

Infrastructure systems biology europe (ISBE): emergence of innovative systems biology servicing

A. Kolodkin^{1, 2, 3, 4, 5*}, L. Alberghina⁶, J.L. Snoep⁷, H.V. Westerhoff^{1, 4, 5, 8}

¹ Infrastructure for Systems Biology Europe (ISBE)

² Luxembourg Centre for Systems Biomedicine, University of Luxembourg, Luxembourg

³ Federal Centre Institute of Cytology and Genetics of Siberian Division of the Russian Academy of Sciences, Russia

⁴ Molecular Cell Physiology, VU University Amsterdam, The Netherlands

⁵ Synthetic Systems Biology, SILS, University of Amsterdam, The Netherlands

⁶ SysBio Centre of Systems Biology, University of Milano-Bicocca, Italy

⁷ Department of Biochemistry, University of Stellenbosch, South Africa

⁸ Manchester Centre for Integrative Systems Biology, UK

* e-mail: a.n.kolodkin@vu.nl

Key words: systems biology, networks, modelling, service

The Infrastructure Systems Biology Europe (ISBE) provides stewardship and help with biological and medical data, their acquisition, their analysis and their understanding. It consists of 5 interconnected infrastructure pillars: 1) The Make Me My Model (M4) pillar consists of a software infrastructure that helps customers to make their various types of data (genome sequence, transcriptome, proteome, metabolome, physiological, kinetic, etc.) predictive and understood via modelling (www.isbe.nl). 2) The Do Me an Experiment pillar is a distributed hardware-plus-service infrastructure that performs systems-biology quality assays as a service (M5; Make Me My Mass Spectra Measurements, enzyme kinetics, metabolomics, and epigenetics (<http://www.sysbio.it/isbe/>)). 3) The Live Model Repository (LMR) of ISBE is a software infrastructure of interconnectable, systems-biology-quality kinetic models through JWS Online (<https://jjj.bio.vu.nl/>). 4) The Data and Model Stewardship of ISBE called FAIRDOM (<http://fair-dom.org>). FAIRDOM platform supports Systems Biology to make Data (models, data, SOPs, samples, workflows) FAIR and platform-exchangeable. 5) Help Me to Model (HMTM) provides training to customers wishing to make models themselves, in online or workshop tutorials (www.isb.nl).

The Netherlands branch of ISBE (www.isbe.nl) focuses on M4, LMR and HMTM. It provides phenomenological modelling (top-down) as well as bottom-up mechanism-based modelling, followed by model analyses that help understand the system under study, e. g. predicts the effects of therapeutic or biotechnological interventions useful for model-driven experimental design and bioengineering, or for therapeutic practice.

ISBE.NL is currently providing CORBEL clients with online modelling services using the FAIRDOM HUB website (<https://fairdomhub.org/>) and coordinating with other European Research Infrastructures, such as EuroBioImaging and Elixir. ISBE.NL profits from the expertise of distinctive systems biologists in a worldwide collaborative network extending from the Netherlands, Luxembourg, Italy, Spain, UK, Germany, and Slovenia, to Russia, and shows the way for innovative network-accommodating biology, biotechnology and medicine.