	8,148
Professor Werner Nahm		-	-	-	-
Professor Luke Drury	To 21st November 2017	-	-	-	-
Professor Liam Breatnach	To 21st November 2017	-	-	-	-
Professor Chris Bean	From 21st November 2017	-	-	-	-
Professor Ruairi Ó hUiginn	From 21st November 2017	-	-	-	-
Registrar					
Mr. Cecil Keaveney *	Retired June 2017	48,226	100	97,906	-
Dr. Eucharia Meehan *		62,566	-	-	-
		110,792	9,824	97,906	11,040

*** Note**

The Registrar's are in receipt of a salary only. They are 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. The Registrar, Mr. Cecil Keaveney retired in June 2017. He received a gratuity of €117,417.

15. Number of Employees with Benefits in 2017 that fall within bands of €10,000 from €60,000 onwards.

	2017	2016
€60,000 to €69,999	2	1
€70,000 to €79,999	7	7
€80,000 to €89,999	1	1
€90,000 to €99,999	0	2
€100,000 to €109,999	3	2
€110,000 to €119,999	0	0
€120,000 to €129,999	0	0
€130,000 to €139,999	7	6

16. Employer Retirement Benefit Contributions

Employer contributions in 2017 totalled €170,987.

17. Capital Commitments

There are capital commitments of €100,000 for 2018 that has not been provided for in the financial statements.

18. iMarl project

Included in project payables is €2,951,071 (2016: €2,956,176) in relation to the iMarl Infrastructure project. The first tender process was completed in 2017 but the equipment is due to be delivered in early 2018. There are two additional tenders for capital expenditure to be finalised in 2018.

19. 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.

19. Judgements in Applying Accounting Policies and Key Sources of Estimation

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.

20. Approval of Accounts

The Financial Statements were approved by Council on the 25th May 2018.

Institiúid Ard-Léinn Bhaile Átha Cliath

RÁITIS AIRGEADAIS

don bhliain dár críoch 31 Nollaig 2017

Ráiteas Rialachais agus Tuairisc na gComhaltaí Comhairle

Corparáid reachtúil is ea Institiúid Ard-Léinn Bhaile Átha Cliath agus bunaíodh í sa bhliain 1940 faoi Acht um Institiúid Ard-Léinn na bliana sin.

Tá an Chomhairle cuntasach don Aire Oideachais agus Scileanna agus freagrach as rialachas maith a chinntiú agus cuireann an tasc seo i gcrích trí chuspóirí straitéiseacha agus spriocanna a leagan síos agus trí chinntí straitéiseacha a ghlacadh i dtaca le gach mórábhar ghnó. Tá freagracht ag an gCláraitheoir/Príomhfheidhmeannach agus an fhoireann ardbhainistíochta as an mbainistiú rialta ó lá go lá, rialú agus treoir na hInstitiúide. Ní mór don Chláraitheoir/Príomhfheidhmeannach agus an fhoireann ardbhainistíochta an treo straitéiseach leathan atá leagtha síos ag an gComhairle a leanúint, agus ní mór dóibh a chinntiú go mbíonn tuiscint shoiléir ag comhaltaí uile na Comhairle ar na príomhghníomhartha agus cinntí a bhaineann leis an aonán, agus maidir le haon rioscaí suntasacha is dócha a bheidh ann. Feidhmíonn an Cláraitheoir/Príomhfheidhmeannach mar chaidreamh díreach idir an Chomhairle agus bainistíocht na hInstitiúide.

Freagrachtaí na Comhairle

Leagtar amach obair agus freagrachtaí na Comhairle san Acht um Institiúid Ard-Léinn 1940. Áirítear i measc na mbuanmhíreanna a bhíonn idir lámha ag baill na Comhairle:

- tuairiscí ó choistí,
- tuairiscí airgeadais/cuntais bainistíochta,
- tuairiscí feidhmíochta, agus
- nithe forchoimeádta.

Tá an Chomhairle freagrach as taifid imleor cuntasaíochta a choimeád a nochtaíonn le cruinneas réasúnta ag am ar bith staid airgeadais na Institiúid agus a chuidíonn lena chinntiú go gcloíonn na ráitis airgeadais le hAlt 28(2) den Acht.

Agus an Chomhairle ag ullmhú na ráitis airgeadais sin éilítear uirthi:

- polasaithe chuntasaíochta oiriúnacha a roghnú agus iad a chur i bhfeidhm go comhleanúnach,
- breithiúnais agus meastacháin a dhéanamh atá réasúnach agus stuama,
- na ráitis airgeadais a ullmhú ar bhonn gnóthais leantach mura bhfuil sé míchuí glacadh leis go leanfaidh an Institiúid ag oibriú, agus aon imeacht ábhartha ó chaighdeáin chuntasaíochta infheidhme a nochtadh agus a mhíniú. Tá an Cláraitheoir/Príomhfheidhmeannach as cothabháil agus iontaofacht na faisnéise corporáidí agus airgeadais ar shuíomh gréasáin na hInstitiúide.

Tá an Chomhairle freagrach freisin as cosaint a dhéanamh ar shócmhainní na hInstitiúide agus as bearta réasúnta a dhéanamh chun calaois agus mírialtachtaí eile a chosc agus a bhrath.

Measann an Chomhairle go dtugann ráitis airgeadais na hInstitiúide léargas fíor agus cóir ar fheidhmíocht airgeadais agus ar staid airgeadais na hInstitiúide ag 31 Nollaig 2017.

Struchtúr na Comhairle

Ia iad comhaltaí na Comhairle an Cathaoirleach a cheapann an tUachtarán, ar chomhairle an Uachtaráin, triúr comhaltaí ex-officio agus seisear comhaltaí ceaptha ag Boird Rialaithe na gcomhscoileanna. Tá Cláraitheoir/Príomhfheidhmeannach agus Riarachán Lárnach ag DIAS. Ceapadh comhaltaí na Comhairle do thréimhse cúig bliana agus tagann siad le chéile dhá uair sa bhliain. Sa tábla thíos taispeántar an tréimhse ceapacháin do na comhaltaí reatha:

Comhalta Comhairle	Ról	Dáta a Ceapadh
		1 Iúil 2015 go 30 Meitheamh 2020
An Dr. Vincent Cunnane	Cathaoirleach	
A. Deeks, Uachtarán COBÁC	Ball Ex-Officio	
P. Prendergast, Prov., TCD	Ball Ex-Officio	
M. Daly, Uachtarán, ARÉ	Ball Ex-Officio	Go Márta 2017
M. Kennedy, Uachtarán, ARÉ	Ball Ex-Officio	Ó Mhárta 2017
An tOll. G. Wrixon	Ceaptha ag an mBord Rialaithe	
An tOll. A. Jaffee	Ceaptha ag an mBord Rialaithe	
An tOll. A. Ahlqvist	Ceaptha ag an mBord Rialaithe	
An tOll. W. Nahm	Ceaptha ag an mBord Rialaithe	
An tOll. R.Ó hUiginn	Ceaptha ag an mBord Rialaithe	Ón 21 Samhain 2017
An tOll. C. Bean	Ceaptha ag an mBord Rialaithe	Ón 21 Samhain 2017
An tOll. L. Drury	Ceaptha ag an mBord Rialaithe	Go 21 Samhain 2017
An tOll. L. Breatnach	Ceaptha ag an mBord Rialaithe	Go 21 Samhain 2017

Tá Coiste Iniúchta agus Riosca bunaithe ag an gComhairle.

Tá ceathrar comhaltaí Boird ar an gCoiste Iniúchta agus Riosca. Is é ról an Choiste Iniúchta agus Riosca tacú leis an gComhairle i dtaca lena bhfreagrachtaí maidir le riosca, rialú agus rialachas agus dearbhú gaolmhar. Tá an Coiste Iniúchta agus Riosca neamhspleách ó bhainistiú airgeadais na heagraíochta. Go háirithe, déanann an Coiste deimhin de go ndéantar monatóireacht ghníomhach agus neamhspleách ar na córais rialaithe inmheánaigh lena n-áirítear gníomhaíochtaí iniúchta. Tuairiscíonn an Coiste Iniúchta agus Riosca don Chomhairle cúpla uair sa bhliain agus go foirmiúil i scríbhinn uair sa bhliain.

Is iad comhaltaí an Choiste Iniúchta agus Riosca: An tUas. Dermot Byrne, Cathaoirleach, An tOll. Dervilla Donnelly, An tOll. Ann Breslin agus An tUas. John Boland. Sa bhliain 2017 tháinig an Coiste Iniúchta agus Riosca le chéile ceithre huair.

Sceideal Tinrimh, Táillí agus Speansais

Leagtar amach anseo thíos sceideal tinrimh ar chruinnithe de chuid na Comhairle agus an Choiste Iniúchta agus Riosca do 2017, lena n-áirítear táillí agus speansais a fuair gach comhalta.

2017	Comhairle	Coiste Iniúchta & Riosca	Táillí 2017 €	Speansais €
Líon Cruinnithe	2	4		
An Dr. V. Cunnane (Ch)	2		-	928
An tOll. G. Wrixon	2		-	460
An tOll. A. Jaffee	1		-	1,228
An tOll. A. Ahlqvist	2		-	7,108
An tOll. W. Nahm	2		-	-
An tOll. L. Drury	2		-	-
An tOll. L. Breatnach	2		-	-
An tOll. C. Bean	-		-	-
An tOll. R. Ó hUiginn	1		-	-
An tUas. D. Byrne (Ch)		4	-	-
An tOll. A. Breslin		4	-	-
An tOll. D. Donnelly		4	-	-
An tUas. J. Boland		1	-	-
			-	9,824

Ráiteas Rialachais agus Tuairisc na gComhaltaí Comhairle (ar lean)

Mórathruithe Pearsanra

D'éirigh beirt chomhaltaí den Chomhairle i rith na bliana. D'éirigh an tOllamh Luke Drury agus an tOllamh Liam Breatnach ar a bpoist le feidhm ón 21 Samhain 2017. Ceapadh an tOllamh Chris Bean agus an tOllamh Ruairi Ó hUiginn ina gcomhaltaí Comhairle ón 21 Samhain 2017.

Ceapadh an tUas. John Boland ina chomhalta den Choiste Iniúchta agus Riosca ón 28 Lúnasa 2017.

Chuaigh an tUas. Cecil Keaveney, Cláraitheoir ar scor an 16 Meitheamh 2017. Thosaigh an Dr. Eucharia Meehan ar a ceapachán mar Chláraitheoir an 18 Bealtaine 2017.

Nochtuithe a Éilíonn an Cód Cleachtais chun Comhlachtaí Stáit a Rialú (2016)

Tá an Chomhairle freagrach as a chinntiú gur chomhlíon an Institiúid riachtanais an Chóid Cleachtais chun Comhlachtaí Stáit a Rialú ("an Cód"), mar a d'fhoilsigh an Roinne Caiteachais Phoiblí agus Athchóirithe i mí Lúnasa 2016. Éilíonn an Cód na nochtuithe seo a leanas:

Briseadh Síos ar Shochair Ghearrthéarma na bhFostaithe

Déantar sochair ghearrthéarma na bhfostaithe de bhreis ar €60,000 a rangú sna bandaí seo a leanas:

Raon		**Líon na bhfostaithe**	
Ó	**Go**	**2017**	**2016**
€60,000 -	€69,000	2	1
€70,000 -	€79,000	7	7
€80,000 -	€89,000	1	1
€90,000 -	€99,000	-	2
€100,000 -	€109,000	3	2
€110,000 -	€119,000	-	-
€120,000 -	€129,000	-	-
€130,000 -	€139,000	7	6

Nóta: chun críocha an nochtaithe seo, áirítear le sochair ghearrthéarma na bhfostaithe i dtaca le seirbhísí a chuireadh ar fáil le linn na tréimhse tuairiscithe tuarastal, ach ní áirítear ÁSPC an fhostóra.

Costais Chomhairliúcháin

Airítear le costais chomhairliúcháin an costas ar chomhairliúchán seachtrach don bhainistíocht agus ní áirítear feidhmeanna seachfhoinsithe "gnó mar is gnách".

	2017	**2016**
	€	**€**
Earcaíocht	38,576	5,106
Táillí Dlí	18,946	19,054
Airgeadais/achtúireach	36,519	22,858
Caidreamh Poiblí	7,780	-
Eile	24,325	33,196
Iomlán na gCostas Comhairliúcháin a gearradh leis an gcuntas Ioncaim agus Caiteachais	**126,146**	**80,214**

Caiteachas Taistil agus Cothabhála

Déantar Caiteachas Taistil agus Cothabhála a rangú mar seo a leanas:

	2017 €	2016 €
Náisiúnta		
- Comhairle	1,388	1,950
- Fostaithe	17,206	6,791
- Cuairteoirí Acadúla	1,394	423
- Tograí	69,449	78,627
Idirnáisiúnta		
- Comhairle	8,336	9,090
- Fostaithe	58,900	45,614
- Cuairteoirí Acadúla	22,592	24,764
- Tograí	109,084	150,267
Iomlán		

Caiteachas Fáilteachais

Áirítear sa chuntas Ioncaim agus Caiteachais an caiteachas fáilteachais seo a leanas:

	2017 €	2016 €
Fáilteachas Foirne	3,124	564
Fáilteachas Cliaint	10,311	9,850
Iomlán	**13,435**	**10,414**

Ráiteas Comhlíonta

Chomhlíon an Institiúid riachtanais an Chóid Cleachtais chun Comhlachtaí Stáit a Rialú (2016), mar a d'fhoilsigh an Roinn Caiteachais Phoiblí agus Athchóirithe i mí Lúnasa 2016, leis na heisceachtaí seo a leanas:

1) Déanfaidh an Chomhairle cóip den phlean bliantúil agus buiséad a scaipeadh agus a fhaomhadh in 2018.

2) Cuirfidh an Chomhairle Athbhreithniú Eifeachtúlachta agus Meastóireachta Boird i gcrích i mí na Samhna 2018.

Vincent Cunnane
Cathaoirleach

27 Meitheamh 2018

Eucharia Meehan
Cláraitheoir

27 Meitheamh 2018

Ráiteas Freagrachtaí na Comhairle

Éilítear ar Chomhairle Institiúid Ard-Léinn Bhaile Átha Cliath faoi alt 28(2) den Acht um Institiúid Ard-Leighinn, 1940 ráitis airgeadais a ullmhú ar shlí a cheadóidh an tAire Oideachais & Eolaíochta le comhthoiliú an Aire Airgeadais Agus an Chomhairle ag ullmhú na ráitis airgeadais sin éilítear uirthi:

- polasaithe chuntasaíochta oiriúnacha a roghnú agus iad a chur i bhfeidhm go comhleanúnach;
- breithiúnais agus meastacháin a dhéanamh atá réasúnach agus stuama;
- na ráitis airgeadais a ullmhú ar bhonn gnóthais leantach mura bhfuil sé míchuí glacadh leis go leanfaidh an Institiúid ag oibriú; agus
- aon imeacht ábhartha ó chaighdeáin chuntasaíochta infheidhme a nochtadh agus a mhíniú

Tá freagracht ar an gComhairle taifid chearta iomchuí a choinneáil a nochtaíonn ag aon am le cruinneas réasúnach staid airgeadais na hInstitiúide agus a chuireann ar a cumas a chinntiú go gcloínn na ráitis airgeadais le hAlt 28(2) den Acht. Tá freagracht ar an gComhairle sócmhainní na hInstitiúide a shlánú agus as céimeanna réasúnacha a ghlacadh le cosc a chur ar chalaois agus ar neamhrialtachtaí eile agus iad a aimsiú.

Ruairí Ó hUiginn
Comhalta Den Chomhairle

Chris Bean
Comhalta Den Chomhairle

27 Meitheamh 2018

Ráiteas maidir le Rialachas Inmheánach

Freagracht as Rialachas Inmheánach

Thar ceann Chomhairle na hInstitiúide admhaímid ár bhfreagracht as a chinntiú go ndéanfar córas éifeachtach de rialuithe inmheánacha a chothabháil agus a oibriú.

Ní féidir leis an gcóras ach dearbhú réasúnach agus ní dearbhú críochnaitheach a chur ar fáil go ndéantar slánú ar shócmhainní, go mbíonn idirbheartaíochtaí údaraithe agus taifeadta i gceart, agus go gcuirtear cosc ar earráidí ábhartha nó ar neamhrialtachtaí nó go n-aimseofaí iad i dtréimhse chaoithiúil.

Nósanna Imeachta Rialaithe Lárnacha

Tá céimeanna glactha ag an gComhairle lena chinntiú go mbeidh timpeallacht rialaithe chuí i bhfeidhm trí

- sainmhíniú soiléir a thabhairt maidir le freagrachtaí bainistíochta;
- ag glacadh le prionsabail an rialachais inmheánaigh atá sa Cód Cleachtais chun Comhlachtaí Stáit a Rialú;
- nósanna imeachta foirmiúla a bhunú le teipeanna rialaithe suntasacha a thuairisciú agus lena chinntiú go dtógtar gníomh cuí leis an gceist a cheartú;
- nósanna imeachta foirmiúla a bhunú chun monatóireacht as dhéanamh ar ghníomhartha agus chun sócmhainní na heagraíochta a chosaint.

Tá próisis bunaithe ag an gComhairle le rioscaí gnó a aithint agus iad a luacháil trí

- nádúr, méid agus tionchar airgeadais na rioscaí a bhíonn os comhair na hInstitiúide a aithint lena n-áirítear méid agus catagóir a mheasann an Institiúid a bheith inghlactha;
- measúnú a dhéanamh ar an dóchúlacht atá ann go dtarlóidh na rioscaí aitheanta;
- measúnú a dhéanamh ar chumas na hInstitiúide na rioscaí a tharlaíonn a bhainistiú agus a mhaolú;
- measúnú a dhéanamh ar na costais a bhaineann le rialacháin áirithe a oibriú a bhaineann leis an sochar a bhaintear amach.

Tá an córas rialaithe airgeadais inmheánaigh bunaithe ar chreat oibre eolais bainistíochta rialta, nósanna imeachta riaracháin lena n-áirítear dualgais a roinnt, agus córas toscaireachta agus cuntasachta.

Áirítear leis go háirithe:

- córas buiséid cuimsitheach le buiséad bliantúil a ndéanann Comhairle na hInstitiúide athbhreithniú air agus a bhíonn comhaontaithe aici;
- athbhreithnithe rialta ag an gComhairle ar thuairiscí airgeadais tréimhseacha agus bliantúla a léiríonn;
- spriocanna a leagan síos le feidhmíocht airgeadais agus feidhmíocht eile a thomhas;
- cloí le treoirlínte chun soláthar don earnáil phoiblí;
- athbhreithnithe rialta ag an gComhairle ar thionscadail taighde seachtaracha.

Leanann an Coiste Iniúchóireachta ag déanamh athbhreithniú ar chúrsaí rialaithe inmheánacha agus ar shaincheisteanna a d'ardaigh an tArd-Reachtaire Cuntas agus Ciste.

I 2017, bhuail an Coiste Iniúchoireachte le cheile ceithre huaire . Ina theannta sin, an tuarascáil ar chórais rialaithe inmheánacha don bhliain 2017 a chuir an tIniúchóir Inmheaánach ar fáil tugadh do bhaill na Comhairle í.

Dearbhaímid go bhfuil nósanna imeachta ar bun ag DIAS lena chinntiú go gcomhlíontar rialacha agus treoirlínte reatha maidir le soláthar.

Aibhsítear nithe ag éirí maidir le rialuithe ar sholáthar faoi nithe i dtaca le rialachas inmheánach thíos.

Dearbhaímid go bhfuil nósanna imeacht ag DIAS chun monatóireacht a dhéanamh ar éifeachtúlacht a nósanna imeachta i dtaca le bainistiú riosca agus rialú.

Ráiteas ar Chóras Rialaithe Airgeadais Inmheánaigh (ar lean)

Nithe maidir le Rialachas Inmheánach

Níor sainaithníodh aon laigí sa rialachas inmheánach i dtaca le 2017 a éilíonn nochtadh sna ráitis airgeadais. Dearbhaímid sa bhliain dar críoch 31 Nollaig 2017, go bhfuil rialacha agus treoirlínte reatha soláthair á gcomhlíonadh ag DIAS.

Tá monatóireacht agus athbhreithniú na Comhairle ar éifeachtúlacht an chórais rialaithe airgeadais inmheánaigh coinnithe ar an eolas trí obair an iniúchóra inmheánaigh, trí obair an Chláraitheora agus oifigigh eile laistigh den Institiúid atá freagrach as creat oibre rialaithe airgeadais cuí a fhorbairt agus a chothabháil, agus trí thuairimí a dhéanann an Coiste Iniúchta agus an tArd-Reachtaire Cuntas agus Ciste ina litir bhainistíochta no i dtuairiscí eile.

Níl polasaí foirmiúil calaoise scríofa ar bun ag an Institiúid, ach tabharfar aghaidh air seo in 2018.

Athbhreithniú Bliantúil ar Rialacháin

Dearbhaím go ndearna an Bord athbhreithniú ar éifeachtachas chórais rialaithe airgeadais inmhéanaigh na hInstitiúide sa bhliain dár críoch 31ú Nollaig 2017.

Dearbhaímid sa bhliain dar críoch 31 Nollaig 2017, rinne an Chomhairle athbhreithniú ar éifeachtacht rialuithe inmheánacha na hInstitiúide. Dearbhaímid go bhfuil córas cuí de rialachas inmheánach agus airgeadais ar bun.

Sínithe thar ceann Chomhairle na hInstitiúide

Vincent Cunnane
Cathaoirleach-Comhairle Na hInstitiúide

Eucharia Meehan
Cláraithheoir

27 Meitheamh 2018

Ard-Reachtaire Cuntas agus Ciste

Tuairisc le cur i láthair Thithe an Oireachtais Institiúid Ard-Léinn Bhaile Átha Cliath

Tuairim ar na ráitis airgeadais

Tá ráitis airgeadais Institiúid Ard-Léinn Bhaile Átha Cliath don bhliain dar críoch 31 Nollaig 2017 iniúchta agam faoin Acht Um Institiúid Ard-Léinn, 1940. Tá na ráitis airgeadais comhdhéanta de

- an ráiteas ar ioncam agus caiteachas agus cúlchistí ioncaim coinnithe,
- an ráiteas ar ioncam cuimsitheach,
- an ráiteas ar shuíomh airgeadais,
- an ráiteas ar shreabhadh airgid, agus
- na nótaí gaolmhara, lena n-áirítear achoimre ar pholasaithe cuntasaíochta suntasacha.

I mo thuairimse, maidir leis na ráitis airgeadais, tugtar leo léargas fíor agus cothrom ar shócmhainní, dliteanais agus suíomh airgeadais na hInstitiúide ag 31 Nollaig 2017 agus ar a hioncam agus ar a caiteachas don bhliain 2017 i gcomhréir leis an gCaighdeán Tuairiscithe Airgeadais (FRS) 102- *An Caighdeán Tuairiscithe Airgeadais a bhaineann leis an Ríocht Aontaithe agus Poblacht na hÉireann.*

Bunús leis an tuairim

Rinne mé m'iniúchadh ar na ráitis airgeadais i gcomhréir leis na Caighdeáin Idirnáisiúnta maidir le hIniúchóireacht (ISAnna) mar atá molta ag an Eagraíocht Idirnáisiúnta Uasfhoras Iniúchóireachta. Tugtar cur síos san aguisín ar mo fhreagrachtaí faoi na caighdeáin sin. Táim neamhspleách ar an Institiúid agus tá mo fhreagrachtaí eitice eile comhlíonta agam i gcomhréir leis na caighdeáin.

Creidim go bhfuil an fhianaise iniúchta atá faighte agam imleor agus cuí chun bunús a sholáthar do mo thuairim.

Tuairisc ar fhaisnéis eile seachas na ráitis airgeadais, agus ar nithe eile

Tá faisnéis áirithe eile curtha i láthair ag an Institiúid chomh maith leis na ráitis airgeadais. Áirítear anseo ráiteas freagrachtaí na Comhairle, an ráiteas maidir le rialú inmheánach agus ráiteas maidir le rialachas agus tuairisc chomhaltaí na Comhairle. San aguisín leis an tuairisc seo, tugtar cur síos ar mo fhreagrachtaí i dtaca leis an bhfaisnéis sin, agus i dtaca le nithe eile a dtugaim cur síos orthu ar bhinn eisceachta.

Níl aon rud le tuairisciú agam ina leith sin.

Colette Drinan
Le haghaidh agus thar ceann an
Ard-Reachtaire Cuntas agus Ciste

29 Meitheamh 2018

Aguisín leis an tuairisc

Freagrachtaí chomhaltaí na Comhairle

Leagtar amach i ráiteas freagrachtaí na Comhairle freagrachtaí chomhaltaí na Comhairle. Tá comhaltaí na Comhairle freagrach as

- na ráitis airgeadais a ullmhú san fhoirm a leagtar amach faoin den Acht Um Institiúid Ard-Léinn 1940
- a chinntiú go dtugtar leis na ráitis airgeadais léargas fíor agus cothrom i gcomhréir le FRS102
- rialtacht na n-idirbheart a chinntiú
- measúnú cé acu an bhfuil sé cuí an bonn gnóthais leantach na cuntasaíochta a úsáid, agus
- cibé rialachas inmheánach a chineann siad atá riachtanach chun ráitis airgeadais a ullmhú atá saor ó mhíráiteas ábhartha, cibé acu calaois nó neamhrialtacht is cúis leis sin.

Freagrachtaí an Ard-Reachtaire Cuntas agus Ciste

Éilítear orm faoin Acht Um Institiúid Ard-Léinn 1940 iniúchadh a dhéanamh ar ráitis airgeadais na hInstitiúide agus tuairisc a thabhairt do Thithe an Oireachtais ina leith.

Is é an aidhm atá agam agus an t-iniúchadh á dhéanamh agam dearbhú réasúnta a fháil faoi cé an bhfuil na ráitis airgeadais mar iomlán saor ó mhíráiteas ábhartha mar thoradh ar chalaois nó neamhrialtacht. Leibhéal ard dearbhaithe is ea dearbhú réasúnta, ach ní barántas é go n-aimseoidh iniúchadh a dhéantar i gcomhréir leis na ISAnna míráiteas ábhartha i gcónaí más ann dó. Féadfaidh míráitis a bheith ann mar thoradh ar chalaois nó earráid agus meastar go bhfuil siad ábhartha más rud é, iontu féin nó go carnach, go bhféadfaí a mheas go mbeadh tionchar acu ar chinntí eacnamaíochta úsáideoirí a rinneadh ar bhonn na ráiteas airgeadais seo.

Mar chuid d'iniúchadh i gcomhréir leis na ISAnna, cuirimse breithiúnas gairmiúil i bhfeidhm agus coinním sceipteachas gairmiúil le linn an iniúchta. Agus é sin á dhéanamh agam,

- Aithním agus déanaimse measúnú ar rioscaí míráitis ábhartha faoi na airgeadais cibé acu calaois nó neamhrialtacht is cúis leis; déanaimse nósanna imeachta iniúchta a dhearadh agus a chur i gcrích a fhreagraíonn do na rioscaí sin; agus faighimse fianaise atá imleor agus iomchuí chun bunús a sholáthar do mo thuairim. Tá riosca níos mó ann nach mbraithfear míráiteas ábhartha ag eascairt as calaois ná ceann ag eascairt as earráid, toisc go bhféadfaidh claonpháirtíocht, brionnú, easnaimh inteannacha, mífhaisnéisí nó sárú ar rialú inmheánach a bheith ann le calaois.
- Faighimse tuiscint ar rialú inmheánach atá ábhartha don iniúchadh d'fhonn nósanna imeachta iniúchta a dhearadh atá iomchuí do na cúinsí, ach ní chun críche tuairim a nochtadh maidir le héifeachtacht na rialuithe inmheánacha.
- Déanaimse meastóireacht ar oiriúnacht na bpolasaithe cuntasaíochta a úsáidtear agus ar réasúntacht na meastachán cuntasaíochta agus na nochtuithe gaolmhara.
- Déanaimse amach cé acu an bhfuil sé oiriúnach bonn gnóthais leantach na cuntasaíochta a úsáid agus, bunaithe ar an bhfianaise iniúchta a fhaightear, cé acu an bhfuil éiginnteacht ábhartha ann i dtaca le heachtaí nó coinníollacha a d'fhéadfadh amhras suntasach a chur ar chumas na hInstitiúide leanúint ar aghaidh mar ghnóthas leantach. Má mheasaim go bhfuil éiginnteacht ábhartha ann, tá orm aird a tharraingt i mo thuairisc ar na nochtuithe gaolmhara sna ráitis airgeadais nó, más rud é nach leor na nochtuithe sin, mo thuairim a leasú. Tá mo thuairimí bunaithe ar an bhfianaise iniúchta a fuarthas suas chomh fada le dáta mo thuairisce. D'fhéadfadh ócáidí nó coinníollacha sa todhchaí cur ar an Institiúid stopadh mar ghnóthas leantach, áfach.
- Déanaimse meastóireacht ar chur i láthair, struchtúr agus ábhar na ráiteas airgeadais ar an iomlán, lena n-áirítear na nochtuithe, agus cé acu an léiríonn na ráitis airgeadais na bun-idirbhearta agus na bun-eachtraí ar bhealach a bhaineann cur i láthair amach atá cóir.

Cuirimse in iúl dóibh siúd atá freagrach as rialachas, i measc nithe eile, an scóip agus an t-amú atá beartaithe don iniúchadh agus torthaí suntasacha an iniúchta, lena n-áirítear easnaimh shuntasacha ar bith sa rialú inmheánach a aithním le linn m'iniúchta.

Faisnéis seachas na ráitis airgeadais

Ní chlúdaíonn mo thuairim faoi na ráitis airgeadais an fhaisnéis eile a chuirtear i láthair leis na ráitis sin, agus ní léirím aon chineál de thuairim dearbhaithe ina leith sin.

I dtaca le m'iniúchadh ar na ráitis airgeadais, tá orm faoi na ISAnna an fhaisnéis eile a chuirtear i láthair a léamh agus, é sin á dhéanamh agam. a mheas cé acu an bhfuil an fhaisnéis eile neamhréireach go hábhartha leis na ráitis airgeadais nó le heolas a fuarthas le linn an iniúchta, nó más cosúil ar bhealach eile go bhfuil sé míráite go hábhartha. Más rud é, bunaithe ar an obair atá déanta agam, go ndéanaimse amach go bhfuil míráiteas ábhartha ar an fhaisnéis eile seo, tá orm an fhíric seo a thuairisciú.

Tuairisciú ar ábhair eile

Déantar m'iniúchadh le tagairt do na tosca speisialta a bhaineann le comhlachtaí Stáit i dtaca lena mbainistiú agus oibriú. Tuairiscím má tá aon nithe ábhartha a bhaineann leis an gcaoi ina bhfuil gnó poiblí déanta.

Féachaim le fianaise a fháil maidir le rialtacht na n-idirbheart airgeadais le linn iniúchta. Tuairiscím má tá aon chás ábhartha ann nár feidhmíodh airgead poiblí chun na gcríoch a bhí beartaithe nó sa chás nár lean na hidirbhearta do na húdaráis a rialaíonn iad.

Tuairiscím eisceachtaí más rud é, i mo thuairimse,

- nach bhfuair mé an fhaisnéis agus na mínithe ar fad a theastaigh uaim do m'iniúchadh, nó
- nár leor na taifid chuntasaíochta chun na ráitis airgeadais a iniúchadh go réidh agus mar ba cheart, nó
- nach bhfuil na the ráitis airgeadais ag teacht leis na taifid chuntasaíochta.

Ráiteas Ioncaim agus Caiteachais agus Cúlchistí Ioncaim Coinnithe

	Notaí	2017 €	2016 €
Ioncam	2		
Deontas Oireachtais		6,566,000	6,256,000
Glan-mhaoiniú iarchurtha do shochair scoir	12.c	811,160	990,526
Díolacháin Foilseachán		42,095	38,973
Ioncam Tionscadail	3	2,238,227	1,939,156
Ioncam ForchostasThionscadail		78,356	107,847
Eile	4	10,702	7,476
		9,746,540	9,339,978
Aistriú ó Cúlchiste Caipitil	6	11,654	272,823
		9,758,194	9,612,801
Caiteachas	2		
Scoil an Léinn Cheiltigh		1,675,927	1,063,960
Scoil na Fisice Teoiriciúla		1,633,748	850,644
Scoil na Fisice Cosmaí		4,046,186	3,403,608
Riarachán		2,342,113	4,172,849
		9,697,974	9,491,061
Barrachas don bhliain		**60,220**	**121,740**
Iarmhéid amhail an 1 Eanáir		912,837	791,097
Iarmhéid amhail an 31 Nollaig		**973,057**	**912,837**

Ráiteas ar Ioncam Cuimsitheach		2017 €	2016 €
Barrachas don bhliain		60,220	121,740
Gnóthachain/(caillteanais) ó thaithí ar oibleagáidí sochair scoir		(518,000)	765,000
Athruithe i bhfoshuíomhanna atá mar bhonn le luach reatha na n-oibleagáidí sochair scoir		13,000	(6,371,000)
(Caillteanas)/Gnóthachan Achtúireach ar Oibleagáidí Sochair Scoir	**12.b**	**(505,000)**	**(5,606,000)**
Leasú ar Mhaoiniú Sochair Scoir Iarchurtha		**505,000**	**5,606,000**
Iomlán aitheanta don bhliain		**60,220**	**121,740**

Is cuid de na ráitis airgeadais seo iad an Ráiteas ar Shreabhadh Airgid agus nótaí 1 go 20.

Ruairí Ó hUiginn
Comhalta Den Chomhairle

Dáta 27 Meitheamh 2018

Chris Bean
Comhalta Den Chomhairle

Dáta 27 Meitheamh 2018

Ráiteas Faoi Staid Airgeadais

	Notaí	2017 €	2016 €
Sócmhainní			
Sócmhainní Seasta: Maoin, Fearas agus Treallamh	5	815,653	827,307
Sócmhainní Reatha:			
Airgead sa Lámh agus ag an mBanc		6,185,822	6,062,056
Infháltais	8	721,753	268,081
Infháltais Tionscadail	3.a	214,064	339,592
Sócmhainní Iomlána		**7,937,292**	**7,497,036**
Lúide Dliteanais			
Nithe Iníoctha - Suimeanna le híoc laistigh de bhliain amháin			
Nithe Iníoctha	7	928,077	530,957
Nithe Tionscadail Iníoctha	3.a	4,565,458	4,744,168
Creidiúnaithe - méideanna atá dlite tar éis bliana amháin	7	655,047	481,767
Dliteanais Iomlána Roimh Phinsin		**6,148,582**	**5,756,892**
Sócmhainní lúide dliteanais Roimh Phinsin		**1,788,710**	**1,740,144**
Maoiniú an Phinsin Iarchurtha	12.c	59,123,000	57,807,000
Dliteanais Phinsin	12.b	(59,123,000)	(57,807,000)
		0	**0**
Sócmhainní Glana		**1,788,710**	**1,740,144**
Maoinithe ag:			
Cuntas Ioncaim agus Caiteachais		973,057	912,837
Cúlchiste Caipitil	6	815,653	827,307
		1,788,710	**1,740,144**

Is cuid de na ráitis airgeadais seo iad an Ráiteas ar Shreabhadh Airgid agus nótaí 1 go 20.

Ruairí Ó hUiginn
Comhalta Den Chomhairle

Dáta 27 Meitheamh 2018

Chris Bean
Comhalta Den Chomhairle

Dáta 27 Meitheamh 2018

Ráiteas Sreabhadh Airgid

	Notaí	2017 €	2016 €
Réiteach barrachais oibríochta chuig glan-insreabhadh airgid ó ghníomhaíochtaí oibríochta			
Barrachas don bhliain		**60,220**	**121,740**
Ús infhaighte	4	(603)	(2,402)
Méadú/(Laghdú) ar Nithe Iníoctha		570,400	(25,346)
(Méadú) ar Infháltais		(453,672)	(2,779)
Glan ardú i gCláir Thaighde agus Táillí		(53,182)	167,815
Dímheas	5	284,451	367,873
Aistriú Cúlchiste Caipitil	6	(11,654)	(272,823)
Caillteanas ar dhiúscairt		-	3,421
Glan insreabhadh Airgid tirim ó ghníomhaíochtaí oibríochta		**395,960**	**357,499**
Ráiteas Sreabhadh Airgid			
Glan insreabhadh airgid tirim ó ghníomhaíochtaí oibríochta		395,960	357,499
Aischuir ar infheistíochtaí agus seirbhísiú airgeadais			
Ús Bainc Infhaighte	4	603	2,402
Caiteachas Caipitiúil			
Ceannach Sócmhainní Inláimhsithe	5	(272,797)	(98,471)
Ardú ar Airgead		**123,766**	**261,430**
Réiteach glaninsreabhadh airgead tirim chuig gluaiseacht i nglanchistí			
Ardú ar Airgead Tirim		123,766	261,430
Iarmhéid faoin 1 Eanáir		6,062,056	5,800,626
Iarmhéid faoin 31 Nollaig		**6,185,822**	**6,062,056**

Anailís ar athrú i nglanchistí	**Airgead infhaighte sa Bhanc** €	**Airgead infhaighte sa Bhanc** €
I dtús na bliana	6,062,056	5,800,626
Sreabhadh Airgid	123,766	261,430
Ag deireadh na bliana	**6,185,822**	**6,062,056**

Is cuid de na ráitis airgeadais seo iad an Ráiteas ar Shreabhadh Airgid agus nótaí 1 go 20.

Ruairí Ó hUiginn
Comhalta Den Chomhairle

Dáta 27 Meitheamh 2018

Chris Bean
Comhalta Den Chomhairle

Dáta 27 Meitheamh 2018

Nótaí do na Ráitis Airgeadais

1. Polasaithe Chuntasaíochta

Bunaíodh an Institiúid faoin Acht um Institiúid Ard-Leighinn, 1940.

Áirítear ar a cuid feidhmeanna saoráidí a sholáthar le hard-léinn a chur chun cinn tuilleadh agus le taighde a dhéanamh i mbrainsí speisialtachta eolais. Tá trí Scoil inti - Scoil an Léinn Cheiltigh, Scoil na Fisice Teoiriciúla agus Scoil na Fisice Cosmaí.

a) Bunús Cuntasaíochta

Seo é an chéad chnuasach de ráitis airgeadais ullmhaithe ag Institiúid Ard-Léinn Bhaile Átha Cliath i gcomhréir le caighdeáin chuntasaíochta eisithe ag an gComhairle Tuairiscithe Airgeadais, lena n-áirítear FRS 102 "An Caighdeán Tuairiscithe Airgeadais is infheidhme sa Ríocht Aointaithe agus I bPoblacht na hÉireann" ("FRS 102").

Chun ráitis airgeadais a ullmhú i gcomhréir le FRS 102 ní mór meastacháin criticiúla cuntasaíochta áirithe a úsáid. Éilítear leis freisin go ndéanfaidh an bhainistíocht breithiúnas agus beartais chuntasaíochta na hInstitiúide á gcur i bhfeidhm. (Féach Nóta 19).

Ullmhaíodh na ráitis airgeadais ar bhonn fabhraithe faoin gcoinbhinsiún costais stairiúil agus comhlíonann siad caighdeáin tuairiscithe airgeadais na Comhairle Tuairiscithe Airgeadais.

Cuireadh na beartais chuntasaíochta seo a leanas i bhfeidhm:

b) Deontais Oireachtais

Taispeántar ioncam ar bhunús airgid isteach.

c) Sócmhainní Seasta

Is éard is Sócmhainní Seasta ann ná troscán, trealamh, ríomhairí agus mótarfheithiclí na hInstitiúide agus taispeántar iad ag costas lúide dímheas carntha. Is mar seo a leanas atá na rátaí dímheasa, ríofa ar bhunús dronlíneach:-

Troscán agus Trealamh	10%
Ríomhairí	25%
Mótarfheithiclí	25%

Faightear áitribh atá i seilbh na hInstitiúide ar léas ó Oifig na nOibreacha Poiblí. Ag gach tuairiscithe déanann an Institiúid measúnú cé acu an bhfuil aon chomhartha de bhearnúchán ann. Má tá a leithéid de chomhartha ann, déantar méid in-aisghabhála na sócmhainne a ríomh, is é sin an ceann is airde idir an luach cóir lúide costais le díol agus a luach in úsáid. Aithnítear caillteanas bearnúcháin má sháraíonn an tsuim ghlanluacha an tsuim in-aisghabhála.

Cinntear gnóthachain agus caillteanais ar dhiúscairtí trí chomparáid a dhéanamh idir na fáltais agus an tsuim in-aisghabhála agus aithnítear iad laistigh den Chuntas Ioncaim agus Caiteachais.

Sócmhainní Oidhreachta

Coinníonn agus cothabhálann an Institiúid sócmhainní oidhreachta áirithe, amhail leabharlanna ina bhfuil bailiúcháin de lámhscríbhinní, leabhair agus paimfléid, chomh maith le hionstraimí eolaíochta ársa. Caomhnaíonn an Institiúid na sócmhainní seo do thaighde agus d'imeachtaí poiblí.

I gcomhréir le caighdeán cuntasaíochta FRS102, ní dhéantar sócmhainní oidhreachta a fuarthas roimh an 1 Eanáir 2007 a chaipitliú sna ráitis airgeadais toisc go meastar nach féidir aon luach fiúntach a lua leo mar thoradh ar easpa eolais ar an mbunchostas agus toisc nach féidir na sócmhainní seo a inréadú go héasca. Ina theannta sin, ní féidir luacháil sheachtrach a fháil ar chostas réasúnta.

Ní bhfuarthas aon sócmhainní oidhreachta i ndiaidh 1 Eanáir 2007. Áirítear na costais caomhnaithe agus caomhantais go léir de réir mar a thabhaítear iad.

d) Cúlchiste Caipitil

Léiríonn cúltaca caipitiúil luach neamh-amúchta ioncaim a úsáidtear le Sócmhainní Seasta a cheannach.

Nótaí do na Ráitis Airgeadais (ar lean)

1. Polasaithe Chuntasaíochta (ar lean)

e) Leabharlann

Díscríobhtar caiteachas ar leabhair leabharlainne agus ábhair sa bhliain a dtabhaítear é.

f) Foilseacháin

Díscríobhtar caiteachas ar fhoilseacháin sa bhliain a dtabhaítear é.

g) Aoisliúntas

Feidhmíonn Institiúid Ard-Léinn Bhaile Átha Cliath scéim phinsin shochair shonraithe a mhaoinítear go bliantúil ar bhonn íoc mar a imíonn tú ó chistí atá ar fáil dó, lena n-áirítear cistí a chuireann an Roinn Oideachais agus Scileanna ar fáil agus ó ranníocaíochtaí a asbhaintear ó thuarastail foirne.

Feidhmíonn Institiúid Ard-Léinn Bhaile Átha Cliath freisin an Scéim Pinsin Seirbhíse Poiblí Aonair (Scéim Aonair), is í sin scéim sochair scoir le sochair sainithe do do sheirbhísigh phoiblí inphinsin a ceapadh ar 1 Eanáir 2013 nó ina dhiaidh. Cuirtear ranníocaíochtaí bhaill na Scéime Singil ar aghaidh chuig an Roinn Caiteachais Phoiblí agus Athchóirithe.

Léiríonn costais phinsin na sochair phinsin a thuilleann fostaithe sa tréimhse agus léirítear iad glan ar ranníocaíochtaí pinsin foirne a bhíonn coinnithe ag Institiúid Ard-Léinn Bhaile Átha Cliath. Aithnítear suim a chomhfhreagraíonn don mhuirear pinsin mar ioncam sa mhéid go bhfuil sé inaisghabhála go ndéantar é a fhritháireamh in aghaidh deontais a bhíonn faighte sa bhliain chun íocaíochtaí pinsin a ghlanadh.

Tá gnóthachain nó caillteanais achtúireacha ar dhliteanais na scéime léirithe sa Ráiteas ar Ghnóthachain agus Caillteanais Aitheanta agus aithnítear coigeartú comhfhreagrach sa mhéid is féidir a aisghabháil ón Roinn Oideachais agus Scileanna.

Léiríonn na dliteanais phinsin luach reatha na n-íocaíochtaí pinsin don todhchaí atá tuillte ag an bhfoireann go dtí seo. Léiríonn maoiniú pinsin iarchurtha an tsócmhainn chomhfhreagrach a bheidh aisghafa i dtréimhsí amach anseo ón Roinn Oideachais agus Scileanna.

h) Tionscadail

Faigheann Institiúid Ard-Léinn Bhaile Átha Cliath maoiniú seachtarach ó thionscal, ó chomhlachtaí rialtais, agus ó Choimisiún na hEorpa. Coinnítear cairt chuntais i gcás gach tionscadal. Léirítear ioncam agus caiteachas ar thionscadail sna ráitis airgeadais sa bhliain lena mbaineann siad. Taispeántar barrachas nó easnamh tionscadail sna ráitis airgeadais nuair a léirítear sin.

i) Infháltais

Tomhaistear infháltais ghearrthéarma ag praghas an idirbhirt, lúide bearnú ar bith.

j) Nithe Iníoctha

Tomhaistear nithe iníoctha gearrthéarma ag praghas an idirbhirt.

k) Airgead Tirim agus Coibhéisí Airgid

Léirítear airgead tirim le hairgead ar láimh agus taiscí le hinstitiúidí airgeadais iníoctha gan pionós ar fhógra nach mó ná 24 uair a' chloig. Is éard is coibhéisí airgid ann infheistíochtaí an-leachtacha a thagann in aibíocht tráth nach mó ná trí mhí ó dháta an tsealbhaithe agus atá inaistrithe go héasca chuig suimeanna aitheanta airgid le riosca neamhsuntasach d'athrú sa luach.

l) Ionstraimí Airgeadais

Ní théann an Institiúid isteach ach in idirbhearta um bhunionstraimí airgeadais a mbíonn aitheantas ar shócmhainní agus dliteanais airgeadais mar thoradh orthu amhail cuntais trádála agus cuntais infhála agus iníoctha eile. Taifeadtar bunionstraimí airgeadais ar phraghas an idirbhirt.

m) Pá Saoire

Aithnítear dliteanas go feadh mhéid teidlíochta pá saoire nár úsáideadh atá fabhraithe ar dháta an chláir chomhardaithe agus tógtha ar aghaidh chuig tréimhsí sa todhchaí. Tomhaistear é seo ag costas tuarastail neamhlascainithe na teidlíochta saoire sa todhchaí agus fabhraítear é ar dháta an chláir chomhardaithe.

1. Polasaithe Chuntasaíochta (ar lean)

n) Léasanna oibriúcháin

Gearrtar cíosanna atá iníoctha faoi léasanna oibriúcháin ar an gCuntas Ioncaim agus Caiteachais de réir mar a thabhaítear iad thar téarma an léasa.

o) Airgeadra Feidhmiúil

Is é an euro airgeadra feidhmiúil agus láithritheach na hInstitiúide.

p) Deontais Neamh-Thionscadail.

Taifeadtar deontais ó thríú páirtithe sna ráiteas airgeadais ag baint úsáide as an Modh Fabhruithe agus leithdháiltear ar ioncam iad sa chaoi is go meaitseáiltear iad leis an gcaiteachas ábhartha lena mbaineann siad.

Nótaí do na Ráitis Airgeadais (ar lean)

2. Anailís Shonraithe d'Ioncam & Caiteachas don bhliain dár críoch 31/12/2017

IONCAM	Nótaí	Léann Cheilteach €	Fisic Theoiriciúil €	Fisic Chosmach €	Riarachán €	2017 Iomlán €	2016 Iomlán €
Deontais Oireachtais		1,611,420	969,532	2,339,860	1,645,188	6,566,000	6,256,000
*Glanmhaoiniú iarchurtha do Shocahir Pinsin	12.c	255,676	54,281	350,038	151,166	811,160	990,526
Díolacháin Foilseachán		42,095	-	-	-	42,095	38,973
Ioncam Tionscadail	3.a	53,127	86,329	2,098,771	-	2,238,227	1,939,156
Ioncam ForchostasThionscadail		-	-	-	78,356	78,356	107,847
Ioncam Eile	4	603	8,360	1,096	643	10,702	7,476
		1,962,921	1,118,502	4,789,765	1,875,353	9,746,540	9,339,978
Aistriú (chuig) ó Chúlchiste Caipitil		-	-	-	11,654	11,654	272,823
		1,962,921	1,118,502	4,789,765	1,887,007	9,758,194	9,612,801
CAITEACHAS							
Costais Phárolla	9	1,064,972	794,830	1,493,564	775,989	4,129,355	3,756,498
*Costais Sochair Scoir	12.a	440,983	656,745	677,912	480,753	2,256,393	2,378,027
Costais Tionscnamh	3.a	45,810	69,312	1,690,828	-	1,805,950	1,852,150
Stóráil Leabharlainne agus Leabhar		37,248	65,206	32,102	-	134,556	151,514
Dímheas	5	-	-	-	284,451	284,451	367,873
Cíos, Rátaí agus Árachas		-	-	-	200,819	200,819	206,345
Costais Ghinearálta	10	13,054	1,933	34,817	191,974	241,778	183,674
Costais Taistil agus Seimineáir		17,249	28,467	72,487	5,789	123,992	97,541
Cothabháil Áitribh agus Slándáil		-	-	-	169,895	169,895	166,443
Costais ríomhairí agus Idirlín		1,126	14,610	38,055	74,623	128,414	130,805
Breosla Solas agus Cumhacht		-	-	-	121,752	121,752	121,912
Post agus Teileafón		-	-	-	21,373	21,373	23,171
Páipéarachas		7,349	1,347	2,577	8,012	19,285	14,851
Foilseacháin		46,627	-	-	-	46,627	21,593
Fógraíocht		578	-	-	5,181	5,759	369
Mion Trealamh Oifige		931	1,298	3,844	1,502	7,575	14,874
Caillteanas ar dhiúscairt	6	-	-	-	-	-	3,421
		1,675,927	1,633,748	4,046,186	2,342,113	9,697,974	9,491,061
BARRACHAS/DON BHLIAIN		**286,994**	**(515,246)**	**743,579**	**(455,107)**	**60,220**	**121,740**
Iarmhéid amhail an 1 Eanáir		254,834	105,338	1,959,115	(1,406,450)	912,837	791,097
Iarmhéid amhail an 31 Nollaig		**541,828**	**(409,908)**	**2,702,694**	**(1,861,557)**	**973,057**	**912,837**

Nóta (a) * Déantar an Maoiniú Iarchurtha Glan do Shochair Scoir a leithdháileadh ar bhonn pro rata chuig an tsuim a íocadh le pinsinéirí sa bhliain.
* An Maoiniú Iarchurtha Glan do Chostais Sochair Scoir a leithdháileadh ar bhonn pro rata chuig na ranníocaíochtaí ón bhfoireann sa bhliain.
Nóta (b) B'ionann agus €356,349 iomlán na bhforchostas a tuilleadh ar thograí in 2017, Tá €78,356 den bhforchostas tograí a tuilleadh curtha chun creidiúint an Riaracháin.
Nóta (c) Cionroinneadh costais a bhaineann go díreach le taighde (m.sh. pá, leabharlann, costais ríomhaire, taisteal) ar an scoileanna. Gearradh forchostais ar nós cíos, árachas, fóntais agus cothabháil maoine ar Riarachán.
Nóta (d) Deontais Fuarthas suim €6,566,000 (2016: €6,256,000) ón Roinn Oideachais agus Scileanna. Tugann an Roinn Oideachais agus Scileanna an deontas i gcomhair dliteanas faoi chostais pá agus neamhphá ghinearálta agus tarraingíonn an Institiúid aníos í ar bhonn bliantúil.

3. (a) Tionscadail

	2017 €	2016 €
Iarmhéideanna Tosaigh	4,404,578	4,236,763
Admhálacha	2,185,045	2,106,971
	6,589,623	6,343,734
Iarmhéideanna Deiridh (Féichiúnaithe €214,064 Creidiúnaithe €4,565,458)	(4,351,396)	(4,404,578)
Curtha i bhfeidhm mar ioncam	2,238,227	1,939,156
Leithroinnt Ioncaim		
Scoil an Léinn Cheiltigh	53,127	37,990
Scoil na Fisice Teoiriciúla	86,329	7,088
Scoil na Fisice Cosmaí	2,098,771	1,894,078
	2,238,227	1,939,156
Ioncam Iomlán Thionscadal	2,238,227	1,939,156

Costais Tionscadal

	Léann Cheilteach €	Fisic Theoiriciúil €	Fisic Chosmach €	2017 Total €	2016 Iomlán €
Íocaíochtaí chuig Páirtithe/ Comhlachais	-	-	-	-	186,947
Tuarastail/Scoláireachtaí	35,159	57,991	1,259,268	1,352,418	1,161,488
Taisteal				-	
	-	1,258	68,191	69,449	78,627
	-	1,658	107,426	109,084	150,267
Eile	10,651	8,405	255,943	274,999	274,821
Costas Iomlán Tionscadal	45,810	69,312	1,690,828	1,805,950	1,852,150

Líon na mBall Foirne Taighde agus Scoláirí Maoinithe go Seachtrach (WTE) 51 (2016: 34).
Le haghaidh eolais maidir le líon na mball foirne lárnacha agus scoláirí, téigh chuig leathanach 16.

3. (b) Sonraí Tionscadail

	Udarás Cistiúcháin	Iarmhéid Tosaigh €	Admhálacha €	Caiteachas Aisfhillteach €	Curtha I bhfeidhm mar Ioncam (Caipteal san áireamh) €	Iarmhéid Deiridh €	Caipiteal €
Scoil an Leinn Cheiltigh							
Irish Script on Screen		14,587	-	-	-	14,587	-
Celtic Summer School		3,553	11,070	10,651	14,623	-	-
Ogham	Dept. Arts	(1,720)	30,000	24,935	28,280	-	-
Peadar O Muircheartaigh IRC Fellowship	IRC	-	21,353	10,224	10,224	11,129	
Iomlán-Leánn Ceilteach		**16,420**	**62,423**	**45,810**	**53,127**	**25,716**	**-**

3. (b) Sonraí Tionscadail (ar lean)

	Udarás Cistiúcháin	Iarmhéid Tosaigh €	Admhálacha €	Caiteachas Aisfhillteach €	Curtha I bhfeidhm mar Ioncam (Caipteal san áireamh) €	Iarmhéid Deiridh €	Caipiteal €
Scoil na Fisice Teoiriciúla							
Bethe Ansatz	SFI	8,402	-	196	8,402	-	-
T.Tchrakian	SFI	4,118	-	2,320	4,118	-	-
G. Kells	SFI	129,780	-	45,650	52,663	77,117	7,726
S Kovacik IRC Fellowship	IRC	-	22,947	10,293	10,293	12,654	-
D Benincasa IRC Fellowship	IRC	-	22,948	10,853	10,853	12,095	-
Iomlán-FisicTheoiriciúil		**142,300**	**45,895**	**69,312**	**86,329**	**101,866**	**7,726**
Scoil na Fisice Cosmaí							
Nam Conference	A. Observ'tory	4,769	-	-	-	4,769	-
KM3Net -PP	EC	-	-	-	-	-	-
NGST Project	ESA	150,883	46,296	171,720	171,720	25,459	-
EASY T. Ray 2014	SFI	15,273	51,228	22,254	66,501	-	44,039
E.O' Gorman Fellow	IRC	12,167	22,947	34,112	35,114	-	-
Horizon 2020 Catalyst MKID	SFI	15,002	-	17,449	17,449	(2,447)	-
J Mackey Royal Society Fellowship	Royal Society	(12,482)	122,404	68,878	89,587	20,335	-
IRC New Horizons DIAS/UCD	IRC	19,838	-	38,782	40,875	(21,037)	-
MKID Camera IP Tray	SFI	260,335	-	160,367	233,165	27,170	64,833
R Garcia Lopez Dig Deep EC Fellowship	EC	108,688	-	30,179	47,071	61,617	1,874
J Mackey Science Week Grant	SFI	313	103	416	416	-	-
Maria Koutoulaki IRC Scholarship	IRC	6,733	24,000	21,814	21,814	8,919	-
J Mackey IRC New Foundations	IRC	10,000	-	10,039	10,000	-	-
Radionet EC Project	EC	-	53,889	6,586	5,222	48,667	3,743
T Ray ERC Easy	EC	-	648,582	63,243	84,633	563,949	11,279
Iomlán-Réaltfhisic		**591,519**	**969,449**	**645,839**	**823,567**	**737,401**	**125,768**

3. (b) Sonraí Tionscadail (ar lean)

	Udarás Cistiúcháin	Iarmhéid Tosaigh €	Admhálacha €	Caiteachas Aisfhillteach €	Curtha I bhfeidhm mar Ioncam (Caipteal san áireamh) €	Iarmhéid Deiridh €	Caipiteal €
Geophysics Schools Seismology	Various	9,592	-	2,383	2,383	7,209	-
CTBTO	Dept.For. Affairs	5,322	-	2,457	2,457	2,865	-
GIANICE 11	SFI	14,524	7,538	4,427	22,062	-	12,302
SIRG E2174	SFI	(4,983)	56,397	27,984	51,414	-	-
ESA UWB Grant	ESA	16,071	-	2,103	7,103	8,968	5,000
IRECCSEM	SFI	(8,716)	27,821	19,072	19,105	-	-
Structure and Seismicity of Ireland's Crust	SFI	128,538	110,402	105,688	118,226	120,714	3,173
PIPCO	Industry	26,335	-	9,680	26,335	-	2,698
Winterc-3D Fullea Fellow	EC	(47,226)	65,753	18,524	18,527	-	-
4DARTIC	Industry	24,072	-	14,272	24,072	-	10,000
ICRAG	SFI	193,338	214,693	456,896	548,979	(140,948)	18,743
Shallow Crust Fellow	SFI	8,790	9,318	18,107	18,108	-	-
V. Rath GSI Short Call	GSI	1,500	-	1,500	1,500	-	-
iMARL Infrastructure	SFI	2,956,176	-	-	5,105	2,951,071	5,105
Geo External Services	Various	-	51,500	22,751	22,751	28,749	
ERC Development iTHERC	SFI	262,791	-	143,586	178,649	84,142	14,476
NIAP-PassVel	Marine Institute	9,976	-	-	-	9,976	-
Duygu Kiyan Fellowship	SFI	58,239	-	59,822	64,691	(6,452)	-
IRC Geotherm	IRC	-	69,996	32,458	37,525	32,471	2,534
ESA 3D Earth	ESA	-	20,000	63,179	63,179	(43,179)	-
GSI Fellowship P Arroucau	GSI	-	44,757	37,110	39,825	4,932	-
SEA-SEIS	SFI	-	154,218	-	-	154,218	-
GSI Shortcall HERSK M. Molhoff	GSI	-	12,400	-	-	12,400	-
GSI Shortcall C. Bean 2017-SC-046	GSI	-	12,485	2,990	3,208	9,277	-
GSI Seismic Network Support	GSI	-	250,000	-	-	250,000	-
Iomlán-Geoifisic		**3,654,339**	**1,107,278**	**1,044,989**	**1,275,204**	**3,486,413**	**74,031**
Iomlán Fisic Chosmach		**4,245,858**	**2,076,727**	**1,690,828**	**2,098,771**	**4,223,814**	**199,799**
Iomlán DIAS		**4,404,578**	**2,185,045**	**1,805,950**	**2,238,227**	**4,351,396**	**207,525**

Nótaí
Áirítear fáltais ó thograí mar ioncam ó thograí, ar leibhéal atá ionann agus an caiteachas bliantúil a tabhaíodh agus forchostais a tuilleadh ag an togra lena mbaineann. Is ionann na comharduithe deiridh thuas agus forchostas a tuilleadh go dtí seo agus réamh-mhaoiniú chun ceangaltais airgeadais in 2018 a shásamh. Léiríonn an colún caipitil an caiteachas ar shócmhainní seasta i rith 2017.

Nótaí do na Ráitis Airgeadais (ar lean)

4. Ioncam Eile

	2017 €	2016 €
Ús bainc	603	2,402
Táillí & Deontais	7,040	1,885
Eile	3,059	3,189
Iomlán	10,702	7,476

5. Sócmhainní Seasta

Costais	Troscán & Trealamh €	Mótarfheithicilí €	Ríomhairí €	Iomlán €
Iarmhéid Tosaigh 1/1/2017	3,822,259	15,131	2,295,351	6,132,741
Breiseanna *	132,845	-	139,952	272,797
Riartha	-	-	(3,456)	(3,456)
	3,955,104	15,131	2,431,847	6,402,082
Dímheas				
Iarmhéid Tosaigh 1/1/2017	3,163,369	5,417	2,136,648	5,305,434
Muirear	199,871	3,780	80,800	284,451
Riartha	-	-	(3,456)	(3,456)
	3,363,240	9,197	2,213,992	5,586,429
Luach glan de réir na leabhar 31/12/2017	591,864	5,934	217,855	815,653
Luach glan de réir na leabhar 31/12/2016	658,890	9,714	158,703	827,307

Nota
* Caipitlítear na sócmhainní seasta de bhreis ar €1,000 I leabhair DIAS.

6. Cúlchiste Caipitil

	2017 €	2016 €
Iarmhéid amhail an 1 Eanáir	827,307	1,100,130
Aistriú ó/(chuig) Cuntas Ioncaim agus Caiteachais		
Ioncam leithroinnte le sócmhainní seasta a fháil (Maoinithe ag Tionascadal)	207,525	85,373
Ioncam leithroinnte le sócmhainní seasta a fháil (Maoinithe ag an Státchiste)	65,272	13,098
Amúchadh ag teacht le dímheas sócmhainní	(284,451)	(367,873)
Méid scaoilte ar dhiúscairtí	-	(3,421)
	(11,654)	(272,823)
Iarmhéid amhail an 31 Nollaig	**815,653**	**827,307**

7. Creidiúnaithe - Méideanna atá dlite laistigh de bhliain amháin

	2017 €	2016 €
Creidiúnaithe Trádála	229,360	101,232
Fabhruithe	432,092	255,263
CBL	117,703	35,713
Nithe Iníoctha Ioncaim	148,922	138,749
	928,077	530,957

Creidiúnaithe dlite tar éis dhá mhí dhéag		2017 €	2016 €
Tá an t-airgead a bhaineann leo seo sealbhaithe mar éarlais.			
Comhdhéanta as:	Vernam Hull Bequest	25,272	25,247
	Carmody Fund	2,461	2,461
	Cuntas Rialaithe Sochair Scoir	627,314	454,059
		655,047	481,767

8. Féichiúnaithe

	2017 €	2016 €
Réamhíocaíochtaí	703,160	144,651
Infháltais ó Dhíolacháin Leabhar	3,292	3,872
Ilnithe	15,301	13,340
Féichiúnaí	-	106,218
	721,753	268,081

9. Costais Phárolla

	Léann Cheilteach €	Fisic Theoiriciúil €	Fisic Chosmach €	Riar. €	2017 Iomlán €	2016 Iomlán €
Poist Lárnacha Maoinithe						
Tuarastal/Pá	965,473	720,686	1,351,053	658,572	3,695,784	3,417,040
Costais Sochair Scoir	-	-	-	117,417	117,417	49,395
Scoláireachtaí	100,000	73,992	142,510	-	316,502	288,314
Airgead Oinigh	-500	152	-	-	-348	1,749
	1,064,973	794,830	1,493,563	775,989	4,129,355	3,756,498

Nóta maidir le Poist Lárnacha Maoinithe
* Líon na mBall Foirne Lárnach (WTE) 51.5 (2016:50.5), Líon ECF (WTE) 55 (2016: 55).
** Scoláirí Lárnacha (WTE) 13 (2016: 14).
Le haghaidh eolais maidir le taighdeoirí a mhaoinítear go seachtrach, téigh chuig leathanach 13.

Íocadh asbhaintí do thobhach pinsin de €214,857 (2016: €224,492) leis an Roinn Oideachais agus Scileanna le linn 2017.

Pá na bPríomhbhall Bainistíochta
Áiríonn na príomhbhaill bainistíochta an Cláraitheoir agus an fhoireann shinsearach bainistíochta as a raibh costas €621,910 (2016 €599,765) sa bhliain.

9. Costais Phárolla

(a) Iomlán na Sochar Fostaithe

	Léann Cheilteach €	Fisic Theoiriciúil €	Fisic Chosmach €	Riar. €	2017 Iomlán €	2016 Iomlán €
Tuarastail/Pá	910,486	656,915	1,281,269	608,383	3,457,053	3,182,121
Ragobair	-	-	-	-	-	-
Liúntais	-	-	-	-	-	-
ÁSPC Fostóra	54,987	63,771	69,784	50,189	238,731	234,919
Costais Sochair Scoir	-	-	-	117,417	117,417	49,395
	965,473	720,686	1,351,053	775,989	3,813,201	3,466,435

10. Speansais Ghinearálta

	Léann Cheilteach €	Fisic Theoiriciúil €	Fisic Chosmach €	Riar. €	2017 Iomlán €	2016 Iomlán €
Ilghnéitheach	6,365	1,019	16,154	19,330	42,868	50,211
* Bolscaireachtaí/Lóin	5,064	914	7,113	11,039	24,130	14,944
Táillí Gairmiúla/ Comhairleoireacht	-	-	-	126,146	126,146	80,214
Oiliúint	1,625		11,550	1,780	14,955	5,955
Costais Bainc	-	-	-	1,636	1,636	1,140
Speansais Chruinnithe Boird	-	-	-	23,510	23,510	26,771
Sláinte agus Sábháilteacht	-	-	-	8,533	8,533	4,439
	13,054	1,933	34,817	191,974	241,778	183,674

Nota
B'ionann agus €13,435 an Caiteachas Fáilteachais in 2017

Táillí Gairmiúla/Costais Comhairleoireachta

	2017 Iomlán €	2016 Iomlán €
Costais Earcaíochta	38,576	5,106
Costais Poiblíochta	7,780	-
Iniúchtaí Inmheánacha/Seachtracha	31,230	22,858
Athbhreithniú Rialachais	5,289	-
Táillí Dlí	18,946	19,054
Athbhreithnithe Eile agus Comhairleoireachtaí Ginearálta	24,325	33,196
	126,146	80,214

11. Léasáil

Léasanna Oibríochta

Tá na háitribh atá i seilbh na hInstitiúide ar léas ó Oifig na nOibreacha Poiblí. Is iad na háitribh a n-airítear ná Réadlann Dhún Since, 5 Cearnóg Mhuirfean, 9-10 Bóthar Burlington agus 31Plás Mhic Liam. Tá téarma 83 bliana fágtha ar an léas do Réadlann Dhún Since agus athnuaitear na léasanna eile ar bhonn bliantúil. Is é tiomantas ar bhonn léasanna den sórt sin maidir le 2018 na €113,609.

Léasanna Oifig na nOibreacha Poiblí	**Cíos Bliantúil €**
Réadlann Dhún Since	330
5, Cearnóg Mhuirfean	5,022
9-10 Bóthar Burlington	50,167
31, Plás Mhic Liam.	58,090
	113,609

An 31 Nollaig 2017 bhí na híocaíochtaí léasa íosta seo a leanas ag an Institiúid faoi léasanna oibriúcháin dochealaithe do gach ceann de na tréimhsí seo a leanas:

	2017 €	**2016 €**
Iníoctha laistigh de bhliain amháin	113,609	113,609
Idir dhá bhliain agus cúig bliana	990	990
I ndiaidh cúig bliana	25,410	25,740

12. Costais Sochair Scoir

a) Anailís ar na costais iomlána pinsin curtha chun dochair do Chaiteachas

	2017 (€'000)	**2016 (€'000)**
Costas na Seirbhíse Reatha	1,396	1,226
Ús ar Dhliteanais Sochair Pinsin	999	1,280
Ranníocaíochtaí Fostaí	(139)	(128)
	2,256	2,378

b) Gluaiseacht i nGlan-Dliteanas Sochair Scoir i rith na bliana airgeadais

	2017 (€'000)	**2016 (€'000)**
Glan-Dliteanas Sochair Pinsin amhail an 1 Eanáir	(57,807)	(51,210)
Costas na Seirbhíse Reatha	(1,396)	(1,226)
Costais Úis	(999)	(1,280)
(Gnóthachan)/caillteanas achtúireach	(505)	(5,606)
Sochair Pinsin íoctha sa bhliain	1,584	1,515
Glan-Dliteanas Pinsin amhail an 31 Nollaig	(59,123)	(57,807)

12. Costais Sochair Scoir

c) Cistiú Iarchurtha do Phinsin

Aithníonn DIAS na méideanna seo mar shócmhainn a chomhfhreagraíonn don dliteanas iarchurtha neamh-mhaoinithe do phinsin bunaithe ar na toimhdí thuaslaithe agus ar roinnt imeachtaí a tharla cheana. Áirítear ar na himeachtaí seo an bonn reachtúil chun sceim aoisliúntais a bhunú, agus an polasaí agus an cleachtas i ndáil le pinsin seirbhíse poiblí a mhaoiniú, lena n-áirítear ranníocaíochtaí ag fostóirí agus próiseas na measteacháin bliantúil. Cé nach bhfuil aon socrú foirmiúil maidir leis na méideanna sonracha seo déanta leis an Roinn Oideachais agus Scileanna, níl aon fhianaise ag DIAS nach leanfaidh an polasaí maoinithe seo de bheith ag freastal ar a leithéid de shuimeanna de réir an chleachtais reatha.

Sa Chuntas Ioncam agus Caitheachais, aithníodh an Glan-Mhaoiniú Iarchurtha do Phinsin sa bhliain mar seo leanas:

	2017 (€'000)	2016 (€'000)
Maoiniú inaisghabhála i ndáil le costais phinsin na bliana reatha	2,395	2,506
Deontas Stáit feidhmithe chun pinsinéirí a íoc	(1,584)	(1,515)
	811	991

Ba í €59.123 milliún (2016: €57.807 milliún) an tsócmhainn mhaoinithe iarchurtha do phinsin amhail an 31 Nollaig 2017.

d) Stair na nOibleagáidí faoin scéim shochair shainithe.

	2017 (€'000)	2016 (€'000)	2015 (€'000)
Oibleagáidí Shochair Shainithe.	59,123	57,807	51,210
(Gnóthachain)/caillteanais iarbhíre ar dhliteanais na scéime.	518	(765)	(1,256)
Céatadán de Luach Dhliteanais na Scéime.	0.88%	(1.32%)	(2.50%)

Tá (gnóthachan)/caillteanas achtúireach carnach €7,643,000 (2016: €7,138,000) aitheanta sa Ráiteas d'Iomlán na nGnóthachan agus na gCaillteanas Aitheanta.

e) Cur síos ginearálta ar an Scéim

Is é atá sa scéim pinsean ná socrú aoisliúntais shochair shonraithe chríoch-thuarastail le sochair agus ranníocaíochtaí sainithe ag rialacháin reatha scéime 'eiseamláire' na hearnála poiblí. Soláthraíonn an scéim pinsean (ochtóidí in aghaidh na bliana seirbhíse), aisce nó cnapshuim (trí hochtóidí in aghaidh na bliana seirbhíse) agus pinsin do chéilí agus leanaí. Is é an 65ú breithlá an Ghnáthaois Scoir agus tá baill a thosaigh roimh 2004 i dteideal éirí as ag aois 60 gan aon laghdú achtúireach ó aois 60. De ghnáth, méadaíonn na pinsin atá á n-íoc (agus pinsin iarchurtha) de réir bhoilsciú ginearálta na hearnála poiblí. Bunaíodh an luacháil a úsáideadh i gcás nochtadh faisnéise faoi FRS17 ar luacháil iomlán achtúireach a rinne achtúire neamhspleách cáilithe a chuir ceanglais FRS san áireamh chun dliteanais na scéime amhail an 31 Nollaig 2017 a mheasúnú.

Is í an Scéim Pinsin Seirbhíse Poiblí Aonair (Scéinm Aonair) an scéim um shochar scoir le leas sainithe do sheirbhísí poiblí inphinsin a ceapadh an 1 Eanáir 2013 nó ina dhiaidh sin i gcomhréir leis an Acht um Pinsin na Seirbhíse Poiblí (Scéim Aonair agus Forálacha Eile) 2012. Tá foráil sa scéim do shochar scoir agus cnapshuim scoir bunaithe ar mheán gairme de phá inphinsin agus pinsin céile agus leanaí. Is í an aois pinsin íosta 66 bliana (ag éirí i gcomhréir le hathruithe in aois pinsin an Stáit). Áirítear áis luathscoir laghdaithe go hachtúireach ó aois 55. Ardaíonn Sochair Scoir atá á n-íoc i gcomhréir leis an bpraghasinnéacs tomhaltóirí.

12. Costais Sochair Scoir (ar lean)

Is mar a leanas a bhí na príomh-thoimhdí achtúireacha a úsáideadh:

	2017	2016	2015
Ráta na nArduithe Tuarastail	2.75%	2.50%	2.50%
Ráta Ardaithe i Sochair Pinsin atá á n-Íoc	2.25%	2.00%	2.00%
Ráta Lascaine	2.00%	1.75%	2.50%
Ráta Boilscithe	1.75%	1.50%	1.50%

Leis an mbonn mortlaíochta atá á leanadh, is féidir dul chun cinn in ionchas saoil le himeacht ama a chur san áireamh; mar sin, braithfidh ionchas saoil ag dul ar scor ar an mbliain a shroichfidh ball aois scoir (65 bliana). Léiríonn an tábla thíos ionchas saoil na mball a shroichfidh aois 65 in 2017 agus in 2037.

	31/12/2017		31/12/2016	
Aois 65 sa bhliain	2017	2037	2016	2036
Ionchas saoil – fir	87.3	89.9	87.3	89.9
Ionchas saoil – mná	88.7	90.9	88.7	90.9

13. Nochtadh Idirbheartaíochtaí

Glacann Comhairle na hInstitiúide le nósanna imeachta de réir threoirlínte atá eisithe ag an Roinn Airgeadais maidir le leasana a nochtaíonn Comhaltaí na Comhairle agus chloígh Comhaltaí na Comhairle leis na nósanna imeachta sin le linn na bliana. Níor léirigh aon Chomhalta de chuid na Comhairle leas.

14. Nochtadh Comhaltaí na Comhairle/Tuarastal an Chláraitheora, Táillí agus Costais

		Luach Saothair Iomláin 2017	Speansais Iomlána 2017	Luach Saothair Iomláin 2016	Speansais Iomlána 2016
Comhalta den Chomhairle		**€**	**€**	**€**	**€**
Dr Vincent Cunnane			928		1,285
Baill ceaptha ag Boird Rialaithe na gComhScoileanna					
An tOllamh Gerry Wrixon			460		665
An tOllamh Arthur Jaffe			1,228		942
An tOllamh Anders Ahlqvist			7,108		8,148
An tOllamh Werner Nahm					
An tOllamh Luke Drury					
An tOllamh Liam Breatnach					
Cláraitheoir					
Cecil Uasal Keaveney *	Scor Meitheamh 2017	48,226	100	97,906	
Dr. Eucharia Meehan *		62,566			
		110,792	9,824	97,906	11,040

*** Nóta**

Is tuarastal amháin a fhaigheann na Cláraitheoirí. Ní íoctar bónas ar bith leo. Ní sháraíonn teidlíochtaí scoir an Chláraitheora na teidlíochtaí caighdeánacha i scéim eiseamláireach aoisliúntais ar leas sainithe na hearnála poiblí. Chuaigh an Cláraitheoir, an tUas. Cecil Keaveney ar scor i Meitheamh 2017. Fuair sé cnapshuim de €117,417.

Nótaí do na Ráitis Airgeadais (ar lean)

15. Líon Fostaithe le Sochair í 2017 a thit idir €10,000 – €60,000

	2017	2016
€60,000 go €69,999	2	1
€70,000 go €79,999	7	7
€80,000 go €89,999	1	1
€90,000 go €99,999	0	2
€100,000 go €109,999	3	2
€110,000 go €119,999	0	0
€120,000 go €129,999	0	0
€130,000 go €139,999	7	6

16. Ranníocaíochtaí Pinsin Fostóra

Ranníocaíochtaí Fostóra í 2017 = €170,987

17. Ceangaltais Caipitil

Tá ceangaltais caipitil de €100,000 do 2018 nach bhfuil curtha ar fáil sna ráitis airgeadais.

18. Togra IMarl

Tá €2,951,071 (2016: €2,956,176) san áireamh i suimeanna iníoctha tograí i dtaca leis an dtogra Infreastruchtúir iMarl. Cuireadh an chéad phróiseas tairisceana i gcrích in 2017 ach tá an trealamh le seachadadh go luath in 2018. Tá dhá thairiscint bhreise do chaiteachas caipitil le cur i gcrích in 2018.

19. Breithiúnais nuair a a chuirtear Polasaithe Cuntasaíochta agus Príomhfhoinsí Meastacháin i bhFeidhm

Chun na ráitis airgeadais seo a ullmhú ní mór don bhainistíocht breithiúnais, meastacháin agus toimhdí a dhéanamh a théann i gcionn ar chur i bhfeidhm na bpolasaithe agus na suimeanna tuairiscithe de shócmhainní agus dliteanais, ioncam agus speansais. Déantar measúnú leanúnach ar bhreithiúnais agus ar mheastacháin agus tá siad bunaithe ar thaithí stairiúil agus ar thosca eile, lena n-áirítear ionchais d'eachtraí sa todhchaí a chreidtear a bheith réasúnta faoi na cúinsí.

Déanann an Institiúid meastacháin agus toimhdí i dtaca leis an todhchaí. Dá bhrí sin, is annamh a bheidh na meastacháin cuntasaíochta a tharlaíonn dá bharr ionann go hiomlán le torthaí ábhartha iarbhír. Maidir leis na meastacháin agus toimhdí a bhfuil riosca suntasach ina leith go mbeidh siad ina gcúis le leasú ábhartha a dhéanamh ar mhéid na sócmhainní agus na ndliteanas laistigh den bhliain airgeadais atá ag teacht, pléitear anseo thíos iad.

Saolta Úsáideacha de Shócmhainní Socair Inbhraite

Is cuid shuntasach d'iomlán na sócmhainní iad sócmhainní fadsaoil - Troscán agus Trealamh, Ríomhairí agus Mótarfheithiclí den chuid is mó. Braitheann an muirear dímheasa bliantúil go príomha ar an bhfad saoil measta atá ag gach cinéal sócmhainne agus, i gcúinsí áirithe, meastacháin ar luachanna iarmharacha. Déanann an Chomhairle athbhreithniú go rialta ar na saolta úsáideacha seo agus athraíonm siad iad más gá chun coinníollacha reatha a léiriú. Agus na saolta úsáideacha seo á gcinneadh déanann an bhainistíocht machnamh ar athrú teicneolaíoch, pátrúin tomhaltais, riocht fhisiciúil agus úsáid mheasta na sócmhainní. Féadfaigh athruithe sna saolta úsáideacha dul i bhfeidhm go suntasach ar an muirear díluachála don bhliain airgeadais.

19. Breithiúnais nuair a a chuirtear Polasaithe Cuntasaíochta agus Príomhfhoinsí Meastacháin i bhFeidhm (ar lean)

Foshuíomhanna Achtúireacha i dTaca le Scéimeanna Sochair Scoir le Sochar Sainithe

Déantar cur i bhfeidhm na bhfoshuíomhanna achtúireacha i dtaca le scéimeanna sochair scoir le sochar sainithe a chorpú sna ráitis airgeadais I gcomhéir le FRS 102. Agus FRS 102 á chur i bhfeidhm, glactar le comhairle ó achtúirí cáilithe neamhspleácha. Sa chomhthéacs seo, déantar breithiúnas suntasach i líon réimsí, lena n-áirítear athruithe sa todhchaí ar thuarastail agus boilsciú, rátaí báis agus rátaí lascaine a roghnú. Déantar sócmhainn le sochar sainithe a thaifeadadh atá ag teacht leis an dliteanas ar an bunús go bhfuil an dliteanas maoinithe ag an stát.

Soláthairtí

Déanann an Institiúid soláthairtí d'oibleagáidí dleathacha agus cruthaitheacha, arb eol di a bheith fós le híoc ag deireadh na tréimhse. I gcoitinne, déantar na soláthairtí seo bunaithe ar fhaisnéis stairiúil nó ar fhaisnéis ábhartha eile, leasaithe do threochtaí le déanaí más cuí. Mar sin féin, is meastacháin iad ar chostais airgeadais eachtaí nach dtarlóidh le roinnt blianta, b'fhéidir. Mar thoradh air seo agus ar leibhéal na héiginnteachta a bhaineann leis na torthaí deiridh, féadfaidh difríocht shuntasach a bheith idir an toradh agus an meastachán.

20. Ceadú Cuntais

Cheadaigh an Chomhairle na Ráitis Airgeadais ar an 25 Bealtaine 2018.

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