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Towards an ontology for Synthetic Biology

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Outline

- Introduction to the Centre of Systems and Synthetic Biology (CSSB)
- CSSB ontology projects:
  - An Ontology for BioModelling (OBM)
  - A Lexicon for Synthetic Biology (SB-Lexicon)
- Collaboration with SBOL prospects

The Centre of Systems and Synthetic Biology

www.brunel.ac.uk/research/centres/cssb

- Biomodelling (Petry nets).
- Multi-scale modelling of behaviour
- Biofuels
- Software systems

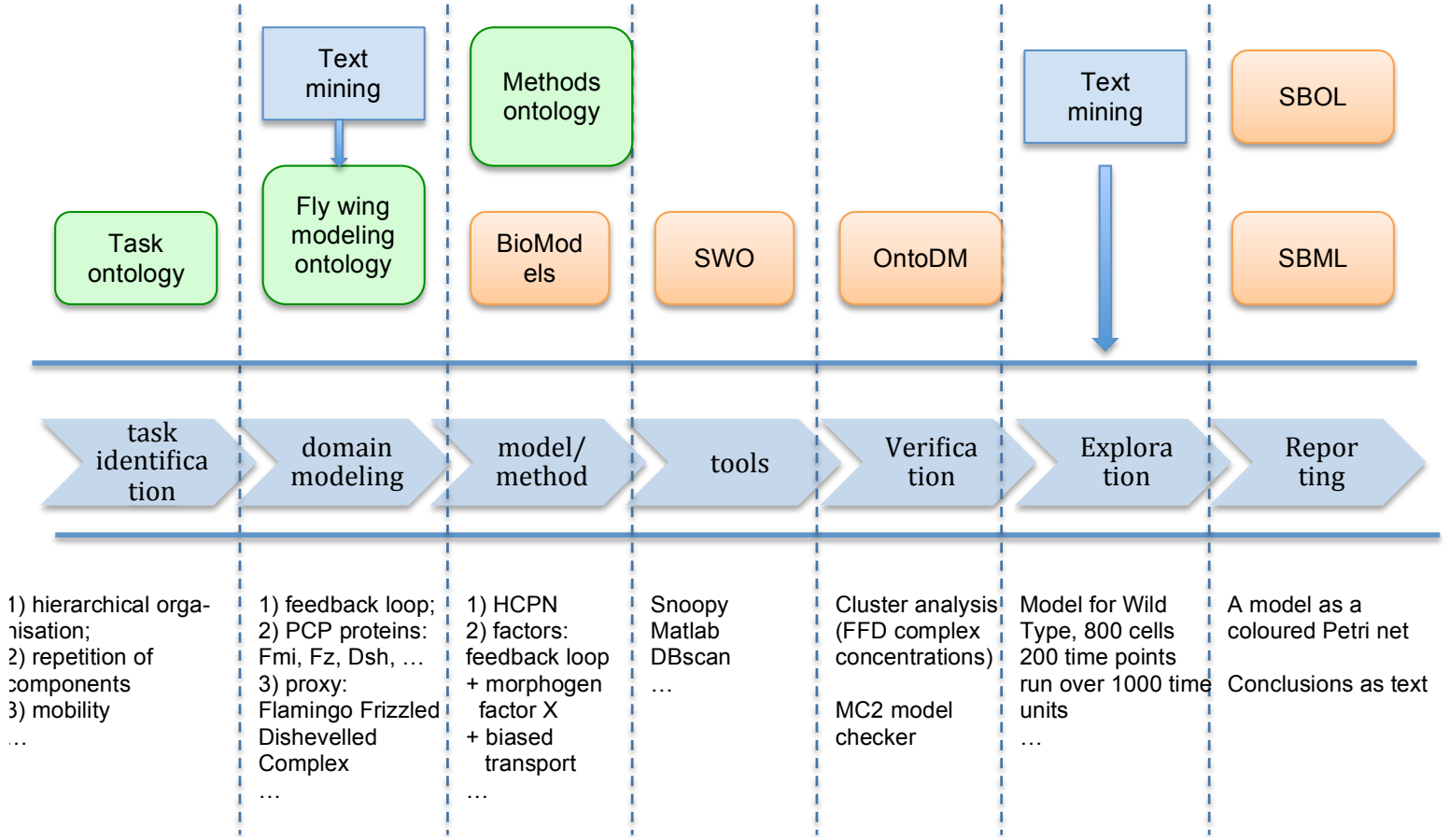
Ontology-driven Engineering of Biological Models

- Proposed OBM for the representation and recording of information about biomodelling investigations [1]. disc.brunel.ac.uk/obm
- Built on the structural approach to biomodelling engineering by Breitling et al [2].

1. Soldatova L.N., Gao, Q., Gilbert, D. (2012) Towards an Ontology of Biomodelling. The Lecture Notes in Computer Science: 7605.

2. Breitling, R., Gilbert, D., Heiner,M., Orton, R. (2008) A structured approach for the engineering of biochemical network models, illustrated for signalling pathways, *Briefings in Bioinformatics* 12.

A typical biomodelling workflow



OBM vision:

- Integration of existing technologies, e.g. Text Mining, Data Mining and Semantic Web, to model a workflow of biomodelling.
- Support of semantic integration of heterogeneous sources of data and knowledge, e.g. ontologies, scientific literature, experiment data.
- Support of an integrative biomodelling platform.
- Use OBI (the ontology for biomedical investigations) as a template for an ontology about SB investigations

OBM Core

- The key entities about biomodelling processes e.g. model, model component, task identification, model verification/ exploration
- Import from some of the relevant resources:

  OBI (the Ontology for Biomedical Investigations), e.g. investigator, objective, conclusion

  SWO (the Software Ontology), e.g. tool, user support

- Participants: Brunel, Manchester, Cardiff, Surrey Universities, Josef Stefen Institute (Slovenia), Rothamsted Research Institute

SB Lexicon

- In collaboration with Cardiff University (Dr Irena Spasik)
- SB Lexicon aims:
  - To populate OBM
  - Support text mining for SB
- Corpus of SB articles (from IET Synthetic Biology, Systems and Synthetic Biology, Journal of Synthetic Biology, etc.)

Invitation for collaboration

- We aim to develop resources that are:
  - Complimentary to SBOL (no duplication of efforts)
  - Interoperable with SBOL
- Seeking for external funding at the national (UK), EU, and US levels
- Join OBM: soldatova.larisa@gmail.com