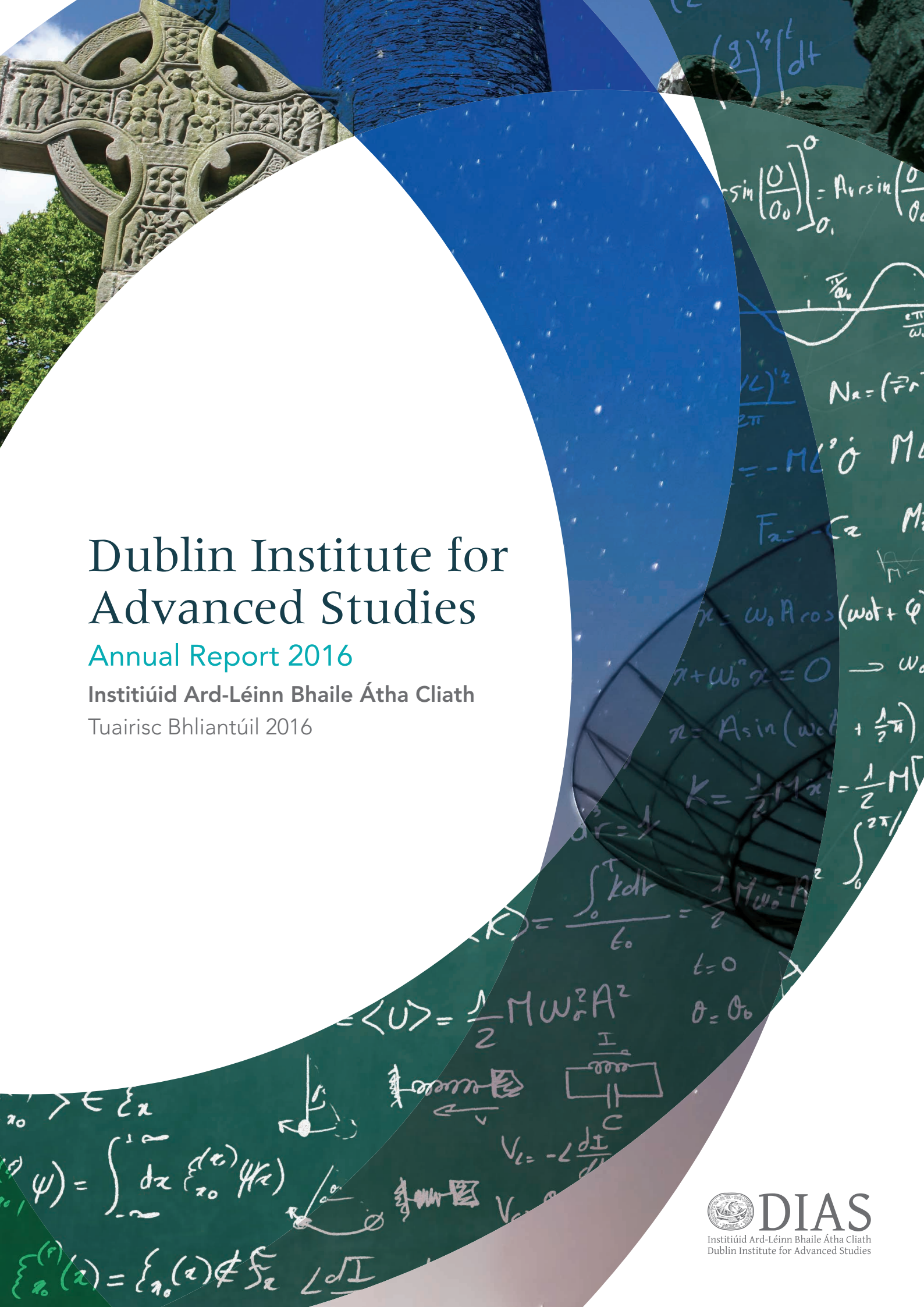




# DIAS

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

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# Dublin Institute for Advanced Studies

Annual Report 2016

Institiúid Ard-Léinn Bhaile Átha Cliath

Tuairisc Bhliantúil 2016



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# DIAS at a Glance – 2016

## OUR TEAM

### OVERVIEW PROFILE

**16%** Administration<sup>1</sup>

**84%** Research<sup>2,3</sup>

<sup>1</sup> Administration + General Technical Support

<sup>2</sup> Research + Specialist Technical Support

<sup>3</sup> 33% externally funded

### ORIGIN OF RESEARCHERS

**35%** Non-EU

**65%** EU

Note: Total number of countries = 22

### SCHOLARS

Rest of world  
**77%**



Ireland  
**23%**



### FELLOWS/PROJECT STAFF

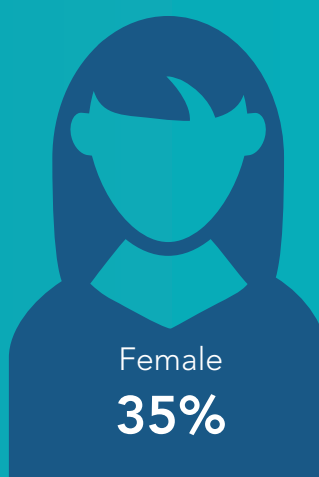
Rest of world  
**68%**



Ireland  
**32%**



### GENDER



## OUR FINANCIAL RESOURCES

### FUNDING SOURCES



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

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



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

IRISH RESEARCH COUNCIL  
An Chomhairle um Thaighde in Éirinn

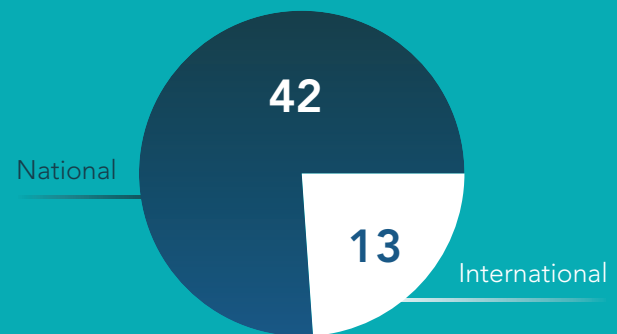


## OUR PARTNERS

### 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

### INDIVIDUAL RESEARCH ASSOCIATES



### FUNDING EXPENDITURE

**€6.26m**

Oireachtas Grant  
(Department of Education and Skills)

**€2.1m**

Other Sources



### INTERNATIONAL RESEARCH VISITORS

**115** Research Visitors

from

**20** Countries

# DIAS at a Glance – 2016

Our International  
Research  
Collaborations\*



## EUROPEAN AND GLOBAL INFRASTRUCTURE PARTICIPATION





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



# Ráiteas an Chathaoirligh

Sa bhliain a lean comóradh 75 bliana ó bhunú na DIAS, lean an Institiúid dá *raison d'être* a leanúint, is é sin buntaighde den scoth a dhéanamh. Mar is féidir a fheiceáil ón tuairisc seo a leanas, d'ainneoin na ndúshlán taighde atá ar siúl fós, d'éirigh leis na Scoileanna, go himmheánach agus trí chomhpháirtíochtaí agus comhoibriú le comhghleacaithe sa phobal acadúil náisiúnta agus idirnáisiúnta, tabhairt faoi chlár an-suntasach. Fuair siad tacaíocht chuige seo ó na boird Scoile nua a ceapadh sa bhliain 2015 agus ba mhaith liom buíochas a ghabháil leis an lucht acadúil sin, a bhfuil clú agus cáil orthu, a bhíonn ag feidhmiú ar na boird, agus atá sásta a gcuid ama agus saineolais a thabhairt chun freastal ar bhonn *pro-bono*. Táimid faoi chomaoin go háirithe ag ár mbaill idirnáisiúnta a thaistealaíonn go Baile Átha Cliath cúpla uair sa bhliain do chruinnithe agus ócáidí eile.

Agus athbhreithniú á dhéanamh ar 2016, léirítear láithreach go mbíonn an taighde in DIAS ina chúis le foilseacháin thábhachtacha thar raon d'irisí ardcháilíochta agus ard-tionchair amhail *Nature*, an *Journal of High Energy Physics* (JHEP), agus *Scientific Reports* agus cinn eile nach iad. Ag teacht le nádúr an taighde, cuireadh gluaiseachtaí eile chun cinn in iúl trí chomhdhála lena n-áirítear roinnt a eagraíodh in DIAS amhail Tionól agus an chomhdháil Dánta Grádha. Leis na samplaí 'Is Eol Dúinn Anois' sna tuarascálacha Scoile aibhsítear beagán den eolas nua a cruthaíodh ónár saothar. Toisc na féidir leis na Tuarascálacha Scoile ach achoimre a thabhairt ar an obair taighde atá ar bun, mholfainn cuairt a thabhairt ar ár suíomh gréasáin agus coinneáil cothrom le dáta trínár mbealaí cumarsáide ar an meáin shóisialta.

Ina theannta sin, is féidir athmhachnamh a dhéanamh ar raon na gníomhaíochtaí in DIAS sa bhliain 2016, agus léirítear é seo go maith leis an scéal gur thosaigh an bhliain le cur i bhfeidhm na Seismiméadar Bhun an Aigéin amach ó chósta Dhún na nGall agus gur chríochnaigh sí le léacht maidir le Fisic an Athraithe Aeráide, agus go sonrach maidir leis an bhfáth a mbíonn easaontas idir saineolaithe. I rith na bliana shroich an tionscnamh *Irish Script on Screen* (ISOS) 365 lámhscríbhinn ar fáil ar líne do thaighdeoirí náisiúnta agus idirnáisiúnta. Bhí méadú suntasach i rith na bliana freisin ar chaidreamh an phobail le DIAS agus a gníomhaíochtaí trí léachtaí agus gníomhaíochtaí eile, mar shampla le linn Seachtain na hEolaíochta agus na hOíche Cultúir. D'fhreastal breis agus 5,500 cuairteoir sa bhliain ar oícheanta oscailte agus ócáidí Réadlann Dhún Sinche. Rinneadh tuilleadh forbartha ar Dhún Sinche i mbliana nuair a cuireadh ceamaraí dreige isteach.

Ag féachaint ar ár ngníomhaíocht chomhoibríoch, lean DIAS dá ról tábhachtach i dtionscnaimh thábhachtacha náisiúnta amhail bunú an tsúimh aLOFAR (radaiteileascóp ísealmhínicíochta na hEorpa) in Éirinn. Lean an Lárionad iCIRAG (lárionad na nGeo-eolaíochtaí) ina bhfuil DIAS ina príomh-chomhpháirtí, ag dul ó neart go neart.

Ón taobh idirnáisiúnta de, neartaíodh ár gcomhoibriú le Gníomhaireacht Spáis na hEorpa (ESA), tionscnamh Spásteileascóp James Webb (JWST), HESS (an Córas Steiréascópach Ardhuinnimh) agus CTA (Eagar Teileascóp Cherenkov), gan ach roinnt bheag de na haonáin agus infreastruchtúir dhomhanda ina bhfuilimid páirteach a lua. Leantar den léiriú ar ár gclú idirnáisiúnta tríd an spéis a léiríonn taighdeoirí idirnáisiúnta i dtaighde a dhéanamh in DIAS, maidir le poist taighde a bhaint amach trí chomórtais agus freisin maidir le bheith ina gCuairteoirí Taighde.

Mar chríoch, lean DIAS den soláthar do Líonra Seismeach Náisiúnta na hÉireann agus don oifig náisiúnta don CTBTO (an Coimisiún Ullmhúcháin d'Eagraíocht an Chonartha um Chosc Cuimsitheach ar Thrialacha Núicléacha). Rinne an coimisiún sin a comóradh 20 bliain a mharcáil sa bhliain 2016 agus eagraíodh comhdháil ardleibhéil ag DIAS chun an ócáid a cheiliúradh. Tá áthas ar DIAS bheith i gcomhpháirtíocht leis an Roinn Gnóthaí Eachtracha agus Trádála sa tionscnamh tábhachtach seo.

Sa bhliain 2016 chuir DIAS leis an stór eolais náisiúnta agus idirnáisiúnta agus tá tionchar againn ar an bhforbairt amach anseo ar phríomhréimsí bunúsacha sa staidéar ar ár gcosmas, ár gcruinne agus ár n-áitheantas. Sa bhliain 2017 leanfaimid de seo agus Plean Straitéiseach agus tionscnamh Cumarsáide á sheoladh againn freisin. Go raibh maith agat as an t-am a ghlacadh lenár dTuarascáil a léamh.

**Dr. Vincent Cunnane**, Cathaoirligh

# Chairman's Statement

In the year that followed the 75th Anniversary of the foundation of DIAS, the Institute continued to deliver on its *raison d'être*, the conduct of excellent basic research. As can be seen from the following report, the Schools, despite ongoing resource challenges, have succeeded internally, and through partnerships and collaborations with colleagues in the wider academic community nationally and internationally, to undertake a very impressive programme. They were supported in doing so by the new School boards which were appointed in 2015 and I would like to thank the academics of such distinction, who serve on the boards, and who are willing to give of their time and expertise to serve on a pro-bono basis. We are particularly indebted to our international members who travel a few times a year to Dublin for meetings and other events.

In reviewing 2016, one immediately becomes aware that research at DIAS continues to result in important publications across a range of high quality and high impact journals such as *Nature*, the *Journal of High Energy Physics (JHEP)*, and *Scientific Reports* among others. In line with the nature of the research, other advances were communicated through conferences including a number hosted at DIAS such as *Tionól* and the *Dánta Grádha* conference. The examples in the School reports highlight just some of the new knowledge created from our work. As the School Reports can of course only provide a summary snapshot of the research work being conducted, I would recommend your visiting our website and keeping up to date through our social media outlets.

Furthermore one can reflect on the range of activities at DIAS in 2016, and this is very well exemplified by the fact that the year began with the deployment of Ocean Bottom Seismometers off the coast of Donegal and concluded with a lecture on the Physics of Climate change, and specifically on the topic of why experts disagree. During the year the Irish Script on Screen (ISOS) initiative reached 365 manuscripts available on-line for researchers nationally and internationally. A significant increase in engagement of the public with DIAS and its activities through lectures and other activities during for example Science Week and Culture Night also occurred in the course of the year. Annual visitor numbers to the Dunsink Observatory open nights and events exceeded 5,500. Dunsink was further developed this year with the installation of Meteor cameras.

Looking to our collaborative activity, DIAS also continued to play a key role in key initiatives nationally such as the establishment of iLOFAR (the European low frequency radio telescope) site in Ireland. The iCRAG (Geosciences centre) Centre in which DIAS is a leading partner continued to go from strength to strength.



CTBTO NDC Workshop Participants.  
Front row, second from left: Dr. Vincent Cunnane, Chairman of Council; Front row, second from right: Cecil Keaveney, Registrar

*Ráinnpháirtithe Ceardlainne CTBTO NDC. Líne thosaigh 2 ó clé: Dr. Vincent Cunnane; Líne thosaigh 2 ó dheas: Cecil Keaveney*

Internationally our collaboration with the European Space Agency (ESA), the James Webb Space Telescope endeavour (JWST), HESS (the High Energy Stereoscopic System) and CTA (the Cherenkov Telescope Array), to name but a few global entities and infrastructures, also strengthened. Our international reputation continued to be reflected through the interest in conducting research at DIAS from international researchers, both in terms of interest in securing competitive research positions and in terms of being Research Visitors.

Finally, DIAS continued to provide for the Irish National Seismic Network and the national office for the CTBTO (the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization). The latter marked its 20th anniversary in 2016 and a high-level conference was held at DIAS to mark the occasion. DIAS are delighted to partner with the Department of Foreign Affairs and Trade on this important initiative.

In 2016 DIAS has contributed to the national and global knowledge pool and is influencing the future development of key fundamental fields in the study of our cosmos, our planet and our identity. In 2017 we will continue to do so whilst launching a new Strategic Plan and Communications initiative. Thank you for taking the time to read our Report.

**Dr. Vincent Cunnane**, Chairman



# Connecting Locally – 2016



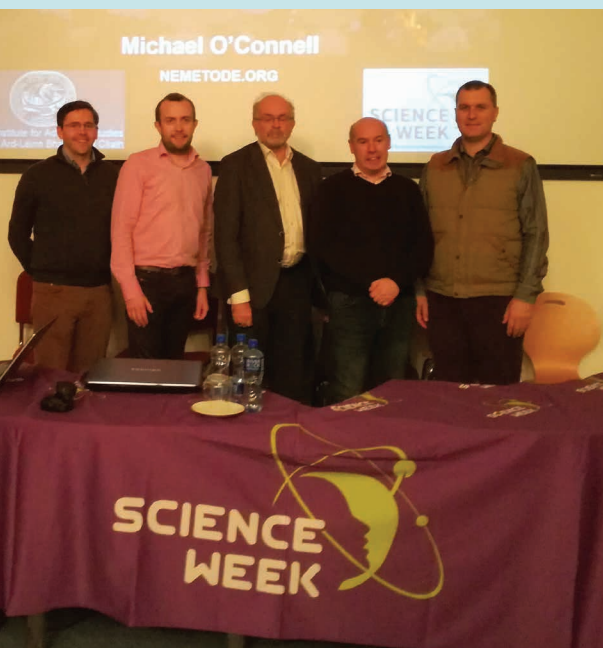
Grubb Telescope at Dunsink  
*Teileascóp Grubb ag Dún Sinche*



Open Night at Dunsink  
*Óiche Oscailte don Phobal i nDún Sinche*



DIAS Statutory Public Lecture  
*Léacht Reachtúil DIAS*



Astrophysics Lecture Science Week  
*Léacht Réalfhísic, Seachtain Eolaíochta*



Installation of the Meteor Camera System  
*Súiteáil Córas Ceamara 'Meteor'*



School visit, Dunsink Dome  
*Cuairt Scoile, ag Cruinneachán Dún Sinche*



Culture Night at Dunsink  
*Oíche Chultúir ag Dún Sinche*

>5,500  
 DUNSINK  
 OBSERVATORY  
 VISITORS

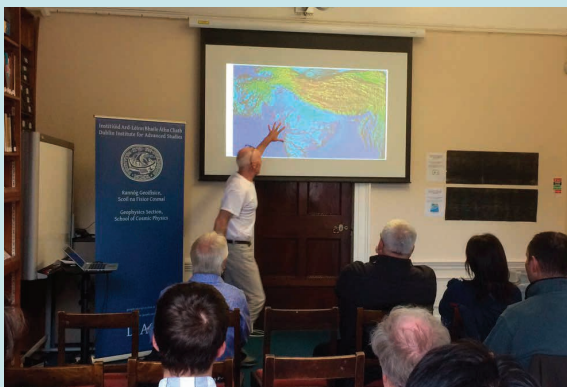


Thanks to the **volunteers** from the Irish Astronomical Society.



>4 MILLION  
 HITS IN 2016

Irish Script on Screen  
 (on-line resource)  
 ISOS (*acmhainn ar-líne*)



Geophysics Lecture Science Week  
*Léacht Geoifisic, Seachtain Eolaíochta*









**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 Chonnlaoidh mheic Con Culainn* a ullmhú, agus lean sé ag obair ar ghnéithe de chomhréir na glásal coibhneasta sa Ghaeilge.

Lean Barry Lewis ag obair ar eagrán de théacs ginealach ar naoimh na Breataine Bige (*Bonedd y Saint*). Chríochnaigh sé caibidil i gcomhair leabhair ar thagairtí do Artúr i bhfilíocht Bhreatnais na Meánaoise, agus alt ar chúla áitiúil an Fhoclóirín Shean-Choirnise.

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.

Lean Gordon Ó Riain le hobair ar eagrán nua de *Irish Grammatical Tracts V*, lena n-áirítear staidéir ar ghnéithe éagsúla den téacs, cuid acu atá le foilsiú mar altanna ar leith. Rinne sé obair eagarthóireachta ar imeachtaí na comhdhála 'The medieval and early modern Irish grammatical and metrical tradition' a reachtáladh sa Scoil ar an 26ú Meán Fómhair 2014, agus chríochnaigh sé a iontráil chatalóige i gcomhair cuid de Leabhar Buí Leacáin.

Lean Mícheál Hoyne ag obair ar a eagrán de dhánta an fhile Seifín Mór, a bhain leis an 15ú haois, agus ar staidéar den ghné den bhfilíocht ar a dtugtar *brúilingeacht*. Chomh maith leis sin, d'ullmhaigh sé roinnt altanna i gcomhair foilsithe, agus chríochnaigh sé monagraf 'Bardic poems on the Meic Dhiarmada' (481 lth.), atá curtha faoi bhráid Choiste Foilseachán na Scoile.

Lean Marie-Luise Theuerkauf ag obair ar a tionscnamh taighde ar an Dindsheanchas i Leabhar Buí Leacáin.

D'oibrigh Silva Nurmio ar a leabhar 'Grammatical Number in Welsh: Diachrony and Typology', atá réamhghlactha le haghaidh foilsithe i sraith

monagrafanna de The Philological Society (dréacht iomlán le soláthar i 2017).

Chríochnaigh sí an chéad chuid dá hobair rannpháirteach ar thionscnamh idirnáisiúnta 'Cross-linguistic research into derivational networks' ina raibh i gceist 30 eangach díorthach don Bhreatnais a chur le chéile; críochnófar an dara cuid (alt ar an Bhreatnais i gcomhair leabhair) i 2017.

Chríochnaigh agus chosain Sarah Waidler a tráchtas PhD 'The Hagiographer and His World: The Writing of Saints' Lives in Ireland in the Central Medieval Period' (Ollscoil Cambridge). Chomh maith leis sin, rinne sí taighde ar a príomh-thionscnamh san Institiúid Ard-Léinn, 'Stories of Saints: Medieval Irish Hagiographical Anecdota', atá le foilsiú mar mhonagraf, agus taighde ar ghnéithe eile den naomhsheanchas, le foilsiú mar altanna.

## MEAMRAM PÁIPÉAR RÍOMHAIRE (MPR/ISOS)

Lean tionscadal Mheamram Páipéar Ríomhaire lena bhailiúchán lámhscríbhinní a mhéadú, bailiúchán a bhfuil 365 lámhscríbhinní ann faoi láthair. Chabhraigh forbairt comhaontuithe páirtíochta institiúide leis na príomhstóir lámhscríbhinní in Éirinn, lena n-áirítear Leabharlann Náisiúnta na hÉireann, Acadamh Ríoga na hÉireann, Coláiste na Tríonóide, Baile Átha Cliath agus leabharlanna na gcoláistí de chuid Ollscoil Náisiúnta na hÉireann. Go dtí seo rinne MPR comhaontuithe le 21 institiúid ar leith, agus táthar ag súil lena thuilleadh comhaontuithe sa bhliain atá romhainn.

I mbliana cuireadh ar fáil ar an suíomh lín dhá lámhscríbhinn i nAcadamh Ríoga na hÉireann, chomh maith leis na catalóga cuí, eadhón, LS C iv 3 agus LS 23 Q 5.

Chomh maith leis sin, tosaíodh ar an suíomh lín a athstruchtúrú; tionscnamh ollmhór is ea é seo, ós rud é go bhfuil gá leis an suíomh a athrú ó bhonn, de bharr an chairn mhóir sonraí atá curtha le chéile le 18 mbliana anuas.

Leis an bhforbairt nua seo, beidh teacht ar íomhánna inzúmála, uirlis bearrtha íomhánna, áiseanna feabhsaithe cuardaigh agus leabharmharcála, agus cuirfear córas cláraithe níos éasca i bhfeidhm.

Rinne Aoibheann Nic Dhonnchadha agus Anne Marie O'Brien cur i láthair in Acadamh Ríoga na hÉireann in Eanáir 2016 ag comhdháil lae ar dhigitíú agus léann na hÉireann. Dhírigh an chaint seo ar bhunú MPR, a aidhmeanna, dul chun chinn, torthaí na hoibre go dtí seo, agus a bhfuil i gceist as seo amach.

# 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 Chonnlaioich mheic Con Culainn* and continued to work on aspects of the syntax of relative clauses in Irish.

Barry Lewis continued to work on edition of Welsh saints' genealogies (*Bonedd y Saint*). He completed a book chapter on Arthurian references in medieval Welsh poetry, and an article on geographical affiliations of the Old Cornish Vocabulary.

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

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

Brian Ó Curnáin continued work on 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.

Gordon Ó Riain continued work on a new edition of IGT V. This included work on several studies of aspects of the tract, some of which will appear as separate publications. He also worked on editing a volume of the proceedings of a conference on 'The medieval and early modern Irish grammatical and metrical tradition' held at the Dublin Institute for Advanced Studies on 26 September 2014, and completed work on a catalogue entry for the Yellow Book of Lecan.

Mícheál Hoyne continued to work on his critical edition of the work of the fifteenth-century poet Seifín Mór and a study of the form of verse known as *brúilingeacht*. In addition, he prepared several articles for publication, and completed a monograph 'Bardic poems on the Meic Dhiarmada' (481 pp.), which has now been submitted to DIAS.

Marie-Luise Theuerkauf continued work on her project, an edition of the *Dindshenchas* in the Yellow Book of Lecan.

Silva Nurmio worked on her book 'Grammatical Number in Welsh: Diachrony and Typology', which has been pre-accepted for publication in the monograph series of The Philological Society (full draft to be submitted in 2017), and finished the first part of her contribution to an international project titled 'Cross-linguistic research into derivational networks', which involved compiling 30 derivational networks for Welsh; a second part (a chapter on Welsh for an edited volume) will be completed in 2017.



The speakers who gave papers at the conference on the Dánta Grádha with the Director of the School, Prof. Liam Breatnach (back row, second from right)

*Na cainteoirí a thug páipéir ag an gcomhdháil um na Dánta Grádha i dteannta le Stiúrthóir na Scoile, An tOll Liam Breatnach (líne chúil, an dara duine ó dheas)*

Sarah Waidler completed, submitted and defended her PhD thesis 'The Hagiographer and His World: The Writing of Saints' Lives in Ireland in the Central Medieval Period' (University of Cambridge). She also conducted research for 'Stories of Saints: Medieval Irish Hagiographical Anecdota', her main project at DIAS, to be published as a monograph, as well as on other aspects of hagiography to be published as articles.

## IRISH SCRIPT ON SCREEN (ISOS)

The Irish Script on Screen project continued to advance its manuscript collection, which now holds some 365 manuscripts. The growth of the ISOS project has been greatly facilitated by the development of institutional partnership agreements with all the major repositories of Irish manuscripts in Ireland, including the National Library of Ireland, the Royal Irish Academy, Trinity College Dublin, and the libraries of the various constituent universities of the National University of Ireland. Currently ISOS has formed various collaborations to date with 21 different institutions, with the hope of further alliances in the coming year.

This year continued work with the Royal Irish Academy saw manuscripts MS C iv 3 and MS 23 Q 5 together with the respective catalogues up live on ISOS.

In addition, a start on the restructuring of the website began, a massive undertaking as the website is in need of a total refurbishment, given the vast amount of data amassed throughout ISOS's eighteen years.



## Scoil an Léinn Cheiltigh (ar leanúint)

### OGHAM IN 3D:

Tuairisc ó Nora White: Sa bhliain 2016 bhronn an tSeirbhís Séadchomharthaí Náisiúnta, an Roinn Ealaíon, Oidhreachta agus Gaeltachta tuilleadh tacaíochta airgeadais don tionscadal OGHAM IN 3D, le haghaidh an chéad bhliain de thionscnamh dhá bhliain. Chomh maith le leanúint ar dhigitíú 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. Faoi láthair tá níos mó ná 125 cloch oghaim ar fáil ar an suíomh, thart ar an tréid cuid dá bhfuil ar eolas againn.

Rinneadh forbairt i mbliana ar an tionscadal Corca Dhuibhne 3D a cuireadh ar bun sa dara leath de 2015. Tar éis cúrsa traenála dhá lá i Márta, ar freastalaíodh air go fonnmhar, thosnaigh na rannpháirtithe ar shéadchomharthaí a thaifeadh. Eagraíodh seisiúin bhreise traenála i Meitheamh agus Lúnasa, inar tugadh treoir do rannpháirtithe maidir leis na céimeanna a dtéitear tríothu chun íomhánna a phróiseáil, agus mionsamhlacha 3D a chruthú. Chuir duine de na rannpháirtithe a scileanna dearadh gréasáin ar fáil chun suíomh lín speisialta don tionscadal a chruthú (<http://www.corcadhuibhne3d.ie>), agus tá roinnt mionsamhlacha 3D ar fáil anois ar an suíomh seo, ina measc, galláin, leaca tuama, ealaín chloiche agus clocha Oghaim. Tháinig duine de na rannpháirtithe ar chloch le crois inscríofa nach raibh ar eolas cheana, agus tugadh tús áite di in alt a d'fhoilsigh an tionscadal in *Archaeology Ireland* (Iml. 30, Uimh. 2. Samhradh 2016). Fuair an tionscadal seo tacaíocht airgid freisin ón Kerry Group, a d'íoc as trealamh, lena n-áirítear ríomhaire agus bog-earra 3D a d'úsáid na daoine a bhí rannpháirteach sa tionscadal. Bhí cur síos ar obair tionscadal Corca Dhuibhne 3D agus Ogham in 3D mar chuid de thaispeántas (Rediscovering the Dingle Peninsula: Digitally Recording and Researching Stone Monuments) i Leabharlann an Daingin i mí na Samhna ag ceiliúradh an chéad 25 bhliain den gClár Fionnachtana.

Tionscadal pobail eile ina bhfuil Ogham in 3D páirteach is ea Tionscadal Caomhnú Eaglais agus Clocha Oghaim An Chnuic Bhuí, Co. Phort Láirge. D'éirigh leis an tionscadal maoiniú airgid a fháil on gComhairle Oidhreachta i 2016, chun measúnú agus suirbhé a thosú ar an suíomh. Táthar ag súil leis an measúnú agus an suirbhé a chríochnú, agus má bhíonn maoiniú ann, oibreacha daingnithe a thosú i 2017.

Foilseacháin: 'Ogham stones from a souterrain in Rathkenny, Co. Kerry', *Celtica* 28 (2016) 208–16.

Páipéir chomhdhála, cur i láthair: 15 Márta 2016, tionscadal Corca Dhuibhne 3D. 25 Lúnasa 2016, Músaem Chontae Phort Láirge Dún Garbháin, 'Ogham Workshop for all the family'. 1 Meán Fómhair 2016, Leabharlann Náisiúnta na hÉireann, Sraith Léachtanna Samhraidh: 'Ogham Stones - our earliest genealogical sources'. 15 Samhain 2016, Ard-Mhúsaem na hÉireann, léacht Seachtain na hEolaíochta: 'Digital Discoveries - The 3D Recording of Ancient Irish Ogham Stones'.

### 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.

Gné thábhachtach den obair seo ab ea liostú sistéimeach léirmheasanna a foilsíodh in irisí ar nós *Celtica*, *Zeitschrift für celtische Philologie*, *Peritia*, *Études Celtiques*, *Studia Hibernica* agus *Béaloideas*; leanfar leis an ngné seo den obair i 2017, ionas go dtabharfar san áireamh gach léirmheas sna hirisí tábhachtacha acadúla ar fhoilseachán a luaitear in BILL.

Chomh maith leis sin, sholáthair sé iontrálacha ar fhoilseacháin sa Léann Ceilteach do imleabhair 49/2 (le foilsíú i 2017) agus 50/1 (le foilsíú i 2017) 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 Búí 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. Eisíodh nuashonruithe rialta ar shealbhú a rinneadh le déanaí agus ar thréimhseacháin reatha agus déileáladh le ceisteanna taighde agus leabharliosta ó bhail na Scoile agus ó chuairteoirí.

### Coiste na Leabharlainne

Tháinig an Coiste le chéile i nDeireadh Fómhair. Tugann an coiste comhairle ar pholasaí na leabharlainne, cur chun cinn na leabharlainne, agus forbairt agus cur i gcrích athraithe straitéiseacha.

## School of Celtic Studies (continued)

The exciting new development will allow users a more dynamic approach when using Irish Script On Screen. Features such as zoomable images, an image cropping tool, easier searching and bookmarking facilities and a new easier registration system will be put into place.

Aoibheann Nic Dhonnchadha together with Anne Marie O'Brien made a presentation in RIA in January 2016 at the day-long conference on digitisation and Irish studies. This talk highlighted the establishment of ISOS, its aim, progress, achievements and future.

### OGHAM IN 3D:

#### Report from Nora White

The National Monuments Service (Dept. of Arts, Heritage, Regional, Rural and Gaeltacht Affairs) continued to support the Ogham in 3D project in 2016 with the first year of a two year project. In addition to continuing the work of digitising ogham stones, this year's work included assessing the ogham records of the Archaeological Survey of Ireland and updating these where necessary. The Ogham in 3D website now has in excess of 125 records available, approximately a third of the known ogham stones in Ireland.

This year also saw the development of the Corca Dhuibhne 3D community project initiated in the second half of 2015. Following an enthusiastically attended two days training in March, participants began recording monuments. Follow up training sessions were organised in June and August where participants were guided through the steps involved in processing their images to create 3D models. One of the participants has volunteered his web design skills and created a dedicated website for the project (<http://www.corcadhuibhne3d.ie>). A number of 3D models have already been uploaded, which include standing stones, headstones and rock art, as well as ogham stones. A previously unknown cross-inscribed stone was discovered by one of the participants and featured in an article published by the project in *Archaeology Ireland* (Vol. 30, No. 2. Summer 2016). The project also received funding from the Kerry Group, which paid for equipment including a computer and 3D software for use by project participants.

The work of the Corca Dhuibhne 3D project, as well as the Ogham in 3D project, featured in an exhibition (Rediscovering the Dingle Peninsula: Digitally Recording and Researching Stone Monuments) in Dingle library in November celebrating the first 25 years of the Discovery Programme.

Another community project in which Ogham in 3D is involved is the Knockboy/Seskinan Church and Ogham Stones Conservation Project. In 2016 the project was successful in a funding application from the Heritage Council to commence a Conservation Assessment and



Ogham Stone

*Cloch Oghaim*

3D Photogrammetric Survey of the site. It is hoped to complete the assessment and survey and, if funding allows, begin consolidation works in 2017.

### Publications

'Ogham stones from a souterrain in Rathkenny, Co. Kerry', *Celtica* 28 (2016) 208–16.

Conference papers/Workshops/Presentations

15th March 2016, Corca Dhuibhne 3D project workshop on 3D recording of ogham stones.

25th Aug 2016, Waterford County Museum, Dungarvan: Ogham Workshop for all the family (Heritage Week).

1st Sept 2016, National Library of Ireland, Summer Lunchtime Lecture Series: 'Ogham Stones - our earliest genealogical sources'.

15th Nov 2016, National Museum of Ireland, Science Week Lecture: 'Digital Discoveries - The 3D Recording of Ancient Irish Ogham Stones'.

### BIBLIOGRAPHY

During 2016 A. Guilarte continued to work on the compilation of the *Bibliography of Irish Linguistics and Literature*, adding new entries on relevant scholarship published in academic journals, monographs, and collective works. He also continued to work on the maintenance and upgrading of the project website.

An important aspect of this work has been the systematic inclusion of reviews appeared in journals such as *Celtica*, *Zeitschrift für celtische Philologie*, *Peritia*, *Études Celtiques*, *Studia Hibernica* and *Béaloideas*; this particular line of work will be continued in 2017, ensuring that all reviews of works mentioned in *BILL* are extracted from the most important academic periodicals.

## Scoil an Léinn Cheiltigh (ar leanúint)

Is iad baill an choiste Liam Breatnach, Aoibheann Nic Dhonnchadha, Alexandre Guilarte agus an Leabharlannaí, Margaret Irons.

### Comhdhálacha agus Seimineáir

D'fhreastail Margaret Irons ar chomhdháil bhliantúil de Chumann Leabharlann na hÉireann (roinn Leabharlanna Acadúla agus Speisialta) 11–12 Feabhra, 'Smashing stereotypes: Librarians get loud!', ar sheimineár Interleaf Technology ar an 26 Meán Fómhair, 'Technology in Libraries', agus ar chruiniú in Acadamh Ríoga na hÉireann, 28 Deireadh Fómhair, i gcomhair Seachtain na Rochtana Oscailte

D'fhreastail Órla Ní Chanainn ar 'Advanced Internet for Information Workers', faoi choimirce McGrath Barrett & Associates ar an 17ú Samhain.

### TIONÓL 2016

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 17ú: Andrew Ó Donnghaile, 'Túarastal Cána Phátraic: Cáin Dairí and Armagh in Ninth-Century Ireland'; Philip Healy, 'The Treatment of Political Hostages in *Aided Chrimthainn meic Fhidaig ocus Trí Mac Echach Muigmedón*'; Siobhán Barrett, 'Blathmac's Fragmentary Quatrains: Preliminary Findings'; Sarah Waidler, 'Relics in Wales and Beyond: The View from the Saints' Lives in Vespasian A xiv'; Romanas Bulatovas, 'Stories from the Law-tracts and *Sanas Cormaic*'; David Stifter, Fangzhe Qiu and Elliott Lash, 'Chronologicon Hibernicum: The *Annals of Ulster* and *Minor Glosses Databases*'.

Tugadh na páipéir seo leanas ar an Aoine an 18ú: Katie Ní Loingsigh, 'Rangú ar chnuasach nathanna as saothar an Athar Peadar Ua Laoghaire. A classification of Irish-language idioms from the work of Peadar Ua Laoghaire'; Breandán Ó Cróinín, 'Bruidhean Bheag na hAlmhan: téacs agus comhthéacs'; Pádraig Ó Cíobháin, 'Airec menman (.i. straitéis) léitheora aeistéitiúil ar léamh séimeolaíoch thús *Mesca Ulad*'; Damian McManus, 'On the use of the *Urlann in Deibhidhe*'; Peter McQuillan, 'Maith an ceannaighe Cormac: Tadhg Dall's poem for Cormac O'Hara'; M. Ní Mhaonaigh, 'A Poem to Ragnall, King of Man: Text and Context'; Colmán Etchingham, 'Gaelic Personal Names in Iceland's *Landnámabók* and the historical antecedent of *Kjarvalr Írakonungr*'; Ronan Mulhaire, 'Resistance and revolt in eleventh and twelfth century Ireland'; Éamon Ó Ciosáin, 'Máirtín Ó Cadhain hag



Tionól 2016

Tionól 2016

ar brezhoneg: an Cadhnach ag foghlaim agus ag saothrú na Briotáinise'; Gregory Toner and Xiwu Han, 'Temporal Text Classification: Computer-based Dating of Medieval Irish Texts'.

Tugadh na páipéir seo leanas ar an Satharn an 19ú: The following were delivered on Saturday 19th: Máire Ní Chiosáin and Pavel Iosad, 'Short vowel allophones in Modern Irish'; Róisín Nic Dhonncha, 'The Concept of Text and the Transmission of Traditional Irish Song'; Seán Ua Súilleabháin, 'Caoineadh Airt Uí Laoghaire: text and translations'; Patrick Sims-Williams, 'Where did Celtic emerge? The Greek evidence'; Michael Clarke, 'A possible new source for the *Merugud Uilix*, the medieval Irish Ulysses narrative'; Deborah Hayden, 'The anatomy of healing from head to toe: on the significance of diseases in a medieval Irish compilation of medical questions'; Richard Sharpe, 'Michael Casey (c. 1752–1829/32), herb doctor, his Irish manuscripts, and John O'Donovan'; Aoibheann Nic Dhonnchadha, 'Michael Casey's Medical Transcripts in Dublin City Library and Archive, Gilbert MS 147'; Helen Imhoff, 'Burial in medieval Irish literature'; Ralph O'Connor, 'Tecosca Ríg at royal inaugurations in mediaeval Ireland: another look at the textual evidence'.

Thug an tOllamh Barry Lewis an Léacht Poiblí Reachtúil a reáchtáladh i gcomhar leis an Tionól i gColáiste na hOllscoile, Baile Átha Cliath ar an Aoine an 18ú Samhain, faoin teideal 'The Impact of the Anglo-Norman Conquest on Hagiography in Wales and Ireland'. Bhí freastal an-mhaith ar an léacht seo, agus tá taifead den léacht seo ar fáil anois ar shuíomh gréasáin na Scoile.

## School of Celtic Studies (continued)

Finally, he contributed entries on Celtic Studies publications to appear in vols. 49:2 for July-December 2015 (forthcoming 2017) and 50:1 for January-June 2016 (forthcoming 2017) 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 on the contents of the Yellow Book of Lecan.

### LIBRARY

Current and retrospective cataloguing continued.

Acquisitions continued in subject areas relevant to the research needs of the School.

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

Research and bibliographical queries from members of the School were dealt with.

Inter-library loans were ordered, consulted and returned to the lending institution.

### Library Committee

The Committee met in October 2016. The Library Committee advises on library policies, promotion of the library and on development and implementation of strategic changes. Committee members are Liam Breatnach, Aoibheann Nic Dhonnchadha, Alexandre Guilarte and the Librarian, Margaret Irons.

### Conferences and Seminars

Margaret Irons attended the following:

Academic & Special Libraries section of the Library Association of Ireland annual conference on 11th & 12th February. 'Smashing stereotypes: Librarians get loud!'

Interleaf Technology seminar on 26th September. 'Technology in Libraries'

Open Action Teach-meet for Open Access week in the Royal Irish Academy on 28th October.

Órla Ní Chanainn attended the following:

'Advanced Internet for Information Workers' Hosted by McGrath Barrett & Associates on 17th November.

### TIONÓL 2016

This year's Tionól, from the 17th to the 19th of November attracted a very wide audience, with an international panel of speakers. Attendance was

high, with audiences reaching ninety people. The following were delivered on Thursday 17th: Andrew Ó Donnghaile, '*Túarastal Cána Phátraic: Cáin Dairí* and Armagh in Ninth-Century Ireland'; Philip Healy, 'The Treatment of Political Hostages in *Aided Chrimthainn meic Fhidaig ocus Trí Mac Echach Muigmedón*'; Siobhán Barrett, 'Blathmac's Fragmentary Quatrains: Preliminary Findings'; Sarah Waidler, 'Relics in Wales and Beyond: The View from the Saints' Lives in Vespasian A xiv'; Romanas Bulatovas, 'Stories from the Law-tracts and *Sanas Cormaic*'; David Stifter, Fangzhe Qiu and Elliott Lash, 'Chronologicon Hibernicum: The *Annals of Ulster* and *Minor Glosses Databases*'.

The following were delivered on Friday 18th: Katie Ní Loingsigh, 'Rangú ar chnuasach nathanna as saothar an Athar Peadar Ua Laoghaire. A classification of Irish-language idioms from the work of Peadar Ua Laoghaire'; Breandán Ó Cróinín, 'Bruidhean Bheag na hAlmhan: téacs agus comhthéacs'; Pádraig Ó Cíobháin, 'Airec menman (i. straitéis) léitheora aeistéitiúil ar léamh séimeolaíoch thús *Mesca Ulad*'; Damian McManus, 'On the use of the *Urlann* in *Deibhidhe*'; Peter McQuillan, '*Maith an ceannaighe Cormac*: Tadhg Dall's poem for Cormac O'Hara'; M. Ní Mhaonaigh, 'A Poem to Ragnall, King of Man: Text and Context'; Colmán Etchingham, 'Gaelic Personal Names in Iceland's *Landnámabók* and the historical antecedent of *Kjarvalr Írakonungr*'; Ronan Mulhaire, 'Resistance and revolt in eleventh and twelfth century Ireland'; Éamon Ó Ciosáin, 'Máirtín Ó Cadhain hag ar brezhoneg: an Cadhnach ag foghlaim agus ag saothrú na Briotáinise'; Gregory Toner and Xiwu Han, 'Temporal Text Classification: Computer-based Dating of Medieval Irish Texts'.

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### COMHDHÁIL LAE AR NA DÁNTA GRÁDHA.

D'eagraigh Mícheál Hoyne agus Síle Ní Mhurchú an chomhdháil seo san Institiúid ar an 17ú Meán Fómhair 2016, le deichniúr cainteoir agus thart ar 60 duine i láthair. Roimh ré cuireadh agallamh ar Mícheál Hoyne ar Raidió na Life, agus i gomhar le Síle Ní Mhurchú scríobh sé sraith de mhíreanna ar na dánta grádha mar chuid de bhlag ar-líne.

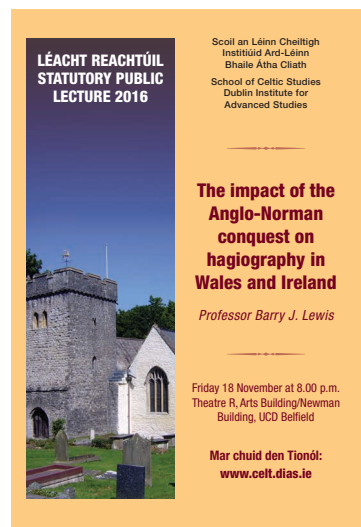
Tugadh na páipéir seo leanas (san ord inar cuireadh i láthair iad): Síle Ní Mhurchú, 'The love poems of Domhnall Mac Carthaigh'; Mícheál Hoyne, 'Gofraidh (mac Briain) Mac an Bhaird'; Deirdre Nic Mhathúna, 'Dánta grá agus cairdis Phiarais Feiritéar'; Mícheál Mac Craith, "'Manufacturing the evidence": the legacy of Robin Flower'; Ruairí Ó hUiginn, 'Na dánta grádha: some literary and historical aspects'; Máirín Ní Dhonnchadha, 'Discourses of male love before the dánta grádha'; Neil Buttimer, 'Emotion in Dánta Grádha'; Dafydd Johnston, 'Metaphors of love in the poetry of Dafydd ap Gwilym'; Damian McManus, 'Poems to women in the Book of Fermoy'; Mícheál B. Ó Mainnín, 'Court and coterie: dánta grádha in the Book of the Dean of Lismore'.

### SEIMINEÁIR AGUS LÉACHTAÍ

D'eagraigh Liam Breatnach seimineár ar théacsanna Sean- agus Meán-Ghaeilge a bhaineann leis na Fothairt agus le Brighid Chill Dara.

D'eagraigh Barry Lewis seimineáir ar fhilíocht Guto'r Glyn, ó Eanáir go hAibreán, agus ar ghraiméir Bhreatnaise na mbard sa 14ú haois ó Dheireadh Fómhair go Nollaig.

Chuir baill foirne páipéir agus léachtaí i láthair ag comhdhála agus ag ionaid náisiúnta agus idirnáisiúnta mar seo a leanas: Liam Breatnach: 'Marriage in Pre-Norman Ireland. Texts and Interpretations'. Ollscoil St Andrews, 8 Feabhra 2016; 'The Brehon Laws', Cumann Seandálaíochta Chill Chainnigh, Teach Rothe, Chill Chainnigh, 19 Deireadh Fómhair 2016. Ruairí Ó hUiginn: 'Strange people, Strange places: aspects of the supernatural in Medieval Irish and Welsh tradition', Institute of Literature, Languages and Creative Arts, Ollscoil Aberystwyth, 15 Márta 2016; 'The O'Donnell Lordship and Gaelic literary tradition', The O'Donnell Lecture, Ollscoil Dún Éideann, 16 Bealtaine 2016; 'Some naming patterns in late medieval Ireland', XV Siompóisiam Idirnáisiúnta de Societas Celtologica Nordica 24–26 Lúnasa 2016, Helsinki; 'The Dánta Grádha: Some Literary and Historical Aspects', Institiúid Ard-Léinn BÁC, 16 Meán Fómhair 2016;



Statutory Public Lecture 2016 Poster

### Léacht Reachtúil 2016

'The Book of Ballymote', Sligo Field Club, 30 Meán Fómhair 2016; 'The growth of Modern Irish', Léacht Chuimhneacháin Carl Marstrander, Ollscoil Oslo 4 Samhain 2016. Pádraig A. Breatnach: 'Scribal accretions in the Martyrology of Donegal (Long Recension)', Celebrating the Saints: A Focus on Martyrologies and Saints' Calendars, Coláiste na Tríonóide, BÁC, 28-9 Deireadh Fómhair 2016. Barry Lewis: 'Saints' Genealogies in Medieval Wales: A Comparison with the Irish Corpus', CAMPS Research Lab, Coláiste na hOllscoile, Gaillimh, 4 Feabhra 2016; 'The Interface between Hagiography and History in Medieval Wales': XV Siompóisiam Idirnáisiúnta de Societas Celtologica Nordica, Helsinki, 26 Lúnasa 2016; 'The Interface between Hagiography and History in Medieval Wales', 8th Colloquium on Medieval Wales, Bangor, 21 Deireadh Fómhair 2016; 'The Impact of the Anglo-Norman Conquest on Hagiography in Wales and Ireland', Léacht Reachtúil Scoil an Léinn Cheiltigh, Coláiste na hOllscoile BÁC, 18 Samhain 2016. Aoibheann Nic Dhonnchadha: 'Michael Casey's Medical Transcripts in Dublin City Library and Archive, Gilbert MS 147', Tionól 2016, Institiúid Ard-Léinn BÁC, Samhain 2016. Brian Ó Curnáin: 'How does Irish work?' i Scoil an Léinn Cheiltigh do mhic léinn teangeolaíochta as Ollscoil Leiden, 29 Eanáir 2016; i gomhar le Conchúr Ó Giollagáin, 'The sociolinguistics of Irish: a differential diagnosis of unidirectional bilingualism', in Ollscoil Leiden, 26 Feabhra 2016; 'Science and Illusion in Minority Language Sociolinguistics', Ollscoil Ghlaschú, 8 Meitheamh 2016; 'Staid Reatha na Gaeltachta', i Ráth Cairn,

## School of Celtic Studies (continued)

The Statutory Public Lecture, held in conjunction with the Tionól, was delivered in UCD by Professor Barry Lewis under the title 'The Impact of the Anglo-Norman Conquest on Hagiography in Wales and Ireland', on Friday the 18th 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.

### ONE-DAY SYMPOSIUM ON DÁNTA GRÁDHA

Mícheál Hoyne and Síle Ní Mhurchú organised a one-day symposium on Irish courtly love poetry at DIAS on the 17 September 2016. It featured 10 speakers and was attended by more than 60 people. In advance of this conference, he was interviewed on Raidió na Life and (again together with Síle Ní Mhurchú) wrote a series of pieces on courtly love poetry for the general public as part of an on-line blog.

The following papers were delivered (in order of presentation):

Síle Ní Mhurchú, 'The love poems of Domhnall Mac Carthaigh'; Mícheál Hoyne, 'Gofraidh (mac Briain) Mac an Bhaird'; Deirdre Nic Mhathúna, 'Dánta grá agus cairdis Phiarais Feiritéar'; Mícheál Mac Craith, "'Manufacturing the evidence": the legacy of Robin Flower'; Ruairí Ó hUiginn, 'Na dánta grádha: some literary and historical aspects'; Máirín Ní Dhonnchadha, 'Discourses of male love before the dánta grádha'; Neil Buttimer, 'Emotion in Dánta Grádha'; Dafydd Johnston, 'Metaphors of love in the poetry of Dafydd ap Gwilym'; Damian McManus, 'Poems to women in the Book of Fermoy'; Mícheál B. Ó Mainnín, 'Court and coterie: dánta grádha in the Book of the Dean of Lismore'.

### SEMINARS AND LECTURES

Liam Breatnach conducted a seminar on Early Irish texts concerned with the Fothairt and Brigit of Kildare.

Barry Lewis conducted seminars on the Poetry of Guto'r Glyn, January-April, and on Welsh bardic grammars of the 14th century, October-December.

### LECTURES

#### Liam Breatnach:

'Marriage in Pre-Norman Ireland. Texts and Interpretations'. University of St Andrews, 8 February 2016.

'The Brehon Laws', Kilkenny Archaeological Society, Rothe House, Kilkenny, 19 October 2016.

#### Ruairí Ó hUiginn:

'Strange people, Strange places: aspects of the supernatural in Medieval Irish and Welsh tradition',

Institute of Literature, Languages and Creative Arts, Aberystwyth University, 15 March 2016.

'The O'Donnell Lordship and Gaelic literary tradition', The O'Donnell Lecture. Edinburgh University, 16 May 2016.

'Some naming patterns in late medieval Ireland', XV International Symposium of Societas Celtologica Nordica 24-26 August 2016, Helsinki.

'The *Dánta Grádha*: Some Literary and Historical Aspects', DIAS, 16 September 2016.

'The Book of Ballymote', Sligo Field Club, 30 September 2016.

'The growth of Modern Irish', The Carl Marstrander Memorial Lecture, Oslo University 4 November 2016.

#### Pádraig A. Breatnach:

'Scribal accretions in the Martyrology of Donegal (Long Recension)', Celebrating the Saints: A Focus on Martyrologies and Saints' Calendars, TCD, 28-29 October 2016.

#### Barry Lewis:

'Saints' Genealogies in Medieval Wales: A Comparison with the Irish Corpus': CAMPS Research Lab, NUI Galway, 4 February 2016.

'The Interface between Hagiography and History in Medieval Wales': 15th International Symposium of Societas Celtologica Nordica, Helsinki, 26 August 2016.

'The Interface between Hagiography and History in Medieval Wales': 8th Colloquium on Medieval Wales, Bangor, 21 October 2016.

'The Impact of the Anglo-Norman Conquest on Hagiography in Wales and Ireland': School of Celtic Studies Statutory Lecture for 2016, UCD, 18 November 2016.

#### Aoibheann Nic Dhonnchadha:

'Michael Casey's Medical Transcripts in Dublin City Library and Archive, Gilbert MS 147', Tionól 2016, DIAS, November 2016.

#### Brian Ó Curnáin:

'How does Irish work?' in DIAS to visiting students from the University of Leiden, 29 January 2016.

With Conchúr Ó Giollaigáin, 'The sociolinguistics of Irish: a differential diagnosis of unidirectional bilingualism', University of Leiden, 26 February 2016.

'Science and Illusion in Minority Language Sociolinguistics', University of Glasgow, 8 June 2016.



## Scoil an Léinn Cheiltigh (ar leanúint)

Co. na Mí, 24 Meán Fómhair 2016; 'Apparent-time Chronology of Post-traditional Irish; New Speakers and the moving target of New Irish', Siompóisiam Sochtheangeolaíota na dTeangacha Ceilteacha, Coláiste na Tríonóide, BÁC, 13 Deireadh Fómhair 2016. Gordon Ó Riain: 'Duanaire Éinrí Uí Néill (†1489)', Éigse Cholm Cille, Ollscoil Uladh, Doire, 5 Márta 2016; 'The Metres of the Citations in IGT V', XV Siompóisiam Idirnáisiúnta de Societas Celtologica Nordica, Ollscoil Helsinki, 24 Lúnasa 2016. Mícheál Hoyne: 'Táth aoinfhir ar iath Maineach: dán ar Uilliam Ó Ceallaigh (†1381) i Leabhar Ua Maine'; Comhdháil Chuimhneacháin Eleanor Knott, Coláiste na Tríonóide, BÁC, 28 Aibreán 2016; 'Gofraidh (mac Briain) Mac an Bhaird: courtly love and panegyric'; Comhdháil Lae ar na Dánta Grádha, Institiúid Ard-Léinn BÁC, 17 Meán Fómhair 2016; 'Was there a synod of poets c. 1200, and did there need to be one?'; Comhdháil Éireannach na Meánaoise, Ollscoil Mhá Nuad, 30 Meitheamh 2016. Marie-Luise Theuerkauf: 'The Road Less Travelled: Cú Chulainn's Journey to Matrimony and the *Dindshenchas of Tochmarc Emire*', Comhdháil 'Landscape and Myth in North-Western Europe', Ludwig-Maximilians-Universität, München, Aibreán 2016; 'The Dagda's Spell in *Tochmarc Emire*', 9ú Comhdháil de ISFNR International Committee for Charms, Charmers and Charming, Coláiste na hOllscoile, Corcaigh, Bealtaine 2016; 'Textual Intermediaries: The *Dindshenchas* of Laud 610', XV Siompóisiam Idirnáisiúnta de Societas Celtologica Nordica, Ollscoil Helsinki, Lúnasa 2016; 'Poems Ascribed to Cináed ua hArtacáin in the Book of Leinster', 36ú Harvard Celtic Colloquium, Ollscoil Harvard, Deireadh Fómhair 2016; 'Tristan and Late Medieval Romance: James Carney's *ur-Tristan Revisited*', 18ú seimineár bliantúil de Chumann na Scríbhneann nGaedhíge, Coláiste na hOllscoile, Corcaigh, Samhain 2016. Silva Nurmio: 'Small but mighty: adjectival suppletion in the Brittonic languages', seimineár taighde Roinn na Luath-Ghaeilge agus an Léinn Cheiltigh, Ollscoil Mhá Nuad; 'Number Suppletion in Adjectives: Typology and the Brittonic Languages', seimineár taighde ASNC, Ollscoil Cambridge; 'Countability and the Welsh nominal system', Datblygiad yr Iaith/Forbairt na Breatnaise, cruinniú bliantúil, Ollscoil Cambridge; 'Ac yna dygwydaw ar dal y deulin y erchi trugared: A new analysis of the Middle Welsh "duals"', seimineár teangeolaíochta na Breatnaise, Gregynog, An Bhreatain Bheag; 'Between things and stuff: mass and collective nouns in Welsh', 9ú Comhdháil na Teangeolaíochta Ceiltí, Cardiff. Sarah Waidler: 'The Miraculous in Central Medieval Irish Saints' Lives: Reuse and Reinterpretation', London Society for

Medieval Studies, Institute for Historical Research, Meitheamh 2016; 'Relics in Wales and Beyond: The View from the Saints' Lives in Vespasian A xiv', Tionól 2016, Institiúid Ard-Léinn BÁC, Samhain 2016; 'Saints and Scholars across the Sea: The Hagiographical View of Educating Saints Abroad', Borderlands and Frontier Zones: Transmarine Interactions with the Celtic World, ag *Seafaring: an early medieval conference on the islands of the North Atlantic*, Ollscoil Denver, Samhain 2016.

### EAGARTHÓIREACHT

Bhí Liam Breatnach ina chomheagarthóir le D. Mc Manus ar Ériu imleabhar 66.

Bhí Ruairí Ó hUiginn ina eagarthóir ar *The Book of Ballymote*, Codices Hibernenses Eximii 2, imeachtaí comhdhála ar Leabhar Bhaile an Mhóta a reachtáladh i 2015, atá le foilsiú ag Acadamh Ríoga na hÉireann. Chomh maith leis sin, d'oibrigh sé leis an Ollamh Barry Lewis ar *Celtica* 29 (le foilsiú i Samhain 2017), agus le Liam Mac Cóil ar *Bliainiris* 11 (le foilsiú i 2017).

Bhí Pádraig Breatnach, Barry Lewis agus Fergus Kelly ina gcomheagarthóirí ar *Celtica* 28 (2016).

Bhí Aoibheann Nic Dhonnchadha ina comheagarthóir le Pádraig Ó Macháin ar *An Linn Bhuí: Iris Ghaeltacht na nDéise* 20 (2016).

Bhí M O Riordan ina léitheoir i gcomhair dhá fhoilseachán de chuid Cló Ollscoile Corcaí ar stair na hÉireann.

Thosaigh Mícheál Hoyne ar obair eagarthóireachta ar imeachtaí

Comhdháil Chuimhneacháin Eleanor Knott (Coláiste na Tríonóide, BÁC, 28 Aibreán 2016) maraon le Christina Cleary (Coláiste na Tríonóide) agus Chantal Kobel (Ollscoil Mhá Nuad). Thosaigh sé freisin ar obair eagarthóireachta ar imeachtaí na Comhdhála Lae ar na Dánta Grádha (Institiúid Ard-Léinn BÁC, 17 Meán Fómhair 2016) maraon le Síle Ní Mhurchú.

### SCRÚDÚCHÁN SEACHTRACH AGUS BALLRAÍOCHT CHOISTÍ

Bhí Liam Breatnach ina bhall de bhord eDIL.

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

## School of Celtic Studies (continued)

'Staid Reatha na Gaeltachta' Ráth Cairn, Co. Meath, 24 September 2016.

'Apparent-time Chronology of Post-traditional Irish; New Speakers and the moving target of New Irish', TCD, 13 October 2016.

### Gordon Ó Riain:

'Duanairé Éinrí Uí Néill (†1489)', Éigse Cholm Cille, University of Ulster, Derry, 5 March 2016.

'The Metres of the Citations in IGT V', 15th international symposium of Societas Celtologica Nordica, University of Helsinki, Finland, 24 August 2016.

### Mícheál Hoynes:

'Táth aoinfhir ar iath Maineach: dán ar Uilliam Ó Ceallaigh (†1381) i Leabhar Ua Maine'; Eleanor Knott Memorial Conference, Trinity College, Dublin, 28 April 2016.

'Gofraidh (mac Briain) Mac an Bhaird: courtly love and panegyric'; Symposium on the Dánta Grádha, DIAS, 17 September 2016.

'Was there a synod of poets c. 1200, and did there need to be one?'; Irish Conference of Medievalists, Maynooth University, 30 June 2016.

### Marie-Luise Theuerkauf:

'The Road Less Travelled: Cú Chulainn's Journey to Matrimony and the *Dindshenchas* of *Tochmarc Emire*', 'Landscape and Myth in North-Western Europe' Conference, Ludwig-Maximilians-Universität, Munich, April 2016.

'The Dagda's Spell in *Tochmarc Emire*', 9th Conference of the ISFNR International Committee for Charms, Charmers and Charming, University College Cork, May 2016.

'Textual Intermediaries: The *Dindshenchas* of Laud 610', XV ISSCN Symposium, University of Helsinki, August 2016.

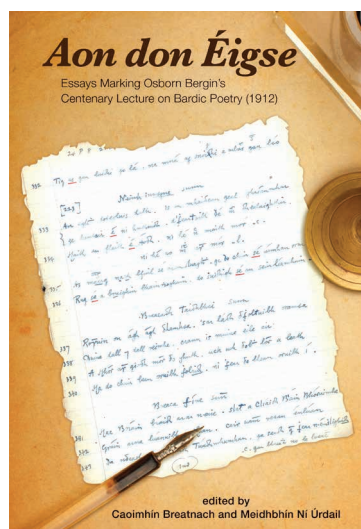
'Poems Ascribed to Cináed ua hArtacáin in the Book of Leinster', 36th HarvardCeltic Colloquium, Harvard University, October 2016.

'Tristan and Late Medieval Romance: James Carney's *ur-Tristan Revisited*', Eighteenth Annual Irish Texts Society Seminar, University College Cork, November 2016.

### Silva Nurmio:

'Small but mighty: adjectival suppletion in the Brittonic languages', Early Irish and Celtic Studies Research Seminar, Maynooth University.

'Number Suppletion in Adjectives: Typology and the Brittonic Languages', Dept. of Anglo-Saxon, Norse and Celtic research seminar, University of Cambridge.



### Aon don Éigse

'Countability and the Welsh nominal system', Datblygiad yr Iaith/The Development of the Welsh Language annual meeting, University of Cambridge.

'Ac yna dygwydaw ar dal y deulin y erchi trugared: A new analysis of the Middle Welsh "duals"', Welsh Linguistics Seminar, Gregynog, Wales.

'Between things and stuff: mass and collective nouns in Welsh', 9th Celtic linguistics Conference, Cardiff.

### Sarah Waidler:

'The Miraculous in Central Medieval Irish Saints' Lives: Reuse and Reinterpretation', London Society for Medieval Studies, Institute for Historical Research, June 2016.

'Relics in Wales and Beyond: The View from the Saints' Lives in Vespasian A xiv', Tionól 2016, DIAS, November 2016.

'Saints and Scholars across the Sea: The Hagiographical View of Educating Saints Abroad', Borderlands and Frontier Zones: Transmarine Interactions with the Celtic World at *Seafaring: an early medieval conference on the islands of the North Atlantic*, University of Denver, November 2016.

### EDITING

Liam Breatnach was co-editor with D. Mc Manus of *Ériu* volume 66.

Ruairí Ó hUiginn edited *The Book of Ballymote*, Codices Hibernenses Eximii 2, the proceedings of a conference on the Book of Ballymote, held in 2015, to be published by the Royal Irish Academy. He also worked with Professor Barry Lewis on *Celtica* 29 (to be published in November 2017), and with Liam Mac Cóil on *Bliainiris* 11 (to be published in 2017).

## Scoil an Léinn Cheiltigh (ar leanúint)

eDIL, ina bhall de Choiste Leabharlainne Acadamh Ríoga na hÉireann, ina bhall de Choiste Náisiúnta Léann na Gaeilge, agus ina bhall de phainéal ceapacháin (Berufungskommission) Cathaoir na Ceiltise, Philipps-Universität, Marburg, an Ghearmáin. Bhí sé mar scrúdaitheoir seachtach sa Ghaeilge in Ollscoil Uladh, agus ina scrúdaitheoir seachtach ar thráchtas PhD i Roinn na Sean agus Meán-Ghaeilge, Coláiste na hOllscoile, Corcaigh, Iúil 2016.

Bhí Pádraig A. Breatnach ina bhall den Choiste Comhairleach le hiarrthóirí ballraíochta a mheasúnú in Acadamh Ríoga na hÉireann.

Bhí Barry Lewis ina bhall den Bhord Comhairleach don tionscnamh ‘Cult of Saints in Wales’, ina bhall den Bhord Eagarthóireachta don sraith ‘Poets of the Nobility’ (araon don Lárionad Ard-Léinn sa Bhreataine agus an Léann Ceilteach, Ollscoil na Breataine Bige), agus ina bhall de Bhord Eagarthóireachta *Proceedings of the Harvard Celtic Colloquium*. Bhí sé ina scrúdaitheoir seachtach ar thráchtas PhD i Scoil na Breatnaise, Ollscoil Cardiff.

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

Bhí M O Riordan ina ball de chomhchoiste Foilseachán Ábhar Spioradálta agus *An Timire*.

Bhí Gordon Ó Riain ina bhall den Choiste Comhairleach Idirnáisiúnta do thionscnamh bunaithe in Ollscoil Connecticut, ‘Reading Early Modern Irish: a digital guide to Irish Gaelic (c. 1200-1650)’.

Lean Mícheál Hoyne mar bhall den Choiste Comhairleach don tionscnamh idirnáisiúnta ‘Reading Early Modern Irish’ (leamh.org).

Ceapadh Silva Nurmio ina ball de choiste eagraithe seimineár bliantúil teangeolaíochta na Breatnaise, Gregynog, an Bhreatain Bheag.

### FOILSEACHÁIN

#### Liam Breatnach:

‘On the Line-Break in Early Irish Verse, and Some Remarks on the Syntax of the Genitive in Old and Middle Irish’, in Matthieu Boyd (ed.), *Ollam. Studies in Gaelic and Related Traditions in honor of Tomás Ó Cathasaigh* (Madison/Teaneck 2016) 195–209.

‘The Glossing of the Early Irish Law Tracts’, in Deborah Hayden and Paul Russell (eds), *Grammatica, Gramadach and Gramadeg. Vernacular Grammar and Grammarians in Medieval Ireland and Wales* (Amsterdam and Philadelphia 2016) 113–32.

#### Ruairí Ó hUiginn:

‘Annals, histories and stories: some thirteenth-century entries in the Annals of the Four Masters’, in M. Boyd (ed.) *Ollam. Studies in Gaelic and Related Traditions in Honor of Tomás Ó Cathasaigh* (Farleigh) 101–16

‘Terms for “death” and “dying” in Irish’, in S. Ryan (ed.) *Death and the Irish* (Dublin 2016) 8–10

‘The Book of Ballymote: scholars, sources and patrons’, le foilsíú in *The Book of Ballymote*, Codices Hibernenses Eximii 2 (eag. R. Ó hUiginn).

#### Pádraig A. Breatnach:

‘An address to Toirdhealbhadh an Fhíona Ó Domhnaill: edition and critical exposition’, *Celtica* 28 (2016) 55–88.

‘Athchuir ar amhrán le hAogán Ó Raithile’, *Celtica* 28 (2016) 168–85.

‘Tomás Ó Con Cheanainn (1921-2015)’, *Celtica* (2016) 238–41.

#### Barry Lewis:

‘Trafod Barddoniaeth yn yr Oesoedd Canol: Y Traddodiad Mawl a Chrefydd’, in Bleddyn Owen Huws agus A. Cynfael Lake (eag.), *Genres y Cywydd* (Talybont 2016) 29–52.

‘The Saints in Narratives of Conversion from the Brittonic-Speaking Regions’, in Roy Flechner agus Máire Ní Mhaonaigh (eag.), *The Introduction of Christianity into the Early Medieval Insular World. Converting the Isles I* (Turnhout 2016) 431–56.

Alt léirmheasa: ‘A New Synthesis of Early Medieval Brittonic History’ (ar Thomas M. Charles-Edwards, *Wales and the Britons 350-1064* (Oxford 2013)), in *Celtica* 27 (2016) 217–37.

Léirmheas: Alan Macquarrie, *Legends of Scottish Saints: Readings, Hymns and Prayers for the Commemorations of Scottish Saints in the Aberdeen Breviary* (Dublin 2012), in *Celtica* 27 (2016) 262–6.

## School of Celtic Studies (continued)

Pádraig A. Breatnach was co-editor, with Fergus Kelly and Barry J. Lewis, of *Celtica* 28 (2016).

Barry J. Lewis was co-editor, with Fergus Kelly and Pádraig A. Breatnach, of *Celtica* 28 (2016).

Aoibheann Nic Dhonnchadha was co-editor with Pádraig Ó Macháin of *An Linn Bhúí: Iris Ghaeltacht na nDéise* 20 (2016).

M O Riordan was a pre-publication reader for two Cork University Press publications on Irish history.

Mícheál Hoyne began editing the proceedings of the Eleanor Knott Memorial Conference (TCD, 28 April 2016) together with Christina Cleary (TCD) and Chantal Kobel (Maynooth University). He also began work together with Síle Ní Mhurchú (UCC) on editing the proceedings of the *Dánta Grádha* Symposium (DIAS, 17 September 2016).

### EXTERNAL EXAMINING AND MEMBERSHIP OF COMMITTEES

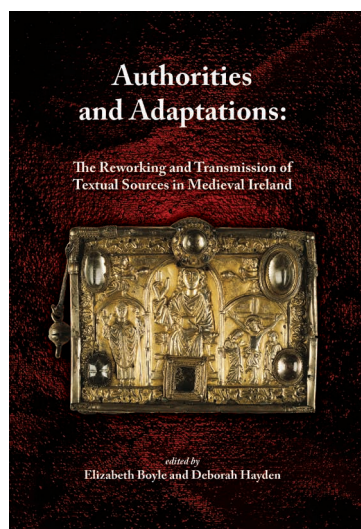
Liam Breatnach was a member of the advisory board of eDIL.

Ruairí Ó hUiginn was re-appointed Chair of Coiste na Logainmneacha 2016 (Government Appointment). He was also Chair of the Management and Editorial Committees of *Foclóir Stairiúil na Nua-Ghaeilge/ Historical Dictionary of Modern Irish* (Royal Irish Academy), a member of the advisory board of eDIL, a member of the Royal Irish Academy's Library Committee, of Coiste Náisiúnta Léann na Gaeilge, and a member of the appointment panel (Berufungskommission) for the Chair of Celtic, Philipps-Universität, Marburg, Germany. He was an external examiner in Irish, Ulster University, and external examiner for a PhD thesis at the Department of Early Irish, University College Cork, July 2016.

Pádraig A. Breatnach was a member of Advisory Committee for the Assessment of Candidates for Membership of the Royal Irish Academy.

Barry Lewis was a member of the editorial board of the *Proceedings of the Harvard Celtic Colloquium*, of the editorial board of the 'Poets of the Nobility' series, University of Wales Centre for Advanced Welsh and Celtic Studies, and of the advisory board of the 'Cult of saints in Wales' project, University of Wales Centre for Advanced Welsh and Celtic Studies. He was an external examiner for a PhD thesis at the School of Welsh, Cardiff University.

Aoibheann Nic Dhonnchadha was a member of the editorial board of CELT, and of An Fochoiste Leabharlainne, Leabharlann de Hindeberg, Coláiste na Rinne.



Authorities and Adaptations

M O Riordan was a member of the joint committee of Foilseachán Ábhar Spioradálta and *An Timire*.

Gordon Ó Riain was a member of the international advisory board for a project based at University of Connecticut, 'Reading Early Modern Irish: a digital guide to Irish Gaelic (c. 1200-1650)', 2014-.

Mícheál Hoyne continued as a member of the international project 'Reading Early Modern Irish' (leamh.org).

Silva Nurmio became a member of the organising committee of the annual Welsh Linguistics Seminar, held at Gregynog in Wales.

### PUBLICATIONS BY MEMBERS OF STAFF

#### Liam Breatnach:

'On the Line-Break in Early Irish Verse, and Some Remarks on the Syntax of the Genitive in Old and Middle Irish', in Matthieu Boyd (ed.), *Ollam. Studies in Gaelic and Related Traditions in honor of Tomás Ó Cathasaigh* (Madison/Teaneck 2016) 195–209.

'The Glossing of the Early Irish Law Tracts', in Deborah Hayden and Paul Russell (eds), *Grammatica, Gramadach and Gramadeg. Vernacular Grammar and Grammarians in Medieval Ireland and Wales* (Amsterdam and Philadelphia 2016) 113–32.

#### Ruairí Ó hUiginn:

'Annals, histories and stories: some thirteenth-century entries in the Annals of the Four Masters', in M. Boyd (ed.) *Ollam. Studies in Gaelic and Related Traditions in Honor of Tomás Ó Cathasaigh* (Farleigh) 101-116



## Aoibheann Nic Dhonnchadha:

‘The Irish Rosa Anglica: Manuscripts and structure’ in Liam P. Ó Murchú (eag.) *Rosa Anglica: Reassessments*. Irish Texts Society Subsidiary Series 28 (Dublin 2016) 114–97.

Le foilsíú: ‘Michael Casey’s medical transcripts in Gilbert MS 147’ (in *Éigse*)

## M O Riordan:

*Múinídh dom glao: éifeacht mhothálach an ghairmigh faoi réir fhilí na Gaeilge* (Gaillimh 2016).

*Muire na mBard* (Foilseacháin Ábhair Spioradálta: Baile Átha Cliath 2016).

Léirmheas: L. Ní Mhunchaile, *Ré Órga na nGael*, in *ComharTaighde 2*.

## Brian Ó Curnáin:

‘Cróineolaíocht na Gaeilge Iarthraidisiúnta i gConamara, 1950–2004’ *Éigse* 39 (2016) 1–43;

‘Cúig Phaidir as an gCaisleán Gearr agus Eanach Dhúin’ *Éigse* 39 (2016) 209–25;

‘Amhrán faoin bPortach as Carna’ *Éigse* 39 (2016) 226–30.

Conchúr Ó Giollaigáin agus Brian Ó Curnáin (eag.), *Beartas Úr na nGael; dálaí na nGael san Iar-Nua-Aoiseachas* (Indreabhán 2016).

## Gordon Ó Riain:

‘Observations on the citations in IGT V’, *Celtica* 28 (2016), 1–33.

## Mícheál Hoyne:

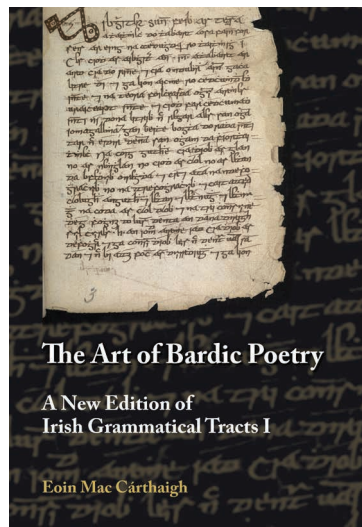
‘An adjectival construction indicating lesser degree in Early Modern Irish’, *Ériu* 66 (2016) 63–75.

‘Stressed monosyllables ending in a short vowel in Classical Modern Irish’, *Celtica* 28 (2016), 186–200.

‘Structural ambiguity and resumptive pronouns: the pragmatics of the transitive “direct” and “indirect” relatives in Modern Irish’, *The Journal of Celtic Linguistics* 17 (2016) 31–95.

Léirmheas ar C. Breatnach and M. Ní Úrdail (eag.), *Aon don Éigse: Essays Marking Osborn Bergin’s Centenary Lecture on Bardic Poetry (1913)* (Dublin 2015), in *Zeitschrift für celtische Philologie* 63 (2016) 239–45.

Léirmheas(as Gearmáinis) ar Eoin Mac Cárthaigh, *The Art of Bardic Poetry* (Dublin 2014), in *Zeitschrift für celtische Philologie* 63 (2016) 270–4.



The Art of Bardic Poetry

## Marie-Luise Theuerkauf:

Léirmheas ar Astrid Petersmann, *Die Kelten*, in *Studia Celtica Fennica* 13 (2016) 104–8.

Léirmheas ar Ralph O’Connor (eag.), *Classical Literature and Learning in Medieval Irish Narrative*, in *Studia Celtica* 49 (2015) 202–3.

## Silva Nurmio:

I gcomhar le David Willis, ‘The Rise and Fall of a Minor Category: the Case of the Welsh Numerative’, *Journal of Historical Linguistics* 6.2 (2016).

Le foilsíú: ‘The Development and Typology of Number Suppletion in Adjectives’, *Diachronica* 34.2.

Léirmheas ar Alexander Falileyev, *Llawlyfr Hen Gymraeg* (2016), le foilsíú in *Journal of Celtic Linguistics*.

## Sarah Waidler:

I gcomhar le R. Gallagher, J. Key, M. Ní Mhaonaigh agus H. Oxenham, ‘Mapping Conversion: A Database of Conversion Episodes in Medieval Insular Hagiography’ (2016), <http://www.asnc.cam.ac.uk/mapping/>

Léirmheas ar Niamh Wycherley, *The Cult of Relics in Early Medieval Ireland*, le foilsíú in *Early Medieval Europe*.

## School of Celtic Studies (continued)

'Terms for "death" and "dying" in Irish', in S. Ryan (ed.) *Death and the Irish* (Dublin 2016) 8-10

'The Book of Ballymote: scholars, sources and patrons' submitted for publication in *The Book of Ballymote. Codices Hibernenses Eximii 2* (ed. R. Ó hUiginn).

### **Pádraig A. Breatnach:**

'An address to Toirdhealbhadh an Fhíona Ó Domhnaill: edition and critical exposition', *Celtica* 28 (2016) 55–88.

'Athchuart ar amhrán le hAogán Ó Raithile', *Celtica* 28 (2016) 168–85.

'Tomás Ó Con Cheanainn (1921-2015)', *Celtica* (2016) 238–41.

### **Barry Lewis:**

'Traffod Barddoniaeth yn yr Oesoedd Canol: Y Traddodiad Mawl a Chrefydd', in Bleddyn Owen Huws and A. Cynfael Lake (eds), *Genres y Cywydd* (Talybont 2016) 29–52.

'The Saints in Narratives of Conversion from the Brittonic-Speaking Regions', in Roy Flechner and Máire Ní Mhaonaigh (eds.), *The Introduction of Christianity into the Early Medieval Insular World. Converting the Isles I* (Turnhout 2016) 431–56.

Review article: 'A New Synthesis of Early Medieval Brittonic History' (on Thomas M. Charles-Edwards, *Wales and the Britons 350-1064* (Oxford 2013)), in *Celtica* 27 (2016) 217–37.

Review: Alan Macquarrie, *Legends of Scottish Saints: Readings, Hymns and Prayers for the Commemorations of Scottish Saints in the Aberdeen Breviary* (Dublin 2012), in *Celtica* 27 (2016) 262–6.

### **Aoibheann Nic Dhonnchadha:**

'The Irish *Rosa Anglica*: Manuscripts and structure' in Liam P. Ó Murchú (ed.) *Rosa Anglica: Reassessments*. Irish Texts Society Subsidiary Series 28 (Dublin 2016) 114–97.

Accepted for publication: 'Michael Casey's medical transcripts in Gilbert MS 147' (by Éigse)

### **M O Riordan:**

*Múinidh dom glao: éifeacht mhothálach an ghairmigh faoi réir fhilí na Gaeilge* (Galway 2016).

*Muire na mBard* (Foilseacháin Ábhair Spioradálta: Baile Átha Cliath 2016).

Review: L. Ní Mhunghaile, *Ré Órga na nGael*, in *ComharTighde* 2.

### **Brian Ó Curnáin:**

'Cróineolaíocht na Gaeilge Iarthraidisiúnta i gConamara, 1950-2004' *Éigse* 39 (2016) 1–43;

'Cúig Phaidir as an gCaisleán Gearr agus Eanach Dhúin' *Éigse* 39 (2016) 209-25;

'Amhrán faoin bPortach as Carna' *Éigse* 39 (2016) 226–30.

Conchúr Ó Giollagáin agus Brian Ó Curnáin (eag.), *Beartas Úr na nGael; dálaí na nGael san Iar-Nua-Aoiseachas* (Indreabhán 2016).

### **Gordon Ó Riain:**

'Observations on the citations in IGT V', *Celtica* 28 (2016), 1–33.

### **Mícheál Hoyne:**

'An adjectival construction indicating lesser degree in Early Modern Irish', *Ériu* 66 (2016) 63–75.

'Stressed monosyllables ending in a short vowel in Classical Modern Irish', *Celtica* 28 (2016), 186–200.

'Structural ambiguity and resumptive pronouns: the pragmatics of the transitive "direct" and "indirect" relatives in Modern Irish', *The Journal of Celtic Linguistics* 17 (2016) 31–95.

Review of C. Breatnach and M. Ní Úrdail (eds), *Aon don Éigse: Essays Marking Osborn Bergin's Centenary Lecture on Bardic Poetry (1913)* (Dublin 2015), in *Zeitschrift für celtische Philologie* 63 (2016) 239–45.

Review (in German) of Eoin Mac Cárthaigh, *The Art of Bardic Poetry* (Dublin 2014), in *Zeitschrift für celtische Philologie* 63 (2016) 270–4.

### **Marie-Luise Theuerkauf:**

Review of Astrid Petersmann, *Die Kelten*, in *Studia Celtica Fennica* 13 (2016) 104–8.

Review of Ralph O'Connor (ed.), *Classical Literature and Learning in Medieval Irish Narrative*, in *Studia Celtica* 49 (2015) 202–3.

### **Silva Nurmio:**

With David Willis, 'The Rise and Fall of a Minor Category: the Case of the Welsh Numerative', *Journal of Historical Linguistics* 6.2 (2016).

Accepted for publication: 'The Development and Typology of Number Suppletion in Adjectives', *Diachronica* 34.2.

Review of Alexander Falileyev, *Llawlyfr Hen Gymraeg* (2016), forthcoming in the *Journal of Celtic Linguistics*.



## GNÍOMHAÍOCHTAÍ EILE

Ghlac Ruairí Ó hUiginn páirt i gclár teilifíse, ‘Treasures of Ireland’ de chuid an BBC, a craoladh ar an 26ú Feabhra 2016.

Bhí Barry Lewis ina phiarmheasúnóir do *Peritia* agus *Ériu*. Ghlac sé páirt in ócáid phoiblí ar fhilíocht Breatnaise na Meánaoise ag Eisteddfod Genedlaethol Cymru, Abergavenny, 3 Lúnasa 2016.

Cuireadh roinnt agallamh ar Bhrian Ó Curnáin ar raidió, teilifís agus sna nuachtáin, ar pholasaí teanga, agus bhí sé ina phiarmheasúnóir do *Éigse*.

Bhí Mícheál Hoyne ina theagascóir Gaeilge do mhic léinn sa chéad bhliain i Roinn na Gaeilge, Coláiste na Tríonóide, BÁC. D’iarr an Dr Katharine Simms air dul i gcúram a catalóige ar-líne de Fhilíocht na Scol ([bardic.celt.dias.ie](http://bardic.celt.dias.ie)), agus tá sí seo anois á tabhairt suas chun dáta agus á leathnú.

D’eagraigh Marie-Luise Theuerkauf seimineár do mhic léinn PhD in Ollscoil Notre Dame, Indiana, faoin teideal ‘Exploring the Literary Landscape of Medieval Ireland: Breaking New Ground after the Dissertation’.

### Sarah Waidler:

With R. Gallagher, J. Key, M. Ní Mhaonaigh and H. Oxenham, 'Mapping Conversion: A Database of Conversion Episodes in Medieval Insular Hagiography' (2016), <http://www.asnc.cam.ac.uk/mapping/>

(assisted with concept, design, database, final edits and wrote content for website)

Review of Niamh Wycherley, *The Cult of Relics in Early Medieval Ireland*, forthcoming in *Early Medieval Europe*.

### OTHER ACTIVITIES AND ACHIEVEMENTS

Ruairí Ó hUiginn took part in a television programme, 'Treasures of Ireland' by the BBC, broadcast on the 26th of February 2016.

Barry Lewis was a peer reviewer for *Peritia and Ériu*. He took part in a public event on medieval Welsh poetry at Eisteddfod Genedlaethol Cymru, Abergavenny, 3 August 2016.

Brian Ó Curnáin gave a number of radio, television and print media interviews on Irish language policy, and was a peer reviewer for *Éigse*.

Mícheál Hoyne taught Modern Irish to First Year undergraduates in the Department of Irish, Trinity College Dublin. He was asked by Dr Katharine Simms to take over her on-line catalogue of Irish Bardic Poetry ([bardic.celt.dias.ie](http://bardic.celt.dias.ie)). This is currently being updated and expanded.

Marie-Luise Theuerkauf gave a seminar for PhD students, University of Notre Dame, Indiana, on 'Exploring the Literary Landscape of Medieval Ireland: Breaking New Ground after the Dissertation'.





School of Cosmic Physics



*Scoil na Fisice Cosmaí*

# Scoil na Fisice Cosmaí

## Réaltfhisic

Cuireadh tús i mbliana le gníomh pleanála comharbachta ag Bord Stiúrtha na Scoile mar ullmhúchán do shraith de dhaoine ag dul ar scor, ag tosú leis an gCeann reatha na Réalteolaíochta agus na Réaltfhisice, Luke Drury, i Meitheamh na bliana 2018. Bhunaigh an Bord tascfhórsa chun scrúdú a dhéanamh ar na roghanna éagsúla atá ar fáil mar ullmhúchán do phróiseas earcaíochta ag tosú in 2017. Idir an dá linn lean an rannóg de bheith antáirgiúil le seachtó trí páipéar foilsithe in irisí móra nó postáilte mar réamhfhoilseacháin (is é polasaí na Rannóige i dtaca le foilsitheoireacht ghlas le rochtain oscailte ná leagan réamhfoilsithe de gach páipéar, atá ar fáil saor in aisce, a phostáil ar arXiv) agus 32 cur i láthair thábhachtacha ag comhdhálacha agus ceardlanna idirnáisiúnta. D'eagraigh Luke Drury dhá cheardlann idirdhisciplíneacha in DIAS mar chuid de thogra arna mhaoiniú ag an gComhairle um Thaighde in Éirinn maidir le heasaontas saineolaithe i gcomhar lena gcomh-phríomhthaighdeoir Maria Baghrmian (Ollamh le Fealsúnacht Mheiriceánach in COBÁC) agus d'eagraigh Jonathan Mackey ceardlann don tionscadal StarBench i Réadlann Dhún Sinche.

**I measc na mbuaicphointí taighde bhí alt san iris mhór le rá *Nature Physics* leis an bpríomhúdar Alessio Caratti o Garatti ó DIAS. Thaispeáin Alessio agus a chomhghleacaithe den chéad uair, maidir leis an bhfoirmiú de réalta óg ollmhór, a mheastar a mais a bheith thart ar fiche oiread na gréine againne, go léiríonn sé rachtanna atá cosúil leis na cinn a fheictear san fhoirmiú ar réalta ar mhais íseal. Tugann sé seo le fios go ndéantar**

réaltaí ollmhóra a fhoirmiú ar bhealach atá an-chosúil le réaltaí ar mhaiseanna ísle trí fhuilleamh dioscathiomáinte agus, go bunúsach, go bhfuil aon phróiseas amháin ann do réaltaí ar mhaiseanna arda agus do réalta ar mhaiseanna ísle araon. Bhí an ibair ag braith ar bhreathnuithe a rinneadh leis an réadlann strataisféarach do réalteolaíocht infridhearg (SOFIA) i gcomhar le hOllscoil Stuttgart chomh maith le breathnuithe ón réadlann Gemini, ó Theileascóp An-Mhór Réadlann Dheisceart na hEorpa agus ó réadlann Calar Alto de chuid Chumann Max Planck. Sampla maith is ea an obair seo, ina raibh réalteolaithe ó Éirinn, ón nGearmáin, ón Ríocht Aontaithe, ón tSile, ó na Stáit Aontaithe agus ón Spáinn páirteach, den chaoi ina gcuirtear cuid mhór de réalteolaíocht na linne seo i gcrích, ag baint úsáide as foirne idirnáisiúnta agus áiseanna breathnaithe iolracha.

Chomh maith le háiseanna atá lonnaithe ar talamh, braitheann réalteolaíocht na linne seo go mór ar bhreathnuithe spásbhunaithe. Tá neart de na codanna tábhachtacha den speictream leictreamaighnéadach, amhail an réimse chian-infridhearg agus X-gha, nach féidir a bhreathnú ach ó os cionn an atmaisféir.

**Buaicphointe taighde eile sa bhliain 2016, a foilsíodh in *Nature* freisin, ab ea an speictream suntasach a d'aimsigh an tsaitilít réadlainne X-gha Sheapánach Hitomi den ghás te i gcroílár na réaltbhraisle Perseus. Bhí Felix Aharonian ó DIAS ar cheann de na heolaithe de chuid Ghníomhaireacht Spáis na hEorpa ag obair ar an misean agus bhí DIAS ina pháirtí sa togra.**

Gné thábhachtach de Hitomi ab ea an scéal gurb í an chéad uair go ndearnadh eagar micrea-bhólaiméadair de bhrathadóirí X-gha a eitilt go rathúil sa spás agus, dá bharr sin, bhí gléine speictreach aige nach raibh a leithéid ann riamh cheana. Is féidir leis nabólaiméadair fuinneamh gach aon fhótóin ar leith a thomhas le cruinneas thart ar 1 pháirt le gach míle. Is leor é seo chun cuardach a dhéanamh don leathnú Doppler de bharr gluaisne ar línte speictreacha X-gha ón ngás te i lár réaltbhraislí má tá an gás i ngluaisne shuaite. Rus suntasach, nach rabhthas ag súil leis, fuarthas amach go raibh an gás sa réaltbhraisle Perseus réasúnta socair. Ar an drochuair, agus díreach i ndiaidh di an breathnú seo a dhéanamh, scrios an tsaitilít í féin mar thoradh ar theip sna córais agus is léir go bhfuil féidirtheachtaí ag baint le micrea-bhólaiméadair do mhisin réalteolaíochta X-gha amach anseo.

Tá DIAS ag glacadh páirt i misin spáis le fada an lá agus ag deireadh na bliana 2016 tháinig deireadh le téarma trí bliana Luke Drury mar chathaoirleach ar an nGrúpa Oibre Réalteolaíochta, ceann de na príomhghrúpaí comhairle laistigh de Ghníomhaireacht Spáis na hEorpa. Ina theannta sin, príomhghníomhaíocht sa rannóg faoi láthair (agus don chéad cúpla bliain eile) is ea obair a bhaineann le MIRI, an Uirlis Lár-Infridhearg, ceann d'ionchuir na hEorpa sa Teileascóp Spáis James Webb, atá le seoladh in 2018. Is comhthaighdeoir é Tom Ray ar an uirlis seo, chomh maith leis an iarratas misin nua leis an nGníomhaireacht Spáis na hEorpa, Ariel.

D'ainneoin atmaisféar an Domhain, tá roinnt réimsí den speictream seachas an réimse optúil inar féidir breathnú a dhéanamh ón talamh, agus is iad an dá shampla is mó an radairéalteolaíocht agus, le déanaí, an réalteolaíocht ardfhuinnimh gáma-gha ag fuinnimh TeV. Tá an rannóg ina comhpháirtí



# School of Cosmic Physics

## Astrophysics

The year saw the start of a succession planning exercise by the Governing Board of the School in anticipation of a series of retirements commencing with that of the current Head of Astronomy and Astrophysics, Luke Drury, in June 2018. The Board established a task force to examine the various options open to it in preparation for a recruitment process starting in 2017. In the meantime the section continued to be very productive with seventy three papers appearing in major journals or posted as preprints (the Section's green open access publishing policy is to post a freely available preprint version of every paper on arXiv) and 32 major presentations at international conferences and workshops. Luke Drury organised two interdisciplinary workshops in DIAS as part of an Irish Research Council funded project on expert disagreement in collaboration with his co-PI Maria Baghramian (Professor of American Philosophy in UCD) and Jonathan Mackey hosted a workshop for the StarBench project in Dunsink Observatory.

**Among the research highlights was an article in the prestigious journal Nature Physics with lead author Alessio Caratti o Garatti from DIAS. Alessio and his co-workers showed for the first time that the formation of a massive young star, estimated to be about twenty times the mass of our sun, exhibits outbursts similar to those seen in low mass star formation.**

This indicates that massive stars form in a very similar way to low mass stars through disc-driven accretion, and that there is essentially one formation process for both high and low mass stars. The work relied on observations made with the Stratospheric observatory for infra-red astronomy (SOFIA) in collaboration with the University of Stuttgart as well as observations from the Gemini observatory, the European Southern Observatory's Very Large Telescope, and the Calar Alto observatory of the Max Planck Society. This work involving astronomers from Ireland, Germany, Italy, UK, Chile, USA and Spain is a good example of how much modern astronomy is done using international teams and multiple observing facilities.

In addition to ground-based facilities, modern astronomy also relies heavily on spacebased observations. Many important parts of the electromagnetic spectrum, such as the far infra-red and the X-ray domain, can only be observed from above the atmosphere.

**Another research highlight of 2016, also appearing in Nature, was the remarkable spectrum obtained by the Japanese X-ray observatory satellite Hitomi of the hot gas at the centre of the Perseus cluster. Felix Aharonian of DIAS was one of the European Space Agency scientists working on the mission and DIAS was a partner in the project.**



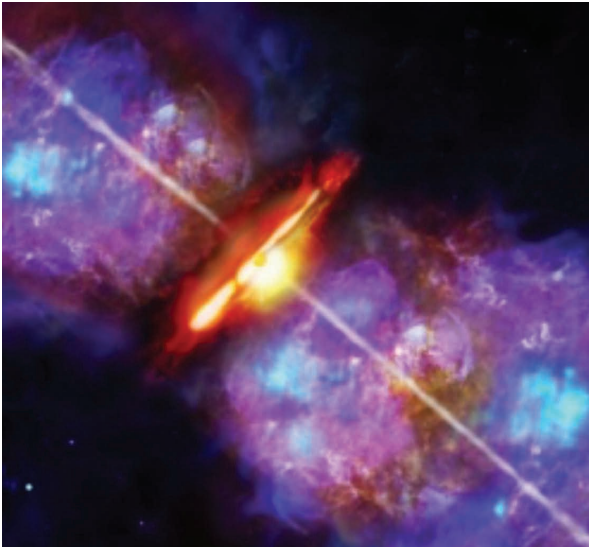
Professor Tim Palmer (Oxford), Evelyn Cusack and Prof. Ray Bates at the Statutory Public Lecture

*An tOll Tim Palmer (Oxford), Evelyn Cusack agus an tOll. Ray Bates Léacht Reachtúil Phoiblí*

A key feature of Hitomi was that it was the first time that a micro-bolometer array of x-ray detectors was successfully flown in space and this gave it unprecedented spectral resolution. The bolometers can measure each individual photon's energy with a precision of about 1 part in a thousand. This is enough to look for the motion-induced Doppler broadening of X-ray spectral lines from the hot gas in the centre of galaxy clusters if the gas is in turbulent motion. Remarkably, and contrary to expectations, the gas in the Perseus cluster turned out to be quite quiescent. Most unfortunately, and immediately after making this observation, the satellite self-destructed due to a systems failure but the potential of micro-bolometers for future X-ray astronomy missions is clear.

DIAS has a long history of participation in space missions and Luke Drury completed at the end of 2016 his three-year term as chair of the Astronomy Working Group, one of the main advisory groups within the European Space Agency. In addition a major activity in the section at the moment (and for the next few years) is work related to MIRI, the Mid Infra-red Instrument, one of the European contributions to the James Webb Space Telescope, due for launch in 2018. Tom Ray is a co-investigator on this instrument as well as in the new mission proposal to the European Space Agency Ariel.

Despite the Earth's atmosphere there are some regions of the spectrum other than the optical where ground-based observing is possible, the two major examples being radio astronomy and, more recently, high-energy gamma-ray astronomy at TeV energies. The section is a partner in the iLOFAR consortium constructing an Irish node of the European low frequency radio



Artist's impression from Deutsches SOFIA Institute press release. Artist's impression of the accretion burst in the high-mass young star S255IR NIRS 3 (Copyright: DSI). [http://www.dsi.uni-stuttgart.de/aktuelles/news/news\\_0056.en.html](http://www.dsi.uni-stuttgart.de/aktuelles/news/news_0056.en.html)

*Imprisean ealaíontóra ó phreasráiteas Deutsches SOFIA Institute. Imprisean ealaíontór ón rois fuillimh sa réalta óg ard-mhaise*

sa chuibhreannas iLOFAR atá ag cruthú nóid na hÉireann den radaiteileascóp ísealmhnicíochta LOFAR i mBiorra. Cuireadh tús le hoibreacha ar an láthair in 2016 agus tá an tsuiteáil beartaithe le bheith ann in 2017. Is é cuibhreannas HESS an príomhchomhoibriú idirnáisiúnta eile ina bhfuil an rannóg ina comhpháirtí le fada an lá, cuibhreannas a oibríonn córas de theileascóip íomháithe atmaisféaracha Cherenkov sa Namaib.

**Rinneadh an córas seo a uasghrádú le déanaí chuig HESS-II le teileascóp mór lárnach breise. Buaicphointe eile sa bhliain ab ea an chéad fhoilsiú de thorthaí ón gcóras uasghrádaithe seo i bhfoirm breathnuithe ar núicléis réaltracha ghníomhacha. Chuidigh mac léinn PhD sa rannóg, Carlo Romoli, leis an bhforbairt ar na huirlisí d'anailís ar shonraí a bhí de dhíth don toradh seo, rud a dhéanann ísliú suntasach ar an tairseach fuinnimh don teicníc íomháithe atmaisféarach Cherenkov.**

Gabhann an rannóg do chlár gníomhach for-rochtana agus rannpháirtíochta leis an bpobal agus oibríonn i ndlúthchomhar le Cumann Réalteolaíochta na hÉireann agus le Cónaidhm Éireannach na gCumann Réalteolaíochta a thugann cúnaimh deonach luachmhar ag ócáidí amhail oícheanta oscailte poiblí i réadlann Dhún Sinche. Fuair Jonathan Mackey deontas beag ó Fhondúireacht Eolaíochta Éireann chun córas de

cheamairí meitéir a shuiteáil i nDún Sinche mar chuid den líonra NEMATODE chun monatóireacht agus athchruthú a dhéanamh ar ruthaig meitéir. Is í an aidhm é seo a úsáid mar fhoinsé d'ábhar léiritheach do chainteanna poiblí agus freisin mar acmhainn teagaisc ar fáil do scoláirí na hidirbhliana.

Is é an tOllamh Tim Palmer, ollamh taighde an Chumainn Ríoga in Ollscoil Oxford, a thug léacht poiblí reachtúil na scoile ar "The Physics of Climate Change: what we know and what we are uncertain about" i gColáiste na Tríonóide an 24 Samhain. Bhí sé mar chuid de thogra idirdhisciplíneach arna mhaoiniú ag an gComhairle um Thaighde in Éirinn maidir le heasaontas saineolaithe idir Luke Drury agus Maria Baghramian (Fealsúnacht, COBÁC) agus mheall sé teach lán de thart ar 400.

### Léaráidí (Pictiúr leath 33)

Imprisean ealaíontóra ó phreasráiteas Deutsches SOFIA Institute. Imprisean ealaíontór ón rois fuillimh sa réalta óg ard-mhaise S255IR NIRS 3 (Cóipcheart: DSI). [http://www.dsi.uni-stuttgart.de/aktuelles/news/news\\_0056.en.html](http://www.dsi.uni-stuttgart.de/aktuelles/news/news_0056.en.html)

Íomhá Chandra den réaltbhraisle Perseus le sonraí a ghlac Hitomi leagtha anuas uirthi. Taispeánann an imlíne oráiste réimse radhairc an SXS. Taispeánann an graif réigiún den speictream lena n-áirítear neart línte astaithe ag iarann agus nicil sa ghás te idir na réaltraí. Is í cúinge na línte seo a thugann le fios nach bhfuil an gás seo an-suaite.

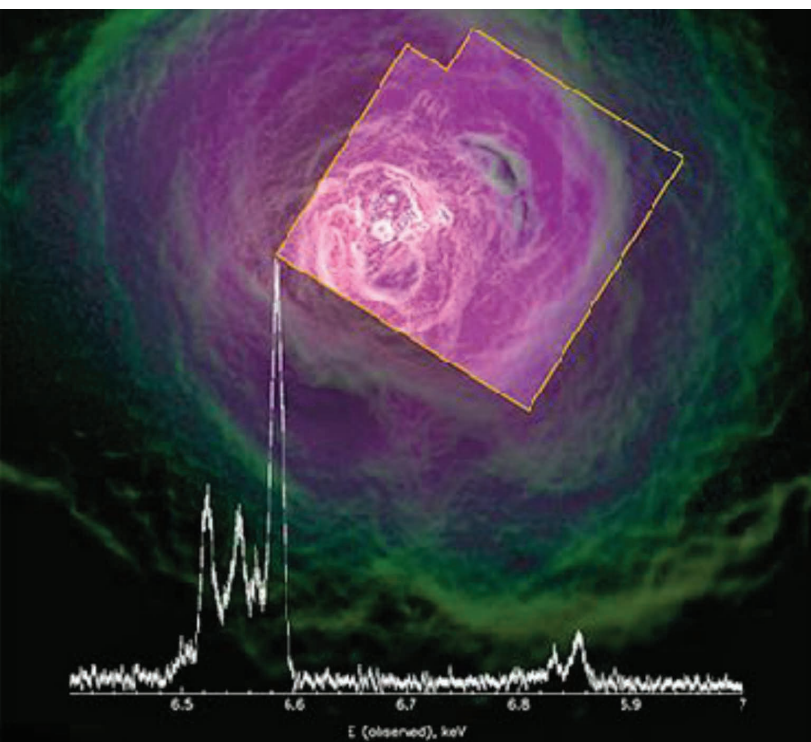
(Léaráid le Hitomi Collaboration/JAXA, NASA, ESA, SRON, CSA)

<http://news.yale.edu/2016/07/06/hitomi-mission-finds-quiet-space-heart-perseuscluster>

### Geoifisic

Le linn 2016 lean an Rannóg Geoifisice de dhul chun cinn a dhéanamh sa táirgeacht taighde, oideachas, tionscnaimh chomhoibríoch nua agus forbairt ar an infreastruchtúr. D'fhoilsigh an rannóg 28 páipéar iomlán piarmheasúnaithe in irisí idirnáisiúnta agus rinne breis agus 100 cur i láthair ag comhdháileacha agus cruinnithe idirnáisiúnta, ar fud an domhain. Síneann na topaicí ó thomhais ón spás ar thionchair shruthlú domhanda an aigéin ar réimse mhaighnéadach an Domhain go dtí íomhánna mionsonraithe de mhaintlín an Domhain, a fuarthas ó thonnta crith talún a taifeadadh ar sheismiméadair ar fud an domhain, sonraí domhantarraingthe agus maignéadacha. Rinne taighdeoirí staidéar freisin ar an tionchar ag stoirmeacha móra atmaisféaracha ar an aigéan domhain agus na próisis gheoifhisice

## School of Cosmic Physics (continued)



<http://news.yale.edu/2016/07/06/hitomi-mission-finds-quiet-space-heart-perseuscluster>

telescope LOFAR at Birr. Site works commenced in 2016 and installation is planned for 2017. The other major international collaboration in which the section has been a long-standing partner is the HESS consortium which operates a system of imaging atmospheric Cherenkov telescopes in Namibia. This system has recently been upgraded to HESS-II with an additional large central telescope.

**Another highlight of the year was the first publication of results from this upgraded system in the form of observations of active galactic nuclei. A PhD student in the section, Carlo Romoli, contributed to the development of the data analysis tools needed for this result which significantly lowers the energy threshold for the imaging atmospheric Cherenkov technique.**

The section pursues an active outreach and public engagement programme and works closely with the Irish Astronomical Society and the Irish Federation of Astronomical Societies who provide invaluable voluntary assistance at events such as public open nights in Dunsink observatory. Jonathan Mackey obtained a small grant from Science Foundation Ireland to install a system of meteor cameras in Dunsink as part of the NEMATODE network to monitor and reconstruct meteor trajectories. The intention is to use this both as a source of illustrative material for public talks and as a teaching resource available to transition year students.

The statutory public lecture of the school was given by Professor Tim Palmer, Royal Society research professor at the University of Oxford, on "The Physics of Climate Change: what we know and what we are uncertain about" in TCD on Nov 24th. It formed part of the IRC-funded interdisciplinary project on expert disagreement between Luke Drury and Maria Baghramian (Philosophy, UCD) and attracted a capacity audience of about 400.

### Illustration (page 33)

Chandra image of the Perseus cluster overlaid with data taken by Hitomi. The orange outline shows the field of view of the SXS. The graph shows a region of the spectrum including many lines emitted by iron and nickel in the hot gas between the galaxies. It is the narrowness of these lines that indicates this gas is not very turbulent.

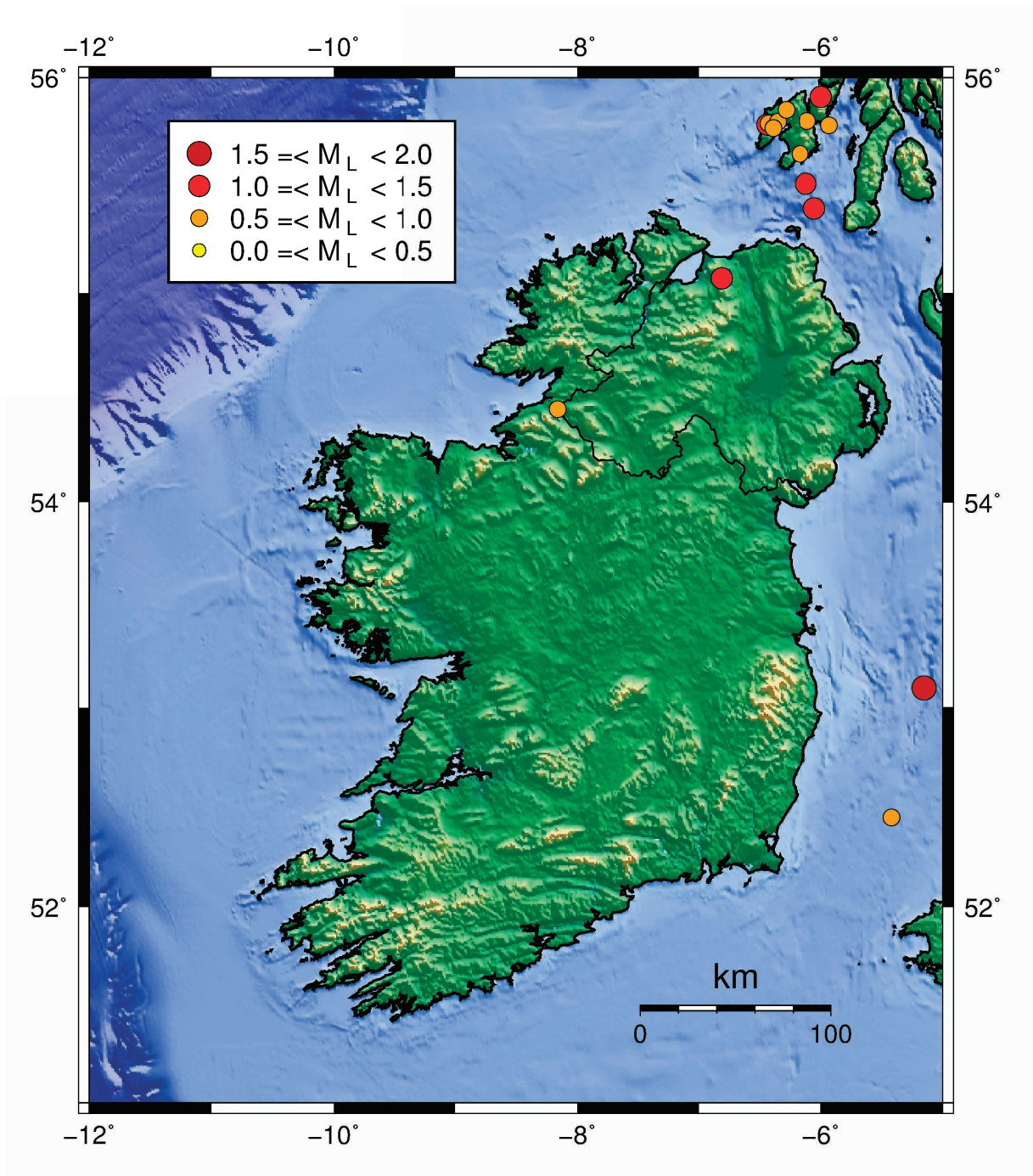
### Geophysics

Throughout 2016 the Geophysics Section continued to make strides in research output, education, new collaborative initiatives and infrastructure development. The section published 28 full peer reviewed papers in international journals and had over 100 presentations at international conferences and meetings, across the world. Topics range from measurements from Space of the effects of global ocean circulation on the Earth's magnetic field to detailed images of the Earth's mantle, obtained from combining earthquake waves recorded on worldwide seismometers, gravity and magnetic datasets.

Researchers also studied the impact on the deep ocean of large atmospheric storms and the long term geophysical processes that lead to the formation of sedimentary basins, offshore Ireland. Through the installation of temporary high density seismic networks, significant advances were also made in our understanding of small earthquake populations in Ireland. We see superb examples of very small earthquakes (usually too small to be felt by humans) repeat slipping in an identical fashion. Hence even in a geographical location with little tectonic activity, there are very interesting dynamic processes at play. These dense networks are also leading to better images of sub-surface geological structure, which has implications for our understanding of how the Earth's crust and its resources formed.

Although DIAS has a remit to focus on fundamental research, nonetheless through the Irish Centre for Research in Applied Geoscience (iCRAG) and collaborations with the Geological Survey, Ireland (GSI) the geophysics section has strengthened its collaboration with industry partners, over the past year. Other fieldwork saw the deployment of Ocean Bottom Seismometers (OBS) in the NE Atlantic; the maintenance of our of bespoke seismic networks

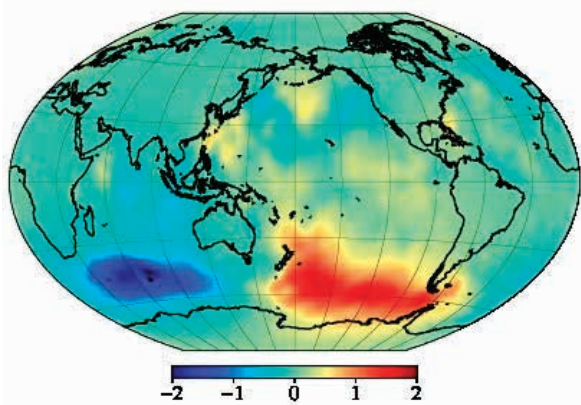




2016 Map of local earthquakes

Léarscáil de chreathanna talún áitiúla 2016

## School of Cosmic Physics (continued)



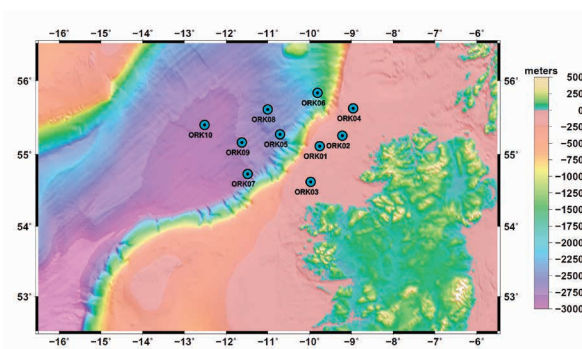
The modelled radial component of the magnetic field (in nT) induced by the wind-driven ocean flow at Swarm satellite altitudes.

*Samhail den chomhpháirt ghatlach den réimse maighnéadach (in nT) ionductaithe ag an sruth aigéin á thiomáint ag an ngaoth ag airdí satailíte Swarm.*



OBS Deployment

*OBS Cur in Úsáid*



OBS Map

*OBS Léarscáil*

in Iceland, and electromagnetic networks on the Azores. These latter deployments both have a focus on volcanoes and both involve strong international collaborations.

**Research highlights include two volcano related publication led by DIAS PhD students, in prestigious journals; Eva Eibl in Nature Geoscience and Johannes Thun in the Scientific Reports. Both papers address the consequence of a weak uppermost crust in volcanic areas for pre-eruptive or syn-eruptive seismic signals and have led to a new understanding of how magma makes its way to the Earth's surface. Other exciting highlights include a recent paper with former DIAS PhD student Andrew Schaeffer as lead author. The paper demonstrates that the Earth's oceanic plates continue to thicken with distance from their ridges, in contradiction to current growth models. The implications are that our current understanding of how plate evolution models work in detail might need to be revisited.**

The section had several new project successes in 2016 but two of note are the €1 million Euro European Space Agency (ESA) award to Zdenek Martenic, Sergei Lebedev and Javier Fulla entitled "3D Earth – A Dynamic Living Planet," and a prestigious Science Foundation Ireland (SFI) award to Javier Fulla deriving from his successful A-rated European Research Council starter (ERC) application.

The infrastructure side saw continuing developments in the Irish National Seismic Network (INSN). These were in both hardware and software and included the development of a new web site ([www.insn.ie](http://www.insn.ie)). Software developments comprised new algorithms and computer codes for better small-earthquake and quarry blast detection in Ireland (we use the quarry blasts for imaging the upper crust). Led by Martin Möllhoff, Mick Smyth Clare Horan and Tom Blake also participated in these INSN developments. Tendering for the Ocean Bottom Seismometer (OBS) iMARL (SFI funded Marine Infrastructure), awarded in 2016, is also complete, with expected delivery of the first tranche of OBSs by end-2017.

The section engaged in educational activities in addition to both academic and public outreach initiatives. Dunsink was the location for the first DIAS week-long Geophysics Undergraduate training module. In collaboration with Chris Bean, Colin Hogg designed and drove the initiative and a total of 21 students from UCD and TCD took the course as part of their undergraduate studies.



## Scoil na Fisice Cosmaí (ar leanúint)

fhadtéarma is cúis le himchuacha dríodair, amach ó chósta na hÉireann. Trí líonraí seismeacha sealadacha ard-dlúis a shuiteáil, rinneadh dul chun cinn suntasach freisin inár dtuiscint ar dhaonraí beaga creathanna talún in Éirinn. Feicimid samplaí iontacha de chreathanna talún an-bheaga (de ghnáth ró-bheag le mothú ag daoine) ag athshleamhnú ar an mbealach céanna. Mar sin, fiú i suíomh geografach nach bhfuil ach beagán gníomhaíochta teicteonacha, bíonn próisis dhinimiciúla an-suimiúla ar siúl. Mar thoradh ar na dlúthlíonraí seo freisin tá íomhánna níos fearr ann de struchtúr geolaíoch faoin dromchla, a bhfuil impleachtaí ann d'ár dtuiscint ar an gcaoi inar cruthaíodh screamh agus acmhainní an Domhain. Cé go bhfuil sainchúram ar DIAS díriú ar bhunthaighde, mar sin féin trí Lárionad na hÉireann um Thaighde sna Geo-eolaíochtaí Feidhmeacha (iCRAG) agus comhoibriú leis an Suirbhéireacht Gheolaíochta Éireann (GSI) neartaigh rannóg na geoifisice a chomhoibriú le comhpháirtithe tionscail, i rith na bliana seo a chuaigh thart. In obair allamuigh eile cuireadh Seismiméadair Bhun an Aigéin (OBS) san Atlantach Thoir-Thuaidh; rinneadh cothabháil ar ár líonraí seismeacha saincheaptha san Íoslainn, agus líonraí leictreamhaighnéadacha sna hAsóir. Díríonn na himlonnaithe deiridh sin ar bholcáin agus bíonn comhoibriú láidir idirnáisiúnta i gceist leo araon.

**Áiríonn na buaicphointí taighde dhá fhoilseachán a bhaineann le bolcáin á stiúradh ag mic léinn PhD de chuid DIAS, in irisí móra le rá; Eva Eibl i *Nature Geoscience* agus Johannes Thun i *Scientific Reports*. Pléann an dá pháipéar leis an toradh a bhíonn ar screabh lag uachtarach i limistéir bolcáine do chomharthaí seismeacha réamhbhrúchtacha nó sionbhrúchtacha agus mar thoradh orthu sin tá tuiscint nua ann ar an gcaoi ina dtagann magma go dromchla an Domhain. I measc na mbuaicphointí eile bhí páipéar le déanaí ina raibh iar-mhac léinn PhD DIAS Andrew Schaeffer ina phríomhúdar. Léiríonn an páipéar go leanann plátaí teicteonacha an Domhain ag éirí tiubh le fad óna n-íomairí, i mbréagnú ar shamhlacha fáis reatha. Is iad na himpleachtaí ná go mb'fhéidir go mbeidh gá le hathbhreithniú a dhéanamh ar ár dtuiscint reatha ar an gcaoi ina n-oibríonn samhlacha forbartha plátaí go mionsonrach.**

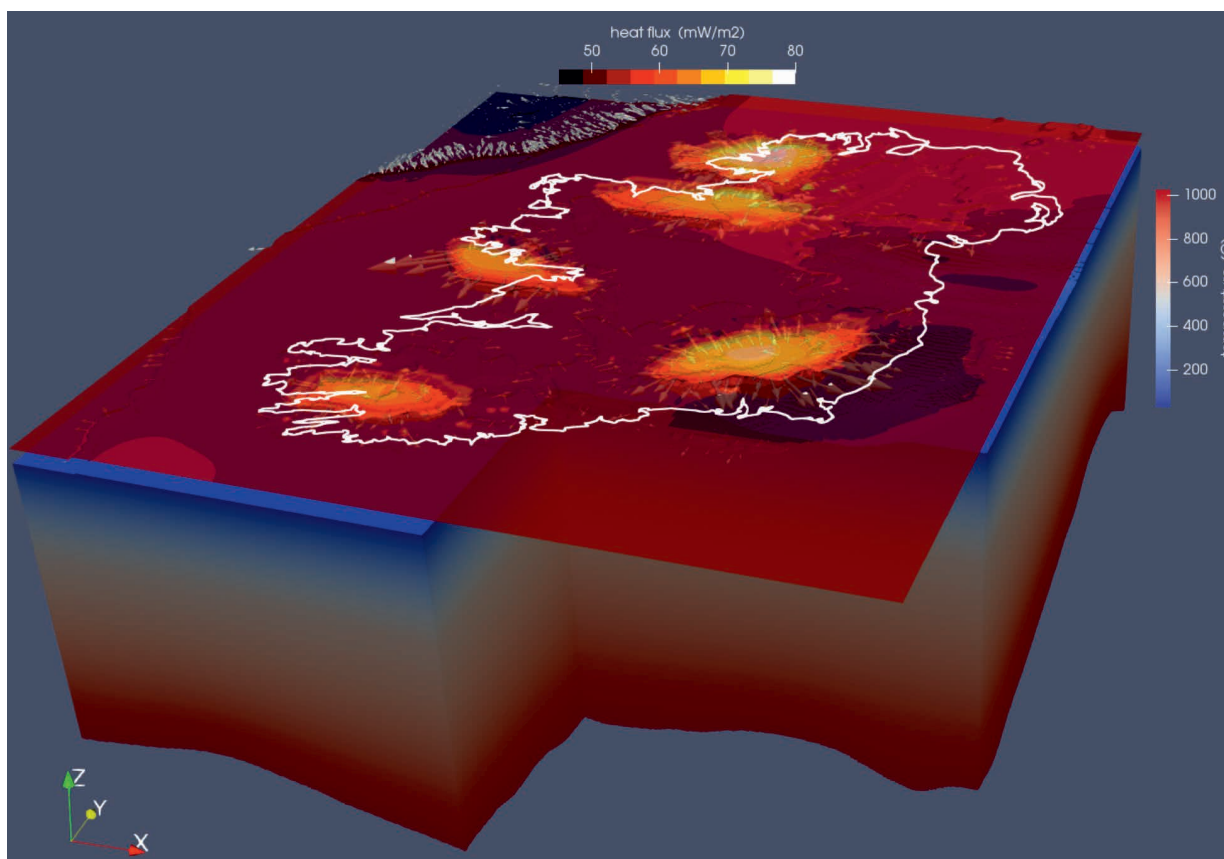
Bhí rath ar roinnt tionscadal ag an rannóg in 2016 ach dhá cheann is fiú a nótaíl is ea an dámhachtain €1 milliún ó Ghníomhaireacht Spáis na hEorpa (ESA) le Zdenek Martenic, Sergei Lebedev agus Javier Fulla dar teideal “3D Earth – A Dynamic

Living Planet,” agus dámhachtain mheasúil ó Fhondúireacht Eolaíochta Éireann (SFI) le Javier Fulla ag eascairt as a iarratas tosaigh rathúil leis an gComhairle Eorpach um Thaighde (ERC) a fuair gradam A.

Ar thaobh an infreastruchtúir de, rinneadh forbairtí leanúnacha i Líonra Seismeach Náisiúnta na hÉireann (INSN). Bhain siad seo le cru-earraí agus le bogearraí agus d'áirigh siad an fhorbairt ar shuíomh gréasáin nua ([www.insn.ie](http://www.insn.ie)). D'áirigh na forbairtí bogearraí algartaim agus cóid ríomhaire nua do bhrathadóireacht níos fearr de chreathanna talún agus pléascanna cairéil in Éirinn (bainimid úsáid as na pléascanna cairéil chun samhlú ar an screabh uachtarach). Faoi cheannas Martin Möllhoff, ghlac Mick Smyth, Clare Horan agus Tom Blake páirt sna forbairtí INSN seo freisin. Tá an tairiscint don infreastruchtúr iMARL Seismiméadair Bhun an Aigéin (OBS) (Infreastruchtúr Mara arna mhaoiniú ag SFI) curtha i gcrích freisin, agus samhlaítear go seachadfar an chéad bheart de OBSann faoi dheireadh na bliana 2017.

Ghabh an rannóg do ghníomhaíochtaí oideachais chomh maith le tionscnaimh for-rochtana acadúla agus poiblí freisin. Is i nDún Sinche a eagraíodh an chéad modúl oiliúna seachtaine de chuid DIAS do bhunchéimithe Geoifisice. i gcomhar le Chris Bean, is é Colin Hogg a rinne an tionscnamh a dheardh agus a mhaoirsiú agus ghlac 21 mac léinn ó COBÁC agus Coláiste na Tríonóide an cúrsa mar chuid dá staidéar fochéime. Bhí Chris Bean ina oiliúnóir freisin ar Scoil Ardoiliúna do Sheismeoilaíocht Spleách ar Am (TIDES) maoinithe ag gníomh COST an AE i Sesimbra sa Phortaingéil. Sa bhliain 2016 d'eagraigh an rannóg ceithre cheardlann idirnáisiúnta, agus b'í an ceann ba shuntasá an ócáid CTBTO ar an gcomóradh 20 bliain ó síníodh an Conradh um Chosc ar Thrialacha Núicléacha. Is é Tom Blake a rinne comhordú ar an ócáid fhíor-rathúil seo. D'eagraigh Brian O'Reilly ceardlann freisin dírithe ar an tionscal maidir le bunú imchuach dríodair. Gníomhaigh an Clár Infreastruchtúir Peitriam (PIP) mar éascaitheoir. D'eagraigh Volker Rath ceardlann ag GSI maidir le 'Airborne Electromagnetic Data Inversion Toolbox' a forbraíodh le déanaí. I measc na ngníomhaíochtaí um fhor-rochtain phoiblí bhí idirghníomhaíochtaí Tom Blake sna meáin maidir le creathanna talún tábhachtacha (go háirithe san Iodáil), cuir i láthair i meánscoileanna ag Chris Bean a chomhoibrigh freisin ar chlár raidió Lyric FM leis an ealaíontóir Siobhan McDonald maidir leis an ngaol idir seismeoilaíocht agus ceol. Agus obair shuntasach ullmhúcháin déanta ag Clare





3D temperature distribution in Ireland, with surface heat flow on top from integrated geophysical-petrological modelling using a highly scalable adaptive grid.

*Dáileadh teochta 3T in Éirinn, le sruth teasa dromchla ar barr ó mhacasamhlú comhtháite geofisiceach-peitreoilíoch ag baint úsáide as greille oiriúnaitheach ard-inscálaithe.*

Chris Bean was also a trainer on a Time Dependent Seismology (TIDES) EU COST action Advanced Training School, Sesimbra, Portugal.

In 2016 four international workshops were organised by the section, the most notable being the CTBTO event on the 20th Anniversary of the signing of the Nuclear Test Ban Treaty. This highly successful event was coordinated by Tom Blake.

Brian O'Reilly also ran an industry facing workshop on sedimentary basin formation. The Petroleum Infrastructure Programme (PIP) acted as facilitator. Volker Rath ran a workshop at the GSI on a recently developed 'Airborne Electromagnetic Data Inversion Toolbox'. Public outreach activities included Tom Blake's media interactions on earthquakes of note (especially in Italy), presentations in Secondary Schools by Chris Bean who also collaborated in a Lyric FM radio programme with artist Siobhan McDonald on relationships between seismology and music.

Following significant preparatory work by Clare Horan we opened the doors of 5 Merrion Square for Culture night and a fusion of talks, posters and streamed seismic data. It was a resounding success. People lined the street to enter the building. Due to limited capacity, numbers were eventually capped at 172 people but those who did manage to get in seemed very pleased with the experience.

## *Scoil na Fisice Cosmaí (ar leanúint)*

Horan, d'osclaíomar na doirse in uimhir 5 Cearnóg Mhuirfean don Oíche Chultúir agus meascán de chainteanna, de phóstaeir agus de shonraí seismeacha sruthaithe. Bhí rath iontach uirthi. Bhí scuaine sa tsráid chun dul isteach. Sa deireadh thiar thall, mar thoradh ar acmhainní teoranta, níor ligeadh isteach ach 172 duine ach is cosúil gur bhain na daoine sin an-taitneamh as an ócáid.



The Geophysics Undergraduate Training Field School

*Scoil Allamuigh*

## PUBLICATIONS ASTRONOMY AND ASTROPHYSICS 2016

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$$\langle \varphi_n | a | \varphi_n \rangle = \sqrt{n} \delta_{n,n-1}$$

$$\langle \varphi_n | a^\dagger | \varphi_n \rangle = \sqrt{n+1} \delta_{n,n+1}$$

$$\langle \varphi_n | X | \varphi_n \rangle = \sqrt{\frac{\hbar}{2m\omega}} [\sqrt{n+1} \delta_{n,n+1} + \sqrt{n} \delta_{n,n-1}]$$

$$E = \frac{1}{2} M g L \theta$$

$$-\frac{\hbar^2}{2m} \frac{d^2 \psi}{dx^2} = E \psi(x)$$

$$\langle \varphi_n | P | \varphi_n \rangle = i \sqrt{\frac{\hbar}{2m\omega}} [\sqrt{n+1} \delta_{n,n+1} - \sqrt{n} \delta_{n,n-1}]$$

$$\hat{P} = \frac{1}{\sqrt{m\hbar\omega}} \hat{P}$$

$$\hat{H} = \frac{1}{2} \hat{P}^2 + \frac{1}{2} m \omega^2 \hat{X}^2$$

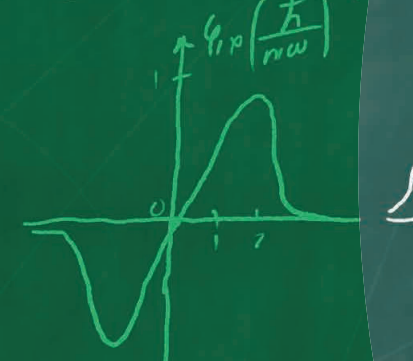
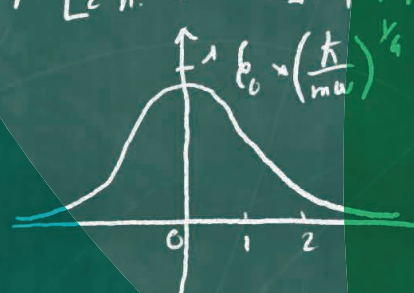
$$\langle \varphi_n | \varphi_n \rangle = \frac{1}{n!} \left( \frac{m\omega}{\hbar} \right)^{n/2} \langle \varphi_0 | a^\dagger^n | \varphi_0 \rangle$$

$$(a) = \begin{bmatrix} 0 & \sqrt{1} & 0 & 0 & \dots & \dots \\ 0 & 0 & \sqrt{2} & 0 & \dots & \dots \\ 0 & 0 & 0 & \sqrt{3} & \dots & \dots \\ \vdots & \vdots & \vdots & \vdots & \ddots & \vdots \\ 0 & 0 & 0 & 0 & 0 & \sqrt{n} \\ \vdots & \vdots & \vdots & \vdots & \vdots & \vdots \end{bmatrix}$$

$$(a^\dagger) = \begin{bmatrix} 0 & 0 & 0 & 0 & \dots & \dots \\ \sqrt{1} & 0 & 0 & 0 & \dots & \dots \\ 0 & \sqrt{2} & 0 & 0 & \dots & \dots \\ 0 & 0 & \sqrt{3} & 0 & \dots & \dots \\ 0 & 0 & 0 & \sqrt{4} & \dots & \dots \\ 0 & 0 & 0 & 0 & 0 & \sqrt{n} \\ \vdots & \vdots & \vdots & \vdots & \vdots & \vdots \end{bmatrix}$$

$$\varphi_0(x) = \langle x | \varphi_0 \rangle = \left( \frac{m\omega}{\pi\hbar} \right)^{1/4} e^{-\frac{1}{2} \frac{m\omega}{\hbar} x^2}$$

$$\varphi_n(x) = \left[ \frac{1}{2^n n!} \left( \frac{\hbar}{m\omega} \right)^{n/2} \right]^{1/2} \left( \frac{m\omega}{\pi\hbar} \right)^{1/4} \left[ \frac{m\omega}{\hbar} x - \frac{d}{dx} \right]^n e^{-\frac{1}{2} \frac{m\omega}{\hbar} x^2}$$



$$[a, a^\dagger] = \frac{1}{2} [\hat{X} + i\hat{P}, \hat{X} - i\hat{P}]$$

$$= \frac{i}{2} [\hat{X}, \hat{P}] - \frac{i}{2} [\hat{P}, \hat{X}]$$

$$[a, a^\dagger] = 1$$

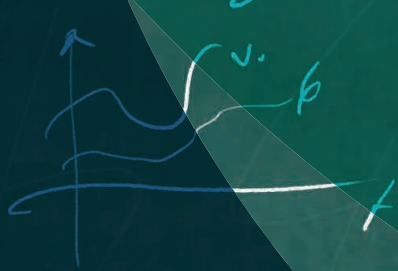
$$= \frac{1}{2} (\hat{X} - i\hat{P})(\hat{X} + i\hat{P}) + \frac{1}{2}$$

$$E = mc^2$$

$$\frac{1}{2m} \langle P^2 \rangle = -\frac{\hbar^2}{2m} \int_{-\infty}^{+\infty} \varphi_n^*(x) \frac{d^2}{dx^2} \varphi_n(x) dx$$

$$n+1 | \varphi_{n+1} \rangle$$

$$n | \varphi_n \rangle$$



$$i\hbar \frac{\partial}{\partial t} \Psi(\vec{r}, t) = -\frac{\hbar^2}{2m} \Delta \Psi(\vec{r}, t)$$

$$\Delta = \frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2} + \frac{\partial^2}{\partial z^2}$$

$$a^\dagger | \varphi_{n-1} \rangle = \frac{1}{\sqrt{n}} (a^\dagger a + 1) | \varphi_{n-1} \rangle$$

$$| \varphi_n \rangle$$

$$\lambda_1 | \varphi_1 \rangle + \lambda_2 | \varphi_2 \rangle \Rightarrow \lambda_1^* \langle \varphi_1 | + \lambda_2^* \langle \varphi_2 |$$



School of Theoretical Physics



*Scoil na Fisice Teoiriciúla*



# Scoil na Fisice Teoiriciúla

## Taighde

Mar a rinne sna blianta roimhe, d'oibríomar ar fhaisnéis agus ríomhaireacht chandamach ar lámh amháin agus ar bhunstruchtúr spásama agus ábhair ar an lámh eile. Sa chéad treo, má thuigtear an fhisic is cinnte go mbeifear ábalta í a úsáid ar scála mór, sa dara treo déantar fiosrú faoi bhunstruchtúir anaithnid na cruinne. Bítear ag súil go dtarlóidh struchtúir ghaomhara sa dá threo. Go deimhin, sampla is ea an léirmheas 'Majorana Fermions in Particle Physics, Solid State and Quantum Information' le Leron agus M. J. Duff, Nollaig 2016, den aontas bunaidh san fhisic agus baineann sé lenár réimsí taighde go léir. Mar shampla, rinne Charles Nash agus Denjoe O'Connor staidéar ar fhermióin scoite Majorana, foirmlithe mar dhéimhíir ar ghraif.

D'fhoilsigh Tony Dorlas in éineacht lena iar-mhac léinn Ciara Morgan saothar ar tharchur faisnéise candamaí trí chainéil thorannacha.

**Tá ráta criticiúil ar féidir rátaí earráide beaga sa dhíchódú a dhéanamh beag faoina bhun, i bprionsabal. Rinne Ciara agus Tony anailís ar cad a tharlaíonn má dhéantar iarracht faisnéis a tharchur ar ráta níos tapúla. An féidir an ráta earráide a theorannú go codán seasta, ar a laghad? Thaispeáin siad nach bhfuil sé seo indéanta maidir le rang mór de chainéil candamacha (le hairíonna cuimhne Markovian).**

Maidir le fisic cháithníní agus domhantarraingt chandamach, is í teoiric na dtéad agus a síneadh nádúrtha go scannáin an réiteach is mó atá chun tosaigh, cé go bhfuil gá le tús nua mar thoradh ar an easpa fianaise ar shárshiméadracht ag fuinnimh LHC.

Níl foirmlíú deifínideach ann fós ar theoiric shínithe na dtéad, ach tá cuma mhaith ar shamhail chur chuige mairíse. Is topaic mhór í seo i ngrúpa Denjoe O'Connor. **i gceithre pháipéar, dhá cheann scríofa ag Yuhma Asano, Veselin Filev, Samuel Kováčik agus Denjoe, ceann amháil ag Veselin agus Denjoe agus ceann amháin ag Yuhma agus comhoibríthe Seapánach, léiríodh go bhfeidhmíonn cuir síos sa tsamhail mairíse ar 4-bráinní agus 5-bráinní mar a bheifí ag súil leo. Dearbhaíonn na hairimh freisin an choibhéis le teoiric domhantarraingthe le déacht holagrafach.**

Baineann cuid mhór den obair úsáid iomlán agus ríachtanach as na hacmhainní ríomhaireachta in DIAS.

Lean Samuel freisin den obair ar aonpholaigh mhaighnéadacha sa mheicnic chandamach neamhchómhalartach a bhí tosaithe aige roimh theacht go DIAS dó. i gceann dá dhá pháipéar



Prof. Werner Nahm, Prof. Sinéad Ryan, Prof. Arthur Jaffe (University of Harvard), Lecture "Beauty and Truth in Mathematics and Physics" May 2016

*An tOll Werner Nahm, an tOll Sinéad Ryan, an tOll Arthur Jaffe (Harvard), ag tabhairt léacht dár teideal "Beauty and Truth in Mathematics and Physics" 2016 Bealtaine*

comhfhreagracha d'áitigh sé gur chóir na haonpholaigh seo a mheas mar iarrthóir don damhna dorcha atá i réim i ndomhantarraingt na réaltraí.

Lean Yuhma Asano dá staidéar freisin ar na dinimicí anordúla i spás AdS, le comhghleacaithe ó Ollscoil Kyoto. D'fhoilsigh siad sampla nua, ina bhfuil dífhoirmiú de chineál tonn-bráine ar an méadracht AdS. Is minic a bhaineann áirimh i dteoiric na réimse candamaí úsáid as spásam scoite ina bhfuil pointí aonraithe eagraithe ar ghraif. B'fhéidir gur uirlis theicniúil a bhbeidh anseo, mar atá i dteoiric an tomhais laitise nó iarracht ar chur síos ar bhunfhisic. Le neart blianta anuas bhí suim ag Denjoe sa dá ghné. Luadh cheana an obair ar dhéimhíir ar ghraif le Charles Nash a foilsíodh sa bhliain 2016.

Féachann clár taighde Leron Borsten le cur síos a sholáthar ar dhomhantarraingt shárshiméadrach mar chineál tairge de dhá theoiric tomhais. Faoi láthair is dearcadh nua é seo ar an bhfisic aithnid, ach b'fhéidir go mbeidh struchtúir níos bunúsaí mar thoradh air.

**Sa bhliain 2016 d'fhoilsigh sé féin agus a chomhghleacaithe páipéar a thaispeáin go bhféadfaí teoiricí éagsúla sárdhomhantarraingthe a fháil trí leasuithe beaga ar na tosca céanna. Tá an réimse bhósónach chéanna ag na teoiricí, ach is deacair iad a nascadh le cur chuige ar bith eile.**

# School of Theoretical Physics

## Research

As in previous years, we worked on quantum information and computing on one hand and on the fundamental structure of spacetime and matter on the other. In regard to the first, understanding of the physics will certainly lead to large-scale applications, the second one explores unknown basic structures of the universe. One expects the occurrence of related structures along both ways. The review 'Majorana Fermions in Particle Physics, Solid State and Quantum Information' by Leron and M. J. Duff, December 2016, exemplifies the underlying unity of physics and concerns all of our research areas. For example, discretized Majorana fermions, formulated as dimers on graphs were studied by Charles Nash and Denjoe O'Connor.

Work on the transmission of quantum information through noisy channels was published by Tony Dorlas together with his former student Ciara Morgan.

**There is a critical rate below which small error rates of decoding can in principal be made arbitrarily small. Ciara and Tony analysed what happens if one tries to transmit information at a faster rate. Can one at least limit the error rate to a fixed fraction? They showed that for a large class of quantum channels (with Markovian memory properties) this is not possible.**

For particle physics and quantum gravity, string theory and its natural extension to membranes is still the leading candidate, though the absence of evidence for supersymmetry at LHC energies requires a fresh start.

A definitive formulation of extended string theory does not exist yet, but a matrix-model approach is promising. This is a major topic in Denjoe O'Connor's group.

**In four papers, two authored by Yuhma Asano, Veselin Filev, Samuel Kováčik and Denjoe, one by Veselin and Denjoe and one by Yuhma and Japanese collaborators it was shown that the matrix-model descriptions of 4-branes and 5-branes work as expected. The calculations also confirm the equivalence to a gravity theory by holographic duality.**

Much of the work makes full and essential use of the computing capacities at DIAS.

Samuel also continued work on magnetic monopoles in non-commutative quantum mechanics he had started before coming to DIAS. In one of his two corresponding papers he argued that these monopoles should be considered as a candidate for the dark matter that dominates the gravity of galaxies.

Yuhma Asano also continued his study of the chaotic dynamics in AdS space, with colleagues from Kyoto University. They published a new example, which consists of a brane-wave type deformation of the AdS metric. Calculations in quantum field theory often make

use of a discretized spacetime consisting of isolated points organized in a graph. This may be a technical tool as in lattice gauge theory or an attempted description of fundamental physics. For many years Denjoe has been interested in both aspects. Work on dimers on graphs with Charles Nash and published in 2016 has already been mentioned.

Leron Borsten's research program aims at a description of supersymmetric gravity as a kind of product of two gauge theories. At present this is a new perspective on known physics, but it may lead to more fundamental structures.

**In 2016 Borsten and co-workers published a paper which demonstrated that different supergravity theories can be obtained by slight modifications of the same factors. The resulting theories share the same bosonic sector, but are hard to relate by any other approach.**

**Marianne Leitner and W. Nahm develop approaches to calculate conformally invariant quantum field theories on arbitrary Riemann surfaces, using methods from algebraic geometry. In 2016 (they) worked out the relation with the alternative approach of Mason and Tuite that uses gluing of surfaces along cuts.**

The combination of both methods should yield further insights.

**Brian Dolan has developed a thermodynamic approach to supersymmetric gauge theories. By holographic duality these theories are related to black holes on Anti-deSitter (AdS) space.**

AdS black holes can be studied by thermodynamics (Hawking radiation etc.). In particular, one can study their response to changes of the cosmological constant. By duality this is related to the isothermal compressibility of the gauge theories. In 3,4, and 6 dimensions one finds critical points in their phase diagram with calculable thermodynamical properties.

**Tigran Tchrakian and co-workers studied charged black holes in AdS space. When the charges come from a nonabelian gauge theory, the black hole can become unstable. In work published in 2016, they showed that this can happen in flat space too, if the gauge group is large enough and certain extra interactions are present.**

W. Nahm continued his work on ancient chronology with the aim to understand the reaction of societies to major climate changes. The chronology of Mesopotamia is settled after a century of controversies. It can be used to fix the chronology of Egypt too, but the work is not yet ripe for a definitive publication. Nahm also directed a working group on palaeogenetics, linguistics and archaeology in the context of the Mainz academy. A first result is a definitive trade link between Anatolia and tin production in Kazakhstan under the control of early Iranians, starting in the 20th century B.C.

## Scoil na Fisice Teoiriciúla (ar leanúint)

Forbraíonn Marianne Leitner agus W. Nahm cuir chuige chun teoiricí réimse candamaí atá do-athraitheach go comhfhoirmiúil a ríomh ar dhromchlaí Riemann treallacha, ag baint úsáide as modhanna ó chéimseata ailgéabrach. Sa bhliain 2016 d'oibrigh siad amach an gaol le cur chuige roghnach Mason agus Tuite a bhaineann úsáid as gliúáil ar dhromchlaí feadh gearrthacha. Ba chóir go bhfaighfí tuilleadh léargas tríd an dá mhodh a nascadh.

Tá cur chuige teirmidinimiciúil forbarth ag Brian Dolan i dtaca le teoiricí tomhais sárshiméadracha. Trí dhéacht holagrafach tá na teoiricí seo gaolta le dúphoill ar spás Anti-deSitter (AdS).

Is féidir staidéar ar dhéanamh ar dhúphoill AdS trí theirmidinimic (radaíocht Hawking etc.). Go háirithe, is féidir staidéar a dhéanamh ar a bhfreagairt d'athruithe ar an tairiseach cosmeolaíoch. Le déacht tá sé seo gaolta le hin-chomhbhrúiteacht iseirmeach na dteoiricí tomhais. I ndiminsin 3, 4, agus 6 aimsítear pointí criticiúla ina bpsléaráid le hairíonna teirmidinimiciúla inríofa.

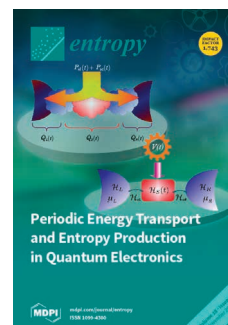
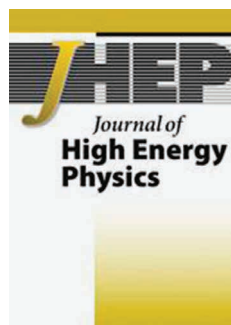
Rinne Tigran Tchrakian agus comhghleacaithe staidéar ar dhúphoill luchtaithe i spás AdS. Nuair a thagann na luchtanna ó theoiric tomhais neamhaibéalacha, féadfaidh an dúpholl éirí míshocair. I saothar a foilsíodh sa bhliain 2016 thaispeáin siad go bhféadfaidh sé seo tarlú sa spás réidh freisin, má tá an grúpa tomhais mór a dhóthain agus má tá idirghníomhaíochtaí áirithe breise i láthair.

Lean W. Nahm dá obair ar croineolaíocht ársa d'fhonn tuiscint a fháil ar an bhfreagairt ag sochaithe ar mhórathruithe aeráide. Tá croineolaíocht na Measpatáime socraithe tar éis céad bliain de chonspóidí. Is féidir í a úsáid chun croineolaíocht na hÉigipte a shocrú freisin, ach níl an saothar aibí go leor le foilsiú fós. Rinne Nahm stiúradh freisin ar ghrúpa oibre ar phailéigineolaíocht, teangeolaíocht agus seandálaíocht i gcomhthéacs acadamh Mainz. Toradh tosaigh is ea nasc cinnte trádála idir an Anatóil agus táirgeadh stáin sa Chasacstáin faoi smacht Iaránach luath, ag tosú sa 20ú haois RC.



Prof. Sheila Rowan (University of Glasgow). Lecture "Gravitational waves: A new Astronomy" November 2016

An tOll Sheila Rowan (University of Glasgow), ag tabhairt léacht dár teideal "Gravitational waves: A new Astronomy" Samhain 2016



Theoretical Physics Journals

Irisí Fisice Teoiriciúla



## PUBLICATIONS 2016

### Papers published in refereed journals

1. **O'Connor, D.** and **Filev, V. G.** (2016) "The BFSS Model on the Lattice", *JHEP* 1605 167.
2. **O'Connor, D.** and **Filev, V. G.** (2016) "A Computer Test of Holographic Flavour Dynamics", *JHEP* 1605 122.
3. **Asano, Y.**, Kyono, H. and Yoshida, K. (2016) "Melnikov's Method in String Theory", *JHEP* 1609 103.
4. Anastasiou, A., **Borsten, L.**, Hughes, M. J. and Nagy, S. (2016) "Global Symmetries of Yang-Mills Squared in Various Dimensions", *JHEP* 1601 148.
5. **Dolan, B.** (2016) "Pressure and Compressibility of Conformal Field Theories from the AdS/CFT Correspondence", *Entropy* 18.
6. Rasmussen, M., Ricaud B. and **Savoie, B.** (2016) "On the Optical Properties of Carbon Nanotubes-- Part I. A General Formula for the Dynamical Optical Conductivity", *J. Math. Phys.* 57 021901.
7. Radu, E., **Tchrakian, D. H.** and Yang, Y. (2016) "Non-Abelian Clouds Around Reissner-Nordstrom Black Holes: the Existence Line", *Phys. Rev D* 93 124069.

### Papers published in conference proceedings and edited works

1. **O'Connor, D.** and **Filev, V. G.** (2016) "Membrane Matrix Models and Non-perturbative Checks of Gauge/Gravity Duality": Proceedings of the Corfu Summer Institute 2015, 1-27 Sept. 2015, Corfu, Greece. *Proceedings of Science* 111.
2. **Borsten, L.** and Duff, M. J. (2016) "Majorana Fermions in Particle Physics, Solid State and Quantum Information": Proceedings of the Erice International School of Subnuclear Physics, 53rd Course: "The Future of Our Physics Including New Frontiers", 24 June-3 July 2015, Erice, Italy.

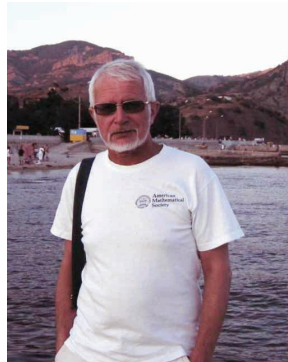
### Preprints (unpublished articles)

1. Radu, E., **Tchrakian, D. H.** and Yang, Y. (2016) "Non-Abelian Clouds Around Reissner-Nordstrom Black Holes: the Existence line".
2. **Dorlas, D C.** and Morgan, C. (2016) "The Strong Converse Theorem for the Product-state Capacity of Quantum Channels with Ergodic Markovian Memory".
3. **O'Connor, D.** and **Filev, V. G.** (2016) "Membrane Matrix Models and Non-perturbative Checks of Gauge/Gravity Duality".
4. **Asano, Y.**, **Filev, V. G.**, **Kovacic, S.** and **O'Connor, D.** (2016) "The Flavoured BFSS Model at High Temperature".
5. **Dolan, B.** (2016) "Pressure and Compressibility of Conformal Field Theories from the AdS/CFT Correspondence".
6. **Asano, Y.**, Kyono, H. and Yoshida, K. (2016) "Melnikov's Method in String Theory".
7. Anastasiou, A., **Borsten, L.**, Duff, M. J., Hughes, M. J., Marrani, A., Nagy, S. and Zoccall, M. (2016) "Twin Supergravities from Yang-Mills Squared".
8. **Kovacic, S.** (2016) "Noncommutativity Inspired Black Holes as Dark Matter Candidate".
9. **Borsten, L.** and Duff, M. J. (2016) "Majorana Fermions in Particle Physics, Solid State and Quantum Information".
10. **Kovacic, S.** and Presnajder, P. (2016) "Magnetic Monopoles in Noncommutative Quantum Mechanics".
11. **Nash, C.** and **O'Connor, D.** (2016) "Dimer Geometry, Amoebae and a Vortex Dimer Model".
12. **Asano, Y.**, **Filev, V. G.**, **Kovacic, S.** and **O'Connor, D.** (2016) "A Computer Test of Holographic Flavour Dynamics II".
13. **Asano, Y.**, Ishiki, G., Shimasaki, S. and Terashima, S. (2016) "On the Transverse M5- Branes in Matrix Theory".

## Some of the International Visitors to Theoretical Physics in 2016



Alessio Marrani  
Padua University, Italy



Alexei Rebenko  
Institute of Mathematics,  
Kiev



Arthur Lipstein  
Durham University



Aybike Özer  
Istanbul Technical  
University



Badis Ydri  
Annaba University, Algeria



Bei-Lok Hu  
University of Maryland



David Evans  
Cardiff University



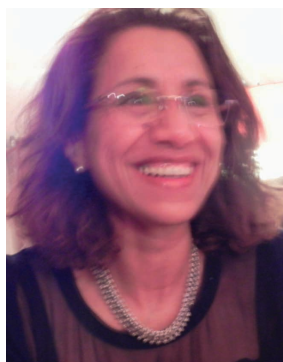
David Turton  
University of Paris-Saclay



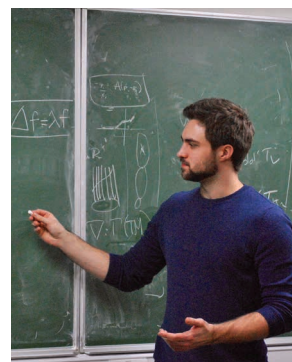
Dionigi Benincasa  
International School of  
Advanced Studies, Trieste



Eugen Radu  
Aveiro University, Portugal



Fatima Laytimi  
Lille University



Ian Jubb  
Imperial College, London



Juraj Tekel  
Comenius University,  
Bratislava

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Malcolm Perry  
University of Cambridge

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Paul Feehan  
Rutgers University,  
New Jersey

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Sachin Vaidya  
Indian Institute of  
Science, Bangalore

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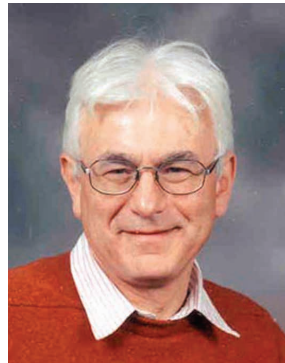
Surya Sumati  
Raman Research Institute,  
Bangalore

---



Xavier Marti  
University of Tours, France

---



Yuri Suhov  
Penn State University

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# DIAS Staff

## Council of DIAS

### Chairman

V. Cunnane

### Ex-Officio Members

A. Deeks, President, UCD

P. Prendergast, Provost, TCD

M. Daly, President, RIA

### Members Appointed by the Governing Boards of Constituent Schools

G. Wrixon

A. Jaffe

A. Ahlqvist

W. Nahm

L. Breatnach

L. Drury

## 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

A. Watson

J. Bell Burnell

K. Verbruggen

L. Maraschi

## Administrative Staff of DIAS 2016

### Registrar

Cecil Keaveney

### Finance Officer

Grace Forkin

### Senior Administrative Officer

Mary Burke

### Assistant Finance Officer

Ronan Byrne

### Clerks

Margaret Loughman (to 31 December)

Helena Moynihan

Edmond Barrett

Mary Brennan

### Head of IT

Dmitri Grigoriev

### Senior Systems Administrator

Jean-François Bucas

### Systems Administrator

Philippe Grange

### Support Staff

Patricia McDonald (to 15 March)

Colette Doyle

Karen Earley

Patrick Wynne

Stephen McCullagh (part-time)

## Staff and Scholars of the School of Celtic Studies 2016

### Senior Professor

L. Breatnach (Director)

R. Ó hUiginn (from 12 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 Dhoncha

### Technical Staff

#### ISOS

A.M. O'Brien

### IT Support

A. McCarthy (part-time)

### Bibliographer

A. Guilarte

### Bergin Fellow

G. Ó Riain (Ireland) (to 28 August)

# Institute Staff (continued)

## Staff and Scholars of the School of Celtic Studies 2016 (continued)

### Scholars

S. Ní Mhurchú (Ireland) (to 30 June)  
M. Hoyne (Ireland)  
S. Nurmio (Finland)  
M. Theuerkauf (Germany)  
S. Waidler (USA/UK) (from 1 February)

### Ogham in 3D Principal Investigator

N. White

### Professor Emeritus

M. Ó Murchú  
F. Kelly  
P. Breatnach

## Staff and Scholars of the School of Theoretical Physics 2016

### Senior Professors

W. Nahm (Director)  
T. Dorlas  
D. O'Connor

### Scholars

B. Savoie (France)  
V. Filev (Bulgaria) (to 31 July)  
Y. Asano (Japan)  
S. Kovacik (Slovakia) (from 17 October)

### Schrodinger Fellows

G Kells (Ireland)  
L. Borsten (Holland)

## Staff and Scholars of the School of Cosmic Physics 2016

### Senior Professors

L. Drury (Director)  
C. Bean

### Professors

T. Ray  
F. Aharonian  
Z. Martinec

### Assistant Professors

S. Lebedev  
B. O'Reilly

### Schrodinger Fellows

A. Taylor-Castillo (U.K.)  
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



## Staff and Scholars of the School of Cosmic Physics 2016 (continued)

### Scholars

T. Farrell (Ireland)  
S. Blake (Ireland) (to 31 March)  
C. Romoli (Italy)  
D. Rodgers-Lee (Ireland) (to 30 November)  
R. Delhaye (France/New Zealand) (to 31 October)  
A. Licciardi (Italy)  
M. Ravenna (Italy)  
E. Neenan (Ireland)  
D. Einspigel (Czech Republic)  
X. Ogaya (Spain) (to 30 September)  
R. Bonadio (Italy)  
D. Kiyan (Turkey) (to 31 December)  
N. Celli (Italy)  
M. Koutoulaki (Greece) (IRC from 1 October)  
R. Fedriani (Spain)  
E. Eibl (Germany) (from 1 September)  
J. Grannell (Ireland) GSI Project (from 1 January)  
G. Poggiali (Italy) SFI project (from 1 February)  
L. Sachl (Czech Republic) SFI project  
(from 1 February to 31 December inclusive)  
I. Babyk (Ukraine) Km3net (from 1 February to  
11 March inclusive)  
G. Maggio (Italy) SFI project (from 1 October)

### Project Staff

J. Vozar (Slovakia) SFI project (to 29 February)  
N. Piana Agostinetti (Italy) SFI project  
F. Lepape (France) SFI project  
J. Campaña (Spain) SFI project (to 30 September)  
C. Coughlan (Ireland) SFI project (to 31 August)  
M. Prada (Spain) PIP project (to 30 September),  
SFI project (from 1 October)  
R. Ainsworth (U.S.A.) SFI project (to 31 October)  
A. Caratti o Garatti (Italy) SFI project (to 31 October),  
MIRI project (from 1 November)  
R. Garcia Lopez (Spain) SFI project (to 31 October), EU  
Individual Marie Curie Fellowship (from 1 November)  
J. Fulla (Spain) EU Marie-Curie  
P. Arroucau (France) SFI project  
E. O’Gorman (Ireland) Irish Research Council  
D. Craig (Ireland), SFI project  
J. Mackey (Ireland) Royal Society/SFI (from 1 January)  
F. Lavoué (France) SFI project (from 15 January)  
M. Topinka (Czech Republic) MIRI project  
(from 11 January)  
P. Kavanagh (Ireland) MIRI project (from 1 February)  
S. Finn (U.K.) Irish Research Council (from 1 April to  
30 September)  
G. Tomar (India) SFI project (from 1 November)  
C. Blease (Ireland) Irish Research Council  
(from 1 November)

### Professor Emeritus

P. Readman  
D. O’Sullivan  
A. Thompson  
A. Jones

### Vacation Students

A. Baird (from 8 June to 31 October inclusive)  
J. Murphy (from 8 June to 31 October inclusive)  
S. Green (from 5 September to 31 December inclusive)



# Financial Statements

for year ended 31 December 2016

## Contents

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<b>59</b>	Statement on Internal Financial Control
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# 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.



**Luke Drury**  
Council Member



**Liam Breatnach**  
Council Member

Date 28 June 2017

# Statement on Internal Financial Control

## Responsibility for Internal Financial Control

On behalf of the Council of the Institute we acknowledge our responsibility for ensuring that an effective system of internal financial control 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 period.

## Key Control Procedures

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

- ▶ clearly defining management responsibilities;
- ▶ establishing formal procedures for reporting significant control failures and ensuring appropriate corrective action.

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 financial 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 2016, the Audit Committee met on four occasions.

In addition, the 2016 report on internal control systems as provided by the Internal Auditor has been made available to Members of Council.

The Council's monitoring and review of the effectiveness of the system of internal financial 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 financial control framework and comments made by the Audit Committee and the Comptroller and Auditor General in his management letter or other reports.

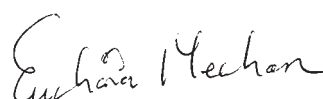
## Annual Review of Controls

We confirm that in the year ended 31st December 2016, Council conducted a review of the effectiveness of the internal financial controls of the Institute.

Signed on behalf of the Council of the Institute



**Vincent Cunnane**  
Chairman - Council of the Institute



**Eucharía Meehan**  
Registrar

28 June 2017

# Comptroller and Auditor General

## Report for presentation to the Houses of the Oireachtas

I have audited the financial statements of the Dublin Institute for Advanced Studies for the year ended 31 December 2016 under the Institute for Advanced Studies Act 1940. The financial statements comprise the Statement of Income and Expenditure and Retained Revenue Reserves, the Statement of Financial Position, the Statement of Cash Flows and the related notes. The financial statements have been prepared in the form prescribed under Section 28 of the Institute for Advanced Studies Act 1940, and in accordance with Generally Accepted Accounting Practice.

### Responsibilities of the Council

The Council is responsible for the preparation of the financial statements, for ensuring that they give a true and fair view, and for ensuring the regularity of transactions.

### Responsibilities of the Comptroller and Auditor General

My responsibility is to audit the financial statements and report on them in accordance with applicable law.

My audit is conducted by reference to the special considerations which attach to State Bodies in relation to their management and operation.

My audit is carried out in accordance with the International Standards on Auditing (UK and Ireland) and in compliance with the Auditing Practices Board's Ethical Standards for Auditors.

### Scope of Audit of the Financial Statements

An audit involves obtaining evidence about the amounts and disclosures in the financial statements, sufficient to give reasonable assurance that the financial statements are free from material misstatement, whether caused by fraud or error. This includes an assessment of

- ▶ whether the accounting policies are appropriate to the Institute's circumstances, and have been consistently applied and adequately disclosed
- ▶ the reasonableness of significant accounting estimates made in the preparation of the financial statements, and
- ▶ the overall presentation of the financial statements.

I also seek to obtain evidence about the regularity of financial transactions in the course of audit.

In addition, I read the Institute's Annual Report to identify material inconsistencies with the audited financial statements and to identify any information that is apparently materially incorrect based on, or materially inconsistent with, the knowledge acquired by me in the course of my audit. If I become aware of any apparent material misstatements or inconsistencies, I consider the implications for my report.

### Opinion on the Financial Statements

In my opinion, the financial statements:

- ▶ give a true and fair view of the assets, liabilities and financial position of the Institute as at 31 December 2016 and of its income and expenditure for 2016; and
- ▶ have been properly prepared in accordance with generally accepted accounting practice.

In my opinion, the accounting records of the Institute were sufficient to permit the financial statements to be readily and properly audited. The financial statements are in agreement with the accounting records.

### Matters on which I Report by Exception

I report by exception if I have not received all the information and explanations I required for my audit, or if I find

- ▶ any material instance where money has not been applied for the purposes intended or where the transactions did not conform to the authorities governing them, or
- ▶ the information given in the Institute's Annual Report is not consistent with the related financial statements or with the knowledge acquired by me in the course of performing the audit, or
- ▶ the Statement on Internal Financial Control does not reflect the Institute's compliance with the Code of Practice for the Governance of State Bodies, or
- ▶ there are other material matters relating to the manner in which public business has been conducted.

I have nothing to report in regard to those matters upon which reporting is by exception.



**Colette Drinan**

For and on behalf of the Comptroller and Auditor General

30 June 2017

# Statement of Income and Expenditure and Retained Revenue Reserves

	Notes	2016 €	2015 €
<b>Income</b>			
Oireachtas Grant		6,256,000	6,136,001
Net deferred funding for retirement benefits	12.c	990,526	748,688
Sales of Publications		38,973	37,550
Projects	3	1,939,156	1,618,398
Project Overhead Income		107,847	-
Other	4	7,476	42,411
		9,339,978	8,583,048
Transfer from Capital Reserve	6	272,823	252,773
		9,612,801	8,835,821
<b>Expenditure</b>			
School of Celtic Studies	2	1,063,960	1,075,067
School of Theoretical Physics		850,644	855,657
School of Cosmic Physics		3,403,608	2,770,948
Administration		4,172,849	4,000,824
		9,491,061	8,702,496
<b>Surplus for the year</b>		<b>121,740</b>	<b>133,325</b>
Balance at 1 January		791,097	657,772
<b>Balance at 31 December</b>		<b>912,837</b>	<b>791,097</b>
<b>Statement of Comprehensive Income</b>			
		<b>2016 €</b>	<b>2015 €</b>
Surplus for the year		121,740	133,325
Experience gains/(losses) on retirement benefit obligations		765,000	1,256,000
Changes in assumptions underlying the present value of retirement benefit obligations		(6,371,000)	2,153,000
<b>Actuarial Gain/(Loss) on Retirement Benefit Obligations</b>	<b>12.b</b>	<b>(5,606,000)</b>	<b>3,409,000</b>
<b>Adjustment to Deferred Retirement Benefit Funding</b>		<b>5,606,000</b>	<b>(3,409,000)</b>
<b>Total Recognised Gain for the Year</b>		<b>121,740</b>	<b>133,325</b>

The Statement of Cash Flows and notes 1 to 20 form part of these financial statements.



**Luke Drury**  
Council Member

Date 28 June 2017



**Liam Breatnach**  
Council Member

Date 28 June 2017



# Statement of Financial Position

	Notes	2016 €	2015 €
<b>Assets</b>			
Fixed Assets: Property, Plant and Equipment	5	827,307	1,100,130
Current Assets:			
Cash on Hand and at Bank		6,062,056	5,800,626
Receivables	8	268,081	265,304
Project Receivables	3(a)	339,592	26,219
<b>Total Assets</b>		<b>7,497,036</b>	<b>7,192,279</b>
<b>Less Liabilities</b>			
Payables - Amounts falling due within one year			
Payables	7	530,957	697,932
Project Payables	3(a)	4,744,168	4,262,982
Payables - Amounts falling due after one year			
	7	481,767	340,138
<b>Total Liabilities</b>		<b>5,756,892</b>	<b>5,301,052</b>
<b>Assets Less Liabilities Before Retirement Benefits</b>			
		<b>1,740,144</b>	<b>1,891,227</b>
Deferred Retirement Benefit funding	12.c	57,807,000	51,210,000
Retirement Benefit Obligations	12.b	(57,807,000)	(51,210,000)
		<b>0</b>	<b>0</b>
<b>Net Assets</b>		<b>1,740,144</b>	<b>1,891,227</b>
<b>Financed by:</b>			
Income and Expenditure Account		912,837	791,097
Capital Reserve	6	827,307	1,100,130
		<b>1,740,144</b>	<b>1,891,227</b>

The Statement of Cash Flows and notes 1 to 20 form part of these financial statements.



**Luke Drury**  
Council Member

Date 28 June 2017



**Liam Breatnach**  
Council Member

Date 28 June 2017

# Statement of Cash Flow

	Notes	2016 €	2015 €
<b>Reconciliation of Operating Surplus to Net Cash Inflow from Operating Activities</b>			
Surplus for the Year		<b>121,740</b>	<b>133,325</b>
Interest Received	4	(2,402)	(8,121)
Increase/(Decrease) in Payables		(25,346)	138,292
(Increase) in Receivables		(2,779)	(92,105)
Net Increase in Research Programmes and Fees		167,815	3,157,057
Depreciation	5	367,873	400,799
Capital Reserve Transfer	6	(272,823)	(252,773)
Loss on Disposal		3,421	831
<b>Net Cash Inflow from Operating Activities</b>		<b>357,499</b>	<b>3,477,305</b>
<b>Cash Flow Statement</b>			
Net Cash Inflow from Operating Activities		357,499	3,477,305
<b>Cashflow from Financing Activities</b>			
Bank Interest Received	4	2,402	8,121
<b>Cashflow from Investing Activities</b>			
Purchase of Tangible Assets	5	(98,471)	(148,857)
<b>Increase in Cash</b>		<b>261,430</b>	<b>3,336,569</b>
<b>Reconciliation of Net Cash Flow to Movement in Net Funds</b>			
Increase in Cash		261,430	3,336,569
Net Funds at 1 January		5,800,626	2,464,057
<b>Net Funds at 31 December</b>		<b>6,062,056</b>	<b>5,800,626</b>
<b>Analysis of Change in Net Funds</b>			<b>Cash at bank and in hand</b>
			<b>€</b>
At Beginning of Year 2016			5,800,626
Cash Flows			261,430
<b>At End of Year 2016</b>			<b>6,062,056</b>

The Statement of Cash Flows and notes 1 to 20 form part of these financial statements.



**Luke Drury**  
Council Member

Date 28 June 2017



**Liam Breatnach**  
Council Member

Date 28 June 2017

# 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.

### d) Capital Reserve

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

### 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.

# Notes to the Financial Statements (continued)

## 1. Accounting Policies (continued)

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.

### 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 31/12/2016

	Notes	School of Celtic Studies €	School of Theoretical Physics €	School of Cosmic Physics €	Adminis- tration €	2016 Total €	2015 Total €
<b>INCOME</b>							
Dept. of Education and Skills Grant-In-Aid (Annual)		1,492,267	949,651	2,293,112	1,520,970	6,256,000	6,136,001
*Net Deferred Funding for Retirement Benefits	12.c	(499,223)	(105,986)	(699,651)	2,295,386	990,526	748,688
Sales of Publications		38,973	-	-	-	38,973	37,550
Project Income	3.a	37,990	7,088	1,894,078	-	1,939,156	1,618,398
Project Overhead Income		-	-	-	107,847	107,847	-
Other	4	569	1,760	2,505	2,642	7,476	42,411
		1,070,576	852,513	3,490,044	3,926,845	9,339,978	8,583,048
<b>Transfer from Capital Reserve</b>		-	-	-	272,823	272,823	252,773
		1,070,576	852,513	3,490,044	4,199,668	9,612,801	8,835,821
<b>EXPENDITURE</b>							
Payroll Costs	9	944,027	776,371	1,436,026	600,074	3,756,498	3,727,036
*Retirement Benefit Costs	12.a	(23,608)	(39,690)	(41,519)	2,482,844	2,378,027	2,141,971
*Retirement Benefit Project Costs	12.a	-	-	-	-	-	(2,392)
Project Costs	3.a	37,990	5,070	1,809,090	-	1,852,150	1,278,583
Library and Book Storage		44,834	64,497	42,183	-	151,514	162,453
Depreciation	5	-	-	-	367,873	367,873	400,799
Rent, Rates and Insurance		-	-	-	206,345	206,345	199,165
General Expenses	10	10,911	1,074	42,430	129,259	183,674	185,494
Travel and Seminar Expenses		13,376	33,059	49,248	1,858	97,541	104,520
Premises Maintenance and Security		-	-	-	166,443	166,443	168,751
Computer and Internet Expenses		5,010	9,125	52,128	64,542	130,805	109,540
Fuel Light and Power		-	-	-	121,912	121,912	146,995
Postage and Telephone		-	-	-	23,171	23,171	25,674
Stationery		4,771	471	5,501	4,108	14,851	22,247
Publications		21,593	-	-	-	21,593	26,827
Advertising		369	-	-	-	369	3,403
Minor Office Equipment		4,687	667	8,521	999	14,874	599
Disposal	6	-	-	-	3,421	3,421	831
		1,063,960	850,644	3,403,608	4,172,849	9,491,061	8,702,496
<b>SURPLUS/(DEFICIT) FOR YEAR</b>		<b>6,616</b>	<b>1,869</b>	<b>86,436</b>	<b>26,819</b>	<b>121,740</b>	<b>133,325</b>
<b>Balance at 1 January</b>		248,218	103,469	1,872,679	(1,433,269)	791,097	657,772
<b>Balance at 31 December</b>		<b>254,834</b>	<b>105,338</b>	<b>1,959,115</b>	<b>(1,406,450)</b>	<b>912,837</b>	<b>791,097</b>

**Note (a)** \* The net of 12c and 12a represents the superannuation paid less contributions deducted within each of the schools and section.

**Note (b)** Costs directly related to research (e.g., pay, library, computer expenses, travel) have been apportioned to the schools. Overhead costs such as rent, insurance, utilities and property maintenance have been charged to Administration.

**Note (c) Grant In Aid** An amount of 6,256,000, (2015 6,136,000) 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.

## Notes to the Financial Statements (continued)

### 3. (a) Projects

	2016 €	2015 €
Opening Balances	4,236,763	1,079,706
Receipts	2,106,971	4,775,455
	6,343,734	5,855,161
Closing Balances (Project Receivables €339,592, Project Payables €4,744,168)	(4,404,578)	(4,236,763)
Applied as Income	1,939,156	1,618,398
<b>Income Allocation</b>		
School of Celtic Studies	37,990	53,934
School of Theoretical Physics	7,088	14,611
School of Cosmic Physics	1,894,078	1,549,853
	1,939,156	1,618,398
<b>Total Project Income</b>	<b>1,939,156</b>	<b>1,618,398</b>

### Project Costs

	Celtic Studies €	Theoretical Physics €	Cosmic Physics €	2016 Total €	2015 Total €
Payments to Partners/Associates			186,947	186,947	86,100
Salaries/Scholarships	37,331		1,124,157	1,161,488	880,467
Travel	541	5,070	223,283	228,894	154,503
Other	118		274,703	274,821	157,513
<b>Total Project Cost</b>	<b>37,990</b>	<b>5,070</b>	<b>1,809,090</b>	<b>1,852,150</b>	<b>1,278,583</b>

### 3. (b) Project Detail

	Funding Authority	Opening Balance €	Receipts €	Recurrent Expenditure €	Applied as Income (including Capital) €	Closing Balance €	Capital €
<b>School of Celtic Studies</b>							
Irish Script on Screen		14,622	-	35	35	14,587	-
Celtic Summer School		3,553	-	-	-	3,553	-
Ogham	Dept. Arts	(3,765)	40,000	37,955	37,955	(1,720)	-
<b>Total Celtic Studies</b>		<b>14,410</b>	<b>40,000</b>	<b>37,990</b>	<b>37,990</b>	<b>16,420</b>	<b>-</b>

## Notes to the Financial Statements (continued)

### 3. (b) Project Detail (continued)

	Funding Authority	Opening Balance €	Receipts €	Recurrent Expenditure €	Applied as Income (including Capital) €	Closing Balance €	Capital €
<b>School of Theoretical Physics</b>							
Bethe Ansatz	SFI	10,402	-	2,000	2,000	8,402	-
T. Tchraikian	SFI	9,206	-	3,070	5,088	4,118	2,018
G. Kells	SFI	-	129,780	-	-	129,780	-
<b>Total Theoretical Physics</b>		<b>19,608</b>	<b>129,780</b>	<b>5,070</b>	<b>7,088</b>	<b>142,300</b>	<b>2,018</b>
<b>School of Cosmic Physics</b>							
Nam Conference	A. Observ'tory	29,769	-	25,000	25,000	4,769	-
GNM	SFI	9,622	-	8,908	9,622	-	-
KM3Net -PP	EC	1,135	4,800	5,935	5,935	-	-
NGST Project	ESA	13,917	281,709	138,578	144,743	150,883	6,165
KVM3Net	EC	2,033	-	2,033	2,033	-	-
Aleks Scholz-Brown Dwarfs	SFI	21,120	-	21,120	21,120	-	-
Origin of Jets	SFI	9,936	13,785	21,403	23,721	-	2,545
EASY T. Ray 2014	SFI	243,126	-	224,740	227,853	15,273	3,113
E. O'Gorman Fellow	IRC	12,724	45,895	44,944	46,452	12,167	1,508
Horizon 2020 Catalyst MKID	SFI	16,200	-	1,198	1,198	15,002	-
J Mackey Royal Society Fellowship	Royal Society	-	75,273	83,543	87,755	(12,482)	4,212
IRC New Horizons DIAS/UCD	IRC	-	41,140	21,302	21,302	19,838	-
MKID Camera IP T.Ray	SFI	-	263,113	1,525	2,778	260,335	1,253
R Garcia Lopez Dig Deep EC Fellowship	EC	-	122,923	14,235	14,235	108,688	-
J Mackey Science Week Grant	SFI	-	2,295	1,982	1,982	313	-
Maria Koutoulaki IRC Scholarship	IRC	-	12,000	5,267	5,267	6,733	-
J Mackey IRC New Foundations	IRC	-	10,000	-	-	10,000	-
<b>Total Astrophysics</b>		<b>359,582</b>	<b>872,933</b>	<b>621,713</b>	<b>640,996</b>	<b>591,519</b>	<b>18,796</b>

## Notes to the Financial Statements (continued)

### 3. (b) Project Detail (continued)

	Funding Authority	Opening Balance €	Receipts €	Recurrent Expenditure €	Applied as Income (including Capital) €	Closing Balance €	Capital €
Samtex	Industry	7,516	-	7,500	7,516	-	-
Geophysics Schools							
Seismology	Various	9,754	-	162	162	9,592	-
Dynamics of Continuity	SFI	4,562	-	4,580	4,562	-	-
Regional Seismic	SFI	3,955	226	4,212	4,181	-	-
CTBTO	Dept. For. Affairs	2,661	48,419	45,758	45,758	5,322	-
IRETHERM	SFI	44,611	113,643	157,176	158,254	-	-
GIANICE 11	SFI	40,288	-	25,764	25,764	14,524	-
SIRG E2174	SFI	44,261	31,300	80,544	80,544	(4,983)	-
ESA UWB Grant	ESA	25,424	-	2,447	9,353	16,071	6,906
IRECCSEM	SFI	(22,454)	59,865	46,127	46,127	(8,716)	-
Structure and Seismicity of Ireland's Crust	SFI	91,676	153,112	111,164	116,250	128,538	5,086
PIPCO	Industry	33,732	102,627	110,024	110,024	26,335	-
Winterc-3D Fullea Fellow	EC	53,743	-	100,969	100,969	(47,226)	-
4DARTIC	Industry	4,572	24,000	4,500	4,500	24,072	-
ICRAG 4359	SFI	364,344	-	77,765	77,765	286,579	-
ICRAG 4364	SFI	-	-	63,147	67,701	(67,701)	4,554
ICRAG 4360	SFI	30,112	-	124,511	171,217	(141,105)	46,706
ICRAG 4361	SFI	59,757	-	16,470	16,470	43,287	-
ICRAG 4362	SFI	135,895	-	7,959	7,959	127,936	-
ICRAG 4369	SFI	-	-	26,021	27,328	(27,328)	1,307
ICRAG 4370	SFI	-	-	25,336	25,336	(25,336)	-
ICRAG 4371	SFI	-	-	111	111	(111)	-
ICRAG 4372	SFI	-	-	2,883	2,883	(2,883)	-
Shallow Crust Fellow	SFI	28,328	37,273	56,811	56,811	8,790	-
V. Rath GSI Short Call	GSI	12,500	11,362	22,362	22,362	1,500	-
P. Arroucau GSI Short Call	GSI	11,750	11,750	23,500	23,500	-	-
iMARL Infrastructure	SFI	2,856,176	100,000	-	-	2,956,176	-
Geo External Services	Various	-	39,675	39,574	39,675	-	-
ERC Development iTHERC	SFI	-	262,791	-	-	262,791	-
NIAP-PassVel	Marine Institute	-	9,976	-	-	9,976	-
Duygu Kiyon Fellowship	SFI	-	58,239	-	-	58,239	-
<b>Total Geophysics</b>		<b>3,843,163</b>	<b>1,064,258</b>	<b>1,187,377</b>	<b>1,253,082</b>	<b>3,654,339</b>	<b>64,559</b>
<b>Total Cosmic Physics</b>		<b>4,202,745</b>	<b>1,937,191</b>	<b>1,809,090</b>	<b>1,894,078</b>	<b>4,245,858</b>	<b>83,355</b>
<b>Total Net Balances - DIAS</b>		<b>4,236,763</b>	<b>2,106,971</b>	<b>1,852,150</b>	<b>1,939,156</b>	<b>4,404,578</b>	<b>85,373</b>

#### Note

Project receipts are applied as project income, at a level that equals the annual expenditure incurred by the associated project. The closing balances above represent overhead earned to date and advance funding to meet financial commitments in 2017. The capital column outlines the expenditure on fixed assets during 2016.



## Notes to the Financial Statements (continued)

### 4. Other Income

	2016 €	2015 €
Bank Interest	2,402	8,121
Fees and Grants	1,885	1,800
Other	3,189	32,490
<b>Total</b>	<b>7,476</b>	<b>42,411</b>

### 5. Fixed Assets: Property, Plant and Equipment

Cost	Furniture & Equipment €	Motor Vehicles €	Computers €	Total €
Opening Balance 1/1/2016	3,783,951	15,131	2,369,194	6,168,276
Additions*	47,959	-	50,512	98,471
Disposals	(9,651)	-	(124,355)	(134,006)
	3,822,259	15,131	2,295,351	6,132,741
<b>Depreciation</b>				
Opening Balance 1/1/2016	2,953,349	1,627	2,113,170	5,068,146
Charge	216,250	3,790	147,833	367,873
Disposals	(6,230)	-	(124,355)	(130,585)
	3,163,369	5,417	2,136,648	5,305,434
Net book value 31/12/2016	658,890	9,714	158,703	827,307
Net book value 31/12/2015	830,602	13,504	256,024	1,100,130

#### Note

\* All fixed assets in excess of €1,000 are capitalised in the books of DIAS.

### 6. Capital Reserve

	2016 €	2015 €
Balance at 1 January	1,100,130	1,352,903
<b>Transfer to Income and Expenditure Account</b>		
Income allocated to acquire fixed assets (Project Funded)	85,373	68,703
Income allocated to acquire fixed assets (Exchequer Funded)	13,098	80,154
Amortisation in line with asset depreciation	(367,873)	(400,799)
Amount released on disposals	(3,421)	(831)
	(272,823)	(252,773)
<b>Balance at 31 December</b>	<b>827,307</b>	<b>1,100,130</b>

## Notes to the Financial Statements (continued)

### 7. Payables due within twelve months

	<b>2016</b>	<b>2015</b>
	<b>€</b>	<b>€</b>
Trade Payables	101,232	290,924
Accruals	255,263	253,032
VAT	35,713	20,055
Revenue Payables	138,749	133,921
	<hr/> 530,957	<hr/> 697,932
	<b>2016</b>	<b>2015</b>
	<b>€</b>	<b>€</b>
<b>Payables due after twelve months</b>		
The following funds are held on deposit.		
These comprise: Vernam Hull Bequest	25,247	25,239
Carmody Fund	2,461	2,461
Retirement Benefit Control Account	454,059	312,438
	<hr/> 481,767	<hr/> 340,138

### 8. Receivables

	<b>2016</b>	<b>2015</b>
	<b>€</b>	<b>€</b>
Prepayments	144,651	244,115
Book Sales Receivables	3,872	1,241
Sundry	13,340	19,948
Debtor Miscellaneous	106,218	-
	<hr/> 268,081	<hr/> 265,304

### 9. Payroll Costs

	<b>Celtic Studies</b>	<b>Theoretical Physics</b>	<b>Cosmic Physics</b>	<b>Admin.</b>	<b>2016 Total</b>	<b>2015 Total</b>
	<b>€</b>	<b>€</b>	<b>€</b>	<b>€</b>	<b>€</b>	<b>€</b>
Salaries/Wages	832,668	706,613	1,327,080	550,679	3,417,040	3,338,099
Gratuities	-	-	-	49,395	49,395	62,910
Scholarships	109,610	69,758	108,946	-	288,314	325,527
Honoraria	1,749	-	-	-	1,749	500
	<hr/> 944,027	<hr/> 776,371	<hr/> 1,436,026	<hr/> 600,074	<hr/> 3,756,498	<hr/> 3,727,036

#### Note

Pension levy deductions of €224,492 (2015: €252,518) were paid to the Department of Education and Skills during 2016.

Staff Numbers 50.5 (2015:50.5), ECF Numbers 55 (2015: 55).

#### Key Management Remuneration

Key management personnel include the Registrar and the senior management team for whom the total remuneration cost was €599,765 (2015 €599,765) in the year.

## Notes to the Financial Statements (continued)

### 10. General Expenses

	Celtic Studies €	Theoretical Physics €	Cosmic Physics €	Admin. €	2016 Total €	2015 Total €
Miscellaneous	7,748	1,074	34,997	6,392	50,211	52,663
*Promotions/Lunches	2,552	-	6,937	5,455	14,944	21,007
Professional Fees	-	-	-	26,315	26,315	49,864
Legal Fees	-	-	-	19,054	19,054	-
Consultancy	-	-	-	18,845	18,845	-
Training	611	-	496	4,848	5,955	11,591
Audit Fee	-	-	-	16,000	16,000	18,000
Bank Charges	-	-	-	1,140	1,140	1,479
*Board Meeting Expenses	-	-	-	26,771	26,771	25,840
Health & Safety	-	-	-	4,439	4,439	5,050
	10,911	1,074	42,430	129,259	183,674	185,494

#### Note\*

Hospitality Expenditure in 2016 totalled €10,414.

### 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 82 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 2017 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
	<b>113,609</b>

At 31 December 2016 the Institute had the following future minimum lease payments under non-cancellable operating leases for each of the following periods:

	2016 €	2015 €
Payable within one year	113,609	113,609
Between two and five years	990	990
After five years	25,740	26,070

## Notes to the Financial Statements (continued)

### 12. Retirement Benefit Costs

#### a) Analysis of total retirement benefit costs charged to Expenditure

	2016 (€'000)	2015 (€'000)
Current Service Cost	1,226	1,040
Interest on Retirement Benefit Obligations	1,280	1,218
Employee Contributions	(128)	(118)
	2,378	2,140

#### b) Movement in Net Retirement Benefit Obligations during the financial year

	2016 (€'000)	2015 (€'000)
Retirement Benefit Obligations at 1 January	(51,210)	(53,870)
Current Service Cost	(1,226)	(1,040)
Interest Costs	(1,280)	(1,218)
Actuarial (Loss)/Gain	(5,606)	3,409
Retirement Benefits Paid in the Year	1,515	1,509
Retirement Benefit Obligations at 31 December	(57,807)	(51,210)

#### 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:

	2016 (€'000)	2015 (€'000)
Funding Recoverable in Respect of Current Year Retirement Benefit Costs	2,506	2,258
State Grant Applied to Pay Pensioners	(1,515)	(1,509)
	991	749

The deferred funding asset for retirement benefits as at 31 December 2016 amounted to €57.807 million (2015: €51.210 million).

#### d) History of defined benefit obligations

	2016 (€'000)	2015 (€'000)	2014 (€'000)
Defined Benefit Obligations	57,807	51,210	53,870
Experience (Gains)/Losses on Scheme Liabilities Amount.	(765)	(1,256)	309
Percentage of Scheme Liabilities.	(1.32%)	(2.50%)	0.60%

The cumulative actuarial (gain)/loss recognised in the Statement of Comprehensive Income amounts to €7,138,000 (2015: €1,532,000).



# Notes to the Financial Statements (continued)

## 12. Retirement Benefit Costs (continued)

### 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 2016.

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

The principal actuarial assumptions were as follows:

	2016	2015	2014
Rate of Increase in Salaries	2.50%	2.50%	2.50%
Rate of Increase in Retirement Benefits in Payment	2.00%	2.00%	2.00%
Discount Rate	1.75%	2.50%	2.25%
Inflation Rate	1.50%	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 2016 and 2036.

Year of Attaining Age 65	31/12/2016		31/12/2015	
	2016	2036	2015	2035
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.

## Notes to the Financial Statements (continued)

### 14. Disclosure of Council Members/Registrar Salary, Fees and Expenses

	Total Remuneration 2016 €	Total Expenses 2016 €	Total Remuneration 2015 €	Total Expenses 2015 €
<b>Council Member</b>				
Dr Vincent Cunnane	-	1,285	-	939
<b>Members Appointed by the Governing Boards of Constituent Schools</b>				
Professor Gerry Wrixon	-	665	-	125
Professor Arthur Jaffe	-	942	-	1,503
Professor Anders Ahlqvist	-	8,148	-	8,908
Professor Werner Nahm	-	-	-	-
Professor Luke Drury	-	-	-	-
Professor Liam Breatnach	-	-	-	-
<b>Registrar</b>				
Mr. Cecil Keaveney *	97,906	-	97,906	-
	<u>97,906</u>	<u>11,040</u>	<u>97,906</u>	<u>11,475</u>

#### \* Note

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

### 15. Number of Employees with Benefits in 2016 that fall within bands of €10,000 from €60,000 onwards.

No. of Employees with benefits €60k	No. of Employees with benefits €70k	No. of Employees with benefits €80k	No. of Employees with benefits €90k	No. of Employees with benefits €100k	No. of Employees with benefits €110k	No. of Employees with benefits €120k	No. of Employees with benefits €130k
1	7	1	2	2	-	-	6

### 16. Employer Retirement Benefit Contributions

Employer contributions in 2016 totalled €135,432.

### 17. Capital Commitments

There are capital commitments of €100,000 for 2017 that has not been provided for in the financial statements.

### 18. iMarl project

Included in project payables is €2,956,176 (2015: €2,856,176) in relation to the iMarl Infrastructure project. As a result of the tendering process, no expenditure was incurred in relation to the project in 2016 (2015: €nil). The first tendering process has now been completed and first contract is due to commence in 2017.

## Notes to the Financial Statements (continued)

### 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.

#### 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 27th June 2017.

# *Ráitis Airgeadais*

*don bhliain dár críoch 31 Nollaig 2016*

## Clár

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# 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 nochtáíonn ag aon am le cruinneas réasúnach staid airgeadais na hInstitiúide agus a chuireann ar a cumas a chinntiú go gclóinn 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 chalois agus ar neamhrialtachtaí eile agus iad a aimsiú.



**Luke Drury**  
Comhalta Den Chomhairle



**Liam Breatnach**  
Comhalta Den Chomhairle

Dáta 28 Meitheamh 2017

# Ráiteas faoin gCóras Rialaithe Airgeadais Inmheánaigh

## Freagracht as an gCóras Rialaithe Airgeadais Inmheánaigh

Thar ceann Chomhairle na hInstitiúide is mian liom ár bhfreagracht a chur in iúl lena chinntiú go ndéantar cothabháil agus go n-oibrítear córas rialaithe airgeadais inmheánaigh.

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;
- ▶ nósanna imeachta foirmiúla a bhunú le teipeanna rialaithe suntasacha a thuairisciú agus lena chinntiú go dtógtar gníomh cuí leis an gceist a cheartú.

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 toiscaireachta 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 feidhmíocht airgeadais in aghaidh réamhaisnéisí;
- ▶ 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 2016, bhuaile an Coiste Iniúchóireachta le cheile ceithre huair. Ina theannta sin, an tuarascáil ar chórais rialaithe inmheánacha don bhliain 2016 a chuir an tIniúcháir Inmheánach ar fáil tugadh do bhaill na Comhairle í.

Tá monatóireacht agus athbhreithniú na Comhairle ar éifeachtúlacht an chórais rialaithe airgeadais inmheánaigh coinnithe ar an eolas trí obair an iniúcháir 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.

## Athbhreithniú Bliantúil ar Rialacháin

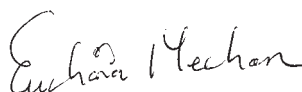
Dearbhaím go ndearna an Bord athbhreithniú ar éifeachtachas chórais rialaithe airgeadais inmheánaigh na hInstitiúide sa bhliain dár críoch 31ú Nollaig 2016.

Sínithe thar ceann Chomhairle na hInstitiúide.



**Vincent Cunnane**

Cathaoirleach-Comhairle Na hInstitiúide



**Eucharía Meehan**

Cláraithheoir

Dáta 28 Meitheamh 2017

# Ard-Reachtair Cuntas agus Ciste

## Tuarascáil le cur i láthair Thithe an Oireachtais

### Institiúid Ard-Léinn Bhaile Átha Cliath

Tá ráitis airgeadais Institiúid Ard-Léinn Bhaile Átha Cliath don bhliain dar críoch 31 Nollaig 2016 iniúchta agam faoin Acht Um Institiúid Ard-Léinn, 1940. Tá na ráitis airgeadais comhdhéanta den Ráiteas ar Ioncam agus Caiteachas agus Cúlchistí Ioncaim Coinnithe, an Ráiteas as Shuíomh Airgeadais, an Ráiteas ar Shreabhadh Airgid agus na nótaí gaolmhara. Ullmhaíodh na ráitis airgeadais san fhoirm a leagtar amach faoi Alt 28 den Acht Um Institiúid Ard-Léinn, 1940 agus i gcomhréir le Cleachtas Cuntasafóchta a nGlactar Leis go Coitianta.

### Freagrachtaí na Comhairle

Tá an Chomhairle freagrach as na ráitis airgeadais a ullmhú, as a chinntiú go dtugtar leo léargas fíor agus cothrom, agus as rialtacht na n-idirbheart a chinntiú

### Freagrachtaí an Ard-Reachtair Cuntas agus Ciste

Is í an fhreagracht atá agamsa na ráitis airgeadais a iniúchadh agus tuairisc a thabhairt orthu de réir dlí is infheidhme.

Déantar m'iniúchadh a riar trí thagairt a dhéanamh do na nithe ar leith is gá a chur san áireamh i ndáil le cúrsaí bainisteoireachta agus oibriúcháin a ghabhann le Comhlachtaí Stáit.

Déantar m'iniúchadh a riar de réir Caighdeán Idirnáisiúnta maidir le hIniúcháireacht (Ríocht Aontaithe agus Éire) agus de réir Caighdeán Eiticíúil an Bhoird um Chleachtas Iniúcháireachta d'Iniúcháirí.

### Réimse Iniúchta na Ráiteas Airgeadais

Cuimsíonn iniúchadh fianaise a fháil faoi na suimeanna agus na nochtuithe sna ráitis airgeadais, ionas go mbeadh leordhóthain fianaise ann a d'fhágfadh cinnteacht réasúnach ann go bhfuil na ráitis airgeadais saor ó mhíríteas ábhartha, cibé acu calaois nó neamhrialtacht is cúis leis sin. Áirítear leis seo measúnú ar

- ▶ cé acu an n-oireann na beartais chuntasaíochta don bhail atá ar chúrsaí na hInstitiúide, ar feidhmíodh na beartais sin ar bhealach leanúnach agus ar foilsíodh iad ar bhealach sásúil
- ▶ réasúntacht meastacháin suntasacha chuntasaíochta a rinneadh in ullmhúchán na ráiteas airgeadais, agus
- ▶ leagan amach na ráiteas airgeadais ar an iomlán.

Féachaim freisin le fianaise a fháil faoi rialtacht na n-idirbheart airgeadais le linn iniúchta.

Ina theannta sin, léim Tuarascáil Bhliantúil na hInstitiúide d'fhonn neamhréireachtaí ábhartha leis na ráitis airgeadais iniúchta a aithint agus d'fhonn faisnéis ar bith a aithint atá mícheart go hábhartha, de réir cosúlachtaí bunaithe ar an eolas atá faighte agam le linn m'iniúchta, nó neamhréireach go hábhartha leis. Má thagaim ar an eolas faoi mhíríteas ábhartha dealraitheacha nó neamhréireachtaí cuirim na himpleachtaí san áireamh i mo thuarascáil.

### Tuairim ar na Ráitis Airgeadais

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 2016 agus ar a hioncam agus ar a caiteachas don bhliain 2016; agus
- ▶ ullmhaíodh i gceart iad i gcomhréir le cleachtas cuntasafóchta a nglactar leis go coitianta.

I mo thuairimse, bhí taifid chuntasaíochta na hInstitiúide imleor chun iniúchadh áisiúil agus cuí a dhéanamh ar na ráitis airgeadais. Tá ná ráitis airgeadais ag teacht leis na taifid chuntasaíochta.

### Nithe ar a dTuairiscím Eisceachtaí

Tuairiscím eisceachtaí mura bhfuair mé an fhaisnéis agus na mínithe ar fad a theastaigh uaim do m'iniúchadh, nó má aimsím

- ▶ aon chás ábhartha nár feidhmíodh suimeanna airgid chun na gcríoch a bhí beartaithe nó sa chás nár lean na hidirbhearta do na húdaráis a rialaíonn iad, nó
- ▶ nach bhfuil an fhaisnéis a tugadh i dTuarascáil Bhliantúil na hInstitiúide ag teacht leis na ráitis airgeadais gaolmhara nó leis an eolas atá faighte agam le linn dom an t-iniúchadh a dhéanamh, nó
- ▶ nach léiríonn an Ráiteas maidir le Rialú Inmheánach Airgeadais comhlíonadh na hInstitiúide leis an gCód Cleachtas maidir le Rialachas Comhlachtaí Stáit, nó
- ▶ go bhfuil nithe ábhartha eile maidir leis an modh a riaradh gnó poiblí.

Níl a thuilleadh le tuairisciú agam maidir leis na nithe seo lena mbaineann tuairisceoireacht eisceachtaí.

### Colette Drinan

Le haghaidh agus thar ceann an Ard-Reachtair Cuntas agus Ciste

30 Meitheamh 2017

# Ráiteas Ioncaim agus Caiteachais agus Cúlchistí Ioncaim Coinnithe

	Notaí	2016 €	2015 €
<b>Ioncam</b>			
Deontas Oireachtais		6,256,000	6,136,001
Glan-mhaoiniú iarchurtha do shochair scoir	12.c	990,526	748,688
Díolacháin Foilseachán		38,973	37,550
Ioncam Tionscadail	3	1,939,156	1,618,398
Ioncam Forchostas Thionscadail		107,847	-
Eile	4	7,476	42,411
		9,339,978	8,583,048
Aistriú ó Cúlchiste Caipitil	6	272,823	252,773
		9,612,801	8,835,821
<b>Caiteachas</b>			
	2		
Scoil an Léinn Cheiltigh		1,063,960	1,075,067
Scoil na Fisice Teoiriciúla		850,644	855,657
Scoil na Fisice Cosmaí		3,403,608	2,770,948
Riarachán		4,172,849	4,000,824
		9,491,061	8,702,496
<b>Barrachas don bhliain</b>		<b>121,740</b>	<b>133,325</b>
Iarmhéid amhail an 1 Eanáir		791,097	657,772
<b>Iarmhéid amhail an 31 Nollaig</b>		<b>912,837</b>	<b>791,097</b>
<b>Ráiteas ar Ioncam Cuimsitheach</b>			
		<b>2016</b>	<b>2015</b>
		€	€
Barrachas don bhliain		121,740	133,325
Gnóthachain/(caillteanais) ó thaithí ar oibleagáidí sochair scoir		765,000	1,256,000
Athruithe i bhfoshuíomhanna atá mar bhonn le luach reatha na n-oibleagáidí sochair scoir		(6,371,000)	2,153,000
<b>(Cailteanas)/Gnóthachan Achtúireach ar Oibleagáidí Sochair Scoir</b>	<b>12.b</b>	<b>(5,606,000)</b>	<b>3,409,000</b>
<b>Leasú ar Mhaoiniú Sochair Scoir Iarchurtha</b>		<b>5,606,000</b>	<b>(3,409,000)</b>
<b>Iomlán aitheanta don bhliain</b>		<b>121,740</b>	<b>133,325</b>

Is cuid de na ráitis airgeadais seo iad an Ráiteas ar Shreabhadh Airgid agus nótaí 1 go 20



**Luke Drury**  
Comhalta Den Chomhairle

Dáta 28 Meitheamh 2017



**Liam Breatnach**  
Comhalta Den Chomhairle

Dáta 28 Meitheamh 2017

# Ráiteas Faoi Staid Airgeadais

	Notáí	2016 €	2015 €
<b>Sócmhainní</b>			
Sócmhainní Seasta: Maoin, Fearas agus Treallamh	5	827,307	1,100,130
Sócmhainní Reatha:			
Airgead sa Lámh agus ag an mBanc		6,062,056	5,800,626
Infháltais	8	268,081	265,304
Infháltais Tionscadail	3.a	339,592	26,219
<b>Sócmhainní Iomlána</b>		<b>7,497,036</b>	<b>7,192,279</b>
<b>Lúide Dlíteanais</b>			
Nithe Iníoctha - Suimeanna le híoc laistigh de bhliain amháin			
Nithe Iníoctha	7	530,957	697,932
Nithe Tionscadail Iníoctha	3.a	4,744,168	4,262,982
Creidiúnaithe - méideanna atá dlite tar éis bliana amháin	7	481,767	340,138
<b>Dlíteanais Iomlána Roimh Phinsin</b>		<b>5,756,892</b>	<b>5,301,052</b>
<b>Sócmhainní lúide dlíteanais Roimh Phinsin</b>			
		<b>1,740,144</b>	<b>1,891,227</b>
Maoiniú an Phinsin Iarchurtha	12.c	57,807,000	51,210,000
Dlíteanais Phinsin	12.b	(57,807,000)	(51,210,000)
		<b>0</b>	<b>0</b>
<b>Sócmhainní Glana</b>		<b>1,740,144</b>	<b>1,891,227</b>
<b>Maoinithe ag:</b>			
Cuntas Ioncaim agus Caiteachais		912,837	791,097
Cúlchiste Caipitil	6	827,307	1,100,130
		<b>1,740,144</b>	<b>1,891,227</b>

Is cuid de na ráitis airgeadais seo iad an Ráiteas ar Shreabhadh Airgid agus nótaí 1 go 20.



**Luke Drury**  
Comhalta Den Chomhairle

Dáta 28 Meitheamh 2017



**Liam Breatnach**  
Comhalta Den Chomhairle

Dáta 28 Meitheamh 2017



# Ráiteas Sreabhadh Airgid

	Nótaí	2016 €	2015 €
<b>Réiteach barrachais oibríochta chuig glan-insreabhadh airgid ó ghníomhaíochtaí oibríochta</b>			
<b>Barrachas don bhliain</b>		<b>121,740</b>	<b>133,325</b>
Ús infhaighte	4	(2,402)	(8,121)
(Laghú)/Méadú ar Nithe Iníochta		(25,346)	138,292
(Méadú) ar Infháltais		(2,779)	(92,105)
Glan ardú i gCláir Thaighde agus Táillí		167,815	3,157,057
Dímheas	5	367,873	400,799
Aistriú Cúlchiste Caipitil	6	(272,823)	(252,773)
Caillteanas ar dhiúscairt		3,421	831
<b>Glan insreabhadh Airgid tirim ó ghníomhaíochtaí oibríochta</b>		<b>357,499</b>	<b>3,477,305</b>
<b>Ráiteas Sreabhadh Airgid</b>			
Glan insreabhadh airgid tirim ó ghníomhaíochtaí oibríochta		357,499	3,477,305
<b>Aischiú ar infheistíochtaí agus seirbhísiú airgeadais</b>			
Ús Bainc Infhaighte	4	2,402	8,121
<b>Caiteachas Caipitiúil</b>			
Ceannach Sócmhainní Inláimhsithe	5	(98,471)	(148,857)
<b>Ardú ar Airgead</b>		<b>261,430</b>	<b>3,336,569</b>
<b>Réiteach glaninsreabhadh airgead tirim chuig gluaiseacht i nglanchistí</b>			
Ardú ar Airgead Tirim		261,430	3,336,569
Iarmhéid faoin 1 Eanáir		5,800,626	2,464,057
<b>Iarmhéid faoin 31 Nollaig</b>		<b>6,062,056</b>	<b>5,800,626</b>
<b>Anailís ar athrú i nglanchistí</b>			<b>Airgead infhaighte sa Bhanc</b>
I dtús na bliana 2016			5,800,626
Sreabhadh Airgid			261,430
<b>Ag deireadh na bliana 2016</b>			<b>6,062,056</b>

Is cuid de na ráitis airgeadais seo é an Ráiteas Beartais Cuntasaíochta agus na nótaí ó 1 go dtí 20.



**Luke Drury**  
Comhalta Den Chomhairle

Dáta 28 Meitheamh 2017



**Liam Breatnach**  
Comhalta Den Chomhairle

Dáta 28 Meitheamh 2017

# 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 speisialtacha 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 caighdeán chuntasaíochta eisithe ag an gComhairle Tuairiscithe Airgeadais, lena n-áirítear FRS 102 "An Caighdeán Tuairiscithe Airgeadais is infheidhme sa Ríocht Aontaithe 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 caighdeán 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 dáta tuairisce measann an Institiúid cé acu an bhfuil aon chomhartha lagaithe ann. Má tá aon chomhartha dá leithéid ann, déantar an tsuim in-aisghabhála a ríomh, is í sin an ceann is airde idir a luach cóir lúide costais le díol agus a luach in úsáid. Aithnítear luach lagaithe sa chás ina sáraíonn an tsuim ghlanluacha an tsuim in-aisghabhála.

Cinntear brabúis agus cailteanais ar dhiúscairtí trí na fáiltais a chur i gcomparáid leis an tsuim ghlanluacha, agus aithnítear iad laistigh den Chuntas Ioncaim agus Caiteachais.

### d) Cúlchiste Caipitil

Léiríonn cúlchiste caipitil luach neamh-amúchta ioncaim a úsáidtear le Sócmhainní Seasta a cheannach.

### 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 mhaoiútear 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.

# Nótaí do na Ráitis Airgeadais (ar leanúint)

## 1. Polasaithe Chuntasaíochta (ar leanúint)

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 bhail 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 coinnte ag Institiúid Ard-Léinn Bhaile Átha Cliath. Aithnítear suim a chomhfhreagraíonn don mhúirear 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 cailteanais achtúireacha ar dhliteanais na scéime léirithe sa Ráiteas ar Ghnóthachain agus Cailteanais 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 tionscadail. 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 gearrthéarma ag praghas an idirbhirt, lúide bearnú ar bith.

### j) Nithe Iníochta

Tomhaistear nithe iníochta gearrthéarma ag praghas an idirbhirt.

### k) Airgead Tirim agus Coibhéisí Airgid

Léirítear airgead tirim le hairgead ar láimh agus taiscí le hinstiúidí airgeadais iníochta 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 iníochta eile. Taifeadtar bunionstraimí airgeadais ar phraghas an idirbhirt.

### m) Pá Saoire

Aithnítear dliteanas go feadh mhéid teidlíochta pá saoire nár úsáideadh atá fabhráithe ar dháta an chláir chomhardaithe agus tógtha ar aghaidh chuig tréimhsí sa todhchaí. Tomhaistear é seo ag costas tuarastail neamhscainithe na teidlíochta saoire sa todhchaí agus fabhraítear é ar dháta an chláir chomhardaithe.

### n) Léasanna Oibriúcháin

Gearrtar cíosanna atá iníochta 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 thrú páirtithe sna ráiteas airgeadais ag baint úsáide as an Modh Fabhráithe agus leithdháiltear ar ioncam iad sa chaoi is go meaitseáiltear iad leis an gcaiteachas ábhartha lena mbaineann siad.

## Nótaí do na Ráitis Airgeadais (ar leanúint)

### 2 Anailís Shonraithe d'Ioncam & Caiteachas don bhliain dár críoch 31/12/2016

IONCAM	Nótaí	Léann	Fisic	Fisic	Riarachán	2016	2015
		Cheilteach	Theoiriciúil	Chosmach		Iomlán	Iomlán
		€	€	€	€	€	€
Deontais Oireachtais		1,492,267	949,651	2,293,112	1,520,970	6,256,000	6,136,001
*Glanmhaoiniú iarchurtha do Shocahir							
Pinsin	12.c	(499,223)	(105,986)	(699,651)	2,295,386	990,526	748,688
Díolacháin Foilseachán		38,973	-	-	-	38,973	37,550
Ioncam Tionscadail	3.a	37,990	7,088	1,894,078	-	1,939,156	1,618,398
Ioncam ForchostasThionscadail		-	-	-	107,847	107,847	-
Ioncam Eile	4	569	1,760	2,505	2,642	7,476	42,411
		1,070,576	852,513	3,490,044	3,926,845	9,339,978	8,583,048
<b>Aistriú ó Chúlchiste Caipitil</b>		-	-	-	272,823	272,823	252,773
		1,070,576	852,513	3,490,044	4,199,668	9,612,801	8,835,821
<b>CAITEACHAS</b>							
Costais Phárola	9	944,027	776,371	1,436,026	600,074	3,756,498	3,727,036
*Costais Sochair Scoir	12.a	(23,608)	(39,690)	(41,519)	2,482,844	2,378,027	2,141,971
*Costais um Tionascadal Sochair Scoir	12.a	-	-	-	-	-	(2,392)
Costais Tionscnamh	3.a	37,990	5,070	1,809,090	-	1,852,150	1,278,583
Stóráil Leabharlaine agus Leabhar		44,834	64,497	42,183	-	151,514	162,453
Dímheas	5	-	-	-	367,873	367,873	400,799
Cíos, Rátaí agus Árachas		-	-	-	206,345	206,345	199,165
Costais Ghinearálta	10	10,911	1,074	42,430	129,259	183,674	185,494
Costais Taistil agus Seimineáir		13,376	33,059	49,248	1,858	97,541	104,520
Cothabháil Áitribh agus Slándáil		-	-	-	166,443	166,443	168,751
Costais ríomhairí agus Idirlín		5,010	9,125	52,128	64,542	130,805	109,540
Breosla Solas agus Cumhacht		-	-	-	121,912	121,912	146,995
Post agus Teileafón		-	-	-	23,171	23,171	25,674
Páipéarachas		4,771	471	5,501	4,108	14,851	22,247
Foilseacháin		21,593	-	-	-	21,593	26,827
Fógraíocht		369	-	-	-	369	3,403
Mion Trealamh Oifige		4,687	667	8,521	999	14,874	599
Caillteanas ar dhiúscairt	6	-	-	-	3,421	3,421	831
		1,063,960	850,644	3,403,608	4,172,849	9,491,061	8,702,496
<b>BARRACHAS DON BHLIAIN</b>		<b>6,616</b>	<b>1,869</b>	<b>86,436</b>	<b>26,819</b>	<b>121,740</b>	<b>133,325</b>
<b>Iarmhéid amhail an 1 Eanáir</b>		<b>248,218</b>	<b>103,469</b>	<b>1,872,679</b>	<b>(1,433,269)</b>	<b>791,097</b>	<b>657,772</b>
<b>Iarmhéid amhail an 31 Nollaig</b>		<b>254,834</b>	<b>105,338</b>	<b>1,959,115</b>	<b>(1,406,450)</b>	<b>912,837</b>	<b>791,097</b>

**Nóta (a)** \*Léiriú is ea glanshuim 12c agus 12a ar an aoisliúntas a íocadh lúide ranníocaíochtaí a asbhaineadh laistigh gach ceann de na scoileanna agus rannóga.

**Nóta (b)** Cionroinneadh costais a bhaineann go díreach le taighde (m.sh. pá, leabharlann, costais ríomhaire, taisteal) ar an scoileanna. Gearradh forchostais ar nós cíos, árachas, fónais agus cothabháil maoine ar Riarachán.

**Nóta (c) Deontas i gCúnamh** Fuarthas suim €6,256,000 (2015: €6,136,001) 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.

## Nótaí do na Ráitis Airgeadais (ar leanúint)

### 3. (a) Tionscadail

	2016 €	2015 €
Iarmhéideanna Tosaigh	4,236,763	1,079,706
Admhálacha	2,106,971	4,775,455
	6,343,734	5,855,161
Iarmhéideanna Deiridh (Féichiúnaithe €339,592 Creidiúnaithe €4,744,168)	(4,404,578)	(4,236,763)
Curtha i bhfeidhm mar ioncam	1,939,156	1,618,398
<b>Leithroinnt Ioncaim</b>		
Scoil an Léinn Cheiltigh	37,990	53,934
Scoil na Fisice Teoiriciúla	7,088	14,611
Scoil na Fisice Cosmaí	1,894,078	1,549,853
	1,939,156	1,618,398
<b>Ioncam Iomlán Thionscadal</b>	<b>1,939,156</b>	<b>1,618,398</b>

#### Costais Tionscadal

	Léann Cheilteach €	Fisic Theoiriciúil €	Fisic Chosmach €	2016 Total €	2015 Iomlán €
Íocaíochtaí chuig Páirtithe/Comhlachais			186,947	186,947	86,100
Tuarastail/Scoláireachtaí	37,331	-	1,124,157	1,161,488	880,467
Taisteal	541	5,070	223,283	228,894	154,503
Eile	118	-	274,703	274,821	157,513
<b>Costas Iomlán Tionscadal</b>	<b>37,990</b>	<b>5,070</b>	<b>1,809,090</b>	<b>1,852,150</b>	<b>1,278,583</b>

### 3. (b) Sonraí Tionscadail

	Udarás Cistiúcháin	Iarmhéid Tosaigh €	Admhálacha €	Caiteachas Aisfhillteach €	Curtha i bhfeidhm mar Ioncam (Caipéal san áireamh) €	Iarmhéid Deiridh €	Caipiteal €
<b>Scoil an Leinn Cheiltigh</b>							
Irish Script on Screen		14,622	-	35	35	14,587	-
Celtic Summer School		3,553	-	-	-	3,553	-
Ogham	Dept. Arts	(3,765)	40,000	37,955	37,955	(1,720)	-
<b>Iomlán-Leánn Ceilteach</b>		<b>14,410</b>	<b>40,000</b>	<b>37,990</b>	<b>37,990</b>	<b>16,420</b>	<b>-</b>



## Nótaí do na Ráitis Airgeadais (ar leanúint)

### 3. (b) Sonraí Tionscadail (ar leanúint)

	Udarás Cistiúcháin	Iarmhéid Tosaigh €	Admhálacha €	Caiteachas Aisfillteach €	Curtha I bhfeidhm mar Ioncam (Caipiteal san áireamh) €	Iarmhéid Deiridh €	Caipiteal €
<b>Scoil na Fisce Teoiriciúla</b>							
Bethe Ansatz	SFI	10,402	-	2,000	2,000	8,402	-
T.Tchrakian	SFI	9,206	-	3,070	5,088	4,118	2,018
G. Kells	SFI	-	129,780	-	-	129,780	-
<b>Iomlán-Fisic Theoiriciúil</b>		<b>19,608</b>	<b>129,780</b>	<b>5,070</b>	<b>7,088</b>	<b>142,300</b>	<b>2,018</b>
<b>Scoil na Fisce Cosmaí</b>							
	A.						
Nam Conference	Observ'tory	29,769	-	25,000	25,000	4,769	-
GNM	SFI	9,622	-	8,908	9,622	-	-
KM3Net -PP	EC	1,135	4,800	5,935	5,935	-	-
NGST Project	ESA	13,917	281,709	138,578	144,743	150,883	6,165
KVM3Net	EC	2,033	-	2,033	2,033	-	-
Aleks Scholz-Brown Dwarfs	SFI	21,120	-	21,120	21,120	-	-
Origin of Jets	SFI	9,936	13,785	21,403	23,721	-	2,545
EASY T. Ray 2014	SFI	243,126	-	224,740	227,853	15,273	3,113
E.O' Gorman Fellow	IRC	12,724	45,895	44,944	46,452	12,167	1,508
Horizon 2020 Catalyst MKID	SFI	16,200	-	1,198	1,198	15,002	-
J Mackey Royal Society Fellowship	Royal Society	-	75,273	83,543	87,755	(12,482)	4,212
IRC New Horizons DIAS/UCD	IRC	-	41,140	21,302	21,302	19,838	-
MKID Camera IP T.Ray	SFI	-	263,113	1,525	2,778	260,335	1,253
R Garcia Lopez Dig Deep EC Fellowship	EC	-	122,923	14,235	14,235	108,688	-
J Mackey Science Week Grant	SFI	-	2,295	1,982	1,982	313	-
Maria Koutoulaki IRC Scholarship	IRC	-	12,000	5,267	5,267	6,733	-
J Mackey IRC New Foundations	IRC	-	10,000	-	-	10,000	-
<b>Iomlán-Réaltfhisic</b>		<b>359,582</b>	<b>872,933</b>	<b>621,713</b>	<b>640,996</b>	<b>591,519</b>	<b>18,796</b>

## Nótaí do na Ráitis Airgeadais (ar leanúint)

### 3. (b) Sonraí Tionscadail (ar leanúint)

	Udarás Cistiúcháin	Iarmhéid Tosaigh €	Admhálacha €	Caiteachas Aisfillteach €	Curtha I bhfeidhm mar Ioncam (Caipiteal san áireamh) €	Iarmhéid Deiridh €	Caipiteal €
Samtex	Industry	7,516	-	7,500	7,516	-	-
Geophysics Schools							
Seismology	Various	9,754	-	162	162	9,592	-
Dynamics of Continuity	SFI	4,562	-	4,580	4,562	-	-
Regional Seismic	SFI	3,955	226	4,212	4,181	-	-
CTBTO	Dept.For. Affairs	2,661	48,419	45,758	45,758	5,322	-
IRETHERM	SFI	44,611	113,643	157,176	158,254	-	-
GIANICE 11	SFI	40,288	-	25,764	25,764	14,524	-
SIRG E2174	SFI	44,261	31,300	80,544	80,544	(4,983)	-
ESA UWB Grant	ESA	25,424	-	2,447	9,353	16,071	6,906
IRECCSEM	SFI	(22,454)	59,865	46,127	46,127	(8,716)	-
Structure and Seismicity of Ireland's Crust	SFI	91,676	153,112	111,164	116,250	128,538	5,086
PIPCO	Industry	33,732	102,627	110,024	110,024	26,335	-
Winterc-3D Fullea Fellow	EC	53,743	-	100,969	100,969	(47,226)	-
4DARTIC	Industry	4,572	24,000	4,500	4,500	24,072	-
ICRAG 4359	SFI	364,344	-	77,765	77,765	286,579	-
ICRAG 4364	SFI	-	-	63,147	67,701	(67,701)	4,554
ICRAG 4360	SFI	30,112	-	124,511	171,217	(141,105)	46,706
ICRAG 4361	SFI	59,757	-	16,470	16,470	43,287	-
ICRAG 4362	SFI	135,895	-	7,959	7,959	127,936	-
ICRAG 4369	SFI	-	-	26,021	27,328	(27,328)	1,307
ICRAG 4370	SFI	-	-	25,336	25,336	(25,336)	-
ICRAG 4371	SFI	-	-	111	111	(111)	-
ICRAG 4372	SFI	-	-	2,883	2,883	(2,883)	-
Shallow Crust Fellow	SFI	28,328	37,273	56,811	56,811	8,790	-
V. Rath GSI Short Call	GSI	12,500	11,362	22,362	22,362	1,500	-
P. Arroucau GSI Short Call	GSI	11,750	11,750	23,500	23,500	-	-
iMARL Infrastructure	SFI	2,856,176	100,000	-	-	2,956,176	-
Geo External Services	Various	-	39,675	39,574	39,675	-	-
ERC Development iTHERC	SFI	-	262,791	-	-	262,791	-
NIAP-PassVel	Marine Institute	-	9,976	-	-	9,976	-
Duygu Kiyon Fellowship	SFI	-	58,239	-	-	58,239	-
<b>Iomlán-Geoifisic</b>		<b>3,843,163</b>	<b>1,064,258</b>	<b>1,187,377</b>	<b>1,253,082</b>	<b>3,654,339</b>	<b>64,559</b>
<b>Iomlán Físic Chosmach</b>		<b>4,202,745</b>	<b>1,937,191</b>	<b>1,809,090</b>	<b>1,894,078</b>	<b>4,245,858</b>	<b>83,355</b>
<b>Iomlán DIAS</b>		<b>4,236,763</b>	<b>2,106,971</b>	<b>1,852,150</b>	<b>1,939,156</b>	<b>4,404,578</b>	<b>85,373</b>

#### Nótaí

Cuirtear fáiltas tionscadail i bhfeidhm mar ioncam tionscadail, ag leibhéal arb ionann an caiteachas bliantúil ag an tionscadal lena mbaineann siad. Léiriú is ea na comhorduithe dúnta thuas ar forchostas a tuilleadh go dáta agus maoiniú roimh ré chun freastal ar thiomantais airgeadais i 2017. Léiríonn an colún caipitil an caiteachas ar shócmhainní seasta i rith 2016.

## Nótaí do na Ráitis Airgeadais (ar leanúint)

### 4. Ioncam Eile

	2016 €	2015 €
Ús bainc	2,402	8,121
Táillí & Deontais	1,885	1,800
Eile	3,189	32,490
<b>Iomlán</b>	<b>7,476</b>	<b>42,411</b>

### 5. Sócmhainní Seasta

Costais	Troscán & Trealamh €	Mótarfheithicilí €	Ríomhairí €	Iomlán €
Iarmhéid Tosaigh 1/1/2016	3,783,951	15,131	2,369,194	6,168,276
Breiseanna *	47,959	-	50,512	98,471
Riарtha	(9,651)	-	(124,355)	(134,006)
	3,822,259	15,131	2,295,351	6,132,741
<b>Dímheas</b>				
Iarmhéid Tosaigh 1/1/2016	2,953,349	1,627	2,113,170	5,068,146
Muirear	216,250	3,790	147,833	367,873
Riарtha	(6,230)	-	(124,355)	(130,585)
	3,163,369	5,417	2,136,648	5,305,434
Luach glan de réir na leabhar 31/12/2016	658,890	9,714	158,703	827,307
Luach glan de réir na leabhar 31/12/2015	830,602	13,504	256,024	1,100,130

#### Nota

\* Caipitlítear na sócmhainní seasta de bhreis ar €1,000 i leabhair DIAS.

### 6. Cúlchiste Caipitil

	2016 €	2015 €
Iarmhéid amhail an 1 Eanáir	1,100,130	1,352,903
<b>Aistriú ó/(chuig) Cuntas Ioncaim agus Caiteachais</b>		
Ioncam leithroinnte le sócmhainní seasta a fháil (Maoinithe ag Tionascadal)	85,373	68,703
Ioncam leithroinnte le sócmhainní seasta a fháil (Maoinithe ag an Státchiste)	13,098	80,154
Amúchadh ag teacht le dímheas sócmhainní	(367,873)	(400,799)
Méid scaoilte ar dhiúscairtí	(3,421)	(831)
	(272,823)	(252,773)
<b>Iarmhéid amhail an 31 Nollaig</b>	<b>827,307</b>	<b>1,100,130</b>

## Nótaí do na Ráitis Airgeadais (ar leanúint)

### 7. Creidiúnaithe - Méideanna atá dlite laistigh de bhliain amháin

	2016 €	2015 €
Creidiúnaithe Trádála	101,232	290,924
Fabhruithe	255,263	253,032
CBL	35,713	20,055
Nithe Iníoctha Ioncaim	138,749	133,921
	530,957	697,932
<b>Creidiúnaithe dlite tar éis dhá mhí dhéag</b>	<b>2016 €</b>	<b>2015 €</b>
Tá an t-airgead a bhaineann leo seo sealbhaithe mar éarlais.		
Comhdhéanta as: Vernam Hull Bequest	25,247	25,239
Carmody Fund	2,461	2,461
Cuntas Rialaithe Sochair Scoir	454,059	312,438
	481,767	340,138

### 8. Féichiúnaithe

	2016 €	2015 €
Réamhíocaíochtaí	144,651	244,115
Infháltais ó Dhíolacháin Leabhar	3,872	1,241
Ilnithe	13,340	19,948
Féichiúnaí	106,218	-
	268,081	265,304

### 9. Costais Phárolla

	Léann Cheilteach €	Fisic Theoiriciúil €	Fisic Chosmach €	Riar. €	2016 Iomlán €	2015 Iomlán €
Tuarastal/Pá	832,668	706,613	1,327,080	550,679	3,417,040	3,338,099
Séisíní	-	-	-	49,395	49,395	62,910
Scoláireachtaí	109,610	69,758	108,946	-	288,314	325,527
Airgead Oinigh	1,749	-	-	-	1,749	500
	944,027	776,371	1,436,026	600,074	3,756,498	3,727,036

#### Nota

Tocadh luach €224,492 (2015:€252,518) laghdaithe tabhaidh pinsin leis on Roinn Oideachais agus Scileanna I rith 2016.

Líon Foirne 50.5 (2015:50.5), Líon ECF 55 (2015: 55).

#### Pá na bPríomhbhall Bainistíochta

Áiríonn na príomhbhaill bainistíochta an Clárartheoir agus an fhoireann shinsearach bainistíochta as a raibh costas €599,765 (2015 €599,765) sa bhliain.

## Nótaí do na Ráitis Airgeadais (ar leanúint)

### 10. Costais Ghinearálta

	Léann Cheilteach €	Fisic Theoiriciúil €	Fisic Chosmach €	Riar. €	2016 Iomlán €	2015 Iomlán €
Ilghnéitheach	7,748	1,074	34,997	6,392	50,211	52,663
*Tionscnaimh cur chun cinn/Lóin	2,552	-	6,937	5,455	14,944	21,007
Táillí Gairmiúla	-	-	-	26,315	26,315	49,864
Táillí Dlí	-	-	-	19,054	19,054	-
Sainchomhairleoireacht	-	-	-	18,845	18,845	-
Oiliúint	611	-	496	4,848	5,955	11,591
Táille Iniúchta	-	-	-	16,000	16,000	18,000
Muirir Bhainc	-	-	-	1,140	1,140	1,479
*Costais Cruinnithe Boird	-	-	-	26,771	26,771	25,840
Sláinte agus Sábháilteacht	-	-	-	4,439	4,439	5,050
	10,911	1,074	42,430	129,259	183,674	185,494

B'é €10,414 an Caiteachas Fáilteachais i 2016.

### 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 31 Plás Mhic Liam.

Tá téarma 82 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 2017 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
	<b>113,609</b>

An 31 Nollaig 2016 bhí na híocaíochtaí léasa íosta seo a leanas ag an Institiúid faoi léasanna oibríocháin dochealaithe do gach ceann de na tréimhsí seo a leanas:

	2016 €	2015 €
Iníochta laistigh de bhliain amháin	113,609	113,609
Idir dhá bhliain agus cúig bliana	990	990
I ndiaidh cúig bliana	25,740	26,070



## Nótaí do na Ráitis Airgeadais (ar leanúint)

### 12. Costais Sochair Scoir

#### a) Anailís ar na costais iomlána pinsin curtha chun dochair do Chaiteachas

	2016 (€'000)	2015 (€'000)
Costas na Seirbhíse Reatha	1,226	1,040
Ús ar Dhliteanais Sochair Pinsin	1,280	1,218
Ranníocaíochtaí Fostaí	(128)	(118)
	2,378	2,140

#### b) Gluaiseacht i nGlan-Dliteanas Sochair Scoir i rith na bliana airgeadais

	2016 (€'000)	2015 (€'000)
Glan-Dliteanas Sochair Pinsin amhail an 1 Eanáir	(51,210)	(53,870)
Costas na Seirbhíse Reatha	(1,226)	(1,040)
Costais Úis	(1,280)	(1,218)
(Gnóthachan)/cailteanas achtúireach	(5,606)	3,409
Sochair Pinsin íoctha sa bhliain	1,515	1,509
Glan-Dliteanas Pinsin amhail an 31 Nollaig	(57,807)	(51,210)

#### 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 meastacháin 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:

	2016 (€'000)	2015 (€'000)
Maoiniú inaishghabhála i ndáil le costais pinsin na bliana reatha	2,506	2,258
Deontas Stáit feidhmithe chun pinsinéirí a íoc	(1,515)	(1,509)
	991	749

Ba í €57.807 milliún (2015: €51.210 milliún) an tsócmhainn mhaoinithe iarchurtha do phinsin amhail an 31 Nollaig 2016.

#### d) Stair na nOibleagáidí faoin scéim shochair shainithe

	2016 (€'000)	2015 (€'000)	2014 (€'000)
Oibleagáidí Shochair Shainithe.	57,807	51,210	53,870
(Gnóthachain)/cailteanais iarbhíre ar dhliteanais na scéime.	(765)	(1,246)	309
Céatadán de Luach Dhliteanais na Scéime.	(1.32%)	(2.50%)	0.60%

Tá (gnóthachan)/cailteanas achtúireach carnach €7,138,000 (2015: €1,532,000) aitheanta sa Ráiteas d'Tomlán na nGnóthachan agus na gCailteanas Aitheanta.

# Nótaí do na Ráitis Airgeadais (ar leanúint)

## 12. Costais Sochair Scoir (ar leanúint)

### 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 FRS102 ar luacháil iomlán achtúireach a rinne achtúire neamhspleách cáilithe a chuir ceanglais FRS san áireamh chun dliteanais na scéime amhail an 31 Nollaig 2016 a mheasúnú.

Is í an Scéim Pinsin Seirbhíse Poiblí Aonair (Scéim 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.

Is mar a leanas a bhí na príomh-thoimhdí achtúireacha a úsáideadh:

	2016	2015	2014
Ráta na nArduithe Tuarastail	2.50%	2.50%	2.50%
Ráta Ardaithe i Sochair Pinsin atá á n-Íoc	2.00%	2.00%	2.00%
Ráta Lascaine	1.75%	2.50%	2.25%
Ráta Boilscithe	1.50%	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 2016 agus in 2036.

	31/12/2016		31/12/2015	
	2016	2036	2015	2035
Aois 65 sa bhliain				
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 threoirilínite atá eisithe ag an Roinn Airgeadais maidir le leasana a nochtáíonn 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.

## Nótaí do na Ráitis Airgeadais (ar leanúint)

### 14. Nochtadh Comhaltaí na Comhairle/Tuarastal an Chláraitheora, Táillí agus Costais

	Luach Saothair Iomláin 2016 €	Speansais Iomlána 2016 €	Luach Saothair Iomláin 2015 €	Speansais Iomlána 2015 €
<b>Comhalta den Chomhairle</b>				
Dr Vincent Cunnane		1,285		939
<b>Baill ceaptha ag Boird Rialaithe na gComhScoileanna</b>				
An tOllamh Gerry Wrixon		665		125
An tOllamh Arthur Jaffe		942		1,503
An tOllamh Anders Ahlqvist		8,148		8,908
An tOllamh Werner Nahm				
An tOllamh Luke Drury				
An tOllamh Liam Breatnach				
<b>Cláraitheoir</b>				
Cecil Uasal Keaveney *	97,906		97,906	
	97,906	11,040	97,906	11,475

#### \* Nóta

Faigheann an Cláraitheoir turastail anháin. Ní íochtar aon bhónas leis. Ní sháraíonn teidlíochtaí pinsin an Chláraitheora gnáththeidlíochtaí scéim aoisliúntais le sochar sainithe na hearnála poiblí.

### 15. Líon Fostaithe le Sochair í 2016 that fall within bands of €10,000 from €60,000 onwards

Líon fostaithe le sochair €60k	Líon fostaithe le sochair €70k	Líon fostaithe le sochair €80k	Líon fostaithe le sochair €90k	Líon fostaithe le sochair €100k	Líon fostaithe le sochair €110k	Líon fostaithe le sochair €120k	Líon fostaithe le sochair €130k
1	7	1	2	2	-	-	6

### 16. Ranníocaíochtaí Pinsin Fostóra

Ranníocaíochtaí Fostóra í 2016 = €135,432

### 17. Ceangaltais Caipitil

Tá ceangaltais caipitil de €100,000 do 2017 nach bhfuil curtha ar fáil sna ráitis airgeadais.

### 18. iMarl Project

San áireamh in infíocthaigh togra tá €2,956,176 (2015: €2,856,176) i dtaca leis an togra infreastruchtúir iMarl. Mar thoradh ar an bpróiseas tairisceana, níor tabhadh aon chaiteachas i dtaca leis an togra i 2016 (2015: €dada). Tá an chéad phróiseas tairisceana curtha i gcrích anois agus tá an chéad chonradh le tosú i 2017.

## Nótaí do na Ráitis Airgeadais (ar leanúint)

### 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 gciann 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 thairbhí 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 ndlíteanas 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 athraíonn 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.

#### 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 boilsíú, rátaí báis agus rátaí lascaine a roghnú. Déantar sócmhainn le sochar sainithe a thaifeadh atá ag teacht leis an dlíteanas ar an bunús go bhfuil an dlíteanas maoinithe ag an stát.

#### Soláthairtí

Déanann an Institiúid soláthairtí d'oibleagáidí dleathacha agus cruthaitheacha, arb eol di a bheith fós le hóc 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 27 Meitheamh 2017.





