Data and Model Sharing: Technical Limitations

David Nickerson
Auckland Bioengineering Institute
The University of Auckland
New Zealand

Auckland Bioengineering Institute
An Institute of The University of Auckland

THE UNIVERSITY OF AUCKLAND
NEW ZEALAND

Data and model sharing?

- Unfettered access to data and tools
  - Share recent discoveries, rapid review and publication
  - Collaboration (experimental, modelling, and tools)
- Data and model description standards
- Use the best tool for the job
- Comprehensive, unambiguous, and machine interpretable resource descriptions

Example: cell model development

- Ion channel models described in CellML
- Signaling pathway models described in SBML
- Supporting data and validation
- Parameter estimation
- Stimulus protocols
- Numerical methods
- Simulation observations

Example: building a whole heart model

- Cell models
- Tissue microstructure
- Constitutive laws
- Anatomical models
- Supporting data and validation
- Numerical methods
- Simulation observations

Model repositories

- CellML model repository
- BioModels database
- NSR physiome models
- CMISS examples / VCell database / EUHeart / RudyLab / ModelDB...

Current status – PMR2

- Distributed version control system
- Workspaces
- Exposures/releases
- Web interface
- Non CellML data

Data and model sharing in practice

- Translation utilities
- Modellers create models in Matlab and send in code for translation to CellML
- Model descriptions available but no links to data
- Journal articles are the preferred end goal

Limitations

- Tools
- Integration of description standards and associated repositories
- Standardisation of core tools
- Documentation/Support
- Acceptance and promotion of common data description formats
  - SED-ML for CellML models? FieldML models?

Acknowledgments

- BMRC A*STAR Grant #05/1/21/19/383
- Auckland University Vice Chancellor's Strategic Development Fund

Further information

- Nickerson & Buist (2009) doi:10.1098/rsta.2008.0296
- Posters on Wednesday afternoon
- Posters on Thursday morning