Contribution ID: **24** Type: **Oral Presentation**

FLASHApp: Interactive Data Analysis and Visualization for Top-Down Proteomics

Wednesday, August 27, 2025 10:50 AM (5 minutes)

Introduction
Top-down proteomics (TDP) is increasingly being applied in proteoform-resolved biomedical and clinical research. The complexity of TDP data demands flexible visualization tools integrated with analysis workflows to streamline interpretation and validation. Existing tools often lack adaptability and interactivity, requiring complimentary manual analysis to generate publication-ready results and figures. This added layer of manual intervention impacts reproducibility, posing a significant challenge to consistent scientific outcomes.
FLASHApp addresses these challenges by providing an interactive solution for TDP data analysis and visualization. As a free, open-source, web-based application it is accessible on any modern computer at https://www.openms.org/FLASHApp/.
Methods
FLASHApp is based on the OpenMS Streamlit template. It supports methods involving TDP tools for spectral deconvolution, quantification, and characterization of proteoforms. In addition to being publicly accessible via the OpenMS website, FLASHApp can easily be hosted in-house (e.g. by core facilities) using a containerized image. A Windows installer eases offline execution for non-bioinformaticians.
Results
Upon entering FLASHApp, a new workspace is automatically created and embedded within the website URL, enabling users to bookmark their session, revisit analyses at a later time, and share results with collaborators. The app's sidebar organizes common TDP tasks into dedicated sections, each guiding users through uploading input files, configuring parameters, executing tools, visualizing outputs, and downloading results. Tailored, publication-ready visualizations presented in a user-configurable layout address the specific requirements of each task, enhancing both interpretability and efficiency of data analysis. The interactive nature of these visualizations allows dynamic adjustments, such as modifying fragment ion matching tolerances.
Conclusion
FLASHApp provides modular, interactive visualizations specifically designed for TDP data analysis, improving usability, reproducibility, and accessibility through both web-based and local setup. These features position FLASHApp as a flexible, user-friendly platform that streamlines TDP workflows, facilitates collaboration through shareable URLs, and aids reproducible scientific discovery.

User consent

yes

Author: MÜLLER, Tom David (University of Tübingen)

Co-authors: KIM, Jihyung (University of Tübingen); ALMAGUER, Andrew (jambit GmbH); FEROZ, Ayesha (University of Tübingen); WALTER, Axel (University of Tübingen); KIM, Jaekwan (Fullseeomics); JUNG, Wonhyeuk (Astrazeneca); KOHLBACHER, Oliver (University of Tübingen); JEONG, Kyowon (University of Tübingen)

Presenter: MÜLLER, Tom David (University of Tübingen)

Session Classification: Lightning Talks