

CRIS systems as key e-infrastructure elements to support Open Science implementation within the European Research Area

Niamh Brennan

Programme Manager for Research Informatics.
The Library of Trinity College Dublin



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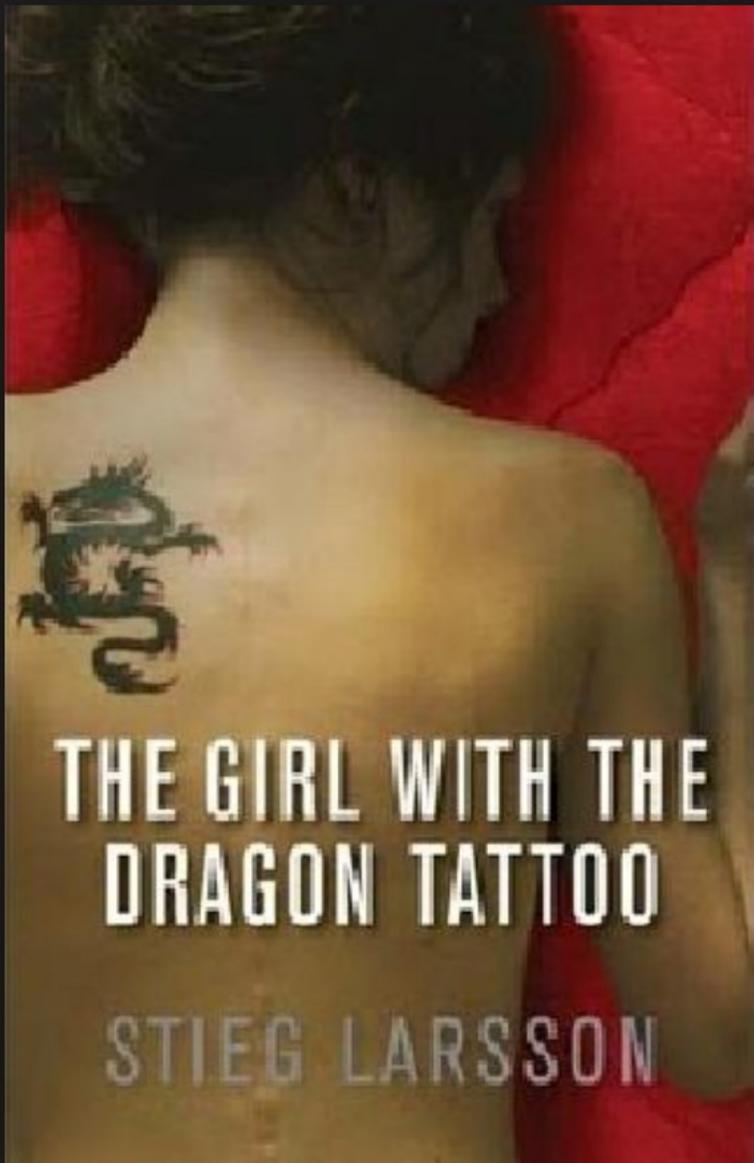
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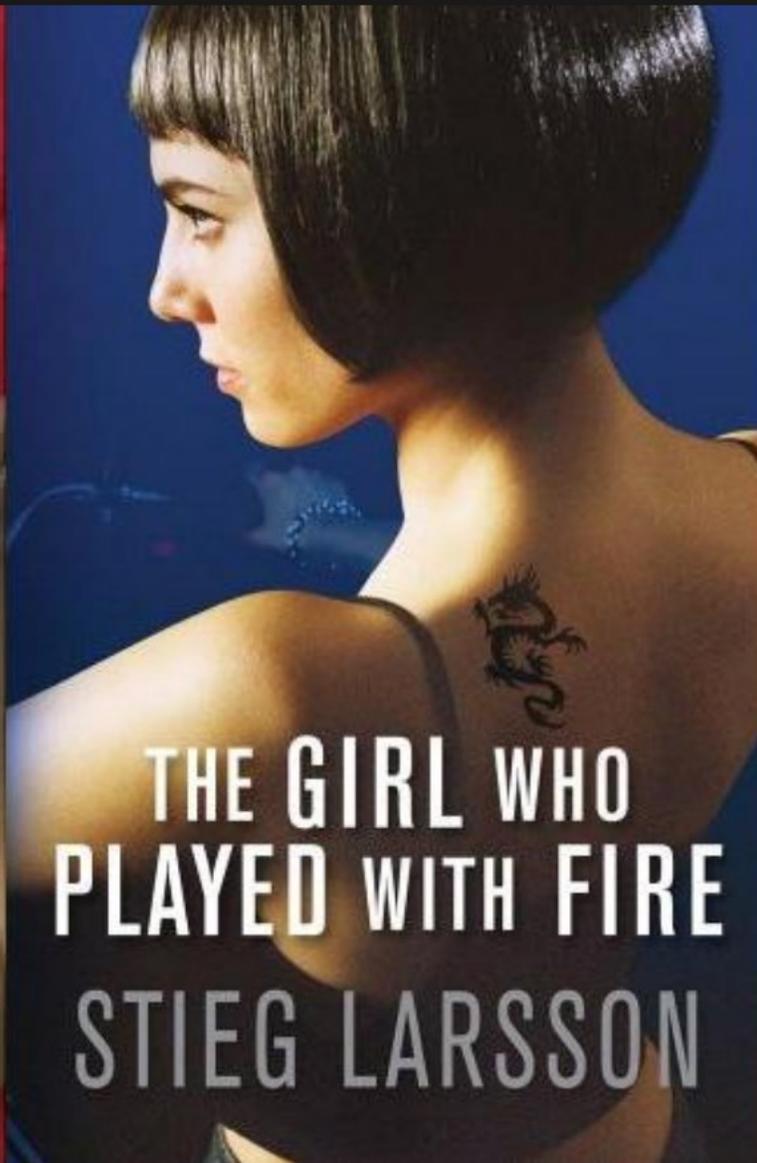


OpenAIRE



**THE GIRL WITH THE
DRAGON TATTOO**

STIEG LARSSON



**THE GIRL WHO
PLAYED WITH FIRE**

STIEG LARSSON

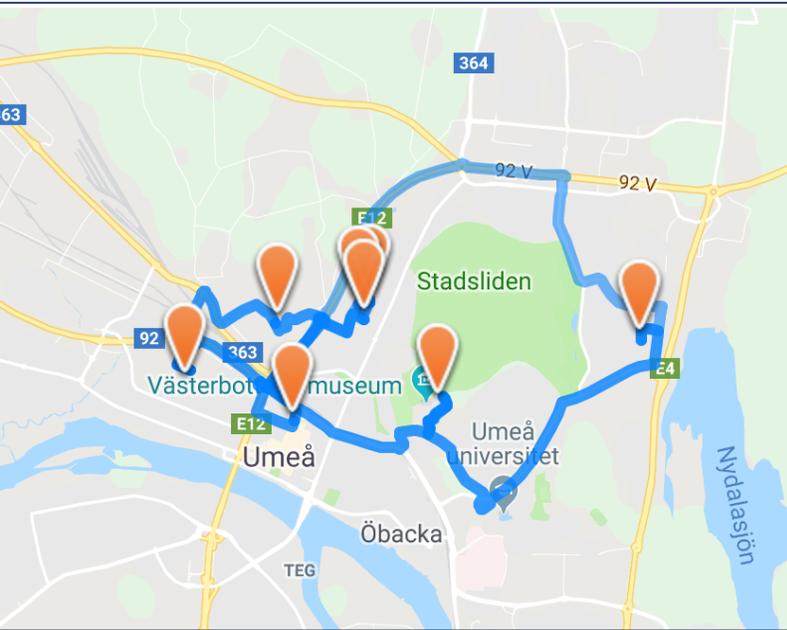


"The most original heroine
to emerge in crime fiction
for many years"

—*ROBERT KENNEDY, Independent*

**THE GIRL WHO KICKED
THE HORNETS' NEST**

STIEG LARSSON



Hagmarksvägen 36

When Stieg Larsson was nine years of age his parents found jobs in Umeå and the family moved to Hagmarksv. He shared a room with his three year younger brother Joakim and before they went to sleep Stieg often told fictional and other exciting bedtime stories.



Norra Ersmarksg. 52

After a few years on Hagmarksvägen, the Larsson family moved the short distance to Norra Ersmarksgatan 52. He realised that Stieg loved writing. Consequently, his parents gave Stieg a Facit typewriter.



Vretgatan 12

To prevent that Stieg Larsson's writing would disturb the neighbors' night rest, his parents rented a room for him at Vretgatan 12. From their balcony, the family could often see Stieg's lights burning late into his nights of creativity.

Stieg Larsson



The Mekka coffee shop

Stieg and a one year older chum, Rune Forsgren, together published Sfären, a



Regiment

After his trip through Europe, Stieg Larsson did his military service as a



Upper secondary schooling at Dragonskolan

“Been there, done that, got the T-shirt.”

— Stieg Larsson, *The Girl Who Kicked the Hornet's Nest*



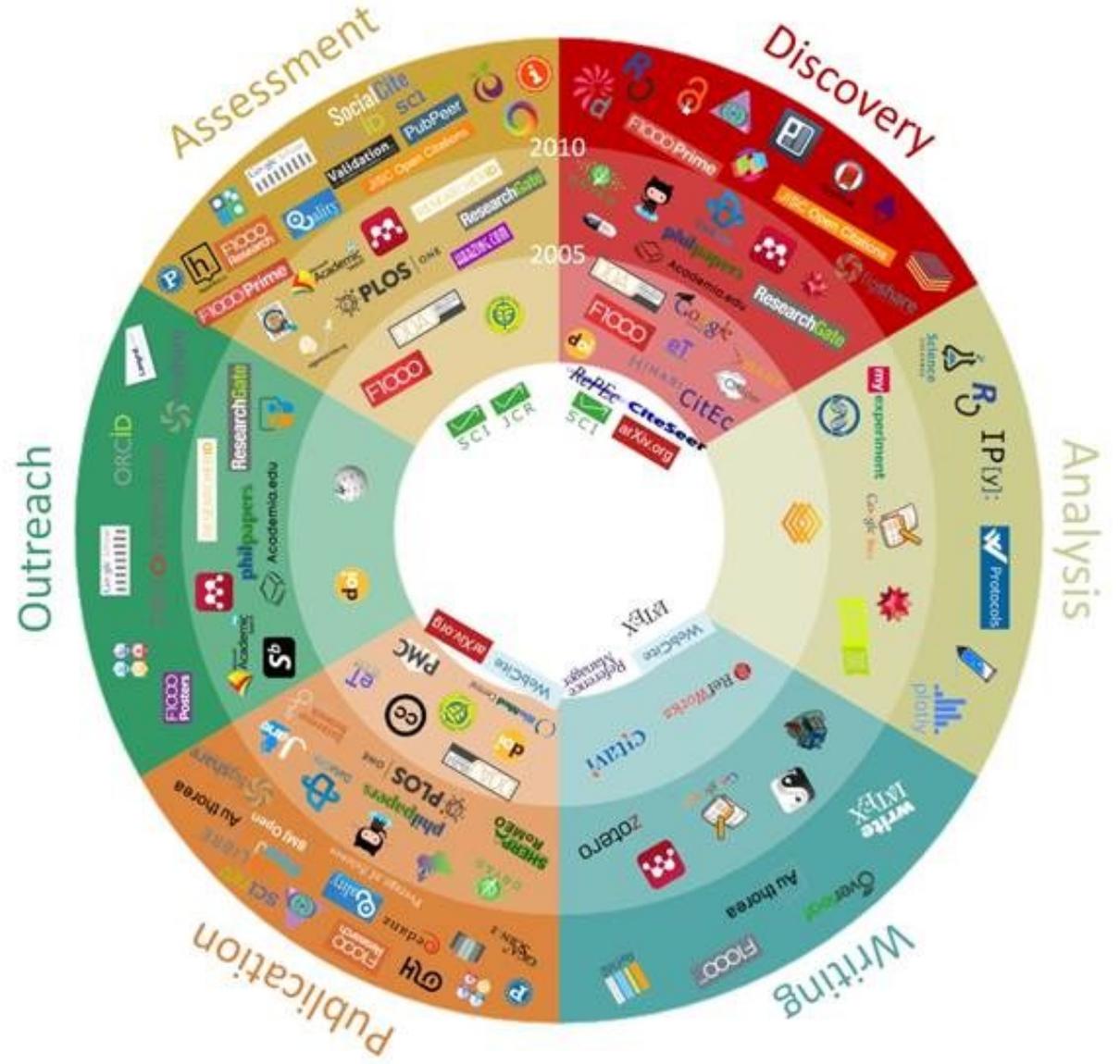
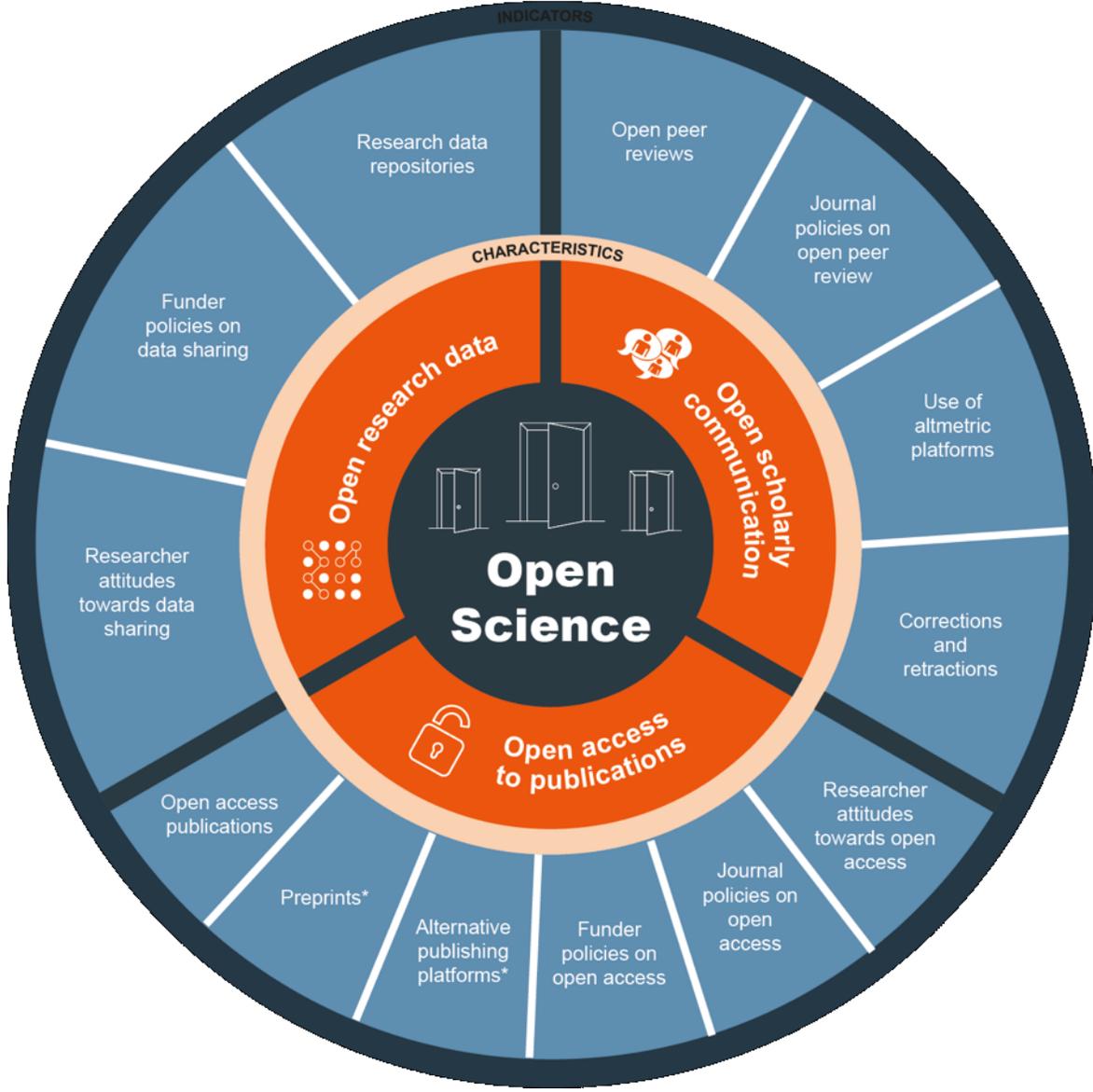
Open Science and availability of information: The role of CRISs



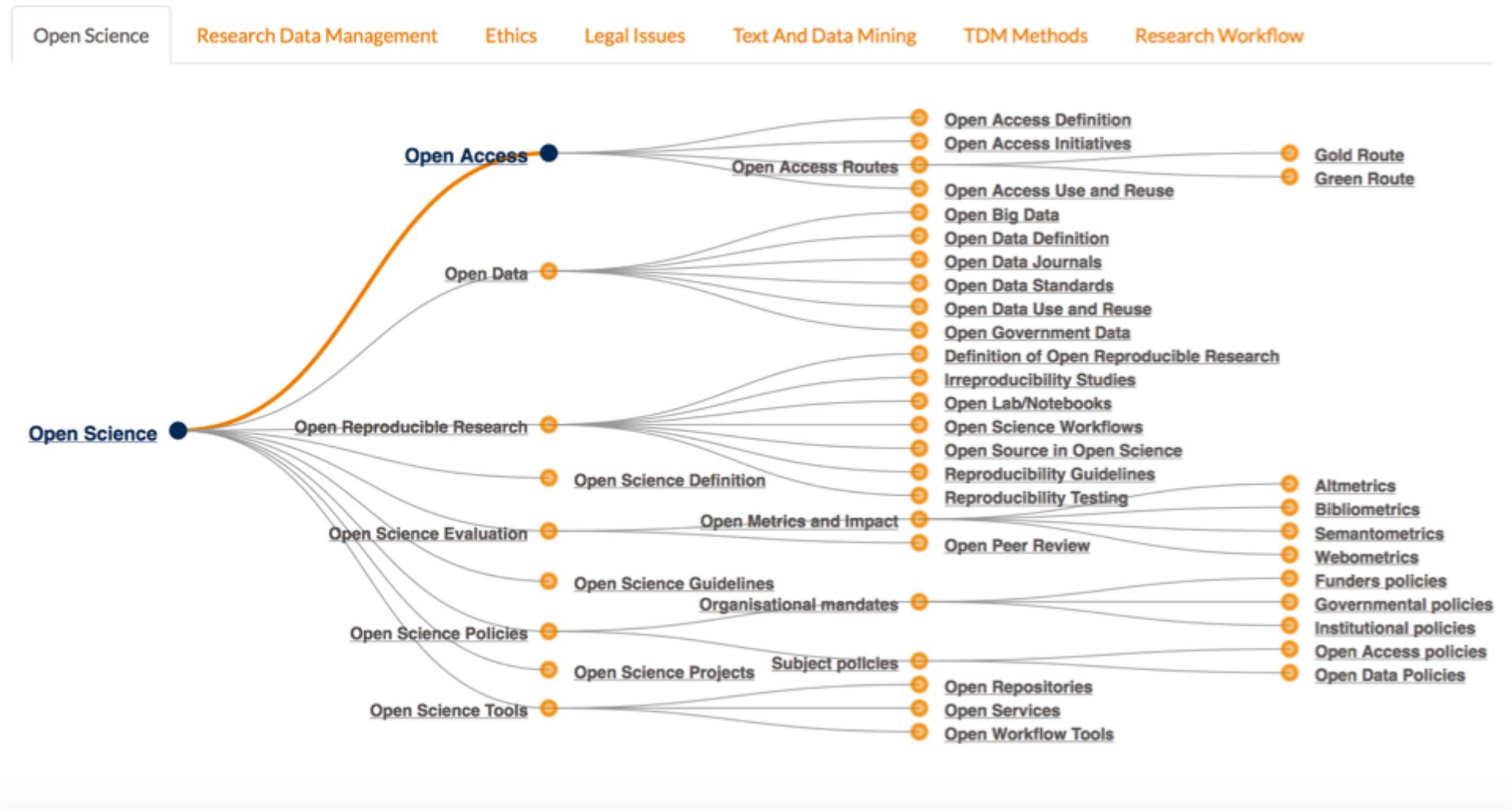
Take home messages

- Open Science assumes the availability of optimal (meaning enough complete and detailed) information on research.
- Therefore, a Research Information Infrastructure (RII) is to be considered a vital, underlying and inextricable part of an Open Science Infrastructure, a.o.t. to guarantee the FAIR-aspect.
- In order for such a RII to function optimally, interoperability between the resources in the infrastructure is necessary, this means: the use of standard and persistent identifiers, standard vocabularies, and a standard exchange format.
- CRISs are to be considered (the) primary resources in the information infrastructure, due to their broad and detailed coverage of aspects and the available, “pre-defined” interlinkage between the information elements in a CRIS.
- A big advantage of CRISs is the accountability of the information: data registered in a CRIS are being controlled and checked by the institution that manages the CRIS. As such a CRIS-based Research Information Infrastructure has a kind of built-in trustworthiness that is difficult if not impossible to achieve in the concept of a self-regulating scientific community.
- The researcher (motivation, committment) is the key.





FOSTER Open Science Taxonomy Tree



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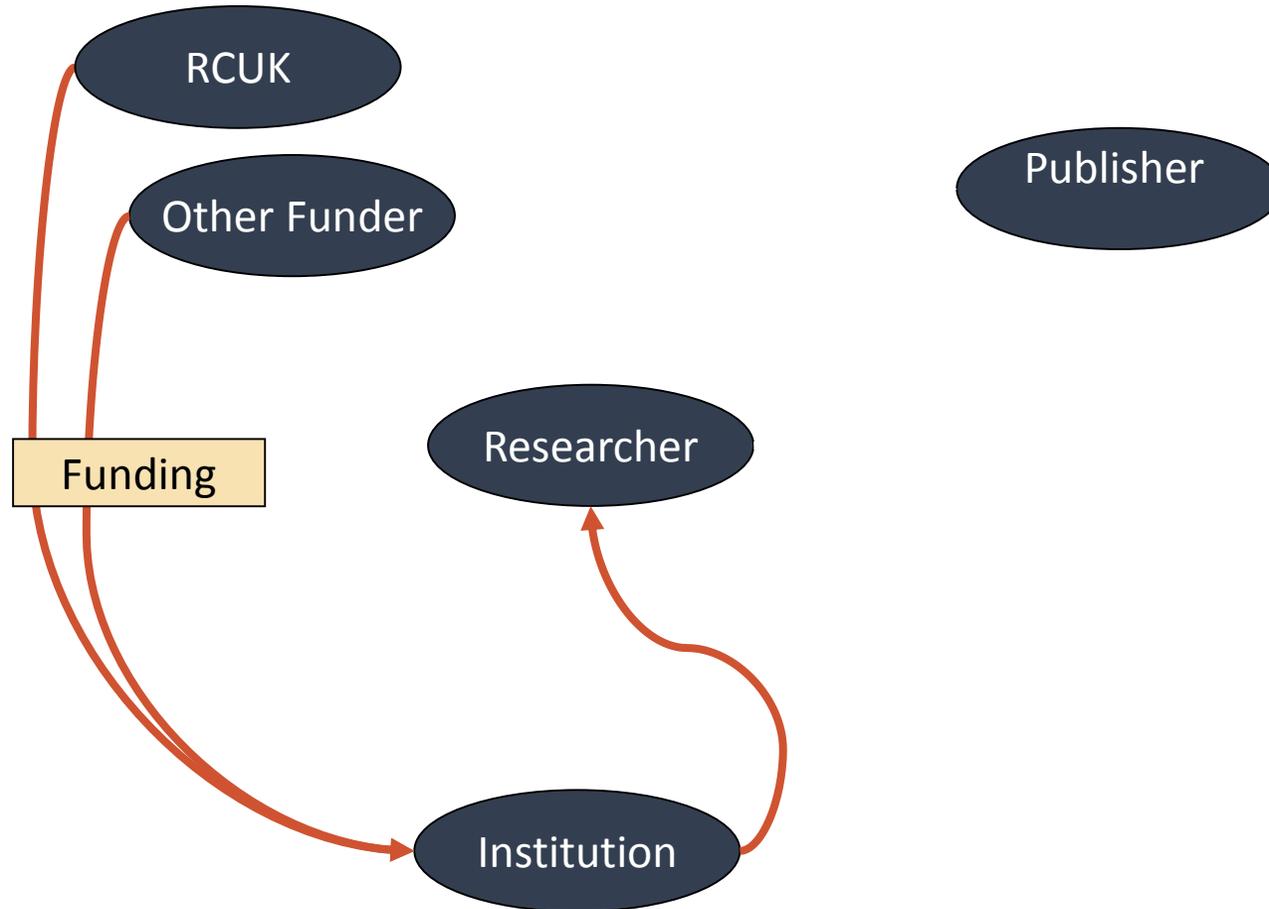
- Innovation
- Transparency
- Validation
- Reproducibility
- Accountability
- Accessibility
- Re-usability



European Commission's 8 pillars of Open Science

- **The future of scholarly publishing**
- **FAIR data**
- **The European Open Science Cloud**
- **Education and skills**
- **Rewards and incentives**
- **Next-generation metrics ('Altmetrics')**
- **Research integrity**
- **Citizen science**

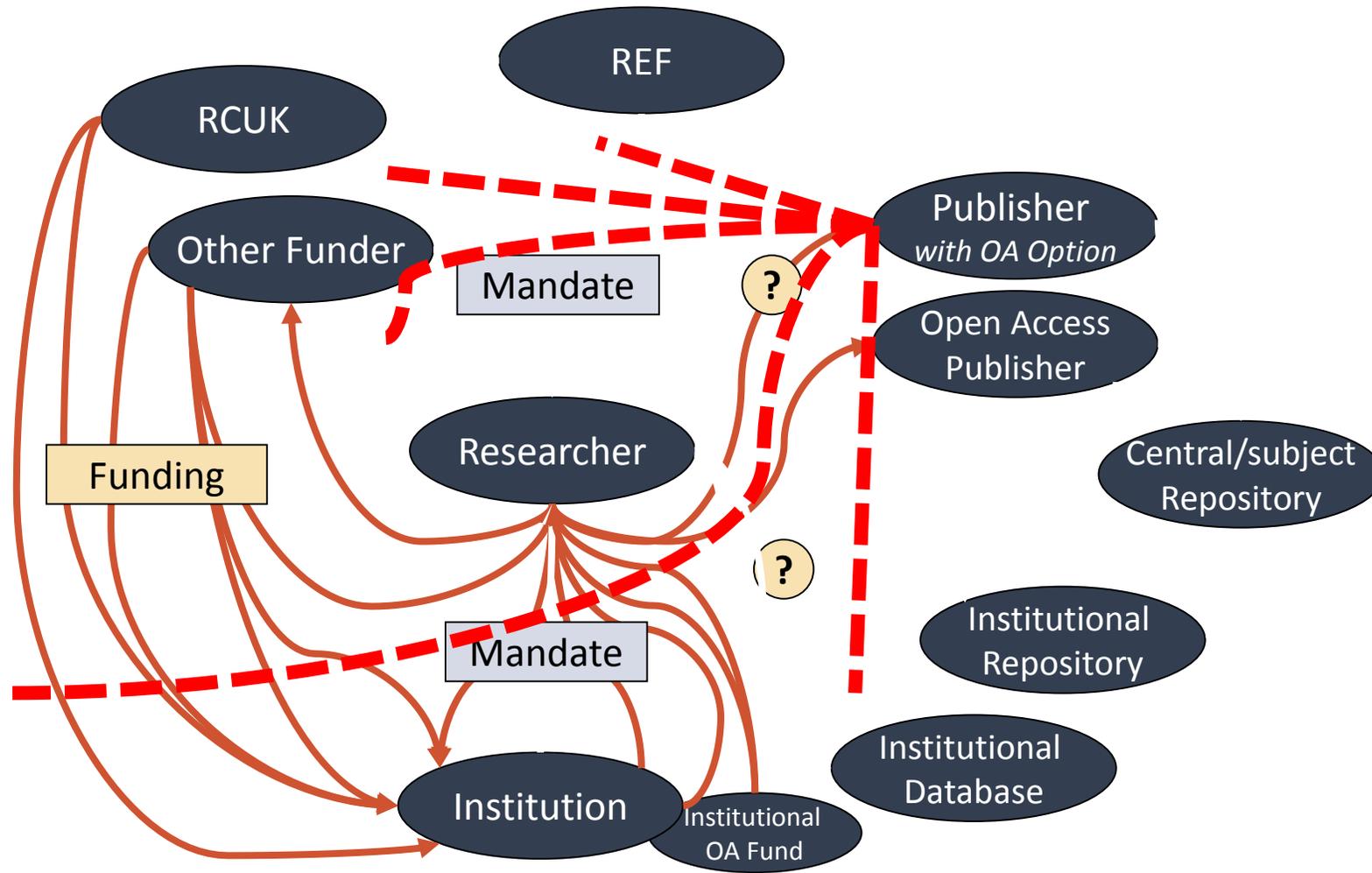
Researcher's view from the past. . .



From Bill Hubbard, University of Nottingham

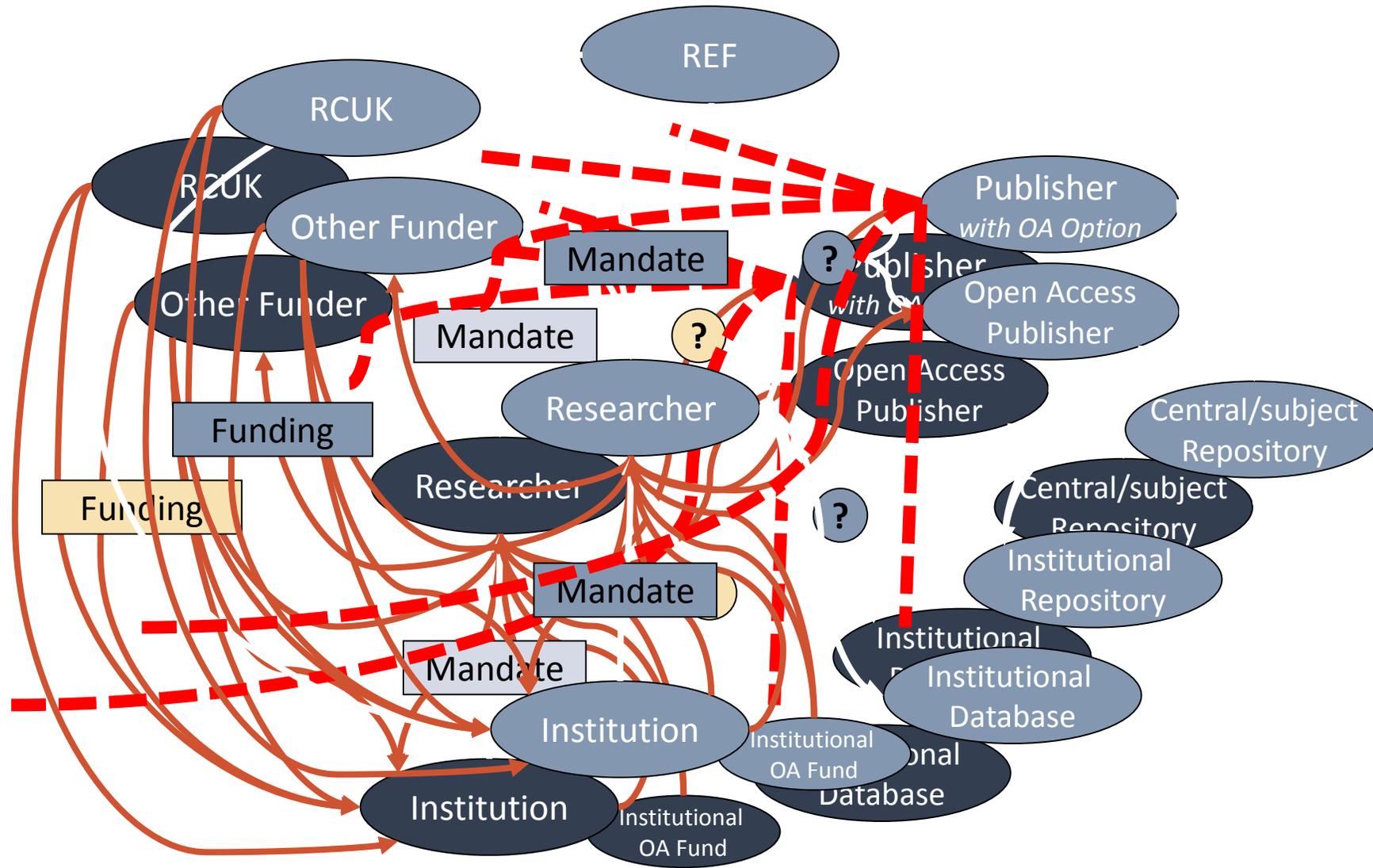
Researcher's view . . .

with the addition of Open Access:



From Bill Hubbard, University of Nottingham

– with added research data!



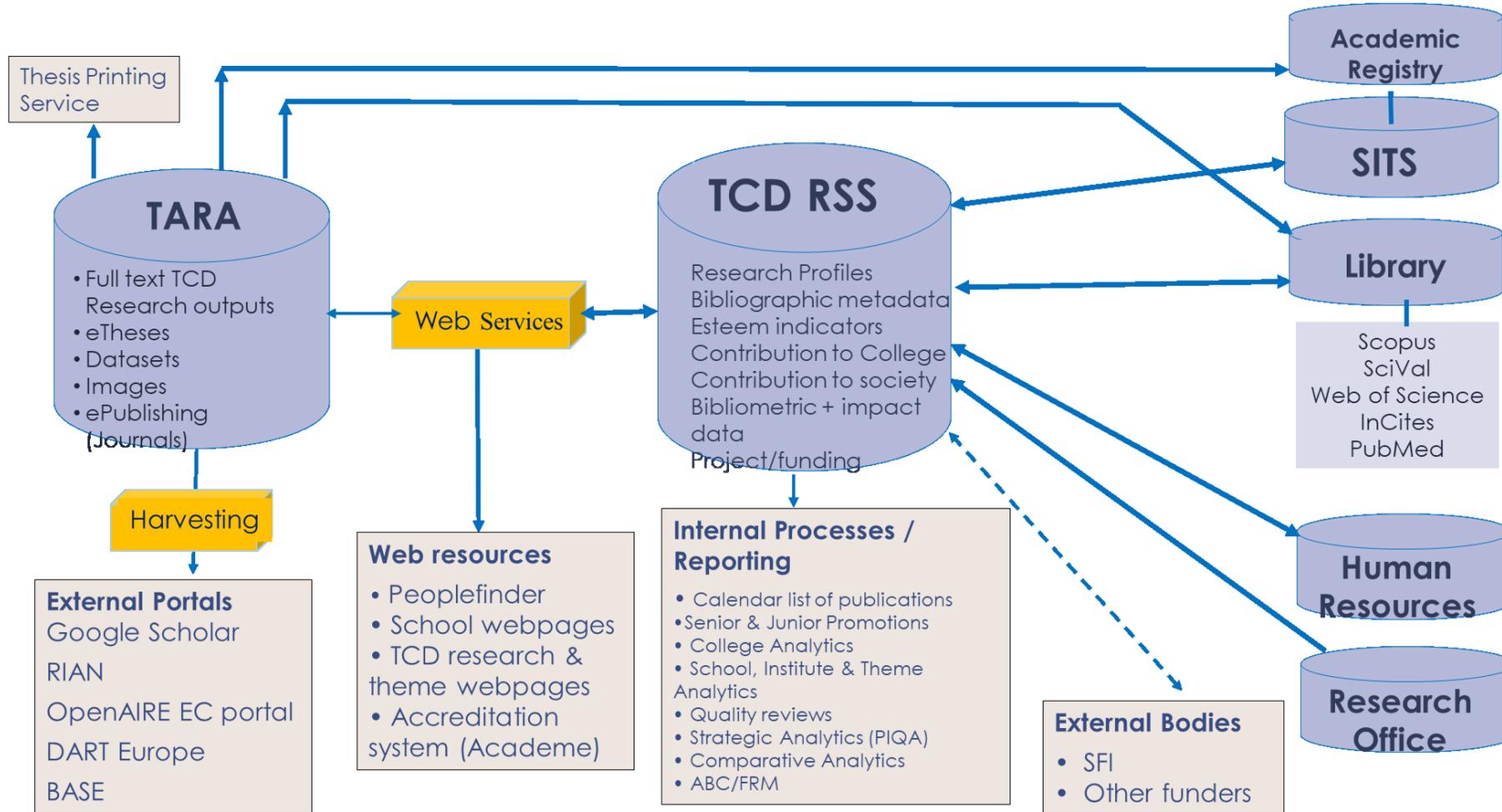
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“You're an entropic chaos factor.”

— Stieg Larsson, *The Girl Who Played with Fire*



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Biography

Last Updated: 12-NOV-14

Dr. Patrick Prendergast, BA, BAI, PhD, ScD, C.Eng, FIEI, FTCD, MRIA is Provost of Trinity College Dublin. Following his election on 2nd April 2011, he commenced his 10-year term as the 44th Provost of the College on 1st August 2011. Dr Prendergast held the Chair of Bio-engineering from 2007 to 2011. He is a Principal Investigator of the Trinity Centre for Bioengineering. Prior to working in TCD he held post-doctoral positions in Rizzoli Orthopaedic Institute, Bologna and the University of Nijmegen. On a sabbatical year (2001–2002) he was Visiting Professor, Institute of Fundamental Technological Research, Poland and Senior Research Fellow, Koiter Institute, Technical University of Delft, The Netherlands. He is a Chartered Engineer and a Fellow of the Institution of Engineers of Ireland. He is a past-president of the Section of Bioengineering of the Royal Academy of Medicine in Ireland (2000-2002), and a Past-President of the European Society of Biomechanics (2002-2004). He won the Parsons Medal in Engineering Science from the Royal Irish Academy in 2003. His research interests are in biomechanics and implant design, and in tissue engineering and mechanobiology. He was Dean of Graduate Studies at the University of Dublin from 2004-2007. In 2007 he was President of the European Alliance of Medical and Biological Engineering Societies. Also in 2007 he obtained a Chair in Bio-Engineering. In March 2008 he was elected to membership of the Royal Irish Academy. In July 2009 he was invited to deliver the Wartenweiler Memorial Lecture at the International Society of Biomechanics in Capetown, South Africa. He was Director of the Trinity Centre for Bioengineering from 2002 to 2008. He was Vice Provost/Chief Academic Officer from July 2008 to October 2010. He obtained a ScD from the University of Dublin in 2009.

Teaching interests and responsibilities

Last Updated: 12-NOV-14

No data has yet been entered for the "Teaching interests and responsibilities " section!

Description of Research Interests

His research interests are in biomechanics and implant design, and in tissue engineering and mechanobiology.

Professional Qualifications

Last Updated: 06-MAY-14

Qualification	Institution	Class of Degree	Title of Dissertation	Date Conferred	Public
 BA, BAI	University of Dublin			1987	Y 
 PhD	University of Dublin			1991	Y 
 Chartered Engineer	Institution of Engineers of Ireland			1993	Y 

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+ Publications and Other Research Outputs

Last Updated: 15-NOV-13

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Peer Reviewed Publications and Other Research Outputs. Total: 265

Edit	Type	Reference	Year	Status	Delete
	Book Chapter	Finite element modelling in orthopaedic implant design in, editor(s)RW Lindsey, Z Gugala , <i>Orthopaedic Implants: Applications, Complications and Management</i> , [Prendergast, P.J, Taylor, M]		IN_PRESS	✗
	Journal Article	Khayyeri H, Prendergast PJ, The emergence of mechanoregulated endochondral ossification in evolution., <i>Journal of biomechanics</i> , 46, (4), 2013, p731-7	2013	PUBLISHED	✗
	Journal Article	Boyle CJ, Lennon AB, Prendergast PJ, Application of a mechanobiological simulation technique to stents used clinically., <i>Journal of biomechanics</i> , 46, (5), 2013, p918-24	2013	PUBLISHED	✗
	Journal Article	Khayyeri H, Isaksson H, Prendergast PJ, Corroboration of computational models for mechanoregulated stem cell differentiation., <i>Computer methods in biomechanics and biomedical engineering</i> , 2013	2013	PUBLISHED	✗
	Journal Article	Newe, C., Cunningham, E., Buchanan, F., Walker, G., Prendergast, P.J., Lennon, A., Dunne, N., Static and dynamic degradation of sintered calcium phosphate ceramics, <i>Key Engineering Materials</i> , 493-494, 2012, p861 - 865 DOI	2012	PUBLISHED	✗
	Journal Article	Nowlan, N.C., Dumas, G., Tajbaksh, S., Prendergast, P.J., Murphy, P., Biophysical stimuli induced by passive movements compensate for lack of skeletal muscle during embryonic skeletogenesis., <i>Biomechanics and Modelling in Mechanobiology</i> , 11, 2012, p207 - 219	2012	PUBLISHED	✗
	Journal Article	Galibarov PE, Prendergast PJ, Lennon AB, A probabilistic modelling scheme for analysis of long-term failure of cemented femoral joint replacements., <i>Proceedings of the Institution of Mechanical Engineers. Part H, Journal of engineering in medicine</i> , 226, (12), 2012, p927-38	2012	PUBLISHED	✗
	Journal Article	Kelly, G.M., Kilpatrick, J.I., van Es, M.H., Weafer, P.P., Prendergast, P.J., Jarvis, S.P. , Bone cell elasticity and morphology changes during the cell cycle , <i>Journal of Biomechanics</i> , 44, (8), 2011, p1484-1490 DOI	2011	PUBLISHED	✗
	Journal Article	Khayyeri, H., Checa, S., Tägil, M., Aspenberg, P., Prendergast, P.J, Variability observed in mechano-regulated in vivo tissue differentiation can be explained by variation in cell mechano-sensitivity, <i>Journal of Biomechanics</i> , 44, (6), 2011, p1051-1058 DOI	2011	PUBLISHED	✗
	Journal Article	Checa, S. , Prendergast, P.J., Duda, G.N, Inter-species investigation of the mechano-regulation of bone healing: Comparison of secondary bone healing in sheep and rat, <i>Journal of Biomechanics</i> , 44, (7), 2011, p1237-1245 DOI	2011	PUBLISHED	✗
	Book Chapter	Computational techniques for selection of biomaterial scaffolds for tissue engineering in, editor(s)P.R. Fernandes, P. Bártoło , <i>Advances on Modelling in Tissue Engineering</i> , Berlin, Springer, 2011, [Checa, S, Sandino, C, Byrne DP, Kelly, DJ, Lacroix, D & Prendergast, PJ]	2011	PUBLISHED	✗
	Journal Article	Karen A. Roddy, Geraldine M. Kelly, Maarten H. van Esc, Paula Murphy, and Patrick J. Prendergast, Dynamic patterns of mechanical stimulation co-localise with growth and cell proliferation during morphogenesis in the avian embryonic knee joint, <i>Journal of Biomechanics</i> , 44, (11), 2011, p143-149 TARA - Full Text	2011	PUBLISHED	✗
	Journal Article	Roddy KA, Prendergast PJ, Murphy P, Mechanical Influences on Morphogenesis of the Knee Joint Revealed through Morphological, Molecular and Computational Analysis of Immobilised Embryos., <i>PLoS one</i> , 6, (2), 2011, pe17526 TARA - Full Text	2011	PUBLISHED	✗
	Journal Article	Nowlan N.C., Dumas, G., Tajbaksh S., Prendergast P. And Murphy P. , Passive Movement Due to External Mechanical Stimulation Plays a Role in Embryonic Skeletal Development. , <i>Biomechanics and Modelling in Mechanobiology</i> , epub ahead of print, 2011	2011	PUBLISHED	✗
	Journal Article	P.J. Prendergast, P.E. Galibarov, C. Lowrey, A.B. Lennon, Computer simulating a clinical trial of a load-bearing implant: example of an intramedullary prosthesis, <i>Journal of the Mechanical Behavior of Biomedical Materials</i> , 4, (8), 2011, p1880-1887 TARA - Full Text	2011	PUBLISHED	✗
	Journal Article	Nowlan, N.C., Dumas, G., Tajbaksh, S., Prendergast, P.J., Murphy, P. , Biophysical stimuli induced by passive movements compensate for lack of skeletal muscle during embryonic skeletogenesis , <i>Biomechanics and Modelling in Mechanobiology</i> , 11, (1-2), 2011, p207-219 TARA - Full Text	2011	PUBLISHED	✗

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Awadhesh Narayan, Aaron Hurley and Stefano Sanvito, Gate controlled spin pumping at a quantum spin Hall edge, *Applied Physics Letters*, 103, 2013, 142407-

Abstract:

We propose a four-terminal device designed to manipulate by all electrical means the spin of a magnetic adatom positioned at the edge of a quantum spin Hall insulator. We show that an electrical gate, able to tune the interface resistance between a quantum spin Hall insulator and the source and drain electrodes, can switch the device between two regimes: one where the system exhibits spin pumping and the other where the adatom remains in its ground state. This demonstrates an all-electrical route to control single spins by exploiting helical edge states of topological materials.

URI:

<http://hdl.handle.net/2262/67947>

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Author's Homepage:

<http://people.tcd.ie/sanvito>

Keywords:

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ATHENA

Anthocyanin and polyphenol bioactives for Health Enhancement through Nutritional Advancement

From 2010-07-01 to 2014-06-30 | ATHENA website

Anthocyanins are health promoting dietary polyphenols that protect against cardiovascular disease, cancer and obesity in preclinical studies with animals. The ATHENA project will address how good dietary anthocyanins are in protecting against chronic disease, by addressing the following questions: Benefits and risks: What is the dose response to anthocyanin phytonutrients? Are anthocyanins from dif...

Project details

Project reference: 245121	Programme acronym: FP7-KBCE
Status: Execution	Subprogramme area: KBCE-2009-2-2-02
Total cost: EUR 4 173 000	Contract type: Small or medium-scale focused research project
EU contribution: EUR 2 995 220	

Result in Brief • Anthocyanin protection against obesity and cancer investigated

Report Summary • Periodic Report Summary - ATHENA (Anthocyanin and polyphenol bioactives for health enhancement through nutritional advancement)

Documents • Periodic Report - ATHENA (Anthocyanin and polyphenol bioactives for health enhancement through nutritional advancement)

Publications (17)

- **Magnetic interaction of Co ions near the (10)bar(1)0 ZnO surface**
Sanvito, Stefano; Archer, Thomas David
2011
- **Prediction of large bias-dependent magnetoresistance in all-oxide magnetic tunnel junctions with a ferroelectric barrier**
Sanvito, Stefano; Rungger, Ivan; Archer, Thomas David
2011
- **Correlation of Rutin Accumulation with 3-O-Glucosyl Transferase and Phenylalanine Ammonia-lyase Activities During the Ripening of Tomato Fruit**
Castrupoli, F.; Remeuf, S.; Minio, A.; Moustropis, D.; Hill, R. D.; Maul, H. F.
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Citation:
Nuala M. Ca?rey, Thomas Archer, Ivan Rungger, and Stefano Sanvito, Prediction of large bias-dependent magnetoresistance in all-oxide magnetic tunnel junctions with a ferroelectric barrier, Physical Review B, 83, 2011, 125409

Abstract:
All-oxide magnetic tunnel junctions (MTJs) incorporating functional materials as insulating barriers have the potential of becoming the founding technology for novel multifunctional devices. We investigate, by first-principles density functional theory, the bias-dependent transport properties of an all-oxide SrRuO3/BaTiO3/SrRuO3 MTJ. This incorporates a BaTiO3 barrier which can be found either in a nonferroic or in a ferroelectric state. In such an MTJ not only can the tunneling magnetoresistance reach enormous values, but also, for certain voltages, its sign can be changed by altering the barrier electric state. These findings pave the way for a new generation of electrically controlled magnetic sensors.

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A web application featuring data visualizations and reports communicating research activity at your theme level

Institute Reports

[RSS Institute Analytics](#)

A web application featuring data visualizations and reports communicating research activity your research group(s), centre(s) and institute(s)

Calendar Reports

[Calendar of Publications and Other Research Outputs](#)

Application to generate Publications and Other Research Outputs for the Calendar.

System Reports

[RSS Admin App](#)

Launch the RSS Admin Web Application

- Dashboard
- Home
- More
- Associations
- Publication Types
- Radar
- Tag Cloud
- Publications
- Promotions
- Calendar
- ABC
- FRM (AHSS)
- FRM (FHS) ...
- FRM (FEMS)

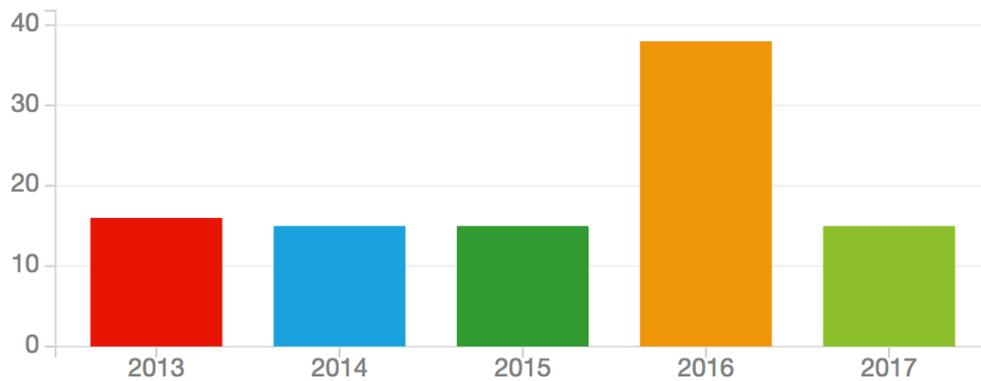
Person:

COLEMAN, JONATHAN (Staff, Physics)

Peoplefinder	Staff Number	Name	College Title	Address	Phone	Email	Department
	99207494	Professor Jonathan Nesbit Coleman	Professor Of Chemical Physics	Physics Department Physics Building College	+353 1 8963859	colemaj@tcd.ie	Physics

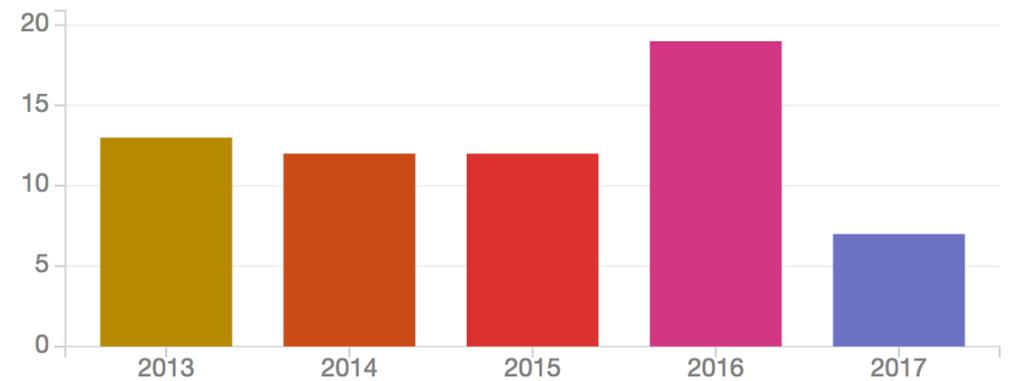
Total Publications & Other Research Output (2013-2017)

Click on a bar for a full list by year



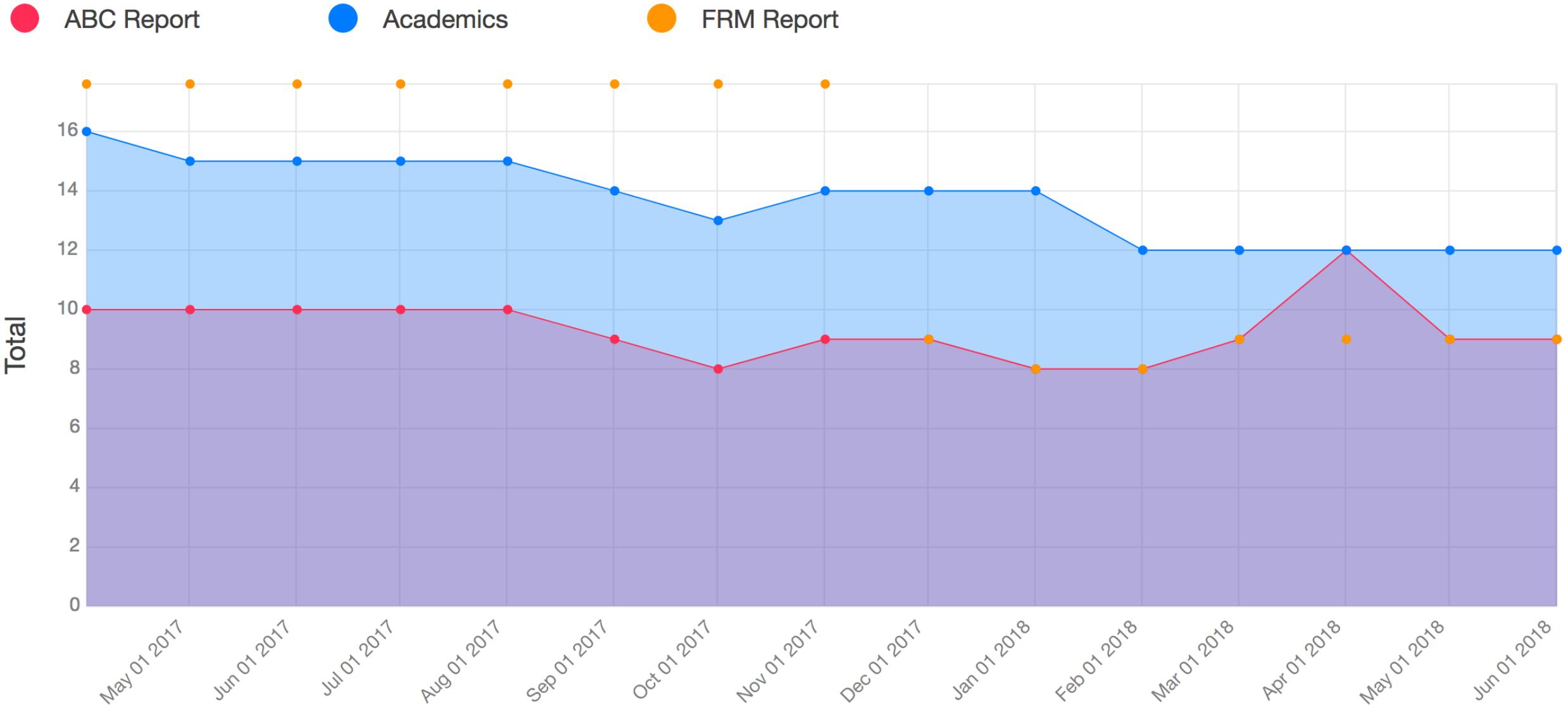
Total TARA Items (2013-2017)

Click on a bar for a full list by year



Faculty Research Metrics

% of academic staff per School who meet the Faculty-selected research productive metrics. 20% of School budget.



Junior and Senior Academic Promotions

MyRSSnbrennan[Return to the Research Support System](#)

- Dashboard
- Publications
- Promotions**
 - Biography
 - Degrees
 - Awards
 - Memberships
 - Career
 - Research
 - Grants
 - Top 10 Works
 - All PR Works
 - All NPR Works
 - Overview
 - Patents
 - Ventures
 - Conferences Organised

Home / Promotions

Biog... Degr... Awar... Mem... Career Rese... Grants Top 10 Works All PR Works All NPR Works Over... Pate... Ventu... Conf... Orga... Servi... to Colle... Servi... to Disci... Output

Senior Academic Promotions

[Next \(Biography\)](#)

Welcome to the Promotions wizard. You can progress through the wizard by clicking on the Next button.

On most pages the underlying data can be edited in the RSS by clicking on the "Edit in the RSS" button. On some pages, the data is edited locally. The RPAMS research grants cannot be edited here.

On the final "Output" page, you can output your "Promotions CV" to Word and continue with your application.

On subsequent visits, you can rapidly navigate the wizard using the menu on the left e.g. click on "Output" to go straight to the "Output" page and generate a fresh CV.

An exploration of the bone health of older adults with an intellectual disability

An exploration of the bone health of older adults with an intellectual disability in Ireland

Author: E. Walsh² & M. McCarron⁴

USA

Bone health matters

Researcher: Eilish Burke

Supervisors: Prof Mary McCarron, Prof P

Why was it important to do this research?

This is a study about poor bone health, where your bones become weak and can break. You may not know as it does not cause any pain. Factors like epilepsy, not doing enough exercise or not taking enough calcium (found in studies on bone health among the general population and people with intellectual disability (ID)).

What did the research want to find out?

To find out how many people with ID had poor bone health.

How did the researchers do the study?

This study is part of the Intellectual Disability Survey (IDS-TILDA). We asked a lot of people about their bone health.

What did the researcher find out?

In total 753 people took part in the study. We found that they had a doctor's diagnosis of osteoporosis or a broken bone. People over the age of 65 with poor bone health. Women were four and half times more likely to have poor bone health than men. People with arthritis were four times more likely to have poor bone health than people without arthritis.

Why should people care about it?



DARAT: Disability Accessible Research Archive

(Open access, TARA-based)

P.I.: Dr Edurne Garcia Iriarte.
TCD School of Social Work & Social Policy.

With:

- Ashling Hayes
- Kevin Kiely
- Enovation Solutions

Search



- Search TARA
- This Collection

Advanced Search

BROWSE

All of TARA

Academic/Research Units & Collections

Titles

Authors

Date of Publication

Subjects

Sponsor

This Collection

Titles

Authors

Date of Publication

Subjects

Sponsor

Trinity College Dublin Drone Survey Dataset



File Type:

Unknown

Item Type:

Dataset

Date:

2017

Author:

DAHAYOT, ROZENN
BOURKE, MARY
Byrne, Jonathan
Connolly, Julie
Su, Jing
Moloney, David
Krylov, Vladimir

Access:

openAccess

Citation:

J. Byrne, J. Connelly, J. Su, V. Krylov, M. Bourke, D. Moloney & R. Dahyot, Trinity College Dublin Drone Survey Dataset, 2017, School of Computer Science & Statistics, Trinity College Dublin, 2017

Download Item:



[3d_mesh.zip \(3D model\)](#) 343.0Mb



[point_cloud.zip \(Data points used to create the 3D mesh model\)](#) 361.5Mb



[Images 1.zip \(Collection of approximately 800 images, Part 1, Images 1-200\)](#)



909.1Mb

[Images 2.zip \(Collection of approximately 800 images, Part 2, Images 200-400\)](#)



958.1Mb

[Images 3.zip \(Collection of approximately 800 images, Part 3, Images 400-600\)](#)



960.7Mb

[Images 4.zip \(Collection of approximately 800 images, Part 4, Images 600-800\)](#)



1.218Gb

[tcd3dintelmovidius2017-drone-imagery\[2\].pdf \(Technical Report\)](#) 1.558Mb

Abstract:

The dataset contains
images from the
and Images 4.
points for the p

URI:

<http://hdl.handle.net/10111/10111>

Author's Home

<http://people.tcd.ie/vdahyot/>
<http://people.tcd.ie/vdahyot/>

Description:

PUBLISHED

Author: DAHYOT,
Vladimir

Publisher: School

Type of material:

URI: <http://hdl.handle.net/10111/10111>

Collections: RSS P

Series/Report no

Availability: Full t

Keywords: Drone

Subject (TCD): Cre

Edition: 2017



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campus
Dahyot^o



t (c).
PARTICIPATION
contributing to the creation
arch and education pur-
the Republic of Ireland
to capture a 3D model
ducation, please contact
process is straight for-

“Ensure the scholarly infrastructure in Europe is highly interoperable to enable the simple and open sharing of metadata between systems, disciplines and countries, and that credit for research contributions is given to all participants (including citizen scientists). This will need all actors to require the use of standardised, unique persistent identifiers for researchers and outputs, and for the acknowledgement of diversity in researcher contributions. Components of the ecosystem (identifiers, metadata, vocabularies, data citations, repositories and other data-infrastructures) need to be developed where necessary, refined, standardized and implemented through dialogue with relevant research communities. Whatever standards/infrastructures are developed, they need to be capable of adapting to innovations in Open Knowledge practices.”

– Open Science Policy Platform combined recommendations, May 2018

Actionable recommendations from the Open Science Policy Platform (OSPP), May 2018*

- Rewards and Incentives
- Research Indicators and Next-Generati
- Future of Scholarly Communication
- European Open Science Cloud
- FAIR Data
- Research Integrity
- Skills and Education
- Citizen Science

Libraries are listed
as drivers under ALL
of the actions.

Stakeholder groups responsible for driving the actions:



Research & E-Infrastructures



Research Libraries



Cultural and Performing Organisations



Policy Making Organisations



Research Funding Organisations



Publishers



Researchers



Scientific Societies & Academies



Citizen Science & Public Engagement Organisations

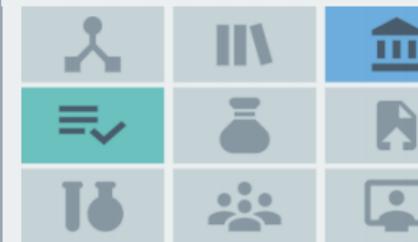
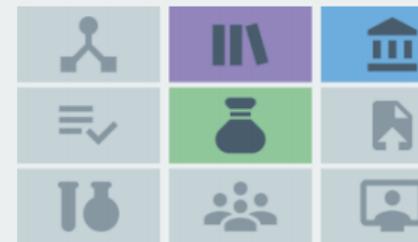
Rewards and Incentives

Funders, research institutions and other evaluators of researchers should actively develop/adjust evaluation practices and routines to give extra credit to individuals, groups and projects who integrate Open Science within their research practice.

Studies must be commissioned and funded to propose guidelines for best practice and tools for research assessment by 2019, together with an active delivery plan and associated timeline for their implementation. These guidelines must take into account career stage and discipline, and be appropriately tailored to their target such as individual, institution and so forth. Exemplars of innovation and good open science practice must be collated, taking into account the DORA Declaration, the Leiden Manifesto, the OS-CAM and other relevant initiatives.

Public research performing and funding organisations (RPOs/RFOs) should provide public and easily accessible information about the approaches and measures being used to evaluate researchers, research and research proposals.

The traditional academic career structure disincentivises Open Science because of the current focus on tenured positions based solely or largely on publication output. Institutions need to have a career and reward structure for all researchers, and particularly for Early Career Researchers (ECRs), that values and promotes a diverse range of outputs, activities and career directions. This should include facilitating a means by which researchers can, for example, move between academia and industry or between national jurisdictions.



Research Indicators and Next-Generation Metrics

Evaluations of individual researchers or of research groups should not use journal brand or Impact Factor as a proxy for research quality. Those responsible for hiring, promotion, funding and/or the evaluation of researchers must use a broader, tailored range of quantitative and qualitative indicators of research activity, progression and impact that incentivises and rewards open research practice. All publication venues must prominently display a broad range of indicators for all research outputs.

Quantitative and qualitative indicators need to be identified and developed for research assessment that captures the full range of contributions to the knowledge system. These should reflect the complexity and varied context of the research environment, the specific characteristics of the research being undertaken, as well as the new kinds of questions and results that might emerge in an open system.

Experiments, pilots and case studies assessing the validity of such indicators need to be undertaken urgently, and included as part of FP9 with appropriate funding allocated to support them. The results and data of these pilots must be made publicly available as exemplars for further implementation.

All researchers need to be identified through an ORCID ID. Best practice for CV/biosketch evaluation should be developed and publicly showcased to encourage a broader recognition of the range of verifiable (and especially open) contributions individuals make to the knowledge system, including teaching and peer review, and the production of a broad range of output types. The career narrative should be central to the evaluation of individual researchers as it provides the crucial context in which indicators can be interpreted.

The data, metadata and methods that are relevant to research evaluation, including but not limited to citations, downloads and other potential indicators of academic re-use, should be publicly available for independent scrutiny and analysis by researchers, institutions, funders and other stakeholders.



Future of Scholarly Communication

All published research outputs from public funding in Europe must be made public in a way that ensures both immediate Open Access and full text and data mining rights of that content, while being sensitive to disciplinary differences*. Venues used for the publication of research outputs must ensure long-term archiving and provide clear, consistent and easily accessible and machine-readable information on their Open Science policies.



Each Member State, together with its respective stakeholders, must develop policies to guarantee compliance with the EU Open Access mandate, including both incentives and enforcement, by 2020. This needs to happen in ways that are sensitive to disciplinary differences, the financial investment required and fast-changing publishing systems.



All authors must make their data and software (i.e. excluding, if relevant, data owned by third-parties, etc) appearing in their open access publications FAIR (Findable, Accessible, Interoperable and Reusable). To this end, a key requirement is deposition in a trusted repository that adheres to FAIR principles. In addition, all publications must include a statement of FAIR compliance for the source data underpinning their claims and the licence for its reuse.



All publication venues must prominently display their Open Access and FAIR data policies.



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FAIR Data

Funders and Research Performing Organisations should give credit for Findable, Accessible, Interoperable and Reusable (FAIR) data resulting from research work, similar to publications, methods, code etc.



Output Management Plans (OMPs, including Data Management Plans, DMPs) and their implementation should be mandatory for all research projects. OMPs should be machine readable and regularly modified to reflect ongoing research developments.



Data resulting from publicly funded research must be made FAIR and citable, and be as open as possible, as closed as necessary.



Research Integrity

All research organisations must have a research integrity policy, including promotion of good research practices, clear procedures for dealing with allegations of research misconduct and a description of possible sanctions for proven cases of misconduct. This policy must be enforced and adequately staffed and financed to investigate any allegation pertinent to their staff. The processes for dealing with such issues should be public, transparent and prominently displayed. Outcomes should be published where the allegations are upheld, taking into account the sensitivity of the issues involved.



All published research outputs should be reported according to recognised community standards where they exist.

For any research project, researchers should define conditions by which their work can be replicated or otherwise verified by others.



All researchers must receive regular training and accreditation on research integrity pertaining to Open Science, including the ethical, legal and social implications of their research practices. Funders (including the EC through FP9) must ensure that there is adequate training given to the researchers they fund, either through the researcher's institution, or provided via other means.



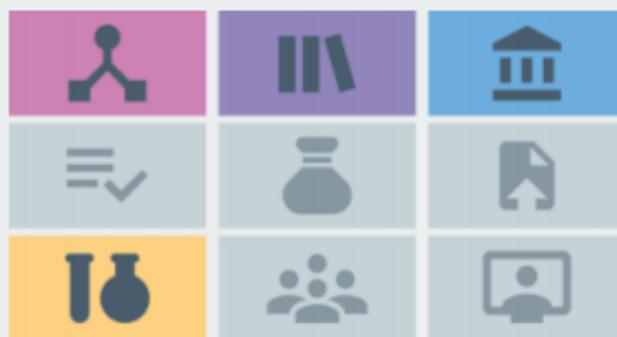
Publishers, data platform and infrastructure providers must agree a standardised set of minimum quality control checks on outputs and openly display the results. The task of undertaking these independent checks needs to be adequately funded. Outputs that pass these checks should be recognised and rewarded in research and researcher evaluation systems, such as FP9.



Skills and Education

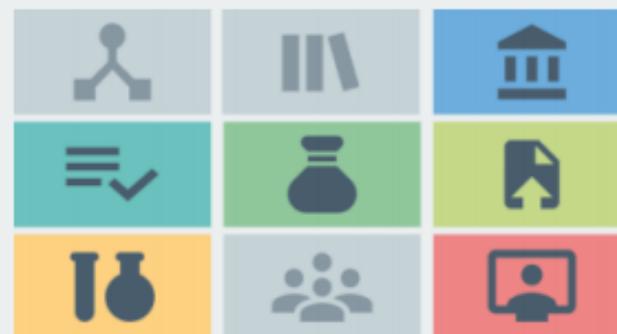
Research Performing Organizations (RPOs) need to work towards the design of appropriate Open Science training that is consistent across Member States, including data literacy, ethics and research integrity, for:

- All researchers, at all levels from early career researchers to senior researchers (R1-R4). Open Science skills need to be explicitly tailored to diverse career paths.
- Research managers and administrators, and other staff involved in the research ecosystem (librarians, repository managers, IT services, data stewards, etc.).
- Students (both undergraduate and graduate levels).



Policy makers, funders and institutions must provide incentives and support towards developing Open Science mentoring and training within a supportive culture and environment.

A fundamental part of a researcher's education is to have a common set of baseline skills on Open Science which must be integrated in the European Framework of Research Careers (EFRC) and the Innovative Doctoral Training Principles (IDTP).



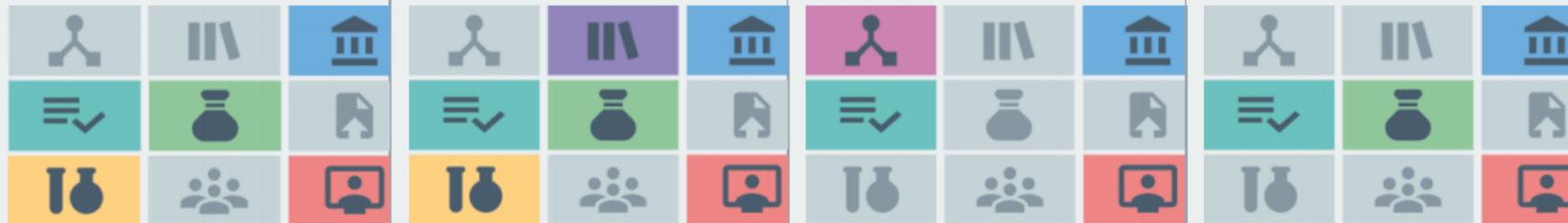
Citizen Science

Publicly funded Citizen Science projects (as part of FP9 projects) should actively apply the principles of Open Science (including openness and reuse of all research outputs, data and publications).

Research-performing organisations (RPOs) are encouraged to promote infrastructures and human capacity to create a supportive and open environment for Citizen Science, which can further strengthen the outreach of RPOs to society. Research libraries are well placed, amongst others, to contribute actively to the necessary coordination and communication infrastructures as well as relevant training, fostering skills such as community management, co-production of knowledge, Open Science standards and social diversity. Appropriate funding and incentives need to be put in place to support this endeavour.

The EC must support an online toolkit for Citizen Science in Europe. This tool must promote Citizen Science as a European asset, offering an entry point and mutual learning space, interconnecting with existing activities and infrastructures at the European, national and local level. It should highlight particular achievements and best practices, and promote a clear set of principles, guidelines & quality criteria for Citizen Science.

Funding for Citizen Science projects should be flexible, long-term and allow for small or experimental projects in collaboration with key stakeholders to be funded. A small section of FP9 should be set aside for citizens to propose research topics or projects. These should be chosen on the basis that they are high risk, beyond traditional research fields and conform to the rigorous standards expected of other projects. Successful proposers will need to work with compliant institutions.





Providing researchers with the skills and competencies they need to practise Open Science

Open Science Skills Working Group Report

Written by the Working Group on Education and Skills under Open Science
July - 2017

3.1. Categories of Open Science Skills

Aligned with the EU Open Science Monitor,⁵⁷ researchers' Open Science skills can be regrouped into four larger categories, *i.e.* :

- Skills and expertise necessary for open access publishing.
- Skills and expertise regarding research data, data production, management, analysis/use/reuse, dissemination and a change of paradigm from "protected data by default" to "open data by default", respecting legal, and other constraints.
- Skills and expertise to act in and beyond one's own scholarly and disciplinary community.
- Skills and expertise resulting from a general and broad concept of citizen science, where researchers interact with the general public to enhance the impact of science and research.

All of these skills are needed at different levels by the research system, whether by researchers or technicians as well as support and administrative staff, depending on the role that these various functions have in an Open Science research environment.

• Skills Related to Open Access Publishing

Library and research information skills (technical/library research support). These refer to a rapidly evolving specialist skill-set amongst a specific cohort of academic and research library and information professional staff which includes research support, development and management of CRIS (current research information systems) and (ideally, integrated) institutional repositories, some discipline-specific e-research methods, new Open Publication strategies, in terms of contracts and relations with publishers, new funding models, and the related changes in publication modes for researchers. They include licensing and copyright advice, bibliometrics and research impact reporting. Some of these functions may be performed by research management staff.

Open publication literacy skills (research user level). These are skills researchers need to have about Open Publication options in order to make the correct choices about where and how to publish their results, how and what to self-archive and how to communicate their research for scholarly and societal impact.

• Skills Related to Data Management and Open Data

Technical skills, in particular data science skills. Data science skills relate to the collation of relevant scientific data, their annotation and documentation, metadata creation, use of taxonomies and ontologies, data mapping, how to handle big data sets, how to properly mine for data, knowledge about existing repositories and how to use them. We note that a distinction should be

First Stage Researcher (R1)

Includes individuals doing research under supervision in industry, research institutes or universities. It includes doctoral candidates. Researchers with this profile will:

- Carry out research under supervision.
- Have the ambition to develop **knowledge of research methodologies** and discipline.
- Have demonstrated a good understanding of a field of study.
- **Have demonstrated the ability to produce data under supervision.**
- Be capable of critical analysis, evaluation and synthesis of new and complex ideas.
- Be able to explain the outcome of research and value thereof to research colleagues.

Desirable competences

- **Develops integrated language, communication and environment skills, especially in an international context.**



ADDED:

Open Science competences:

Research integrity/ethics, Information literacy, open access, publishing/dissemination, DMPs etc.

Optimal training/learning modes & incentives.

Formal, structured, learning, standardised, accredited and badged. Use of hands-on, applied, PBL.

Mentoring by senior researchers

Integrated with Researcher Career Development.

Recognised Researcher (R2)

- ◆ Doctorate degree (PhD) holders who have not yet established a significant level of independence,
- ◆ Researchers with an equivalent level of experience and competence.



Necessary competences (*All competences of 'First Stage Researcher' plus:*)

- Has demonstrated a systematic understanding of a field of study and mastery of research associated with that field.
- Has demonstrated the ability to conceive, design, implement and adapt a substantial programme of research **with integrity**.
- Has made a contribution through original research that **extends the frontier of knowledge**.
- Demonstrates critical analysis, evaluation and synthesis of new and complex ideas.
- Can communicate with their peers - be able to explain the **outcome of their research and value thereof to the research community**.

Desirable competences

- Understands the agenda of industry and other related employment sectors
- Understands the value of their research work in the context of products and services from industry & related employment sectors
- Can communicate with the wider community, and with society generally
- Can be expected to promote technological, social or cultural advancement in a knowledge based society
- Can mentor First Stage Researchers

Open Science competences: as per R1 plus impact, innovation, research evaluation level 1.

Optimal training/learning modes & incentives: Structured, accredited professional development training; Mentoring, rewards & funder incentives.

Established Researcher (R3)

Includes: Researchers who have developed a level of independence.

Necessary competences All necessary and most desirable competences of 'Recognised Researcher' plus:

- Has an established reputation based on research excellence in their field
- Makes a positive contribution to the development of knowledge, research and development through co-operations and collaborations.
- Identifies research problems and opportunities within their area of expertise.
- **Identifies appropriate research methodologies and approaches.**
- Conducts research independently which advances a research agenda.
- Can take the lead in executing collaborative research projects in cooperation with colleagues and project partners.
- **Publishes papers as lead author, organises workshop or conference sessions.**

Desirable competences

- **Establishes collaborative relationships with relevant industry research or development groups.**
- **Communicates their research effectively to the research community and wider society.**
- **Is innovative in their approach to research.**
- Can form research consortia and secure research funding / budgets / resources from research councils or industry.

- **Is committed to professional development of their own career and acts as mentor for others.**



ADDED:

Open Science competences: as per R2 plus impact, innovation, research evaluation level 2, funding proposals, research management.

Optimal training/learning modes:

Structured, accredited professional development training; Mentoring, rewards & funder incentives.

Leading Researcher (R4)

This is a researcher leading their research area or field. It would include the team leader of a research group or head of an industry R&D laboratory. In particular disciplines, may include individuals who operate as lone researchers.

Necessary competences (All necessary and most desirable competences of 'Established Researcher' plus:)

- Has an international reputation based on research excellence in their field
- Demonstrates critical judgment in the identification and execution of research activities.
- Makes a substantial contribution (breakthroughs) to their research field or spanning multiple areas.
- Develops a strategic vision on the future of the research field.
- Recognises the broader implications and applications of their research.
- Publishes and presents influential papers and books, serves on workshop and conference organising committees and delivers invited talks.

Desirable competences

- Is an expert at managing and leading research projects.
- Is skilled at managing and developing others.
- Has a proven record in securing significant research funding / budgets / resources.



ADDED:

Open Science competences: as per R3 plus impact monitoring and reporting, innovation, research evaluation level 3, funding proposals, research project reporting; communication and engagement with policy-makers, media. Open Science leadership.

Optimal training/learning modes

Integrated into accredited institutional senior management training programmes + prestigious external leadership courses.

Open Science Leadership accreditation required by funders for all funded PI's. plus evidence of open access track record.

14 Core Skills & Competencies for an Open Science Leader*

1. Influencing skills
2. Being able to empower others
3. Being entrepreneurial
4. Creating visions and missions
5. Conveying visions and missions
6. Being able to source facts & figures
7. Networking skills
8. Communication skills
9. Managing people
10. Programme / project management
11. Technical skills (basic) related to TDM or data
12. Managing finances, incl. funding
13. Understanding and addressing sustainability
14. Knowledge of the workings of the scholarly workflow, e.g. Open Access, Open Data, Open software, knowledge of various publishing choices (from working papers, e-notebooks to article or books), funding models, and platforms in ideally a range of disciplines; licensing and collection management; quality management and mechanisms such as (open) peer review; IPR, CC and licensing; the role of scholarly communication in academic integrity; and knowledge of research evaluation systems. Lastly, knowledge of innovative initiatives that challenge current practices.



Trinity College Dublin

Coláiste na Tríonóide, Baile Átha Cliath

The University of Dublin

“Research Integrity and Open Scholarship in a Digital Era”

TCD New Course for all incoming doctoral students: September 2018

Course content:

Research Integrity

Copyright and intellectual property; plagiarism

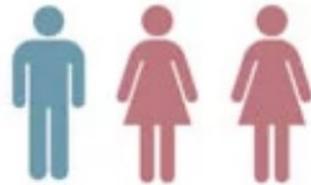
Data protection and research data management

Scholarly communication: publishing, dissemination, impact and open access

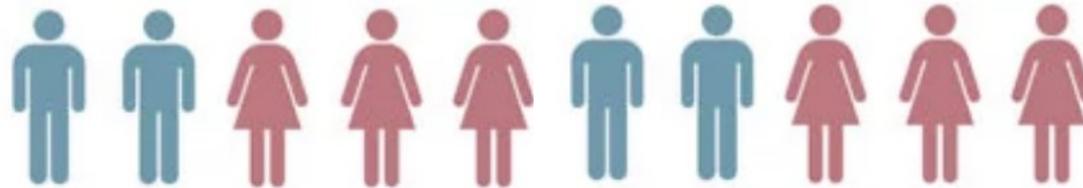
Reporting, presentation, evaluation.

TCD Library: Developing layers of support for Open Scholarship

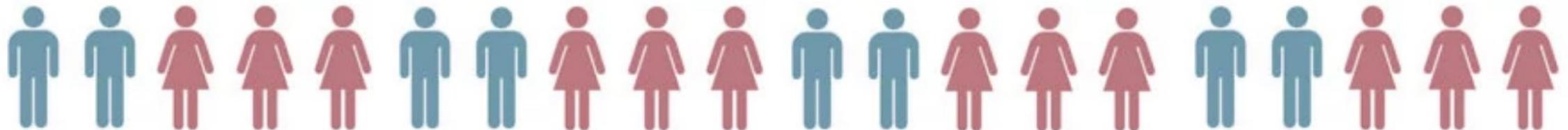
Level 1 In-depth and up-to-date knowledge and practical skills; skills to train and support people at all levels; expertise and ability to advise, direct and make decisions on policies.



Level 2 Understanding of general principles, policies and practices; skills to train and support people at early to intermediate stages; knowledge of where to direct people for more support.



Level 3 Understanding of general principles and policies; knowledge of where to direct people for more support.





EUROPEAN
COMMISSION

Brussels, 25.4.2018
C(2018) 2375 final

COMMISSION RECOMMENDATION

of 25.4.2018

on access to and preservation of scientific information

Requires Member States to respond with:

- a) Coherent policy
- b) Implementation plan/s
- c) Associated financial planning

for:

- Open Access Publications
- Research Data Management (including Open Access)
- Preservation & re-use of scientific information
- Skills & competences
- Incentives & rewards
- Multi-stakeholder dialogue on open science at national, European and international level

* http://ec.europa.eu/newsroom/dae/document.cfm?doc_id=51636

“Member States should ensure that...

innovative companies, in particular small and medium-sized enterprises, independent researchers (for instance citizen scientists), the public sector, the press and citizens at large have, in a transparent and non-discriminatory manner, the widest possible access to [scientific publications and research data of] the results of research that receives public funding in view of enabling innovation, empowering the public sector and informing citizens. ”

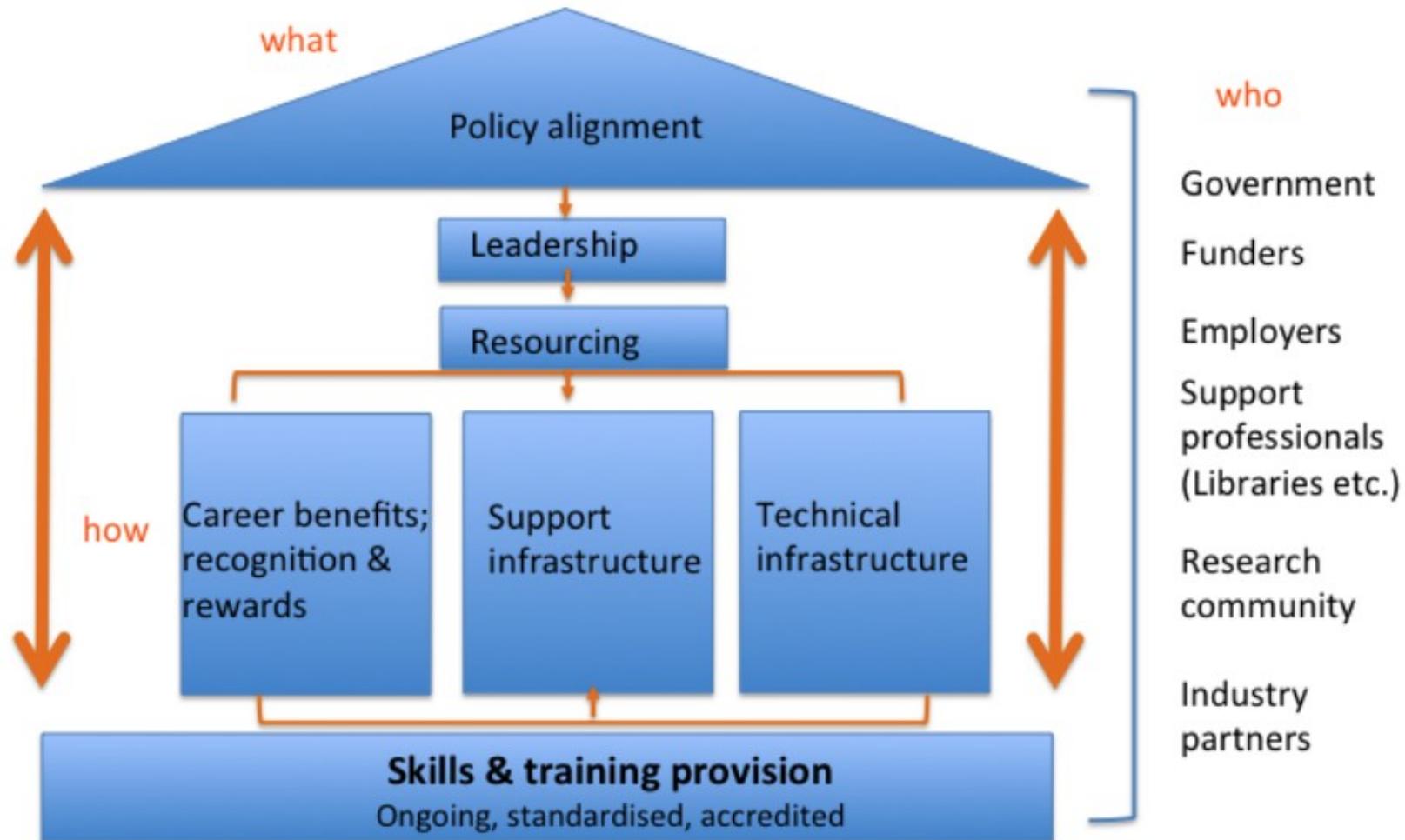
Open Science Career Assessment Matrix (OS-CAM)	
<i>Open Science activities</i>	<i>Possible evaluation criteria</i>
RESEARCH OUTPUT	
Research activity	Pushing forward the boundaries of open science as a research topic
Publications	Publishing in open access journals Self-archiving in open access repositories
Datasets and research results	Using the FAIR data principles Adopting quality standards in open data management and open datasets Making use of open data from other researchers
Open source	Using open source software and other open tools Developing new software and tools that are open to other users
Funding	Securing funding for open science activities
RESEARCH PROCESS	
Stakeholder engagement / citizen science	Actively engaging society and research users in the research process Sharing provisional research results with stakeholders through open platforms (e.g. Arxiv, Figshare) Involving stakeholders in peer review processes
Collaboration and Interdisciplinarity	Widening participation in research through open collaborative projects Engaging in team science through diverse cross-disciplinary teams
Research integrity	Being aware of the ethical and legal issues relating to data sharing, confidentiality, attribution and environmental impact of open science activities Fully recognizing the contribution of others in research projects, including collaborators, co-authors, citizens, open data providers
Risk management	Taking account of the risks involved in open science
SERVICE AND LEADERSHIP	
Leadership	Developing a vision and strategy on how to integrate OS practices in the normal practice of doing research Driving policy and practice in open science Being a role model in practicing open science
Academic standing	Developing an international or national profile for open science activities Contributing as editor or advisor for open science journals or bodies
Peer review	Contributing to open peer review processes Examining or assessing open research
Networking	Participating in national and international networks relating to open science

RESEARCH IMPACT	
Communication and Dissemination	Participating in public engagement activities Sharing research results through non-academic dissemination channels Translating research into a language suitable for public understanding
IP (patents, licenses)	Being knowledgeable on the legal and ethical issues relating to IPR Transferring IP to the wider economy
Societal impact	Evidence of use of research by societal groups Recognition from societal groups or for societal activities
Knowledge exchange	Engaging in open innovation with partners beyond academia
TEACHING AND SUPERVISION	
Teaching	Training other researchers in open science principles and methods Developing curricula and programs in open science methods, including open science data management Raising awareness and understanding in open science in undergraduate and masters' programs
Mentoring	Mentoring and encouraging others in developing their open science capabilities
Supervision	Supporting early stage researchers to adopt an open science approach
PROFESSIONAL EXPERIENCE	
Continuing professional development	Investing in own professional development to build open science capabilities
Project management	Successfully delivering open science projects involving diverse research teams
Personal qualities	Demonstrating the personal qualities to engage society and research users with open science Showing the flexibility and perseverance to respond to the challenges of conducting open science

Figure 1: Open Science Career Assessment Matrix (OS-CAM) representing the range of evaluation criteria for assessing Open Science activities

Can this model be applied to Open Science & CRIS development, internally & externally?

Engaging researchers at all levels: supporting structure.



“Everyone has secrets. It's just a matter of finding out what they are .”

— Stieg Larsson, The Girl Who Kicked the Hornet's Nest



Challenges

Metrics for Open Science

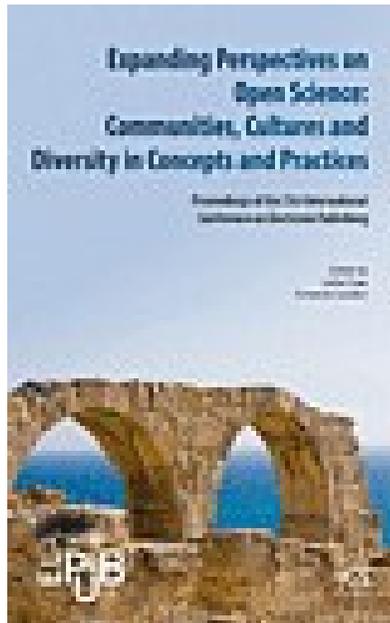
- Open Science metrics

- Rewards and incentives

Open Science monitoring

The broader Open Science agenda and the position of CRIS
(institutional...)

Open Science Monitoring...



4. Conclusions: The “Jyväskylä Model” in Practice

The information gathered from research information systems in Finnish universities is not reliable enough for measuring **open** access development. This is true for both gold and green **open** access. Therefore, two essential actions must be implemented:

1. Gold, green, and hybrid **open** access papers must be identified and cataloged within the research information systems with high-quality reliability, and
2. The interoperability of institutional repositories and current research information systems must be improved so that the complete information about the deposited papers in the repository is exported automatically and accurately to the research information system.

‘What has become apparent in this study so far, is that information on OA publishing is rather dispersed, which means that our results clearly show that not one single source is sufficiently ‘strong’ to be taken into account for OA labeling of publications...’ – CWTS, 2017

KPI	OBJECTIVE	INDICATOR TYPE	SOURCE	REQUIRES DEVELOPMENT?
Proportion of staff engaged in socially engaged research	2	COMMUNITY ENGAGEMENT	POTENTIAL RSS	Y
Proportion of students engaged in socially engaged research	2	COMMUNITY ENGAGEMENT	POTENTIAL RSS	Y
Proportion of staff involved in community based/community engaged learning	2	COMMUNITY ENGAGEMENT	POTENTIAL RSS	Y
Proportion of students involved in community based/community engaged learning	2	COMMUNITY ENGAGEMENT	POTENTIAL RSS	Y
Proportion of staff involved in volunteering	2	COMMUNITY ENGAGEMENT	POTENTIAL RSS	Y
Proportion of students involved in volunteering	2	COMMUNITY ENGAGEMENT	POTENTIAL RSS	Y
Number of incoming mobility of International Academic Staff and researchers	2	INTERNATIONALISATION	POTENTIAL RSS	Y
Publications with international peers	2	INTERNATIONALISATION	RSS/SCIVAL	N
Organisation of international conferences	2	INTERNATIONALISATION	RSS	N
Number of publications and field-adjusted percentage share of world output	3	RESEARCH QUALITY & ACADEMIC IMPACT	RSS/SCIVAL	N
Number of publications per academic staff	3	RESEARCH QUALITY & ACADEMIC IMPACT	RSS	N
Field adjusted citation rates	3	INTERNATIONALLY RECOGNISED RESEARCH WHICH WILL ENHANCE THE REPUTATIONS OF STAFF, INSTITUTIONS AND IRELAND	INCITES/SCIVAL/DI MENSIONS	N
Citation impact	3	INTERNATIONALLY RECOGNISED RESEARCH WHICH WILL ENHANCE THE REPUTATIONS OF STAFF, INSTITUTIONS AND IRELAND	INCITES/SCIVAL/DI MENSIONS	N
Increase in number of research and scholarship activity/outputs per research-active academic staff	3	INTERNATIONALLY RECOGNISED RESEARCH WHICH WILL ENHANCE THE REPUTATIONS OF STAFF, INSTITUTIONS AND IRELAND	RSS	N
Number of staff who have undertaken research integrity training	3	INTERNATIONALLY RECOGNISED RESEARCH WHICH WILL ENHANCE THE REPUTATIONS OF STAFF, INSTITUTIONS AND IRELAND	POTENTIAL RSS	Y
Total number of new patent applications filed during the year	3	IP AND IP TRANSACTIONS	RSS/SCIVAL	N
Total number of patents granted in year	3	IP AND IP TRANSACTIONS	RSS/SCIVAL	N
Total number of patents owned by the RPO at year end	3	IP AND IP TRANSACTIONS	RSS/SCIVAL	N
Total number of licences, options and assignments executed (LOAs)	3	IP AND IP TRANSACTIONS	POTENTIAL RSS	Y
Number of active collaborations between institutions and enterprises	3	INCREASED COLLABORATIONS WITH ENTERPRISE	POTENTIAL RSS	Y
Public-Private scientific co-publications (no. and per million of population)	3	INCREASED COLLABORATIONS WITH ENTERPRISE	RSS/SCIVAL	N
% of publications deposited in Open Access repositories	3	OPEN SCIENCE	RSS/TARA	N
Number of researchers trained in FAIR data management	3	OPEN SCIENCE	POTENTIAL RSS	Y
Number of active engaged research partnerships / projects	3	ENGAGED RESEARCH	POTENTIAL RSS	Y
Income generated by successful engaged research projects	3	ENGAGED RESEARCH	POTENTIAL RSS	Y
New skills and competencies generated by engaged research findings	3	ENGAGED RESEARCH	POTENTIAL RSS	Y
Number of new products /patents generated by engaged research findings	3	ENGAGED RESEARCH	POTENTIAL RSS	Y

Ireland's Higher Education Authority System Performance Framework

200 indicators for annual reporting on all aspects of Higher Education

2 Open Science metrics:

1. % of publications in open access repository

2. Number of researchers who have undertaken FAIR research data management training.



RESEARCHERS

CITIZEN SCIENTIST



POLICYMAKERS



BUSINESS - INDUSTRY - SMEs



STUDENTS & TEACHERS



PRACTITIONERS

Activists

NGOs



MEDIA PROFESSIONALS

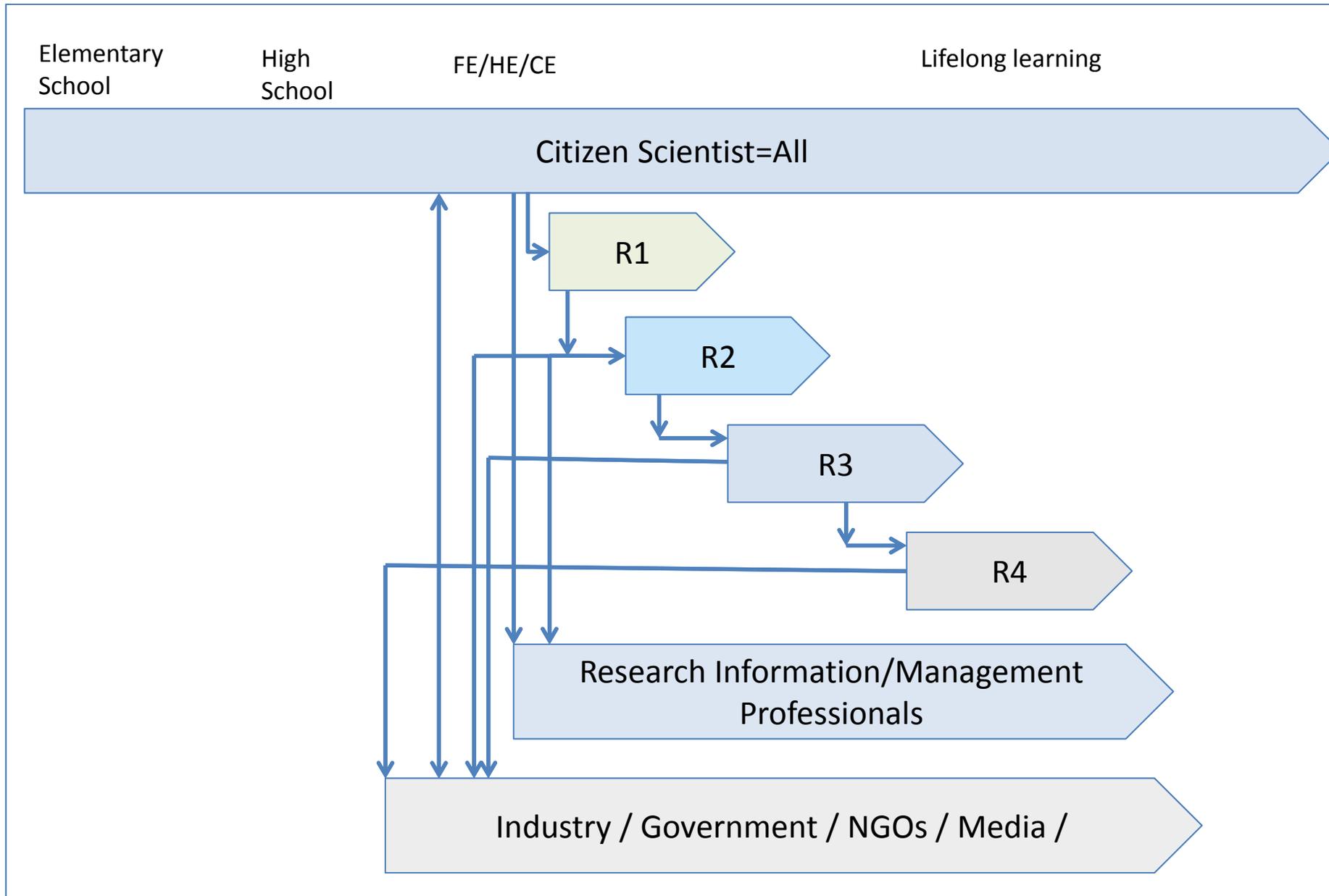
Charities



INFLUENCERS

Community

Open Science Skills in Research, Civil Society and Lifelong Learning*



From the Bratislava Declaration of Young Researchers...

‘1.2 We call on the EC and Member States to incorporate research and scientific skills into high-school education through radical reform of curricula and methods of assessment: students must be given the opportunity to practice research and scientific thinking in schools – not just listen to teachers talk about it.’

<http://www.eu2016.sk/data/documents/bratislava-declaration-of-young-researchers-final.pdf>

“We need to have a talk on the subject of what's yours and what's mine.”

— Stieg Larsson, *The Girl with the Dragon Tattoo*



- OpenAIRE compatibility for CRIS systems: recent progress,

Pablo de Castro, University of Strathclyde/euroCRIS; Jan Dvorak, Charles University Prague/euroCRIS; Ed Simons, Radboud University Nijmegen/euroCRIS



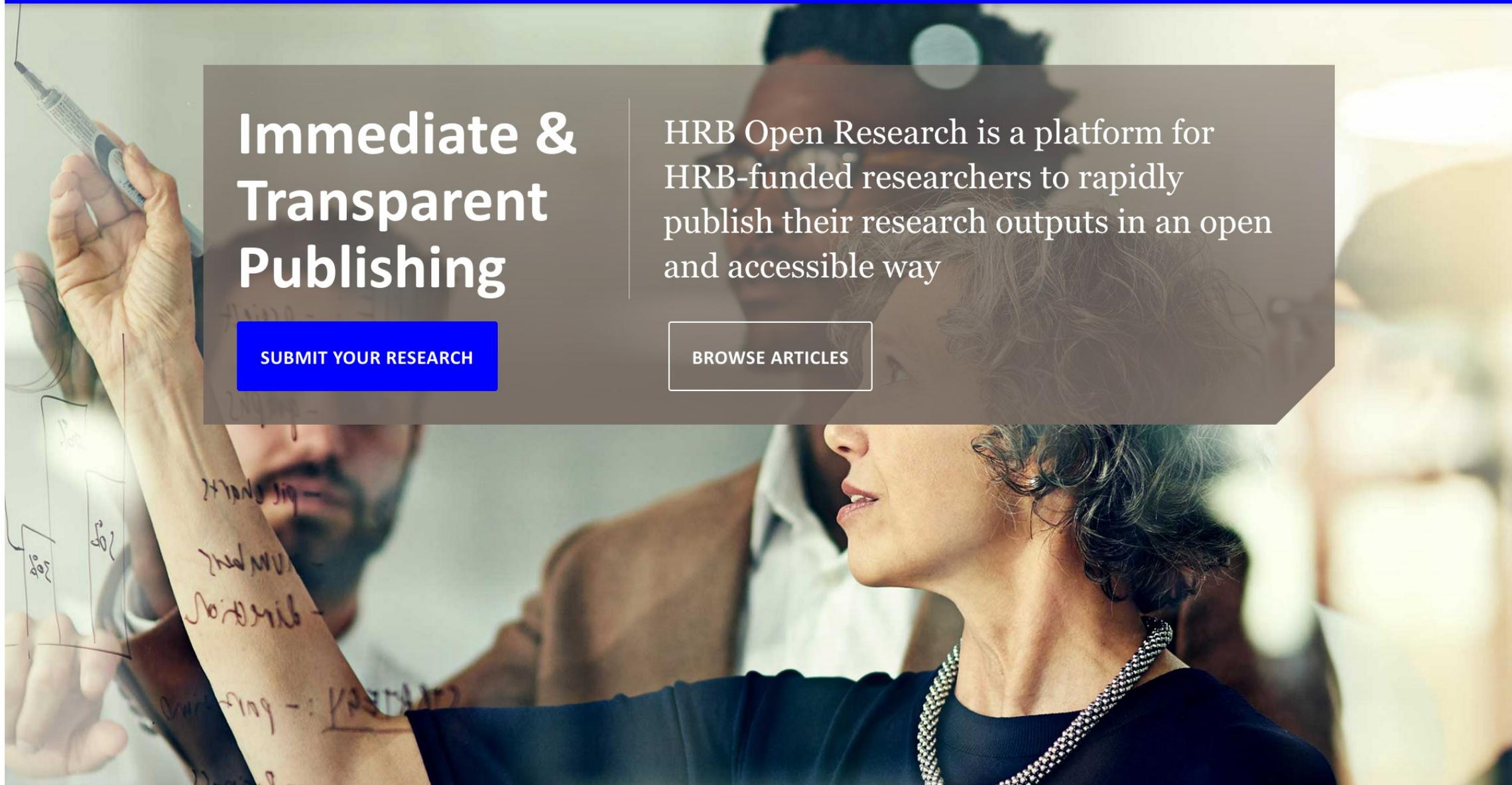
“The gradual addition of CRIS systems to the list of OpenAIRE data providers will mean a qualitative leap in the volume of contextual metadata that gets delivered for research output records, including research data, publications and other text-based outputs.”

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“Dear Government... I'm going to have a serious talk with you if I ever find anyone to talk to.”

— Stieg Larsson, *The Girl Who Played with Fire*



National Policy Agenda



Pre-Innovation 2020

National Open Access Forum

2012 National Open Access Principles

Relating to open access to

- Publications
- Data, where feasible

Innovation 2020

- Refers to National Open Access Principles
- **Action 4.7:**
 - Provides for support of national and European Access policies and principles for publications
 - Commits to integrate and support open access repositories, the national research classification system, HEI research information systems, research funders' grant management system and expertise locators systems
- **Responsibility: HEA, KTI, SFI, HRB, DRI**

National Policy Agenda: Current Developments



The National Open Research Forum (NORF)

Co-Chaired by Patricia Clarke (HRB) and Gemma Irvine (HEA) with Secretariat provided by DJEI

Output from Working Groups by end 2018

Expanding membership

Working Groups established to:

- I. Develop a vision for Open Science agenda for Ireland**
- II. Review national principles for Open Access to publications**
- III. Propose national principles for open research data in Ireland**
- IV. Take stock of current capacity and capability and identify future needs re Human resources**
- V. Infrastructure**

‘EU-level action alone will not suffice. Success depends on the commitment and expertise of many players: national governments, regions, local authorities, businesses and employers, workers and civil society, and people themselves, taking up opportunities to make the best of their talents.’

– p3 New Skills Agenda for Europe

Thank you!