Skills that Researchers Need to Work in an Open Science Environment

- Gareth O'Neill
- Implementing HRS4R
- MSCA 2018 in Vienna
- 02 October 2018

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The European Council of Doctoral Candidates and Junior Researchers

gareth.oneill@eurodoc.net
@gtoneill | www.eurodoc.net

This talk

- Eurodoc=early-career researchers
- What is and why do Open Science?
- Open Access by 2020 with Plan S
- FAIR and Big Data for researchers
- Open Science skills for researchers

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@gtoneill | www.eurodoc.net

Eurodoc=early-career researchers

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Eurodoc=early-career researchers

- Legal registered non-profit organisation
- Founded in 2002 and based in Brussels
- Federation of ±30 national associations
- Run for and by early-career researchers
- For 1+ million early-career researchers
- Funded by member fees and volunteers

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@gtoneill | www.eurodoc.net

Eurodoc=early-career researchers

We develop policy on topics for ECRs:

- Career Development
- Employment Status
- Interdisciplinarity
- Mobility
- Research Integrity
- Doctoral Training
- Equality
- Mental Health
- Open Science
- Research Quality

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Eurodoc=early-career researchers

Impact Outlook

- 'Open Science will be the new way of conducting research by opening up access to research data and results via new digital technologies and collaborative tools'
- 'A main question for us is to what extent will early-career researchers need to be trained for these practices and what is the role of early-career researchers in the shift to Open Science?'

GARETH O'NEILL is a linguist interested in experiential categories in language. He is President of Eurodoc and an expert on intersectoral mobility and Open Science in the Netherlands and for the European Commission.

EVA HNÁTKOVÁ is a Greek engineering scientist who is interested in improving higher education and particularly doctoral training. She is a General Board Member and coordinator of Working Group on Doctoral Training at Eurodoc.

Contact details

Gareth O'Neill
President
E: gareth.oneill@eurodoc.net
T: +31 620093173

Eva Hnátková
General Board Member
Coordinator WG Doctoral Training
E: eva.hnatkova@eurodoc.net
T: +420 604328869
W: http://eurodoc.net

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Gareth O'Neill

Eva Hnátková

Open science for early-career researchers

Gareth O'Neill, President, and Eva Hnátková, General Board Member/Coordinator WG Doctoral Training, explain why Open Science is a strategic priority within the European Council of Doctoral Candidates and Junior Researchers (Eurodoc)

From your perspective, in order to maintain Europe's position as a global research hub, is it essential to support and foster open access to science and research?

GO: The implementation of Open Science is fundamental to the 'New Vision for Europe' proposed by the European Commission (EC). Open Science will be the new way of conducting research by opening up access to research data and results via new digital technologies and collaborative tools. Open Science is actually just one policy initiative of a threefold strategy to fundamentally open up research and innovation in Europe. Open Innovation will bring new actors into the innovation process, creating new products, markets and entrepreneurship. Open to the World will develop more international cooperation and science diplomacy, as well as address core societal issues. These initiatives together will indeed position Europe as a global and innovative research hub. Opening up access to research is important for all researchers who rely on the research data and results from other researchers to confirm new developments and discoveries and build upon previous research. This is especially true for academic institutions in lesser developed countries, which may not be able to afford the often high costs for access to research through commercial publishers.

What are the goals of Eurodoc in relation to Open Science and the role it plays? Which Eurodoc Working Groups (WGs) are working on Open Science and what are their main tasks?

GO: Eurodoc supports the concept of Open Science and will ensure that the needs and wishes of early-career researchers (ECRs) are taken into account in the development of Open Science policies. 'Development' is the key word here because what exactly Open Science is and how to do it are still being figured out by all major stakeholders. 'Open Science' is essentially an umbrella term for various practices such as Open Access, Open Data, Open Methodology, Open Source, Open Peer Review, Open Education, Alternative Metrics and Citizen Science. A main question for us is to what extent will ECRs need to be trained for these practices and what is the role of ECRs in the shift to Open Science? Our WGs on Open Science and on Doctoral Training will address these issues.

EH: Our WGs are one of the driving forces behind Eurodoc. WG members are mostly ECRs from our national associations and experts interested in the topic of the WG. Open Science is a relatively new concept that needs to be further refined and adopted by ECRs. The main goals of WG Open Science are to raise awareness, share information, encourage debate and develop policies on Open Science for ECRs. Doctoral training, on the other hand, is an established academic concept that forms the backbone of the doctoral programme and prepares future researchers for science. The main goals of WG Doctoral Training are to monitor and improve the training of doctoral candidates at institutions in Europe. These two WGs are working closely together to train ECRs for Open Science.

What do you consider to be the key barriers to Open Science for European and international research communities? What new skills are needed to overcome these barriers?

GO: We recently conducted a survey together with the EC on Open Science for researchers, with a focus on Open Access and Open Data. We identified key issues for all researchers and especially for ECRs across Europe. Researchers are generally unaware of what Open Science is and how to do it. Most have not followed training courses on Open Science or used Data Management Plans or metadata in their research. Most are also not being adequately supported at their institutions, with researchers saying that there are no institutional/funding guidelines as well as no general specialist support for Open Science. Our results show that institutions have not implemented a clear Open Science policy and need to more proactively support the shift to Open Science. Lack of coherent policy on Open Science is not reserved to institutions, but is also apparent at national levels. Most countries in Europe have not yet developed strategic plans to implement Open Science and may not yet consider Open Science as a strategic priority. For the open cultural shift to succeed, Open Science must be encouraged and supported at all levels: by the EC, national governments, academic institutions and the researchers themselves.

EH: Open Science consists of a mix of different practices and we cannot expect that ECRs can and should be trained in all of these practices. Some essential skills that we find important are general knowledge of Open Science and specific knowledge of research integrity, Open Access publishing, research data management and FAIR (Findable Accessible Interoperable Reusable) Open Data, the use of Data Management Plans and metadata, Open Education, and Citizen Science. Such skills training should be offered within an optional Open Science suite of courses that is embedded in the (post)doctoral training programme of ECRs. These courses should furthermore be tied to actual Open Science practice whereby ECRs can learn by training and learn by doing. At a European level, skills training for Open Science should also be embedded in the Innovative Doctoral Training Principles and in the European Framework for Research Careers. Skills training, however, is not enough. As Gareth says, there also needs to be comprehensive awareness raising, encouragement, planning and support for Open Science and ECRs.

How does Eurodoc contribute to the debate on Open Science? Do Eurodoc members advocate specifically for Open Access and Open Data?

GO: Open Science is one of Eurodoc's strategic priorities. The concept of Open Science is new and we aim to contribute to the development and implementation of Open Science from the perspective of ECRs. We recently do this in collaboration with our main partners such as the Directorate General for Research and Innovation of the EC, the European University Association, and Science Europe. We also inform Open Science initiatives by taking part in advisory boards such as for the FOSTER Plus project, which aims to develop advanced level and discipline-specific training materials for Open Science. We further organise conferences and workshops for ECRs on Open Science – indeed, the 2017 Eurodoc Conference was titled 'Open Science: Challenges and Opportunities for Early-Career Researchers'. And we raise awareness on Open Science for ECRs and contribute to the public debate via social media and the higher education and science press.

EH: Eurodoc is a federation of national associations representing ECRs from 30 countries in Europe. Our members are active in Open Science and are developing their own national policies. This is especially the case for Open Access and Open Data, which in a way form the core of Open Science, and which researchers know the most about according to our survey. Our members are involved in national advocacy campaigns, take part in conferences and workshops such as the OpenCon conferences, and invite specialists to give lectures on Open Science at local events for ECRs. As you can see, we aim for a high level of engagement at all levels and do our best to not only open up science but to open up science policy.

www.impact.pub

[O'Neill & Hnátková (2018)]

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gareth.oneill@eurodoc.net
@gtoneill | www.eurodoc.net

What is and why do Open Science?

UNIVERSITY OF TARTU Library

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@gtoneill | www.eurodoc.net

What is and why do Open Science?

OI more actors in the innovation process

OS more open research via use of digital technology and tools

OW more cooperation and societal impact

European Commission (2016)

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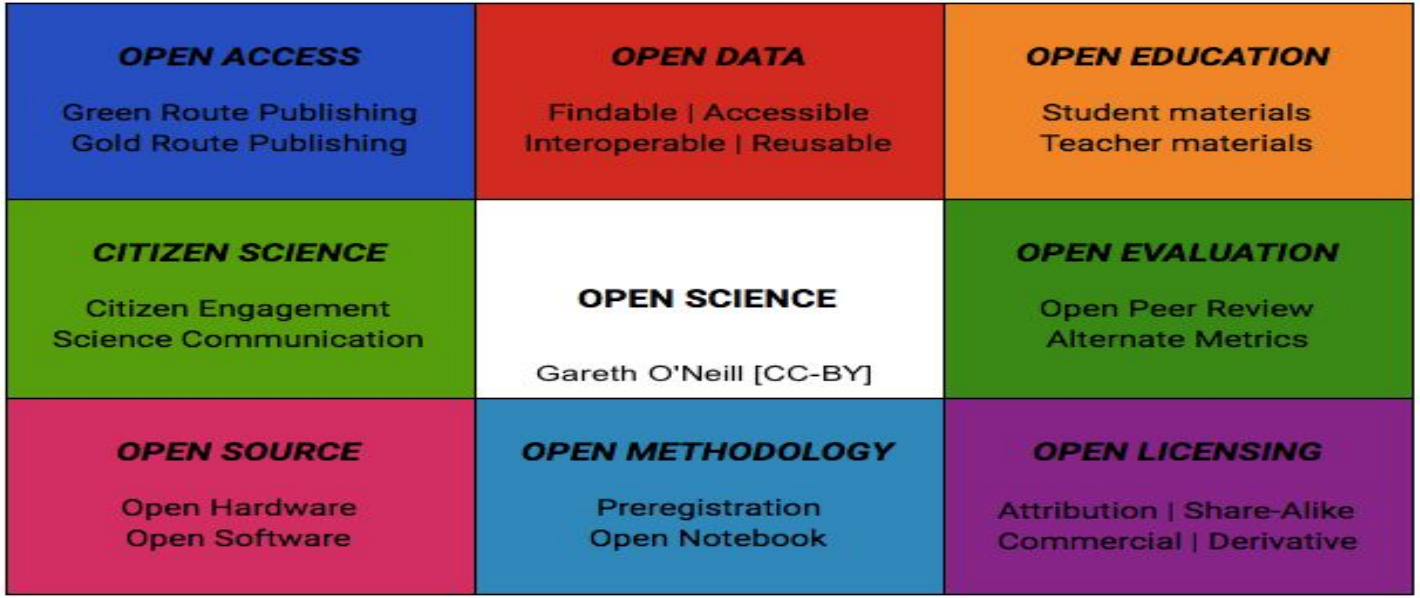
What is and why do Open Science?



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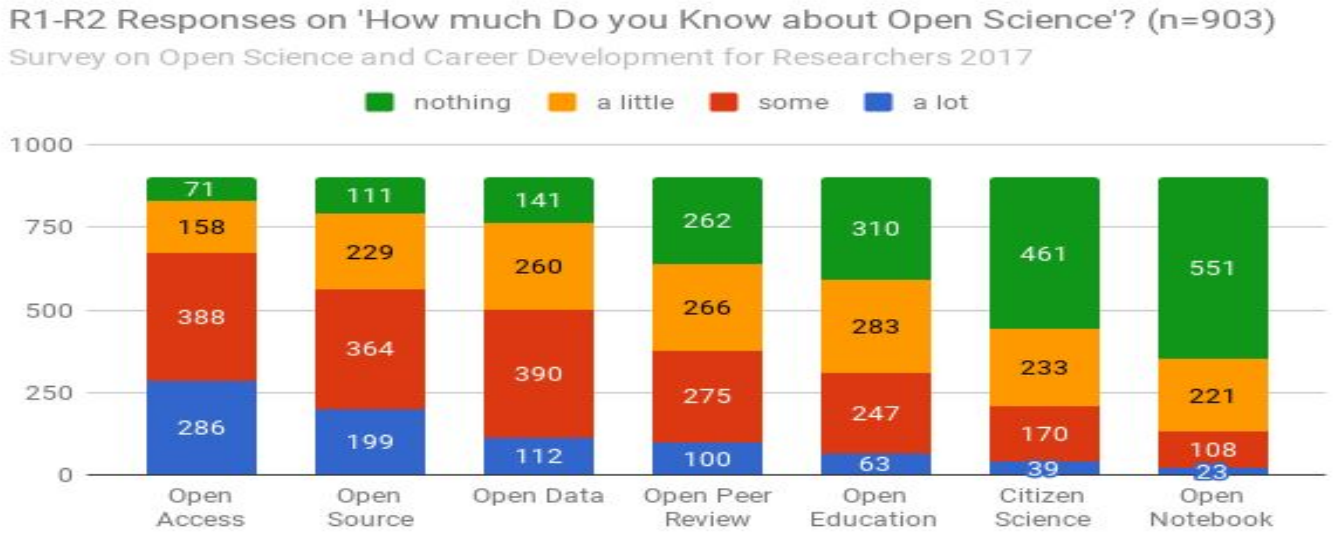
What is and why do Open Science?



O'Neill et al (2017)

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What is and why do Open Science?

- opens up research
- increases visibility
- increases impact
- increases integrity
- pools resources
- fastens innovation
- as open as possible!

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Open Access by 2020 with Plan S

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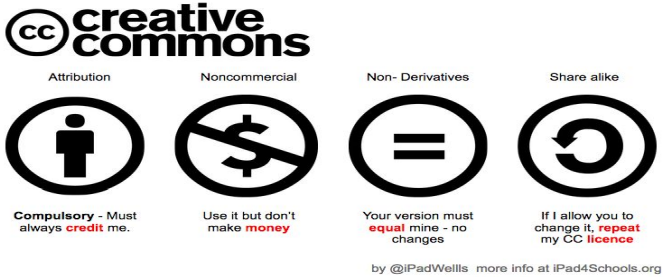
Open Access by 2020 with Plan S

PAYWALL
The Business of Scholarship



- Standard publishing:
- University libraries buy subscriptions
- Non-members pay to read publications
- Often authors do not retain copyright

Paywall the Movie | Creative Commons

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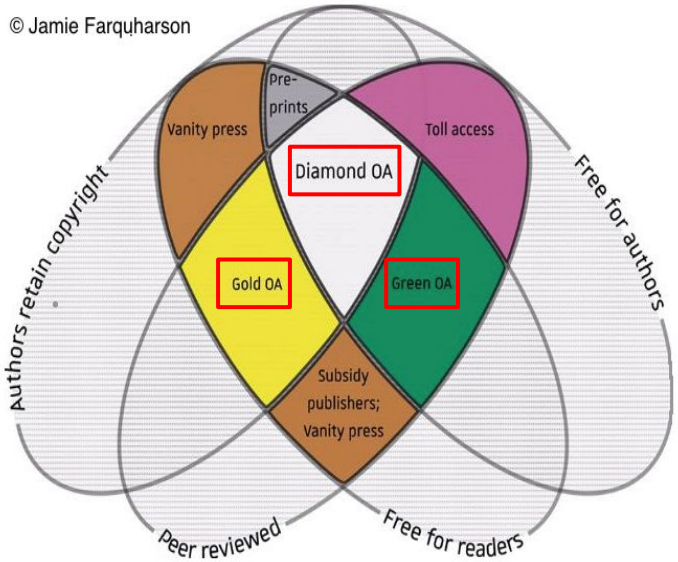
Open Access by 2020 with Plan S



Open Access routes:

- green = self-archive version in repository
- gold = pay fee (APC) to open immediately
- diamond = no fees to open immediately

[Open Access Overview]

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Open Access by 2020 with Plan S

- Plan S = cOAlition S
- 12 national funders
- science publications
- all in Open Access
- full and immediate
- by 01 January 2020
- 10 core principles

Plan S

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Open Access by 2020 with Plan S

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MARIE CURIE ALUMNI

YAE

Joint Statement on Open Access for Researchers via Plan S

Plan S calls for all scientific publications on the results of research funded by national and European research councils and funding bodies to be published in compliant Open Access journals or on compliant Open Access platforms by 01 January 2020. The plan was initiated by the Open Access Envoy of the European Commission and Science Europe and will be implemented by cOAlition S. The coalition currently includes 11 national funders and is supported by the European Commission and European Research Council. Plan S consists of 10 principles to be enacted by coalition members. We, representatives of early-career and senior researchers in Europe, commend cOAlition S for taking this bold and ambitious step towards Open Access and offer our support as well as comments on implementing Plan S.

Support for Plan S:

✓ copyright + books
✓ immediate + full
✓ fees + funding cap
✓ platforms + policies
?? venues with no fees
?? data + source code

Joint Statement (2018)

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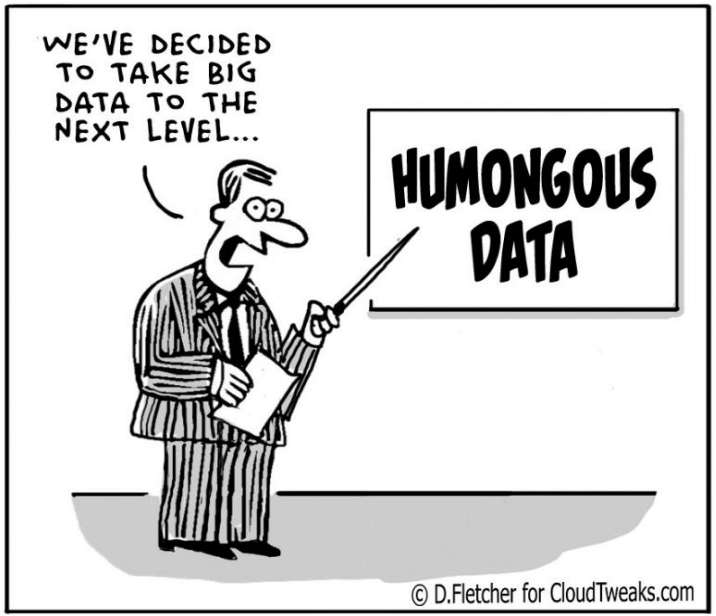
FAIR and Big Data for researchers



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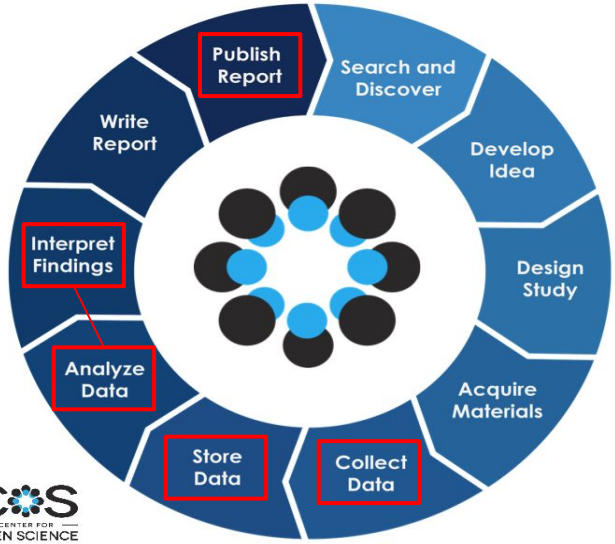

Open Science Framework

- collect and tag data with metadata
- store and curate data for posterity
- analyse and logically interpret data
- open up data and research outcomes

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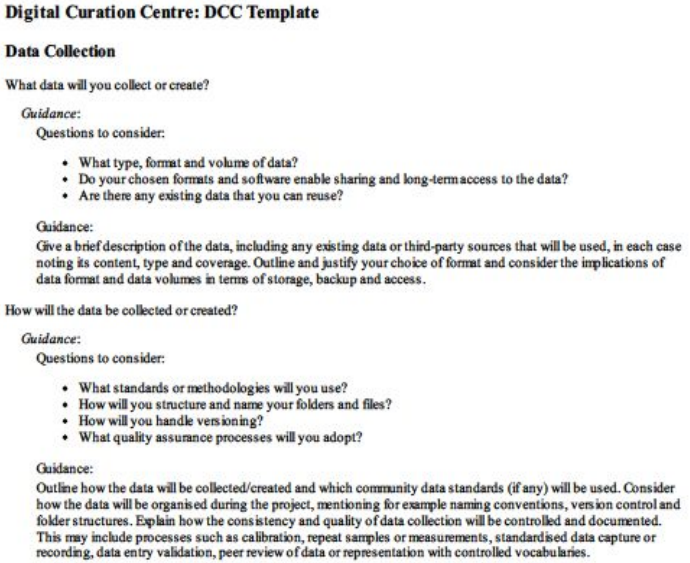

Digital Curation Centre: DCC Template

Data Collection

What data will you collect or create?

Guidance:
Questions to consider:

- What type, format and volume of data?
- Do your chosen formats and software enable sharing and long-term access to the data?
- Are there any existing data that you can reuse?

Guidance:
Give a brief description of the data, including any existing data or third-party sources that will be used, in each case noting its content, type and coverage. Outline and justify your choice of format and consider the implications of data format and data volumes in terms of storage, backup and access.

How will the data be collected or created?

Guidance:
Questions to consider:

- What standards or methodologies will you use?
- How will you structure and name your folders and files?
- How will you handle versioning?
- What quality assurance processes will you adopt?

Guidance:
Outline how the data will be collected/created and which community data standards (if any) will be used. Consider how the data will be organised during the project, mentioning for example naming conventions, version control and folder structures. Explain how the consistency and quality of data collection will be controlled and documented. This may include processes such as calibration, repeat samples or measurements, standardised data capture or recording, data entry validation, peer review of data or representation with controlled vocabularies.

[DMP Online]

Data Management:

- data plans (DMPs)
- data collection
- data analysis
- data visualisation
- data archiving
- data stewardship
- FAIR principles

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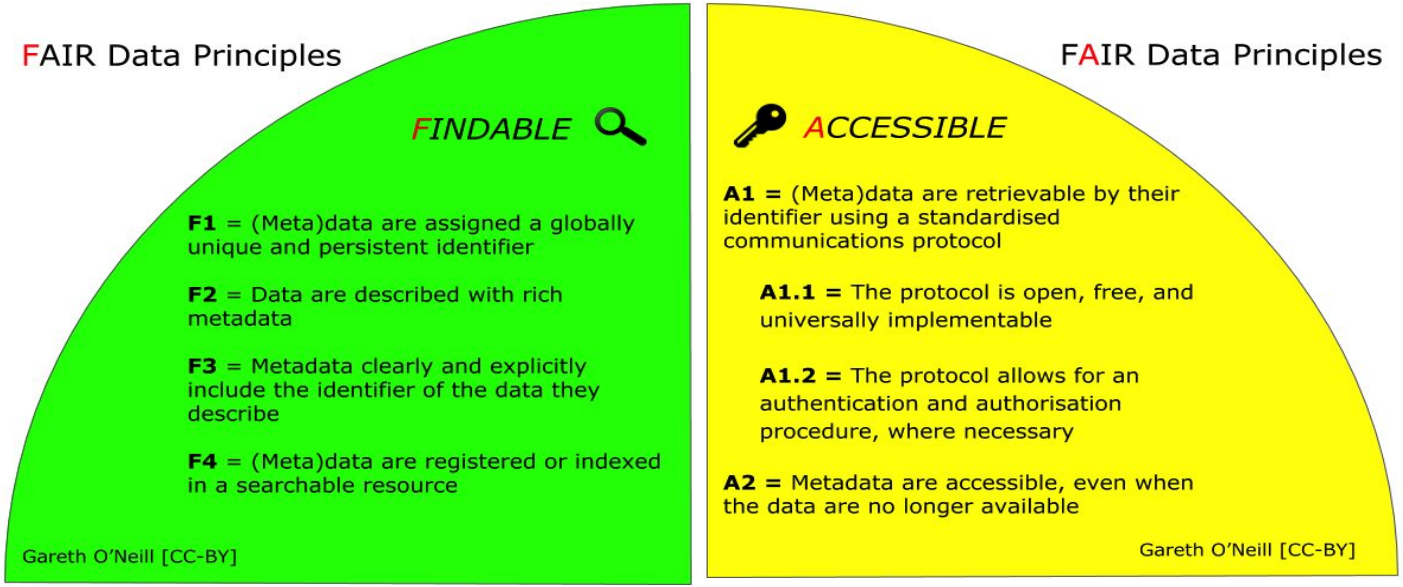
FAIR and Big Data for researchers



FAIR Data Principles

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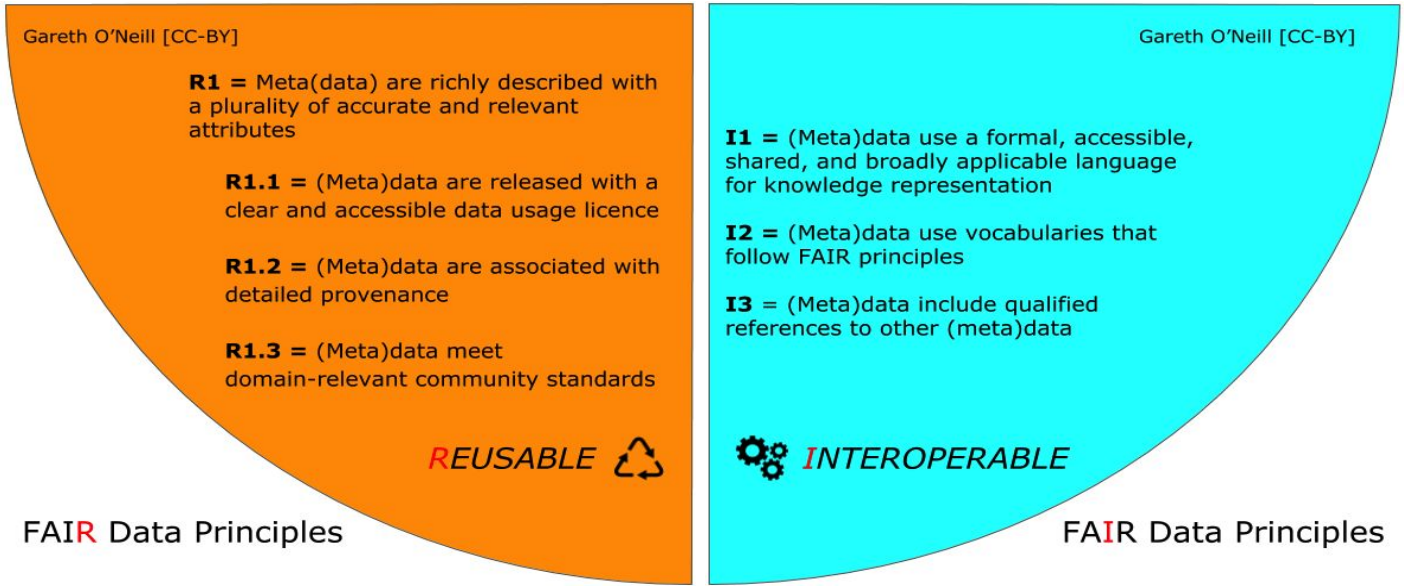

FAIR Data Principles

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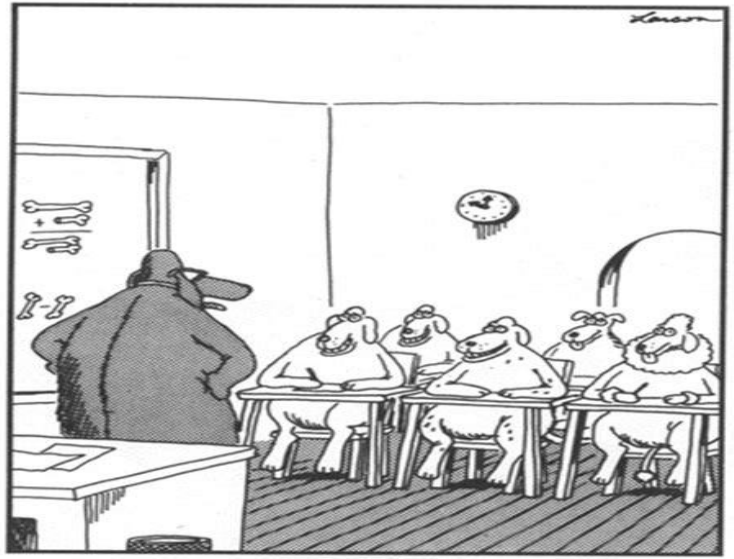
Open Science skills for researchers



"Well, here we go again. ... Did anyone here *not* eat his or her homework on the way to school?"

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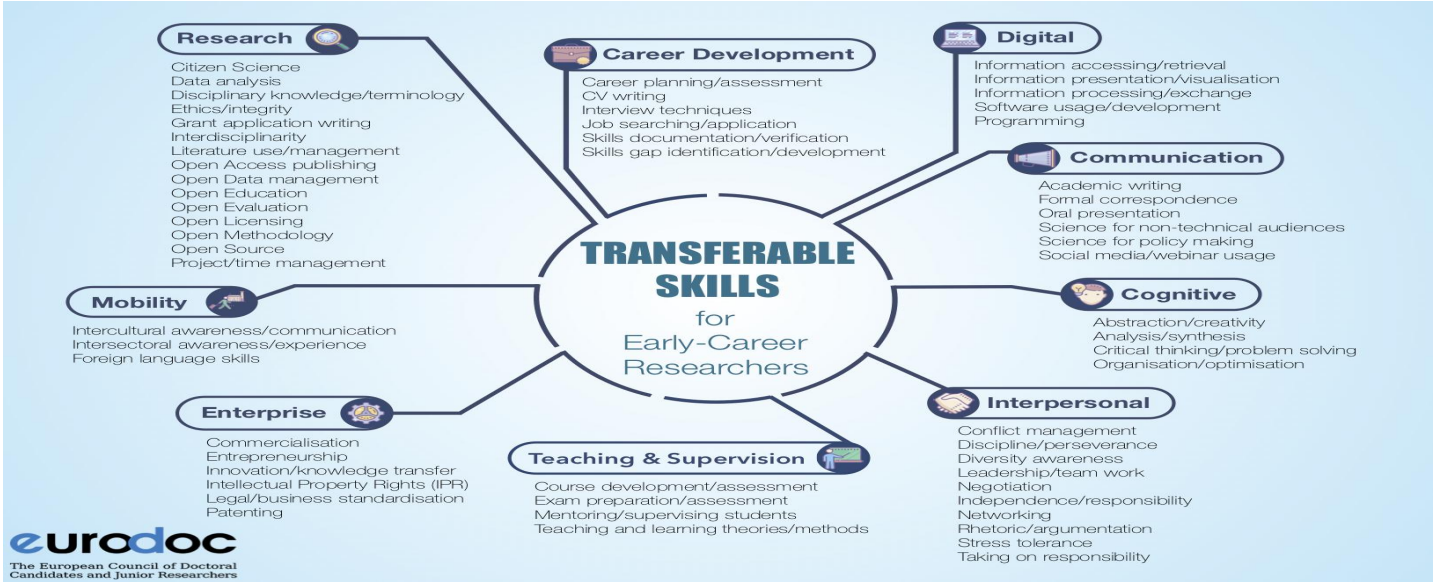

Eurodoc Skills Report (2018) | Eurodoc Skills Infographic (2018)

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Open Science skills for researchers

Communication	• Academic writing • Formal correspondence • Oral presentation • Science for non-technical audiences • Science for policy making • Social media and webinar usage
Digital	• Information accessing and retrieval • Information presentation and visualisation • Information processing and exchange • Programming • Software usage and development

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Open Science skills for researchers

Career Development	• Career planning and assessment • CV writing • Interview techniques • Job application • Job searching • Skills documentation and verification • Skills gap identification and development
Enterprise	• Commercialisation • Entrepreneurship • Innovation • Intellectual Property Rights (IPR) • Knowledge transfer within and across sectors • Legal and business standardisation • Patenting

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Open Science skills for researchers

Research (research intensive and non-research intensive)	• Citizen Science • Data analysis • Disciplinary knowledge and terminology • Ethics and integrity • Grant application writing • Interdisciplinarity • Literature use and management • Open Access publishing • Open Data management • Open Education • Open Evaluation • Open Licensing • Open Methodology • Open Source • Project management • Time management

Eurodoc Skills Report (2018) | Eurodoc Skills Infographic (2018)

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Open Science skills for researchers

C&C and HRS4R:

- link to Open Science
- training and support
- research evaluation
- recruitment criteria
- career progression
- Open Science label?

Charter & Code (C&C) | Human Resources Strategy for Researchers (HRS4R)

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Skills that Researchers Need to Work in an Open Science Environment

Thank you for listening!

- Gareth O'Neill - President of Eurodoc

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