FAIR and Open Science to Enable Cross-Domain Research

Wednesday, 10 April 2024 10:30 (45 minutes)

The major global scientific and human challenges of the 21st century (including climate mitigation and adaptation, environmental sustainability, biodiversity and ecosystem management, disaster risk reduction, the interplay of society, the economy and energy policy) can only be addressed through cross-domain research that seeks to understand complex systems through machine-assisted analysis at scale. Our capacity for such analysis is currently constrained by the limitations in our ability to access and combine heterogenous data within and across domains. The FAIR principles and the frameworks set by Open Science provide a significant part of the solution. Attention needs to be paid to the interfaces where data is used between disciplines.

To help address these issues, CODATA has been entrusted by the International Science Council (ISC) to develop a programme of activity: 'Making Data Work for Cross-Domain Grand Challenges'. After some exploratory work, the flagship activity is the WorldFAIR project which focuses on the implementation of the FAIR principles both within and across 11 different domain and cross-domain case studies, with a central effort to understand and guide cross-domain FAIR. It is the first broad-based and global effort to understand the issues around cross-domain and cross-infrastructure FAIR implementation through a case study driven methodology. Ultimately, WorldFAIR will provide guidance for FAIR implementation both within specific domains and across them. The necessity, affordances and opportunities for cross-domain research are often overlooked, partly due to entrenched academic disciplines. This presentation will outline a number of concrete examples from the WorldFAIR project as well as a discussion of the contributions to the European Open Science Cloud.

The I and the R of FAIR pose considerable challenges but are fundamental to addressing complex issues where datasets need to be combined and in enhancing scientific rigour and reproducibility. To help address this, WorldFAIR is developing the Cross-Domain Interoperability Framework (CDIF) which identifies a set of functional requirements for interoperability, particularly for steps in data combination, and recommends good practices for each of these requirements, in relation to the use of existing or emerging standards and specifications. The CDIF is categorically not a new standard, but is intended to act as a lingua franca across domain data practices and encourage the incorporation of a number of standards that perform important and specific functions across domains. Similarly, WorldFAIR has made extensive use of FAIR Implementation Profiles (FIPs). FIPs can be used as a model for good practice in given research communities as well as a resource for exploring convergence across domains. In turn this has implications for how we think about FAIR assessment.

The plenary will close with an interactive Q&A and questions for the audience. We are keen to get feedback on these approaches and identify opportunities for collaboration to support cross-domain research.

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Session Classification: Keynote