Universität Rostock

Traditio et Innovatio

Elaine
electrically active implants
SFB 1270

WebProv: A web-based tool to access, store, and display provenance information of simulation models

Introduction

- Provenance provides “information about entities, activities, and people involved in producing a piece of data or thing, which can be used to form assessments about its quality, reliability, or trustworthiness” (Groth and Moreau, WWW Consortium 2013).
- We have developed an interactive website that contains provenance information of Wnt signaling models that were published in 12 different publications.
- Activities: Model building activity (MBA), Model exploration activity (MEA)
- Entities: Simulation model (M), Wet-lab data (W), Simulation data (S)
- Current version: https://sfb-elaine.github.io/WebProv/

Features

Included:
- Interactive front-end as seen in Fig. 1.
- Search box: All database entries are searchable.
- Show provenance graph of a study (model and data that has been published) or show entire provenance graph starting from specific node.
- Expand and collapse provenance graph of a study.
- Add and edit nodes or links (drag and drop included). Use right click for connecting two nodes.

Under development:
- Display missing connections to data from other sources.
- Implement Neo4j graph database.
- Query graph database and display results.
- Add and edit arbitrary information to nodes and links.

Open Questions

- Which level of abstraction (granularity) is required to include all major steps of a simulation study?
- What roles should there be for relating aggregations (studies) to each other in the provenance model?
- How should one include other entities such as assumptions or hypotheses?
- How could WebProv be combined with existing simulation model databases?
- How could WebProv automatically extract and store provenance information from publication?
- Which information should be displayed in color (e.g., cell line used in wet-lab experiment)?

Example: Provenance Models of Canonical Wnt Signaling Models

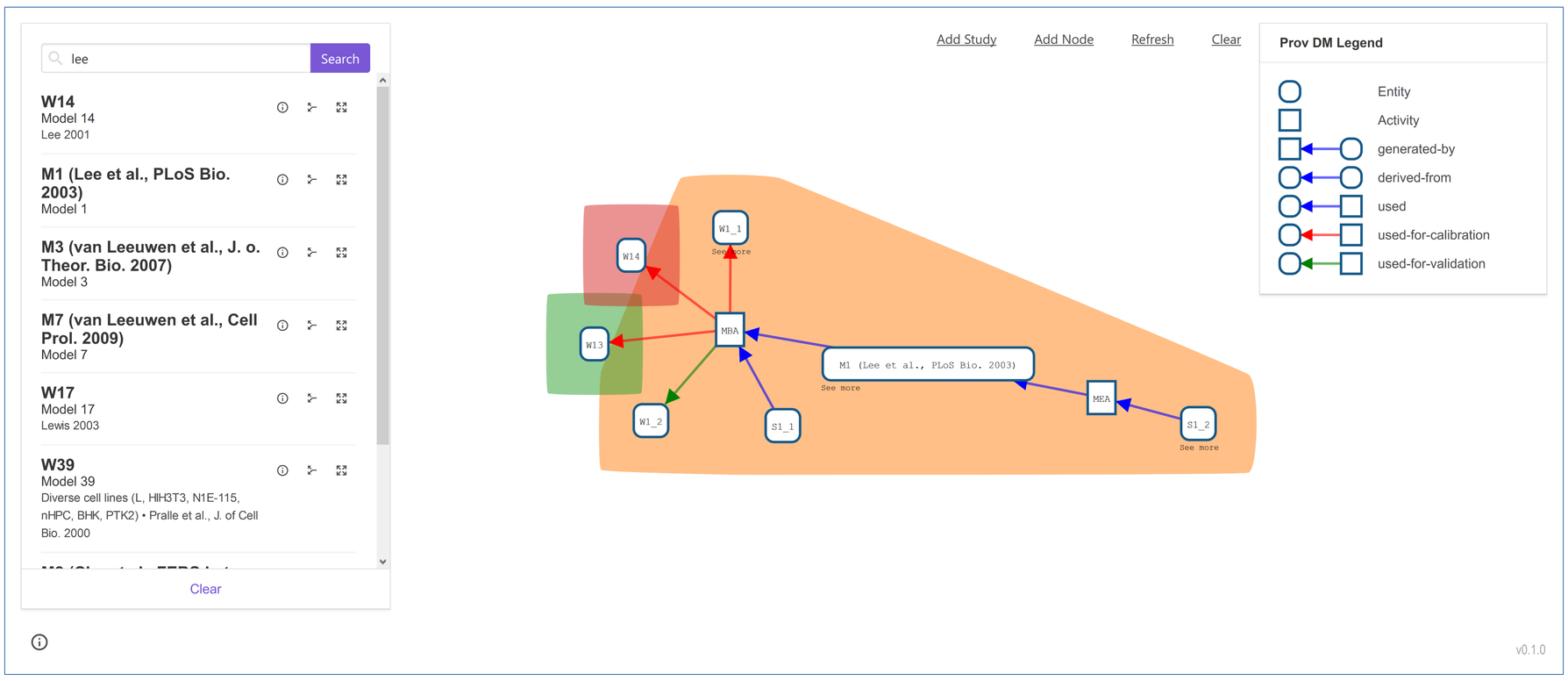

Fig. 1: Screenshot of WebProv displaying the provenance graph of M1 (Lee et al., Plos Bio. 2003) after clicking on (“Show Entire Study”) and (“Show Provenance Graph”).

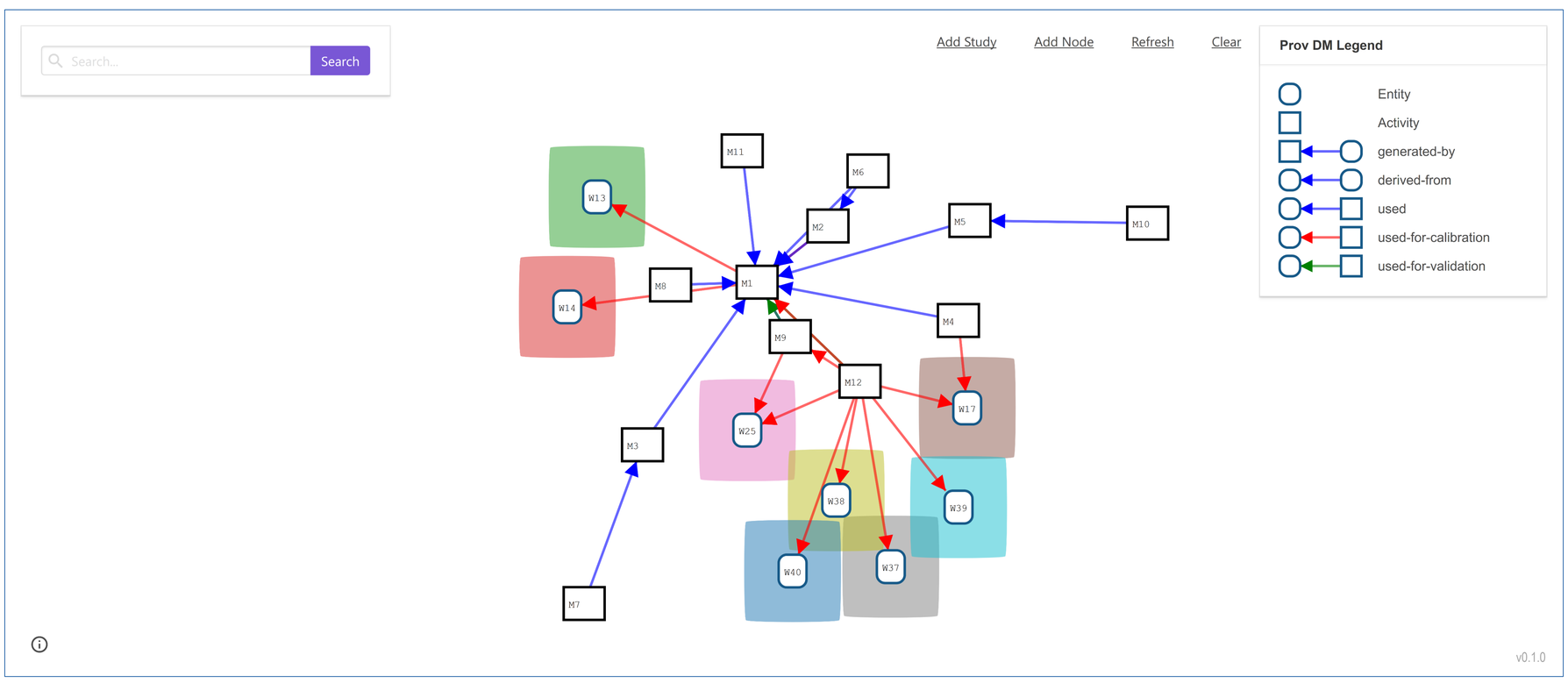

Fig. 2: Screenshot of WebProv displaying Wnt simulation models (M1-M12) saved in the database. The graphs of each simulation study was collapsed by double clicking on the colored region.

Kai Budde, **Jacob Smith***, **Andreas Ruscheinski**, **Adelinde M. Uhrmacher**
INSTITUTE OF VISUAL AND ANALYTIC COMPUTING | MODELING AND SIMULATION GROUP | **University of Rostock** | 18051 Rostock
* FACULTY OF COMPUTER SCIENCE | **University of New Brunswick** | Fredericton, NB E3B 5A3, Canada

This research was supported by the German Research Foundation (Deutsche Forschungsgemeinschaft (DFG)) within the Collaborative Research Center (SFB) 1270 'Elaine'.