The Benefits of Open Scholarship Skills for All Library Roles (and All Libraries)

Niamh Brennan

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

niamh.brennan@tcd.ie

@niamhmbrennan
- Innovation
- Transparency
- Validation
- Reproducibility
- Accountability
- Accessibility
- Re-usability
What is the role of the Librarian in this world? In the world of Open Scholarship?
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...
Researcher’s view . . .

From Bill Hubbard, University of Nottingham
and soon, with added research data?!

From Bill Hubbard, University of Nottingham
3.1. Categories of Open Science Skills

Aligned with the EU Open Science Monitor, 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 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.

Open Science competences:
Research integrity/ethics, Information literacy, open access, publishing/dissemination, DMPs etc.

Optional 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.

ADDED:
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.
- Takes ownership for and manages own career progression.
- Co-authors papers at workshop and conferences.

**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.

**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.

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.

* [http://proud2know.eu/14corecompetenciesopenscienceleader_blog38/](http://proud2know.eu/14corecompetenciesopenscienceleader_blog38/)
2 key aspects:

- Librarians as trainers / specialist skills providers
- Specialist skills for Library staff
October 26th, 2017

‘A Policy into Practice workshop on embedding standardised Open Science skills for your researchers’

Participants:
University libraries
Special Libraries
Private College library
Hospital
Student representative
Human Resources representative
Library School

Open Research Skills provision:
a) Doctoral and early career researcher training
b) Established researcher training
c) Information professionals/knowledge workers: skills provision
d) Institutional & national coordination & accreditation

“Researchers need the skills before they start as postgraduates.”
“Need to build in to the information literacy programme. There are gaps – and a huge amount of variance”.
‘No knowledge of open access’.
‘Very little research ethics training. No knowledge on data security. Pockets of excellence – pockets of appalling ignorance. Curate’s egg’.
‘Library communities can do a lot; research data management and digital preservation – there’s a whole range of actions possible’.
‘Early intervention: library skills training can be engaged’.
‘Skills Gap: there needs to be honesty around this’.
‘CPD – Career Profession Development & engagement with Library Schools’
“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.
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.
Can this model be applied to Open Scholarship skills for library staff?

Engaging researchers at all levels: supporting structure.

[Fig 4.3, OSPP Open Science Skills WG Report]
Actionable recommendations from the Open Science Policy Platform (OSPP), May 2018*

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

Stakeholder groups responsible for driving the actions:

- Research & E-Infrastructures
- Policy Making Organisations
- Researchers
- Research Libraries
- Research Funding Organisations
- Scientific Societies & Academies
- Universities & Research Performing Organisations
- Publishers
- Citizen Science & Public Engagement Organisations

* https://ec.europa.eu/research/opendefinition/pdf/integrated_advice_opspp_recommendations.pdf#view=fit&pagemode=none
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).
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.
“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 and its role in universities: A roadmap for cultural change

‘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.’

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 Development

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
RESEARCHERS

POLICYMAKERS

BUSINESS - INDUSTRY - SMEs

STUDENTS & TEACHERS

Activists

NGOs

PRACTITIONERS

Community Groups

Charities

MEDIA PROFESSIONALS

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

Elementary School  High School  FE/HE/CE  Lifelong learning

Citizen Scientist=All

R1

R2

R3

R4

Research Information/Management Professionals

Industry / Government / NGOs / Media /

*Niamh Brennan, March 2017*
This course describes the integration of Open Science topics in a newly developed Information Literacy workshop for 1st-year PhD candidates. The workshop treats Open Science as an integral part of Information Literacy and does not set it apart. Awareness of Open Science topics is an important step in the development of PhD candidates into “informed researchers”.

**Learning objectives**

- Understand the reasons for and against integrating Open Science topics into existing Information Literacy courses.
- Identify how Open Science topics are integrated into a new workshop for PhD candidates about Information and Data in general.

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**Introduction**

**Background and content**

**Course structure / Learning journey**

The new workshop “The Informed Researcher: Information and Data Skills” is a blended workshop for groups of 1.5 PhD candidates per iteration. The workshop includes two classroom sessions of 4 hours each, and an online self-study module of approx. 8-10 hours. The online module is not intended to be purely individual. Interaction amongst participants and between participants and teacher is required.

[https://www.fosteropenscience.eu/content/integrating-open-science-information-literacy-education](https://www.fosteropenscience.eu/content/integrating-open-science-information-literacy-education)
1. **Expert talk**: ‘ex cathedra’ talk by an external expert on the subject, preferably followed by Q&A.

2. **Talk by peers**: experience-based talk by a peer, preferably followed by Q&A.

3. **Panel session**: panel consisting of three or more experts, preferably with audience engagement.

4. **Workshop**: informal, hands-on session lead by an expert. Can be aimed at creation of tools/policies or just include practical exercises.

5. **Group work/Break-out sessions**: informal sessions where experts and/or peers share knowledge and/or experiences.

6. **E-learning**: using online educational technologies for learning and teaching (online courses, webinars, etc.).

### FOSTER Training Toolkit

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<tr>
<th>Audience</th>
<th>Expert talk</th>
<th>Talk by peers</th>
<th>Panel session</th>
<th>Workshop</th>
<th>Group work/Break-out sessions</th>
<th>E-learning</th>
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<td>Research Project Managers</td>
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<td>Policy makers &amp; Funders</td>
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The Open Science Training Handbook

A group of fourteen authors came together in February 2018 at the TIB (German National Library of Science and Technology) in Hannover to create an open, living handbook on Open Science training. High-quality trainings are fundamental when aiming at a cultural change towards the implementation of Open Science principles. Teaching resources provide great support for Open Science instructors and trainers. The Open Science training handbook will be a key resource and a first step towards developing Open Access and Open Science curricula and pedagogies. Supporting and connecting an emerging Open Science community that wishes to pass on their knowledge as multipliers, the handbook will enrich training activities and unlock the community's full potential.

Sharing their experience and skills of imparting Open Science principles, the authors (see below) produced an open knowledge and educational resource oriented to practical teaching. The focus of the new handbook is not spreading the ideas of Open Science, but showing how to spread these ideas most effectively. The form of a book sprint as a collaborative writing process maximised creativity and innovation, and ensured the production of a valuable resource in just a few days.

Bringing together methods, techniques, and practices, the handbook aims at supporting educators of Open Science. The result is intended as a helpful guide on how to forward knowledge on Open Science principles to our networks, institutions, colleagues, and students. It will instruct and inspire trainers how to create high quality and engaging trainings. Addressing challenges and giving solutions, it will strengthen the community of Open Science trainers who are educating, informing, and inspiring themselves.

Help us making the handbook better

We welcome comments and feedback from everyone, irrespective of their expertise or background. The easiest way to do this is to leave a comment right here by touching any paragraph with your mouse pointer and then clicking on the plus sign appearing next to that paragraph. Also, you can create pull requests, either from within the Gitbook website or app, or with any tool you like. The handbook's content is maintained as this GitHub
Upcoming E-learning courses and webinars
Open Access requirements

Updated on 06 May 2016

Would you like to know more on how to comply with the Horizon 2020 Open Access (OA) mandate and Open Research repository or OA journal OpenAIRE compatible with Horizon 2020 OA requirements? Have questions about success factors? Take our free e-learning courses and webinars provided by FOSTER (Facilitate Open Science Training for European Union) OpenAIRE and PASTEUR4OA (Open Access Policy Alignment Strategies for European Union Research).

https://www.openaire.eu/webinars/
7 Innovative Doctoral Training Principles

- Research excellence
- Attractive institutional environment
- Interdisciplinary research options,
- Exposure to industry and other relevant employment sectors,
- International networking
- Transferable skills training,
- and
- Quality assurance.
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<tr>
<th>Transferable skill category</th>
<th>Skills included:</th>
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<tr>
<td>Interpersonal skills</td>
<td>* Working with others/teamwork</td>
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<td>* Mentoring and supervisory skills</td>
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<td>* Negotiating skills</td>
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<td>* Networking skills</td>
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<td>Organisational skills</td>
<td>* Project and time-management skills</td>
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<td>* Career planning skills</td>
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<td>Research competencies</td>
<td>* Grant application writing skills</td>
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<td>* Research management and leadership</td>
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<td>* Knowledge of research methods and technologies beyond the PhD project</td>
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<td>* Research ethics and integrity</td>
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<td>Cognitive abilities</td>
<td>* Creativity and the ability for abstract thought</td>
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<td>* Problem solving</td>
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<td>Communication skills</td>
<td>* Communication/presentation skills, written and oral</td>
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<td>* Communication/dialogue with non-technical audiences (public engagement)</td>
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<td>* Teaching skills</td>
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<td>* Use of science in policy making</td>
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<td>Enterprise skills</td>
<td>* Entrepreneurship</td>
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<td>* Innovation</td>
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<td>* Commercialisation, patenting and knowledge transfer</td>
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*Source: ESF (2009), grouped into categories by author.*
EC 8 Key Competences for Lifelong Learning

1. **Communicating in a mother tongue:** ability to express and interpret concepts, thoughts, feelings, facts and opinions both orally and in writing.

2. **Communicating in a foreign language:** as above, but includes mediation skills (i.e. summarising, paraphrasing, interpreting or translating) and intercultural understanding.

3. **Mathematical, scientific and technological competence:** sound mastery of numeracy, an understanding of the natural world and an ability to apply knowledge and technology to perceived human needs (such as medicine, transport or communication).

4. **Digital competence:** confident and critical usage of information and communications technology for work, leisure and communication.

5. **Learning to learn:** ability to effectively manage one’s own learning, either individually or in groups.

6. **Social and civic competences:** ability to participate effectively and constructively in one’s social and working life and engage in active and democratic participation, especially in increasingly diverse societies.

7. **Sense of initiative and entrepreneurship:** ability to turn ideas into action through creativity, innovation and risk taking as well as ability to plan and manage projects.

8. **Cultural awareness and expression:** ability to appreciate the creative importance of ideas, experiences and emotions in a range of media such as music, literature and visual and performing arts.
Distinguishing the Open Science levels:

- General: Citizen Scientist: Basic Skills
- General: Citizen Scientist: Key Competencies
- Researcher Career Development: Professional Competencies, Iterative, R1-R4
- Research Information Professional (a) General; b) Specialist
- Research Management Professional (a) General; b) Specialist
- Data Scientist (see Edison discussion document: [http://edison-project.eu/sites/edison-project.eu/files/filefield_paths/edison_cfds-draft-cc-v07_0.pdf](http://edison-project.eu/sites/edison-project.eu/files/filefield_paths/edison_cfds-draft-cc-v07_0.pdf))
- Industry-based Researcher
- State Laboratory / Research Institute-based Researcher
- Government / NGO – based Researcher
- Other...
‘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!
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Pontika et al. (2015) Fostering open science to research using a taxonomy and an eLearning portal, Nancy Pontika, Petr Knoth, Matteo Cancellieri, Samuel Pearce; proceedings of the 15th International Conference on Knowledge Technologies and Data-driven Business, (i-KNOW '15), Graz, Austria, October 21-22, 2015; Article No. 11, ACM Digital Library, doi: 10.1145/2809563.2809571; http://dl.acm.org/citation.cfm?id=2809571


