Opening up the Research Community to the Open Science paradigm

Remedios Melero. IATA-CSIC
Partner of Foster project
Quick facts.....
Partners

- **Universidade do Minho** – *Portugal (coordinator)*
- Georg-August-Universitaet Goettingen Stiftung Oeffentlichen Rechts – *Germany*
- Danmarks Tekniske Universitet – *Denmark*
- Stichting eIFL.net – *Netherlands*
- SPARC-Europe – *UK*
- Stichting LIBER – *Netherlands*
- University of Glasgow – DCC – *UK*
- Technische Universiteit Delft – *Netherlands*
- The Open University – *UK*
- ICM - Uniwersytet Warszawski – *Poland*
- Consortium Universitaire de Publications Numériques Couperin – *France*
- **Consejo Superior de Investigaciones Científicas** – *Spain*
- University of Edinburgh - DCC – *UK*
General objectives

• **Support different stakeholders, especially young researchers**, in adopting open access in the context of the European Research Area (ERA) and in complying with the open access policies and rules of participation set out for Horizon 2020;

• **Integrate open access principles and practice in the current research workflow** by targeting the young researcher training environment;

• **Strengthen the institutional training capacity** to foster compliance with the open access policies of the ERA and Horizon 2020 (beyond the FOSTER project);

• **Facilitate the adoption, reinforcement and implementation of open access policies from other European funders**, in line with the EC’s recommendation.
https://www.fosteropenscience.eu/
Diagram of Foster’s Content Classification

https://www.fosteropenscience.eu/
Events

https://www.fosteropenscience.eu/events
FOSTER Courses
https://www.fosteropenscience.eu/courses

COURSE: The Horizon 2020 Open Research Data pilot
Intended audience: Project Managers, Researchers and students, Policy makers and Funders, Librarians and Repository managers. Research Administration level: Introductory; no previous knowledge is required.

A course for researchers, research support staff and project officers.
Learning objectives:
1. Understand what is required of participants in the H2020 Open Research Data pilot
2. Learn about the concepts of open data, metadata, licensing and repositories
3. Identify key resources and services that can help you to comply with requirements
4. Undertake short tests to check your understanding.

COURSE: Making your Repository or Open Access Journal OpenAIRE compatible with OA Horizon 2020 requirements
Intended audience: Librarians and Repository managers, Policy makers and Funders, Publishers. Level: Introductory; awareness of
Course for Repository managers, Data archives managers, Librarians, Journal editors and publishers,
Data providers, Research managers and administrators.

Objectives:
1. Understand of the OpenAIRE infrastructure and content harvesting
2. Identify the OpenAIRE guidelines to metadata specifications, levels and OAI sets
3. Define the levels of compatibility based on specific needs and technical context
4. Identify and implement system configurations, tools and facilities for repository platforms
5. Use the OpenAIRE validator tool for compatibility tests and registration.

Start Date: 23 November 2015
End Date: 27 November 2015
Online Session: 26 November - 11:00 CET (register here for online session: http://goo.gl/forms/8HP1vEn4UY)

COURSE: Open Access to publications in Horizon 2020

The purpose of this course is to inform the researchers on how to comply with the H2020 mandate by depositing their publications in open access. Based on a total of 3 hours, the objectives are:
- Understand the context and the content of the H2020 mandate.
Love research data management

Report from the 5 CESSDA workshops on RDM organised in 2015

Love was at times in the air during our series of training workshops on Research Data Management for Open Data. Five partners from across the CESSDA network of social sciences data archives put their heads and training ideas together for some good cross-fertilisation. Doctoral training workshop at five European universities in 2015 was the result, with trainers from across the team co-delivering these.

DATA CATALOGUE

The data Catalogue provides a seamless interface to datasets from social science data archives across Europe. It is available in nine languages.
Where does Europe go towards open science?

The importance of creating change and training in open science issues

• Very briefly: Past, Present and the future
• New challenges, initiatives and projects
• “Dare or share”
• “From vision to action”
• Open science a challenge for new jobs
The Commission has carefully analysed the effects of open access policies on the scientific publishing market, both by means of a study and of a public consultation in 2006. These are available at: http://ec.europa.eu/research/science-society/page_en.cfm?id=3185

In August 2008 The EC announce which parts of FP7 will be covered by the open access pilot?

The pilot covers approximately 20% of the FP7 budget and will apply to specific areas of research under the 7th Research Framework Programme (FP7):

Health; Energy; Environment; Information and Communication; Technologies (Cognitive Systems, Interaction, Robotics); Research Infrastructures (e-Infrastructures); Socio-economic Sciences and Humanities; Science in Society
What changes in Horizon2020?

- Update of Guidelines
- New clauses in Grant Agreements
- OA to publications is mandatory for all projects
- OA to data piloted for 7 selected areas
- Member States are requested to develop and align national OA policies and infrastructures

The Declaration calls upon United Nations Member States to make an international commitment through the post-2015 development agenda to ensure that everyone has access to, and is able to understand, use and share the information that is necessary to promote sustainable development and democratic societies.

The Declaration was launched at the IFLA World Library and Information Congress in Lyon, France, 18 August 2014.

Lyon, 2014 http://www.lyondeclaration.org/
Removing ‘legal barriers’

May 2015 (group of experts)
http://thehaguedeclaration.com

Big Data can reshape the world and save lives.
By analysing it, we can find answers to challenges such as climate change and global epidemics. Economies can be stimulated. Innovation can be fostered. But first, intellectual property law must change and access to technology must be improved, making facts, data and ideas equally accessible for everyone.
• Key information on Open Access, such as benefits, challenges and ways of implementing Open Access

• Set of topics that institutions should consider when developing and implementing their policies on Open Access
“many large journal publishers have rendered the situation “fiscally unsustainable and academically restrictive”, with some journals costing as much as $40,000 per year (and publishers drawing profits of 35% or more)”

“In the era of Open Science, Open Access to publications is one of the cornerstones of the new research paradigm and business models must support this transition. It should be one of the principal objectives of Commissioner Carlos Moedas and the Dutch EU Presidency (January-June 2016) to ensure that this transition happens.”
Open science is beyond open access
Open Science Definitions

“Open Science (OS) offers researchers tools and workflows for transparency, reproducibility, dissemination and transfer of new knowledge.”

“The conduction of science in a way that others can collaborate and contribute, where research data, lab notes and other research processes are freely available, with terms that allow reuse, redistribution and reproduction of the research. (Open science, http://en.wikipedia.org/wiki/Open_science)”

“Open science is the idea that scientific knowledge of all kinds should be openly shared as early as is practical in the discovery process.” (Michael Nielsen, http://openscienceasap.org/open-science/)
Principles of Open Science

Open Methodology (Methods, processes, relevant documents)

Open Source (Soft- and Hardware)

Open Data (data free to re-use)

Open Access to scholarly outputs (gratis and libre)

Open Peer Review (transparency in evaluation and quality criteria)

Open Educational Resources (MOOCs, OERs)

http://openscienceasap.org/open-science/
Open Science: One Term, Five Schools of Thought.
http://book.openingscience.org/basics_background/open_science_one_term_five_schools_of_thought.html

- **Technological architecture**
- **Accessibility of knowledge creation**
- **Collaborative research**
- **Access to knowledge**
- **Alternative impact measurement**

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**Infrastructure School**
- **Assumption:** Efficient research depends on the available tools and applications.
- **Goal:** Creating openly available platforms, tools and services for scientists.
- **Keywords:** Collaboration platforms and tools

**Public School**
- **Assumption:** Science needs to be made accessible to the public.
- **Goal:** Making science accessible for citizens.
- **Keywords:** Citizen Science, Science PR, Science Blogging

**Democratic School**
- **Assumption:** The access to knowledge is unequally distributed.
- **Goal:** Making knowledge freely available for everyone.
- **Keywords:** Open access, intellectual property rights, Open Data, Open Code

**Measurement School**
- **Assumption:** Scientific contributions today need alternative impact measurements.
- **Goal:** Developing an alternative metric system for scientific impact.
- **Keywords:** Altmetrics, peer review, citation, impact factors
e-InfraNet: ‘Open’ as the default modus operandi for research and higher education
Open data must be accessible, useable, assessable and intelligible (extracted from Science as an Open Enterprise, 2012)

FAIR Data Principles: Findable, Accessible, Interoperable, and Re-usable
Validating the ‘Science 2.0’ consultation
https://scienceintransition.files.wordpress.com/2014/10/rtd_public-consultation-
science-2-0-final.pdf

Objectives..:
• Awareness
• Challenges
• Actions to benefit innovation and competitiveness
Figure 1 Drivers of open science (Questionnaire responses to ‘What are the key drivers of ‘Science 2.0’?’)

<table>
<thead>
<tr>
<th>Driver</th>
<th>Totally Agree</th>
<th>Partially Agree</th>
<th>Partially Disagree</th>
<th>Don’t Know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability of digital technologies and their increased capacities</td>
<td>76%</td>
<td>22%</td>
<td>2%</td>
<td></td>
</tr>
<tr>
<td>Researchers looking for new ways of disseminating their output</td>
<td>47%</td>
<td>43%</td>
<td>7%</td>
<td>2%</td>
</tr>
<tr>
<td>Researchers looking for new ways of collaboration</td>
<td>43%</td>
<td>43%</td>
<td>3%</td>
<td>0%</td>
</tr>
<tr>
<td>Increase of the global scientific population</td>
<td>30%</td>
<td>45%</td>
<td>4%</td>
<td>17%</td>
</tr>
<tr>
<td>Growing criticism of current peer-review system</td>
<td>34%</td>
<td>42%</td>
<td>6%</td>
<td>14%</td>
</tr>
<tr>
<td>Public demand for better and more effective science</td>
<td>36%</td>
<td>39%</td>
<td>2%</td>
<td>16%</td>
</tr>
<tr>
<td>Public funding supporting ‘Science 2.0’</td>
<td>32%</td>
<td>41%</td>
<td>6%</td>
<td>15%</td>
</tr>
<tr>
<td>Growing public scrutiny of science and research</td>
<td>28%</td>
<td>44%</td>
<td>3%</td>
<td>19%</td>
</tr>
<tr>
<td>Public demand for faster solutions to Societal Challenges</td>
<td>26%</td>
<td>45%</td>
<td>3%</td>
<td>20%</td>
</tr>
<tr>
<td>Scientific publishers engaging in ‘Science 2.0’</td>
<td>22%</td>
<td>40%</td>
<td>6%</td>
<td>22%</td>
</tr>
<tr>
<td>Citizens acting as scientists</td>
<td>11%</td>
<td>33%</td>
<td>6%</td>
<td>34%</td>
</tr>
</tbody>
</table>

Legend:
- I totally agree
- I partially agree
- I don’t know
- I partially disagree
- I totally disagree
Figure 4: Implications of Open Science (Questionnaire responses to ‘What are the implications of ‘Science 2.0’ for society, the economy and the research system?’)

- Science more reliable (e.g. re-use of data): 46% totally agree, 37% partially agree, 4% unsure.
- Science more efficient: 42% totally agree, 41% partially agree, 3% unsure.
- Faster and wider innovation: 42% totally agree, 40% partially agree, 6% unsure.
- Data-intensive science as a key economic driver: 41% totally agree, 38% partially agree, 6% unsure.
- Greater scientific integrity: 37% totally agree, 41% partially agree, 6% unsure.
- Reconnect science and society: 33% totally agree, 43% partially agree, 6% unsure.
- Science more responsive to societal challenges: 29% totally agree, 47% partially agree, 6% unsure.
- Research more responsive to society through crowd-funding: 21% totally agree, 39% partially agree, 9% unsure.
- Crowd-funding an important research funding source: 18% totally agree, 40% partially agree, 8% unsure.
### Barriers at individual level

<table>
<thead>
<tr>
<th>Barrier</th>
<th>I totally agree</th>
<th>I partially agree</th>
<th>I don't know</th>
<th>I partially disagree</th>
<th>I totally disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concerns about quality assurance</td>
<td>53%</td>
<td>35%</td>
<td>3%</td>
<td>8%</td>
<td>2%</td>
</tr>
<tr>
<td>Lack of credit-giving to 'Science 2.0'</td>
<td>50%</td>
<td>38%</td>
<td>4%</td>
<td>7%</td>
<td>1%</td>
</tr>
<tr>
<td>Lack of integration in the existing infrastructures</td>
<td>46%</td>
<td>39%</td>
<td>5%</td>
<td>9%</td>
<td>1%</td>
</tr>
<tr>
<td>Limited awareness of benefits of 'Science 2.0 for researchers'</td>
<td>43%</td>
<td>41%</td>
<td>4%</td>
<td>9%</td>
<td>2%</td>
</tr>
<tr>
<td>Lack of financial support</td>
<td>47%</td>
<td>35%</td>
<td>6%</td>
<td>10%</td>
<td>3%</td>
</tr>
<tr>
<td>Uncertain benefits for researchers</td>
<td>35%</td>
<td>46%</td>
<td>5%</td>
<td>10%</td>
<td>4%</td>
</tr>
<tr>
<td>Legal constraints (e.g. copyright law)</td>
<td>43%</td>
<td>38%</td>
<td>6%</td>
<td>9%</td>
<td>5%</td>
</tr>
<tr>
<td>Lack of research skills fit for 'Science 2.0'</td>
<td>43%</td>
<td>37%</td>
<td>4%</td>
<td>13%</td>
<td>3%</td>
</tr>
<tr>
<td>Lack of incentives for junior scientists to engage with 'Science 2.0'</td>
<td>44%</td>
<td>32%</td>
<td>6%</td>
<td>13%</td>
<td>5%</td>
</tr>
<tr>
<td>Concerns about ethical and privacy issues</td>
<td>26%</td>
<td>44%</td>
<td>6%</td>
<td>17%</td>
<td>7%</td>
</tr>
</tbody>
</table>
Figure 3 Barriers for Science 2.0 at the institutional level (Questionnaire responses to ‘What are the barriers for ‘Science 2.0’?')

What are the barriers of 'Science 2.0' at the institutional level?

- Limited awareness of 'Science 2.0': 50% I totally agree, 39% I partially agree, 3% I don't know, 6% I partially disagree, 3% I totally disagree
- Concerns about quality assurance: 50% I totally agree, 37% I partially agree, 3% I don't know, 7% I partially disagree, 2% I totally disagree
- Uncertain benefits for research: 37% I totally agree, 44% I partially agree, 4% I don't know, 12% I partially disagree, 3% I totally disagree
- Uncertain socio-economic benefits: 29% I totally agree, 44% I partially agree, 7% I don't know, 15% I partially disagree, 5% I totally disagree
- Concerns about ethical and privacy issues: 31% I totally agree, 41% I partially agree, 5% I don't know, 19% I partially disagree, 5% I totally disagree
Change is irreversible!!
• Accessible
• Usable
• Assessable
• Intelligible

• “The best thing to do with your data will be thought of by someone else.”
  This thought by Rufus Pollock may be inspiring to some, but scary to others.

• Research has shown that those who share data tend to get more citations for their articles (Alan Hyndman)

• While publishing the results of research open access has now been widely accepted, there are still many challenges to making data truly open. Do we value data as a research product?

• Instead of mandating open data and hoping that scientists will comply, we need to focus on the benefits of sharing data, and make sure that the right incentives are in place. (Tom Pollard)

http://blogs.biomedcentral.com/bmcblog/2015/03/03/open-data-obstacles-opportunities/
Science is in transition. This poster gives an impression of the exploratory phase of a project aiming to chart innovation in scholarly information and communication flows from evolutionary and network perspectives.

101 Innovative tools and sites in 6 research workflow phases (<2000-2015)

We intend to address the questions of what drives innovation and how these innovations change research workflows and may contribute to more open, efficient and good science.

Most important developments in 6 research workflow phases

Typical workflow examples

Most important developments in 6 research workflow phases

<table>
<thead>
<tr>
<th>Trends</th>
<th>Analysis</th>
<th>Writing</th>
<th>Publication</th>
<th>Outreach</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>social discovery tools</td>
<td>datadecision &amp; crowdsourced science</td>
<td>collaborative online writing</td>
<td>Open Access &amp; data publication</td>
<td>scholarly social media</td>
<td>article level (altmetrics)</td>
</tr>
<tr>
<td>growing importance of data discovery</td>
<td>more online analysis tools</td>
<td>more integration with publication &amp; assessment tools</td>
<td>more use of “publish first, judge later”</td>
<td>use of altmetrics for monitoring outreach</td>
<td>more open and post-publication peer review</td>
</tr>
<tr>
<td>willingness to share in analysis phase</td>
<td>acceptance of collaborative online writing</td>
<td>effect of journal/publisher status</td>
<td>requirements of funders &amp; institutions</td>
<td>who pays for costly qualitative assessment?</td>
<td></td>
</tr>
<tr>
<td>discovery based on aggregated OA full text</td>
<td>open lab notes</td>
<td>semantic tagging while writing/editing</td>
<td>reader-sided paper formatting</td>
<td>using repositories for institutional visibility</td>
<td>using author-, publication- and affiliation IDs</td>
</tr>
<tr>
<td>real semantic search (concepts &amp; relations)</td>
<td>reproducibility</td>
<td>safety/privacy of online writing</td>
<td>globalization of publishing/access standards</td>
<td>making outreach a two way discussion</td>
<td>quality of measuring tools</td>
</tr>
</tbody>
</table>

Most important long-term development
- multidisciplinary + citation-enhanced databases
- collaboration + data-driven
- online writing platforms
- Open Access
- more & better connected researcher profiles
- importance of societal relevance + non-publication contributions

Potentially most disruptive development
- semantic/concept search + contextual/social recommendations
- open science
- collaborative writing + integration with publishing
- circumventing traditional publishers
- public access to research findings, also for agenda setting
- moving away from simple quantitative indicators

Typical workflow examples
From vision to action
Based on 5 policy actions:

- Foster Open Science
- Remove barriers to Open Science
- Develop research infrastructures for Open Science
- Mainstream Open Access to research results
- Embed Open Science in Society

https://ec.europa.eu/research/openscience/pdf/draft_european_open_science_agenda.pdf
Some actions...

- Reward researchers engaged in Open Science activities (career development)
- Allow research funders to provide specific incentives for 'collaborative science' including societal actors and citizen science
- Improve expertise and guidance (in open science)
- Implement data-sharing principles (e.g. G8 principles / FAIR)

Some implementations....

- Recognize new professions e.g. Establish a professorship on Openness, on Big data management, data mining etc.
- Introduce openness as criterion for receiving research funding
- Analyse current competency levels (research organisations)
- Adapt university curricula to new needs
- Pilot a EU Certificate of Open Research
- Create incentives for skill transfer in data analytics and cloud technology for research
This document is a living document reflecting the present state of open science evolution. It is based on the input of many participating experts and stakeholders of the Amsterdam Conference ‘Open Science – From Vision to Action’, hosted by the Netherlands’ EU Presidency on 4 and 5 April 2016.

Formulated to reach two important pan-European goals for 2020:

1. **Full open access for all scientific publications**
2. **A fundamentally new approach towards optimal reuse of research data**

To reach these goals by 2020 we need flanking policy:
- **New assessment, reward and evaluation systems**
- **Alignment of policies and exchange of best practices**

http://english.eu2016.nl/documents/reports/2016/04/04/amsterdam-call-for-action-on-open-science
Twelve actions grouped around the five cutting themes that follow the structure of the European Open Science Agenda proposed by the EC

**Removing barriers to open science**
1. **Change** assessment, evaluation and reward systems in science
2. **Facilitate** text and data mining of content
3. **Improve** insight into IPR and issues such as privacy
4. Create **transparency** on the costs and conditions of academic communication

**Developing research infrastructures**
5. Introduce FAIR and secure data principles
6. Set up common e-infrastructures

**Fostering and creating incentives for open science**
7. Adopt open access principles
8. Stimulate new publishing models for knowledge transfer
9. Stimulate evidence-based research on innovations in open science

**Mainstreaming and further promoting open science policies**
10. Develop, implement, monitor and refine open access plans

**Stimulating and embedding open science in science and society**
11. Involve researchers and new users in open science
12. Encourage stakeholders to share expertise and information on open science
Research data deserve training!!!
https://www.openaire.eu/intro-researchers

For Researchers

Updated on 11 September 2015

Search in OA research results...

and discover through linked research entities.

For Researchers

Open Science

Link your research results

In our linked data world your research is yet another piece of the puzzle. Publishing/depositing in OA is a major step, but doing it properly is equally important. Your best bet is to use repositories/journals that use persistent IDs (e.g., CrossRef, DataCite, CNRI handles, ORCID, FundRef) and they expose data in an interoperable form.

So what to do? When you publish or deposit in OA make sure you use a fully OpenAIRE-compliant repository. If you don’t, use our linking services afterwards and associate your research results:

1. Link publications or data to funding for our associated funders
2. Link publications with data - buttons are in every publication/data landing page

You need to be a registered user to perform these tasks.
The objective of this IG is the exchange of information about existing developments and initiatives and promotion of training/education to manage research data throughout the data lifecycle. Concretely, it will make the case for creating taxonomies of the skills required by different group of data management specialists/professionals and elaborating reference models as a basis to:

i. enable the setting of quality standards for appropriate education and training programmes aimed at researchers and the professionals that support them, at all career stages;

ii. encourage the recognition of data skills amongst employees, employers, and professional bodies.

iii. prepare the ground for practical applications applying these standards in educational environments
Data Scientist is a complex profession, where several competences from multiple disciplines have to be combined to identify a profile of professional competences that are required more and more in several employment contexts and stakeholder domains.

..”data scientists range from pure e-Science driven by research communities, to applications of Data Science Professionals in Public Institutions”

“future Data Scientists must posses knowledge (and obtain competencies and skills) in data mining and analytics, information visualisation and communication, as well as in statistics, engineering and computer science, and acquire experiences in the specific research or industry domain of their future work and specialisation.
The purpose of LEARN is to take the LERU Roadmap for Research Data produced by the League of European Research Universities (LERU) and to develop this in order to build a coordinated e-infrastructure across Europe and beyond. LEARN will deliver:

- a model Research Data Management (RDM) policy;
- a Toolkit to support implementation, and;
- an Executive Briefing in five core languages so as to ensure wide outreach.

http://learn-rdm.eu
Welcome to the DART Project

Welcome to the web space for the Institute of Museum and Library Services (IMLS)-funded project titled, “Analysis of data management plans as a means to inform and empower academic librarians in providing research data support.” We refer to the project in more informal terms as “The DART Project” (DART = Data management plans as A Research Tool).

This two-year National Leadership Grant for Libraries Demonstration Project, led by Oregon State University in collaboration with the University of Oregon, the University of Michigan, the Georgia Institute of Technology and Pennsylvania State University, will facilitate a multi-university study of faculty data management plans (DMPs). The primary outputs of this project will be:

**Project Outputs**
1) An analytic rubric to standardize the review of data management plans as a means to inform targeted expansion or development of research data services at academic libraries;
2) A study utilizing the rubric that presents the results of data management plan analyses at five universities.
So you want to be a data scientist?

18 Mar 2013 | 11:25 GMT | Posted by Catherine de Lange | Category: Business

Data scientist has been billed as the ‘sexiest job of the 21st Century’ – but who are data scientists, and how can you get in on the action?

If you’ve already been through school, but still want to be a data scientist? Not to worry, Hilary Mason, chief scientist at Bitly says that good data scientists have three essential traits:

- **They can model a data set mathematically**
- **They have engineering skills**
- **They can find insights and tell stories from their data**
Trends....

"Data Scientist", data researcher Job Trends
THE WORLD NEEDS DATA SCIENTISTS

Now HIRING!

IF YOU ARE A MATH- OR DATA-DRIVEN INDIVIDUAL LOOKING FOR THE PERFECT CAREER FIT, look no further than data science. Due to the ongoing explosion of big data, companies have more information at their fingertips than ever—and not enough people who can make sense of it all. This reality has created a big market for quantitative analysts and individuals who can put massive amounts of data into perspective. Take a look.

EXPLAINING THE SUDDEN NEED FOR DATA SCIENTISTS

These scientists don’t just happen to be getting far more job offers without reason. Today’s modern business needs to manage far more data than ever before, and few have the talent on staff for the job. Projections indicate that the market will experience meteoric growth in the next several years.

The Big Data Market Forecast

<table>
<thead>
<tr>
<th>Year</th>
<th>$ in Billions</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>5.1</td>
</tr>
<tr>
<td>2012</td>
<td>10.2</td>
</tr>
<tr>
<td>2013</td>
<td>16.8</td>
</tr>
<tr>
<td>2014</td>
<td>32.1</td>
</tr>
<tr>
<td>2015</td>
<td>48.0</td>
</tr>
<tr>
<td>2016</td>
<td>53.4</td>
</tr>
</tbody>
</table>

BEST NEW JOBS IN AMERICA

<table>
<thead>
<tr>
<th>Job</th>
<th>Projected Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Video Game Designer</td>
<td>32.4%</td>
</tr>
<tr>
<td>Data Scientist</td>
<td>18.7%</td>
</tr>
<tr>
<td>Sustainability Consultant</td>
<td>18.7%</td>
</tr>
<tr>
<td>Solar Sales Consultant</td>
<td>16.4%</td>
</tr>
<tr>
<td>Social Media Manager</td>
<td>13.6%</td>
</tr>
<tr>
<td>Wind Turbine Mechanical Engineer</td>
<td>8.8%</td>
</tr>
</tbody>
</table>
¡Gracias!
Thank you!

rmelero@iata.csic.es

More information:
http://www.fosteropenscience.eu/
http://www.pasteur4oa.eu/
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