



Verification of Systems Biology Research in the age of Collaborative Competition

sbv IMPROVER stands for Systems Biology Verification combined with Industrial Methodology for Process Verification in Research.

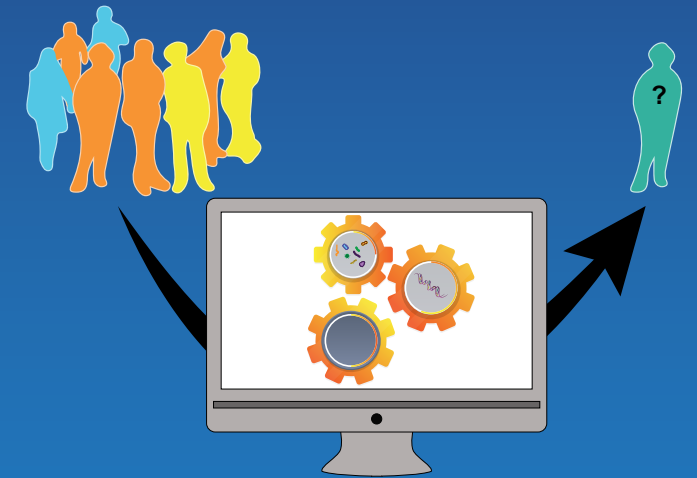
The sbv IMPROVER project is designed to enable scientists to learn about and contribute to the development of a new crowd sourcing method, for verification of scientific data and results.

Past sbv IMPROVER competitions

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|-------------|---|
| 2012 | Diagnostic Signature Challenge Designed to determine whether computational approaches and transcriptomics data could be used for phenotype prediction. |
| 2013 | Species Translation Challenge Designed to address whether biological events observed in rodents were translatable to humans. |
| 2014 | Network Verification Challenge Designed to verify previously built biological network models relevant to lung biology and responses to exposure. |
| 2014 | Systems Toxicology Challenge Designed to verify if a robust predictive signature can be extracted from gene expression data that differentiates smokers, former smokers, and never smoker subjects. |
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| 2016 | Singapore Datathon Designed to analyze big data in the field of epigenomics and extract biological knowledge. |
| 2017 | Israel Epigenomics Challenge Designed to predict class labels of different exposed groups based on epigenomics and transcriptomics information. |
| 2017 | Japan Biological Interpretation Datathon Designed to assess biological interpretation and quantification of biological impact based on omics datasets. |
| 2018 | Microbiomics Challenge Designed to establish the best performing pipeline to identify taxonomic profiles. |
| 2019 | Metagenomics Diagnosis for IBD Challenge In Inflammatory Bowel Disease (IBD), aims at investigating the diagnostic-potential of metagenomics data. |

sbv IMPROVER CHALLENGE

Metagenomics Diagnosis for IBD Challenge



Discover new ways to diagnose!
Contribute. Collaborate. Compete.

Key publications

sbv IMPROVER Project

- Meyer et al., **Verification of systems biology research in the age of collaborative competition.** Nat Biotechnol. 2011

Diagnostic Signature Challenge

- Tarca et al., **Strengths and limitations of microarray-based phenotype prediction: lessons learned from the IMPROVER Diagnostic Signature Challenge.** Bioinformatics. 2013

Species Translation Challenge

- Rhrissorakrai et al., **Understanding the limits of animal models as predictors of human biology: lessons learned from the sbv IMPROVER Species Translation Challenge.** Bioinformatics. 2015
- Poussin et al., **The species translation challenge - A systems biology perspective on human and rat bronchial epithelial cells.** Scientific Data. 2014

Microbiomics in Health and Diseases

- Titz B et al., **Proteomics and Lipidomics in Inflammatory Bowel Disease Research: From Mechanistic Insights to Biomarker Identification.** Int J Mol Sci. 2018
- Scotti E et al., **Exploring the microbiome in health and disease: Implications for toxicology.** Tox Res and Appl. 2017

Systems Toxicology Challenge

- Poussin et al., **Crowd-sourced verification of computational methods and data in systems toxicology: a case study with a heat-not-burn candidate modified risk tobacco product.** Chem Res Toxicol. 2017
- Belcastro et al., **The sbv IMPROVER Systems Toxicology Computational Challenge: Identification of Human and Species-Independent Blood Response Markers as Predictors of Smoking Exposure and Cessation Status.** Computational Toxicology. 2017

Your publication can be next...

Rules and Terms and Conditions of participation, available at: www.sbvimprover.com



PMI SCIENCE
PHILIP MORRIS INTERNATIONAL

The Challenge in a Nutshell

Inflammatory bowel disease (IBD) constitutes a spectrum of chronic inflammatory disorders which recurrently affects the gastro-intestinal tract of millions of patients worldwide. **Ulcerative colitis (UC)** and **Crohn's disease (CD)** are the two main clinically defined manifestations of IBD, each with distinctive clinical and pathological features.

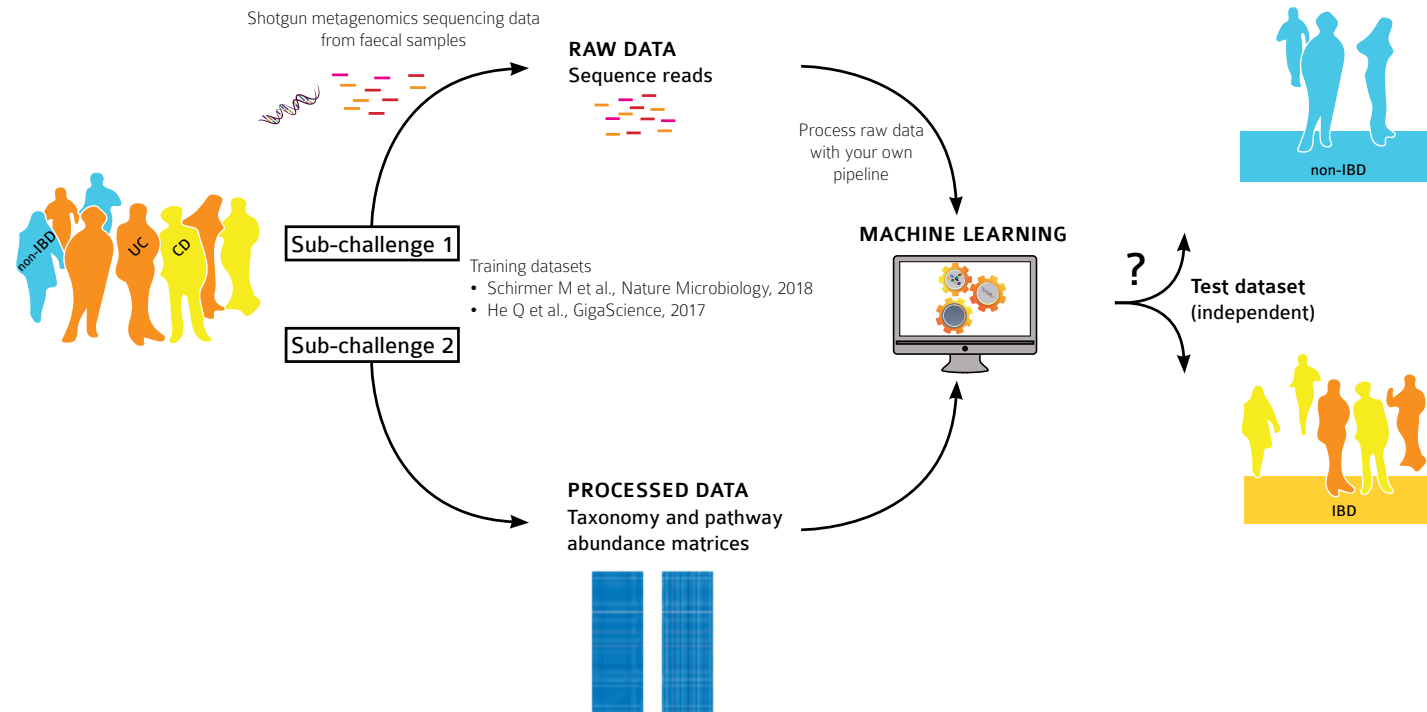
Endoscopy constitutes the gold standard for the diagnosis and monitoring of IBD. The diagnosis is usually confirmed by colon biopsy and complemented with the measurement of clinical molecular biomarkers. Their low sensitivity and high variability limit clinical efficacy. Thus, there is a need to identify novel biomarkers that could be assessed with less invasive methods.

Be part of the Journey!

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|-------------|--|
| SHOWCASE | Show your data science skills. |
| COMPETE | 6 x \$2,000 prizes. |
| NETWORK | Grow your professional network. |
| BENCHMARK | Receive an independent assessment of your methods. |
| PUBLISH | Co-author scientific article(s) describing the outcome of the challenge. |
| COLLABORATE | Have fun working with others. |

Objective

The Metagenomics Diagnosis for Inflammatory Bowel Disease Challenge aims to **investigate the diagnostic potential of metagenomics data to discriminate patients with IBD** including UC and CD from non-IBD subjects, or within IBD subjects, separating UC and CD subjects.



Scientific questions

- Which predictive computational model is the most accurate to classify subjects as IBD vs non-IBD or CD vs UC?
- What do the most discriminative metagenomics features tell us?
Are these features rather based on taxonomy, pathways and/or others, e.g., k-mers?
Are they distinct between UC and CD or do they show commonalities?

www.sbvimprover.com/challenge-5

