

Statistical design and analysis for reproducible quantitative mass spectrometry-based experiments

Statistical methodology is key for reproducible research. This is particularly true in quantitative mass spectrometry-based proteomic experiments, which must overcome many sources of bias and unwanted variation. This talk will illustrate challenges of reproducible research in quantitative mass spectrometry-based proteomics, and will discuss ways in which reproducibility is promoted by appropriate statistical methodology. We will present the methods behind MSstats, an open-source R package for statistical relative quantification of proteins and peptides, and will demonstrate that they reduce the dependency of biological conclusions on tools used for initial data processing. Finally, we will discuss the importance of statistical approaches to experimental design, and of methods for assay characterization and quality control that can assist in conducting reproducible large-scale research.

References:

<http://www.mcponline.org/content/11/4/M111.014662>

https://link.springer.com/chapter/10.1007/978-3-319-56970-3_9

<http://www.mcponline.org/content/early/2017/05/08/mcp.M116.064774.abstract>

Biography

Olga Vitek holds a BS degree from the University of Geneva, Switzerland, and a MS in Mathematical Statistics and a PhD in Statistics from Purdue University. She interned at Eli Lilly & Company in Indianapolis and held a position of post-doctoral associate in the Aebersold Lab at the Institute for Systems Biology in Seattle. Between 2006-2014 she was an assistant professor, and then an associate professor with tenure at Purdue University, with a joint appointment in the Department of Statistics and Department of Computer Science. In the summer of 2014 she joined Northeastern University, with a joint appointment in the College of Science and the College of Computer and Information Science.

Professor Vitek was named the Sy and Laurie Sternberg Interdisciplinary Associate Professor at Northeastern University, and University Faculty Scholar at Purdue University. While at Purdue, she was recognized with an Outstanding Assistant Professor Teaching Award, a Graduate Student Mentoring Award, and a Teaching for Tomorrow Award. She is a recipient of the National Science Foundation CAREER Award. She serves on the Board of Directors of the US Human Proteome Organization.