Crowd-Verification of Systems Biology Research Challenges: Species Translation and Biological Networks

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sbv IMPROVER at a Glance

sbv IMPROVER stands for systems biology verification and Industrial Methodology for Process Verification in Research. It is a robust methodology that verifies systems biology approaches using double-blind performance assessment and applies the wisdom of crowds to solve scientific challenges [1] [2].

The project team includes scientists from Philip Morris International's (PMI) Research and Development department and IBM's Thomas J. Watson Research Center. The project is funded by PMI.

What constitutes a sbv IMPROVER Challenge?

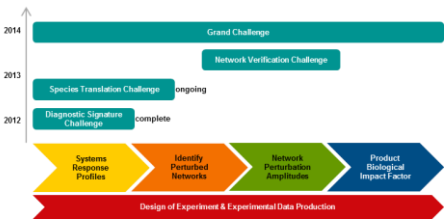
- is a scientific problem presented to the community
- often comes with a "Gold Standard" or a solution to the challenge, to which each prediction is compared

Approach to Challenge Design

The Approach has the following Advantages

- nucleates a community around a given scientific problem
- allows for unbiased benchmarking
- establishes the state-of-the-art technology and knowledge in a field
- complements the classical peer-review process

The sbv IMPROVER Context



Real world Challenges mapped against the Research Vision

The first sbv IMPROVER Challenge: Diagnostic Signature

The goal of the Diagnostic Signature Challenge was to assess and verify computational approaches that classify clinical samples based on transcriptomics data. It was successfully closed at the end of 2012 after 54 scientific teams from across the world had participated. The best performing teams were announced at the Symposium 2012 in Boston, USA.

The second sbv IMPROVER Challenge: Species Translation

open

The aim of the Species Translation Challenge is to:

- identify rules which map measurements derived from systematic perturbations in one species to another species
- quantify the translatability between species
- understand the limitation of species translatability

Each Sub Challenge addresses a different aspect of translatability.

Species Translation Challenge Roadmap

sbv IMPROVER Symposium 2013

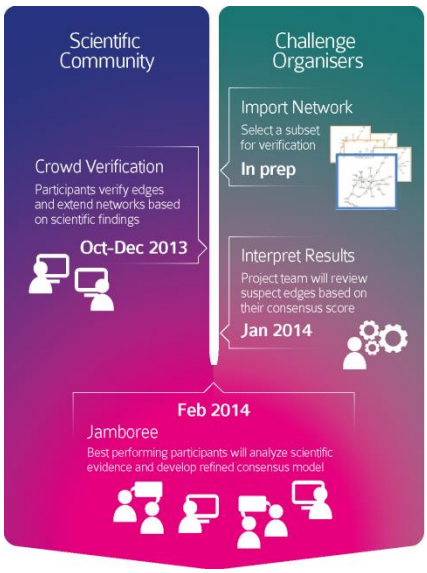
We will share the results of the Species Translation Challenge and will award the best performing teams at the sbv IMPROVER Symposium 2013 taking place on 29 – 31 October 2013 in Athens, Greece.

The third sbv IMPROVER Challenge: Biological Network Verification

opening October

Biological network perturbations play a fundamental role in today's systems-based biology, pharmacology and toxicology:

- They create the link between experimental measurements and a priori knowledge [3]
- Network models consist of qualitative causal relationships between biological entities to represent current scientific knowledge [4] [5]
- The purpose of the Network Verification Challenge is to engage the scientific community in the review of networks and to improve the representation of fundamental biological processes involved in respiratory disease
- The networks are represented in the Open Source markup language BEL, http://www.openbel.org



Network Verification Challenge at a Glance

References

[1] Meyer, P., et al. (2011), Verification of systems biology research in the age of collaborative competition, Nature Biotechnology, 29, 811-815.

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The sbv IMPROVER project, the website and the Symposia are part of a collaborative project designed to enable scientists to learn about and contribute to the development of a new crowd sourcing method for verification of scientific data and results. The project team includes scientists from Philip Morris International's (PMI) Research and Development department and IBM's Thomas J. Watson Research Center. The project is funded by PMI.

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