COMMITTEE ON DATA
CODATA
INTERNATIONAL SCIENCE COUNCIL

International Science Council

Building Foundation for a World of Open Data and Open Science

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Vice President
CODATA
www.codata.org

UNISA Open Access webinar
21 October 2020

ISC, Institutional and Partner Members

- **ISC Members:** International Scientific Unions, Associations and other bodies related to ISC.
  - https://codata.org/membership/international-science-council-bodies/
  - Improved engagement with Unions and Associations: DRUM, DDI-CDI and Decadal Programme.
- **Institutional Members:** Commercial and NFP organisations.
  - Members and Benefits Documents: https://codata.org/membership/institutional-members/
- **Partner Organisations:** Scientific and data organisations with which it is important to partner (e.g. Data Together Organisations, DDI Alliance, IIASA).
  - Members and Template MoUs: https://codata.org/membership/partner-organisations/

CODATA's mission and operation

- **The mission of CODATA is to "Connect data and people to advance science and improve our world".**

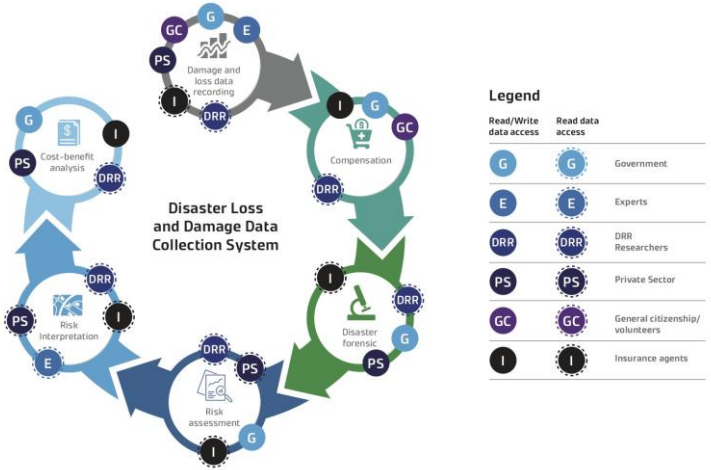
- As the 'Committee on Data of the International Science Council (ISC)', CODATA supports the ISC's mission of 'advancing science as a global public good' by promoting Open Science and FAIR data. CODATA convenes a global expert community and provides a forum for international consensus building and agreements around a range of data science and data policy issues, from the fundamental physical constants to cross-domain data specifications.
- **CODATA's membership includes national data committees, scientific academies, International Scientific Unions and other organisations.**

CODATA National Committees

- **Engage:** point of contact with CODATA;
- **Influence:** contribute to CODATA strategy;
- **Coordinate:** forum by which national stakeholders may advance data agenda in step with international developments;
- **Collaborate:** propose Task Groups, host or participate in international workshop series, engage with Early Career Data Professionals Group;
- **Partner:** undertake activities with other National Committees, bilaterally or in groups.
- **Data Together:** where possible and appropriate engage with the other Data Together Organisations
- **New Member: New Zealand; other discussions underway with potential national members.**
- Guidance for National Committees: https://codata.org/membership/national-members/

CODATA Task Groups

- Advanced mathematical tools for data-driven **applied systems analysis:** ***led to joint IIASA-CODATA Working Group.***
- Applying Data Integration and Data Science Tools toward Research of Urban Life and **Smart Cities:** ***supporting decadal programme.***
- Digital Representation of Units of Measure (**DRUM**)
- Improving Data Access and Reusability **(IDAR-TG):** ***particularly for data at risk…***
- **Agriculture Data**, Knowledge for Learning and Innovation**:** ***training and analysis platform, Kenya, East Africa***
- **Citizen Science for the SDGs** – Aligning Citizen Science outcomes to the UN Sustainable Development Goals**:** ***article, fieldwork by two interns.***
- **FAIR Data for Disaster Risk Reduction:** *white papers, policy briefs and webinars.*
- Preservation of and Access to Scientific and Technical Data in/for/with Developing Countries **(PASTD):** ***training and knowledge bases for LMICs***



For a larger image, please visit https://tinyurl.com/DisasterLossData

http://bit.ly/TGGDRR-White_Paper_2

Data Policies

GBIF Global Biodiversity Information Facility

- CODATA Data Policy Committee http://bit.ly/data-policy-committee;
- One major policy report per year.
- 20-Year Review of GBIF published in May 2020
- Preparing Independent Review of CAS Earth data policy and practices

Data Science

ubiquity press open scholarship

- Data Science Journal: https://datascience.codata.org/
- International Data Week and CODATA Conference series.
- Task Groups and Working Groups.

Data Skills

GO FAIR

ICTP The Abdus Salam International Centre for Theoretical Physics

FAIRSFAIR

CODATA

- CODATA-RDA School of Research Data Science.
- CODATA China, PASTD and other training activities.
- #terms4FAIRskills and FAIRsFAIR Competence Centres.

Data to Improve our World

DDI DATA DOCUMENTATION INITIATIVE

- **Decadal Programme:** Making Data Work for Cross Domain Grand Challenges
- Promoting Good Data Practices
- Regional Open Science Platforms

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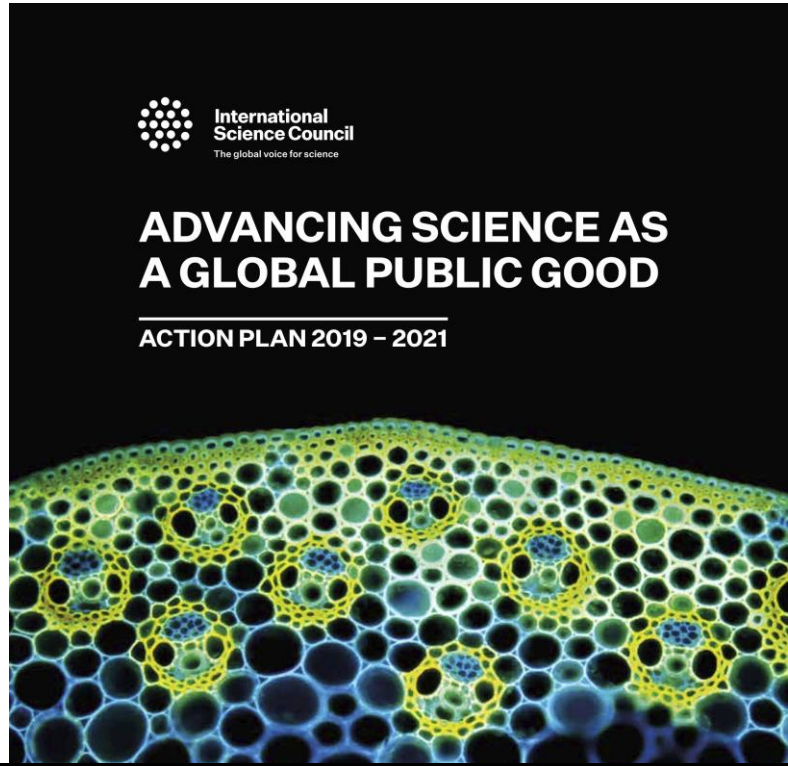
Making Data Work for Cross-Domain Challenges: the Premise

- The major, pressing global scientific and human issues of the 21st century can **ONLY** be addressed through **research that works across disciplines to understand complex systems**, and which uses a **transdisciplinary**
- The digital and data revolution presents us with huge opportunities and significant challenges.
- Major challenges for many scientific domains – requires work on data specifications, semantics, infrastructures, etc.
    - **80% of effort used on data wrangling; conservative estimate of 10.2 Bn Euro opportunity cost from sub-optimal data stewardship.**
- Open Science and FAIR data provide solutions.
- Considerable global interest in data platforms (EOSC etc).



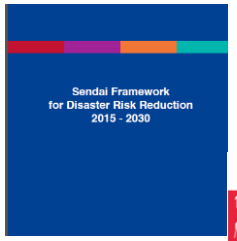
Data for Global Grand Challenges

- Addressing global grand challenges requires cross-domain collaboration.
- Needs the ability to gather data from many sources, to combine them and extract information from complex and heterogeneous data.
  - Combining data for SDG indicators is challenging.
  - Combining data for the scientific contribution to understanding of SDGs is very challenging!
- **ISC and ISC members (particularly Unions and Associations), and ISC programmes have a role to play.**
- Addressing how to access and combine data (issues of data interoperability) need input from domain experts and definitions agreed by communities.
- Major challenge of fundamental importance to science – **the work of a global decadal programme**.

futureearth
research for global sustainability

IRDR
Integrated Research on Disaster Risk

URBAN HEALTH AND WELLBEING
A SYSTEMS APPROACH



Findable Accessible Interoperable Reusable

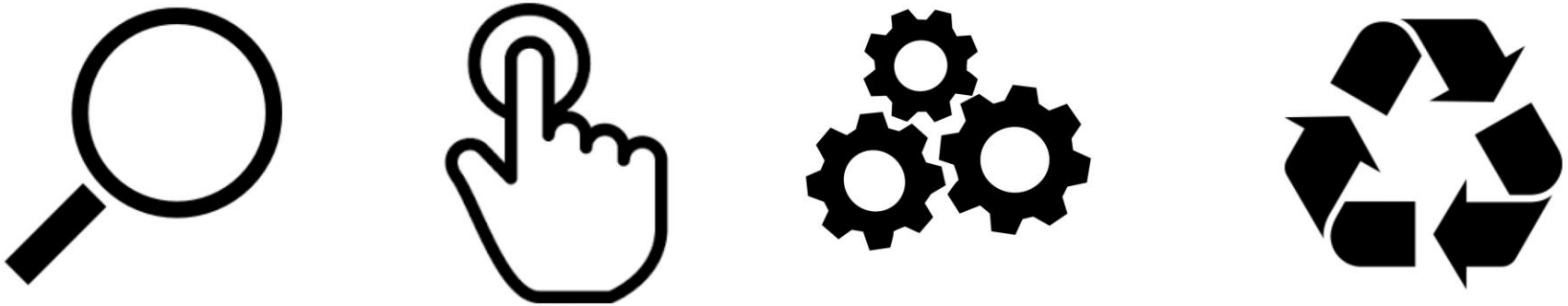


Image CC-BY-SA by SangyaPundir

(Mons, B., et al., The FAIR Guiding Principles for scientific data management and stewardship, Scientific Data, http://dx.doi.org/10.1038/sdata.2016.18)

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FAIR Guiding Principles

To be Findable:

- F1. (meta)data are assigned a globally unique and persistent identifier
- F2. data are described with rich metadata (defined by R1 below)
- F3. metadata clearly and explicitly include the identifier of the data it describes
- F4. (meta)data are registered or indexed in a searchable resource

To be Accessible:

- A1. (meta)data are retrievable by their identifier using a standardized communications protocol
- A1.1 the protocol is open, free, and universally implementable
- A1.2 the protocol allows for an authentication and authorization procedure, where necessary
- A2. metadata are accessible, even when the data are no longer available

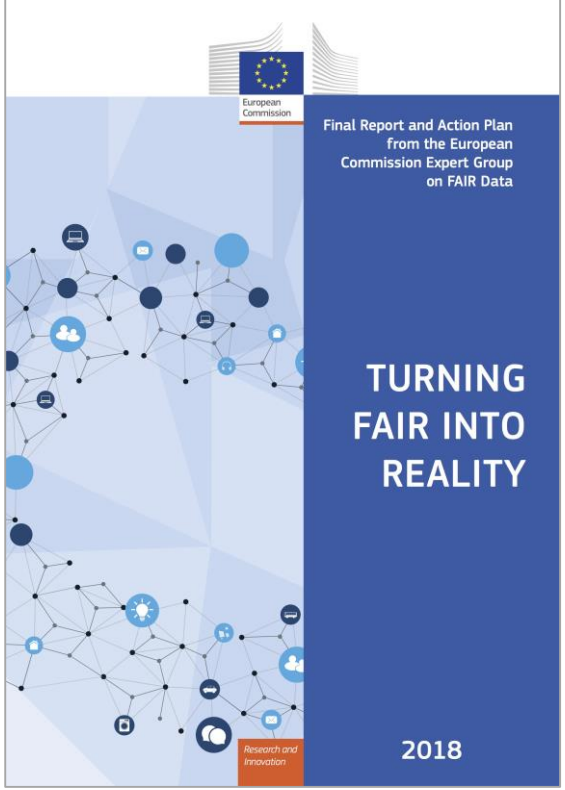
To be Interoperable:

- I1. (meta)data use a formal, accessible, shared, and broadly applicable language for knowledge representation.
- I2. (meta)data use vocabularies that follow FAIR principles
- I3. (meta)data include qualified references to other (meta)data

To be Reusable:

- R1. meta(data) are richly described with a plurality of accurate and relevant attributes
- R1.1. (meta)data are released with a clear and accessible data usage license
- R1.2. (meta)data are associated with detailed provenance
- R1.3. (meta)data meet domain-relevant community standards

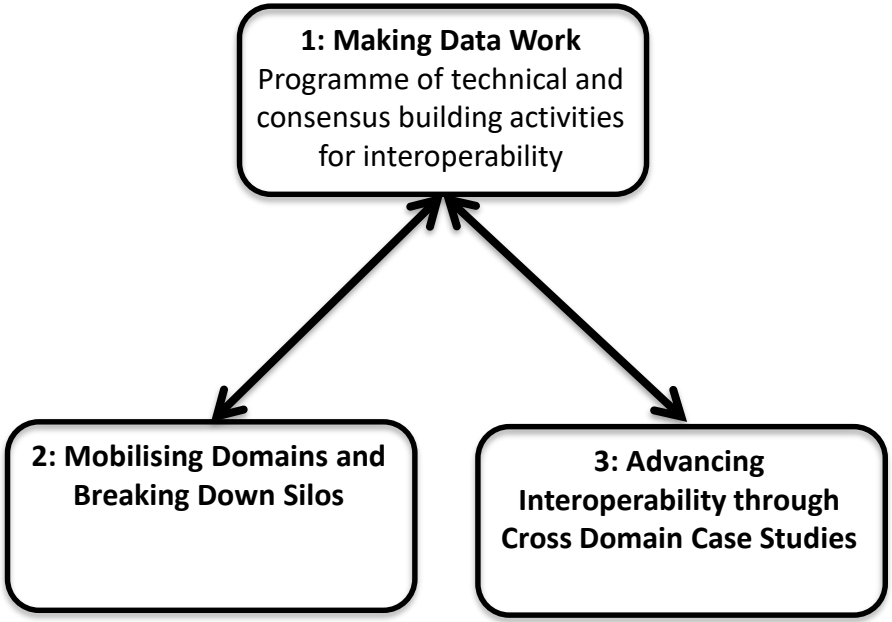
(Mons, B., et al., The FAIR Guiding Principles for scientific data management and stewardship, Scientific Data, http://dx.doi.org/10.1038/sdata.2016.18)



European Commission Expert Group, Chaired by Simon Hodson, Turning FAIR into Reality (2018)
https://doi.org/10.2777/1524

- **Findable:** have sufficiently rich metadata and a unique and persistent identifier, to enable discovery.
- **Accessible:** retrievable by humans and machines through a standard protocol; authentication and authorization where necessary.
  - Allows programmatic access for analysis.
- **Interoperable:** metadata use a 'formal, accessible, shared, and broadly applicable language for knowledge representation'.
  - The descriptions of variables etc follow a shared specification and are commensurable.
- **Reusable:** metadata provide rich and accurate information; clear usage license; detailed provenance.
  - Both humans and their analytical tools know what can be done with the data (license) and can assess its provenance.

Making Data Work: programme design



- Programme comprises three work areas.
  - Consensus and technical solutions for data interoperability (terminologies, ontologies, metadata, machine learning);
  - Mobilising domains and breaking down silos (working with Unions, Associations and other domain organisations);
  - Advancing solutions through cross-domain case studies.
- Current case studies in: **resilient cities, disaster risk reduction and infectious diseases**. **More planned and invited!**
- Working with domain and cross-domain areas, semantic solutions and machine learning.

Initial Pilot Activities

Initial Working Groups / Activities

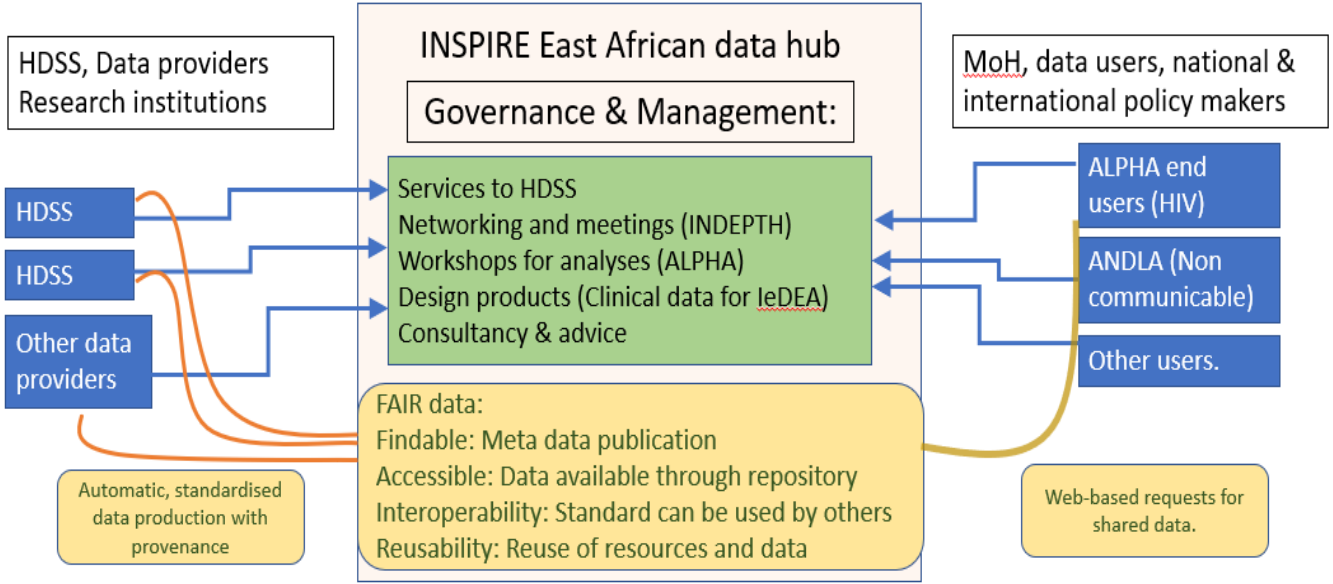
1. Digital Representation of Units of Measure (TG is a key contribution to the decadal programme)
2. Semantic Interoperability and Conceptual Framework (good practice for semantic resources)
3. Supporting further refinement of the DDI-Cross Domain Integration specification
4. Policy Monitoring Indicators (SDGs, Sendai etc)
5. Infectious Diseases: projects looking at data integration in HIV and COVID
6. Resilient and Healthy Cities: large group with a number of cities and projects, identifying shared themes.

Initial Pilot Activities: DDI-CDI

DDI-Cross Domain Integration Collaboration

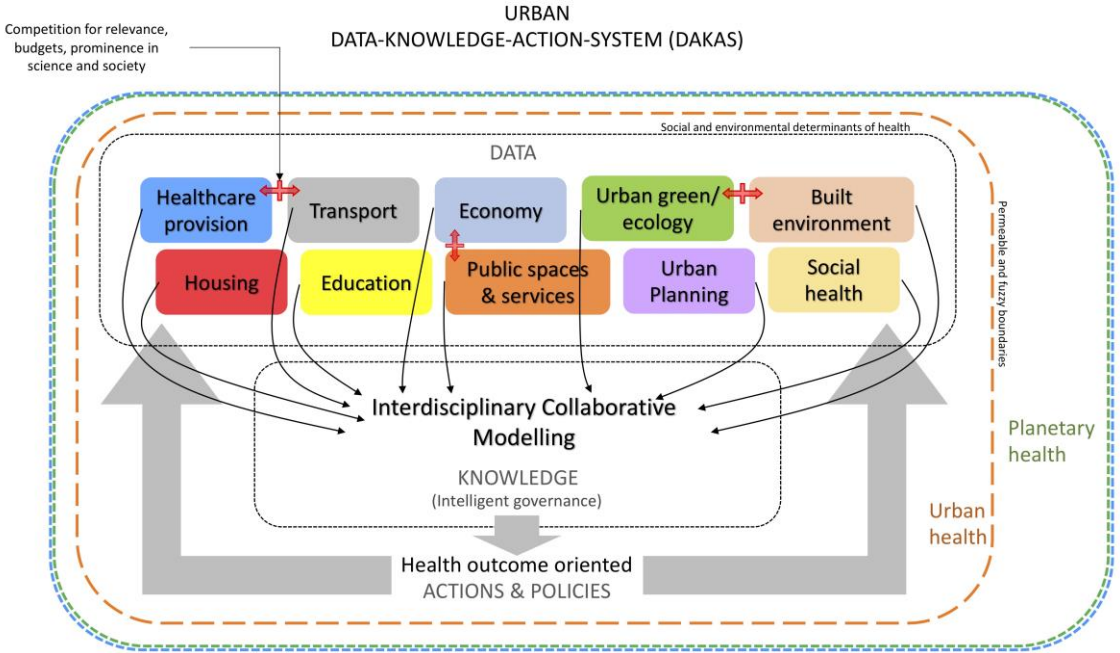
- DDI-CDI (Cross Domain Integration) is designed to interface with other standards and to help interoperability between different data types, standards, formats.
- Series of webinars to assist review of specification: https://bit.ly/DDI-CDI-Webinars
- Invite participation of International Scientific Unions and domain experts in a series of virtual workshops to identify use cases and further refine the specification.
- EOSC funding to consult on DDI-CDI with European Research Infrastructures and further refine the specification.
- Upcoming workshops on representation of units, on provenance, on environmental use cases and health/medical use cases.

Initial Pilot Activities: Combining Social Science and Health Data



- Project with LSHTM combining HDSS (health and demographic surveillance system) data with clinical data.
- Secure data system.
- Consistent semantics and metadata.
- DDI-CDI also playing a role.
- Aim to apply the same approach to COVID Data.
- Diagram courtesy Chufundo Kanjala, INSPIRE Project.

Initial Pilot Activities: Resilient Cities (Data-Knowledge-Action System)

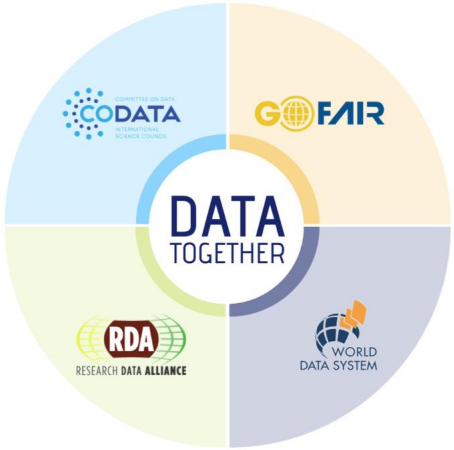


- Decadal Programme Pilot Working Group on Resilient and Healthy Cities.
- Partnership with the ISC Programme on Urban Health and Wellbeing.
- Developing a conceptual model for Data Knowledge Action System.
- Data case studies: application of data audit, FAIR data.
  - E.g. mobility and contact tracing.
- Feeds into Interdisciplinary Collaborative Modelling with both data, community and expert inputs.
- Diagram courtesy of Franz Gatzweiler, UHWB.

Decadal Programme: Delivery Agents / Activities

Delivery Agents

- Coordinating Programme Office / Secretariat
- Cohort of Metadata and Ontology Experts
- Distributed programme offices / nodes
- Partner projects and working groups
- **Preparing call for Management Committee and for Programme Offices and Partners.**

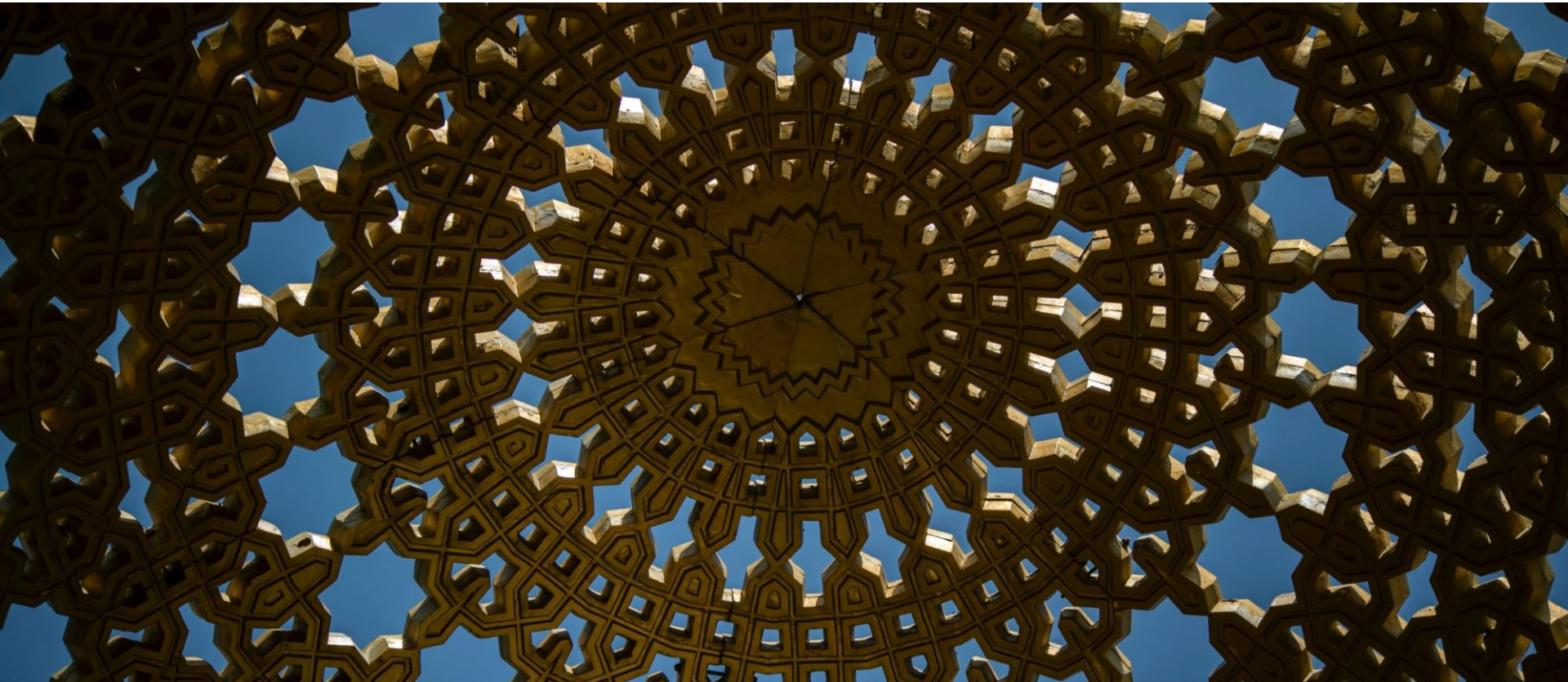


Delivery Activities / outputs

- Consensus workshops
- Regular intensive sprint workshops (Dagstuhl model)
- Identification and description of issues in domains / across domains
- Alignment and harmonisation of metadata specifications, refinement of ontologies and taxonomic systems, development of cross-walks between vocabularies, and the application of automation and machine learning to assist data linking and integration.

Making Data Work for Cross-Domain Challenges

- Aim to launch the Decadal Programme at the ISC GA and associated events ‘Global Knowledge Forum’ in Oman, 10-14 October 2021: https://council.science/about-us/governance/general-assembly/muscatassembly



FAIR Convergence Symposium

- Entirely virtual event.
- 30 November-4 December.
- Keynotes, interactive sessions, posters.
- Preparatory workshops on key themes: Sept-Nov.
- **Call for Sessions, Posters and Lightning Talks: https://conference.codata.org/FAIRconvergence2020/**
- **Deadline for Session Proposals 30 September.**
- **Strongly encourage session proposals from CODATA China.**

INTERNATIONAL DATA WEEK 2021

Data to Improve our World

8 -11
NOVEMBER
2021

SEOUL,
REPUBLIC OF
KOREA

Convened by

CODATA
COMMITTEE ON DATA
INTERNATIONAL SCIENCE COUNCIL

WORLD DATA SYSTEM

RDA
RESEARCH DATA ALLIANCE

KISTI
www.kisti.re.kr
Korea Institute of
Science and Technology Information

KRISS
Korea Research Institute of Standards and Science

SUNGKYUNKWAN UNIVERSITY
1398

IDW 2023, A Festival of Data, Salzburg, 23-26 October 2023

Data Skills and Training

FAIRsFAIR Project: Major EU H2020 Project

- Contributing to WP3 on Good Practices; WP5 on Synthesis and Synchronisation across initiatives; WP6 on FAIR Competence and Training.
- Laura Molloy employed by CODATA full-time on FAIRsFAIR.

#terms4FAIRskills

- Initiative to develop a community recognised terminology for FAIR data skills and competencies, **EOSC Funding obtained for short project.**
- See: http://www.codata.org/fair-data-training and https://terms4fairskills.github.io/Announcement.html

FAIRSFAIR
Fostering Fair Data Practices in Europe

Regular Beijing Data Science Training Workshops

- Most recently in Sept 2019
- Also in 2017, 2016, 2014, 2012.
- Other training workshops in Bangalore and Jakarta (2015).
- Helped scope the approach of the CODATA-RDA Data Schools.

CODATA-RDA Schools of Research Data Science

- **CODATA-RDA Schools of Research Data Science: http://bit.ly/CODATA-RDA-data_schools**
- Film: https://vimeo.com/299263596
- New website for the initiative (under construction): https://codata-rda-datascienceschools.github.io/
- **2020: Pretoria… virtual school for alumni in September…**
- 2019: Addis, Trieste, Trieste Advanced Workshops, Costa Rica.
- 2018: Brisbane, Trieste, Trieste Advanced Workshops, Kigali, São Paulo
- 2017: Trieste, Trieste Advanced Workshops, São Paulo
- 2016: Trieste

Data Schools
SCHOOLS OF RESEARCH DATA SCIENCE
CODATA – RDA

CODATA – RDA
Data Schools

CODATA Connect: Early Career and Alumni Group

CODATA Connect: https://codata.org/initiatives/strategic-programme/codata-connect/

- Initial Leads are Shaily Gandhi (India) and Felix Emeka Anyam (Nigeria).
  - Webinar Series on Resilient Cities
  - Webinar Series on Research Skills
  - Essay Competition and Datathon.
- Both are alumni of CODATA Data Schools; Shaily and Felix then organised a school on urban data science https://sws.cept.ac.in/course-detail/urban-data-science-S19FT001

CODATA-RDA Data Schools Alumni

- Students > Helpers > Instructors > Directors…
- Alumni Sara El Jadid, Marcela Alfaro and Bianca Peterson are now co-chairs of the Data Schools.
- Virtual Alumni School in September.

Follow CODATA!

- CODATA Website: http://www.codata.org/
- CODATA Blog: http://codata.org/blog/
- CODATA International News and Discussion List: http://bit.ly/CODATA-International-List
- CODATA Data Science and Data Stewardship Careers List: http://bit.ly/CODATA_Careers_List
- CODATA on Twitter: @CODATANews and @simonhodson99
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Thank you for your attention

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