

Call for Papers: Advances in Data Modeling and Knowledge Representation for Research Data

The Data Science Journal is a peer-reviewed, open access, electronic journal dedicated to the advancement of data science and its application in policies, practices and management of Open Data. DSJ is seeking papers for a special issue devoted to **“Advances in Data Modeling and Knowledge Representation for Research Data”**. Please see details about the call for submissions and deadlines below.

Research data systems have matured greatly over the last decade - partly in response to the growing complexity, amount, and heterogeneity of research data. Innovations such as data harmonization, interoperability frameworks, and feature extraction tools are greatly improving the capabilities of research communities to access and manipulate data in computing systems. Underpinning these new systems-level features and functionalities are a number of robust conceptual, logical, and physical data models. These include data- and curation-oriented models such as the Open Provenance Model and the Research Object Model, as well as ontologies of observable phenomena and objects such as the the Semantic Web for Earth and Environmental Terminology (SWEET) ontologies and the Gene Ontology.

Unfortunately, the formal literature of data science often glosses over or excludes the design work that goes into developing and implementing these models. As a result it is often unclear how or why design decisions were made, or what advances and new techniques have been developed for data modeling and knowledge representation as they are applied to research data. This special issue seeks contributions from the Data Science community on the development, implementation, and evolution of data models and ontologies - including the use of knowledge representation languages like RDF and OWL in advancing the capabilities of research data systems. We welcome submissions that report on empirical research that is completed or in progress, as well as pieces that can clearly articulate grand challenges and opportunities for advancing our current understanding of data models, research data curation systems, and knowledge representation, more generally.

Submissions may cover topics including (but are not limited to):

- **Design choices:** A designer of a data model often faces choices between expressiveness, ease of use, and computational complexity - How are these tradeoffs accounted for in doing requirements engineering at the beginning stages of developing a curation system?
- **Harmonization:** What are complications in, or best practices for harmonizing conceptual models ? (e.g. FRBR + CIDOC CRM = FRBRoo)
- **Interoperability:** How have data models been developed to facilitate cross or interdisciplinary data interoperability?
- **Requirements Engineering:** Research data systems are often developed by

working closely with data producers and potential systems users. How are requirements for a data model generated from these types of interactions?

- **Ontology Development:** Ontologies capture a conceptualization of a domain. How are the essential aspects of research domain or a research data system to be analyzed for representation? How can an existing ontologies be evaluated for potential implementation or refinement?
- **Sustainability:** Knowledge organization and representation activities contribute greatly to the sustainability and long-term success of a research data curation systems - How do these activities co-evolve with the discipline or domain that they serve? How have data models and metadata schemas been edited and revised to accommodate changes in scale, complexity, or heterogeneity of research data?
- **Education:** What are the competencies necessary for doing knowledge representation work and research data systems development? How are these skills taught in classrooms, workshops, and continuing education programs

Submissions can be of two types:

Research Papers describe the outcomes and application of unpublished original research. These should make a substantial contribution to knowledge and understanding in the subject matter and should be supported by relevant figures and where appropriate data. Research Papers should be no more than 8,000 words in length.

Practice Papers report upon or critique a specific topic such as a particularly difficult aspect of doing data modeling, education in Knowledge Representation, or other topics related to the special issue's focus. Practice Papers can either describe the finished outputs of a project, or the procedures, protocols, and models in use by an established research data system. Practice Papers should be no longer than 3,000 words in length.

Article Processing Charges (APCs): Potential authors should note that Data Science Journal levies an APC of £350 for each article (Research Paper or Practice Paper) published. Please contact the Guest Editors or Editor-in-Chief, Sarah Callaghan (sarah.callaghan@stfc.ac.uk), if you have any questions or think you will have difficulty meeting this cost.

The deadlines associated with this special issue are as follows:

- **Full papers due: March 31, 2016**
- Special issue publication (anticipated): December, 2016

Special-issue guest editors:

- Nic Weber (University of Washington) nmweber@uw.edu
 - Karen Wickett (University of Texas)
 - Pascal Hitzler (Wright State University)
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