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Preface

Two major challenges to the use of digitally encoded biomedical data for improving health are its distributed nature and lack of harmonization [1]. Semantic technologies, including ontologies, terminologies, Uniform Resource Identifiers (URIs), and the Resource Description Framework (RDF), are key to addressing these challenges. By enabling the precise identification of entities and the computable encoding of formal class definitions, semantic technologies enable large-scale semantic normalization of distributed biomedical data sets.

The Joint Workshop on Semantic Technologies Applied to Biomedical Informatics and Individualized Medicine, co-located with the 11th International Semantic Web Conference, brought together researchers, developers, and practitioners who are actively applying semantic technologies and biomedical data to improving health. Five peer-reviewed papers describing original research in this area were presented at the workshop.

- Corrigan, Soler, and Delaney present incremental progress of the "Translational Medicine and Patient Safety in Europe" project, funded by the EU FP7. The focus of the work is a proof of concept infrastructure to support the creation of actionable knowledge within the electronic health record for clinical decision support. The infrastructure is based on evidence from new research findings coupled with contemporary clinical knowledge and practice. The focus of this work is the use of methods from ontology development and statistics to create a consistent model of the evidence-of-association between the clinical and diagnostics cues.

- McCusker et al. present a novel and intriguing architecture called the "Global Health Explorer" for processing Twitter "tweets" to identify the occurrence of terms from biomedical ontologies for the purpose of visual analysis and data exploration. Novel features of the architecture include an approach the authors term "Ontology-as-API", and the integration of a high dimensional data visualization tool called the Data Cube Explorer. This paper highlights how ontologies and terminologies perform a critical role in enabling biomedical Natural Language Processing (NLP) algorithms to richly annotate biomedical and entities and relationships. The approach may compliment other public health data sets such as World Health Organizations' Global Health Observatory (GHO) dataset and the ReDD-Observatory.

- De Waard and Scheider propose the use of an ontology model called ORCA to enable better representation of biomedical argumentations. ORCA is a lightweight ontology to represent observational and interpretational assertions in scientific documents. The paper presents a brief description of the ontology, the motivation behind it, related work, and a few biomedical applications. This paper is highly relevant since the reliability and attribution of biomedical results, data, and information is a critical issue in research. Moreover, the research

highlights an important use of ontologies to model scientific discourse and evidence with the vision of creating computable chains of claims and evidence that explicitly model the consensus, disagreement, and questions necessary for advancing science in a given field.

- Baranya et al. present an approach for improving medical visualization of semantically annotated CT-Images. The approach combines multiple biomedical ontologies and image characteristics to define what is referred to as a Transfer Function (TF). Essentially a TF maps volumetric data into optional properties, and in general, is not easy to define. The proposed framework--ANISE--is a rule-based system that comprises multiple annotators and rules engine to for defining the TFs based on semantic annotations using ontologies such as FMA and RadLex.

- Chniti et al. describe a novel framework for writing business rules using a structured language that should be usable by domain experts while ensuring that the rules involve entities from a formal ontology can be executed over an object-oriented decisions support system. Rules authored in natural language are translated to IRL executable rules. From there, there are BOMs, XOMs, Java objects and WODMs.

Many thanks to all our contributors and participants at SATBI+SWIM 2012 and also the Programme Committee whose feedback has resulted in a fruitful collection of papers, providing added value to current leading edge research.

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Alejandro Rodríguez-González
Jyotishman Pathak
Mark D. Wilkinson
Nigam H. Shah
Robert Stevens
Richard Boyce
Ángel García-Crespo

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Organization

Organizing Committee

Alejandro Rodríguez González, PhD
CBGP-UPM, Spain
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Mayo Clinic, USA
Mark Wilkinson, PhD
CBGP-UPM, Spain
Nigam H. Shah, MBBS, PhD
Stanford University, USA
Robert Stevens, PhD
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University of Pittsburgh, USA
Angel García Crespo, PhD
University Carlos III of Madrid, Spain

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