

Mass Spectrometry-Centered Multi-Omics: Advancing Galaxy Training Materials for Integrated Analysis and Community Adoption



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MS-Based Proteomics

Mass spectrometry
(MS) revolutionized
biological research

Enables high-
throughput protein
analysis

Crucial for
multi-omics
(Proteogenomics,
Metaproteomics)

Multi-omics: flow of information

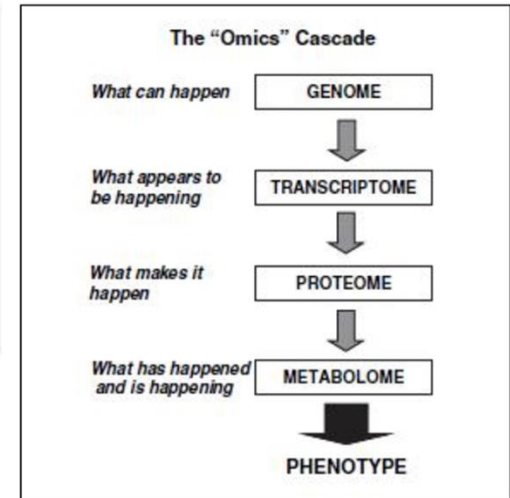
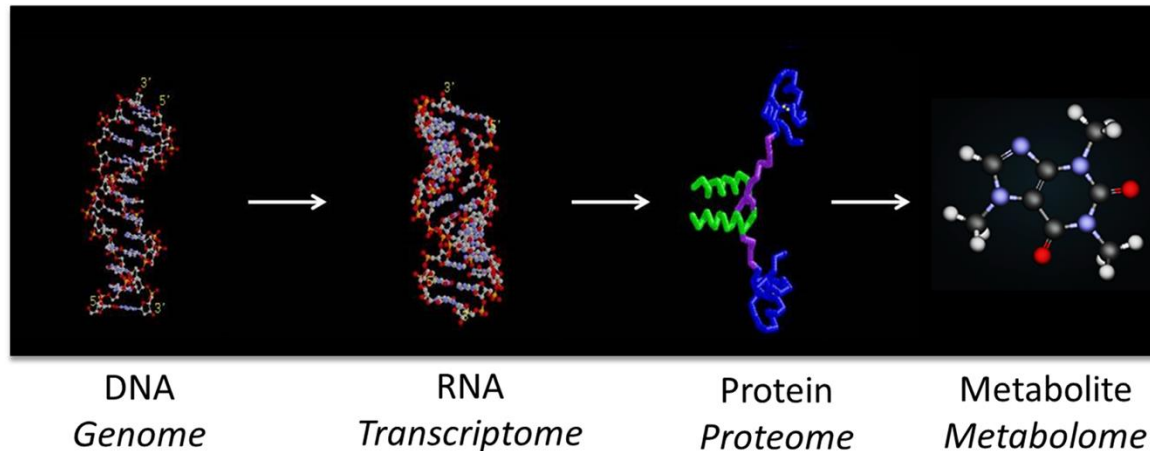


Image Source:

<http://fluorous.com/images/omics.JPG>

Characterizing more proteoforms via multi-omics

(Original)

DNA sequence: A A T G C A T A T G C A
mRNA sequence: U U A C G U A U A C G U
amino acid sequence: Leu -- Arg -- Ile -- Arg

(Mutated)

DNA sequence: A A T **T** C A T A T G C A
mRNA sequence: U U A **A** G U A U A C G U
amino acid sequence: Leu -- **Ser** -- Ile -- Arg

Role in Multi-Omics

- Proteogenomics: Enhances genome annotation, reveals mutations/novel transcripts
- Metaproteomics: Explores functional roles of microbiomes
- Applications: Cancer research, personalized medicine, environmental microbiomes

Challenges



MS data is complex and requires robust computational tools



Need for accessible platforms and standardized workflows



Data Volume and Storage issues



Usability and Training Gaps



Reproducibility, Shareability and Benchmarking



Community Engagement and Sustainability

Solution



Galaxy Training Network (GTN)



URL:
[HTTPS://TRAINING.G
ALAXYPROJECT.ORG/](https://training.galaxyproject.org/)



PROVIDES CURATED
TRAINING
RESOURCES AND
TUTORIALS



COLLABORATION
WITH GTN FOR
INTEGRATED
WORKFLOWS



SUPPORTS
REPRODUCIBILITY
AND ACCESSIBILITY

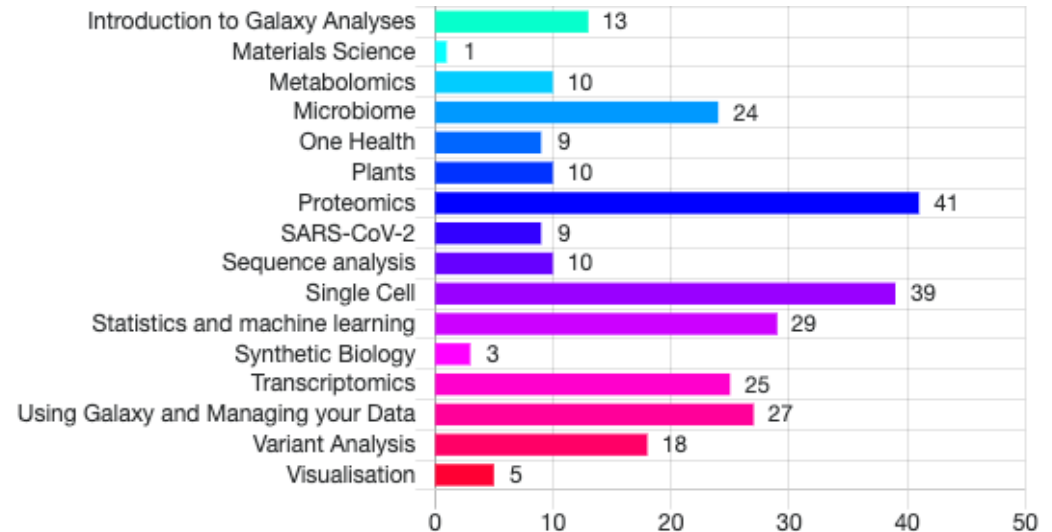



TRAINING OR
INTRODUCING NEW
USERS TO THE
PLATFORM VIA
SMORGASBORD/
GALAXY TRAINING
ACADEMY

GTN Statistics

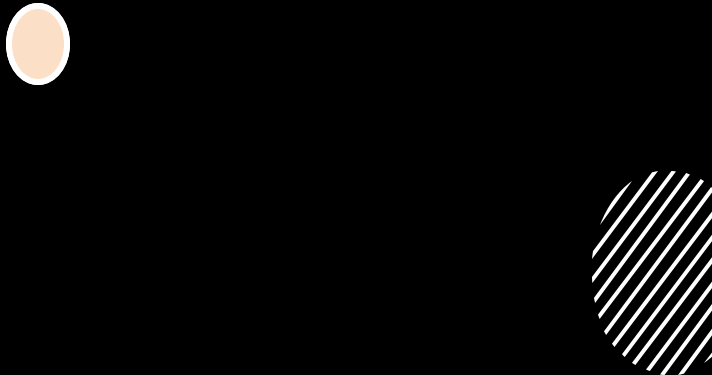
35 Topics	477 Tutorials	25 Learning Paths	476 FAQs
490 Contributors	10.0 Years	115 News Posts	214 Videos (146.6h)

Tutorials per Topic





Overview of GTN Proteomics Tutorials



41 total tutorials on
proteomics



20 contributed by Galaxy-P:

3

proteogenomics

5

metaproteomics

5

clinical
metaproteomics

7

neoantigen
prediction

Step-by-Step Tutorial Strengths

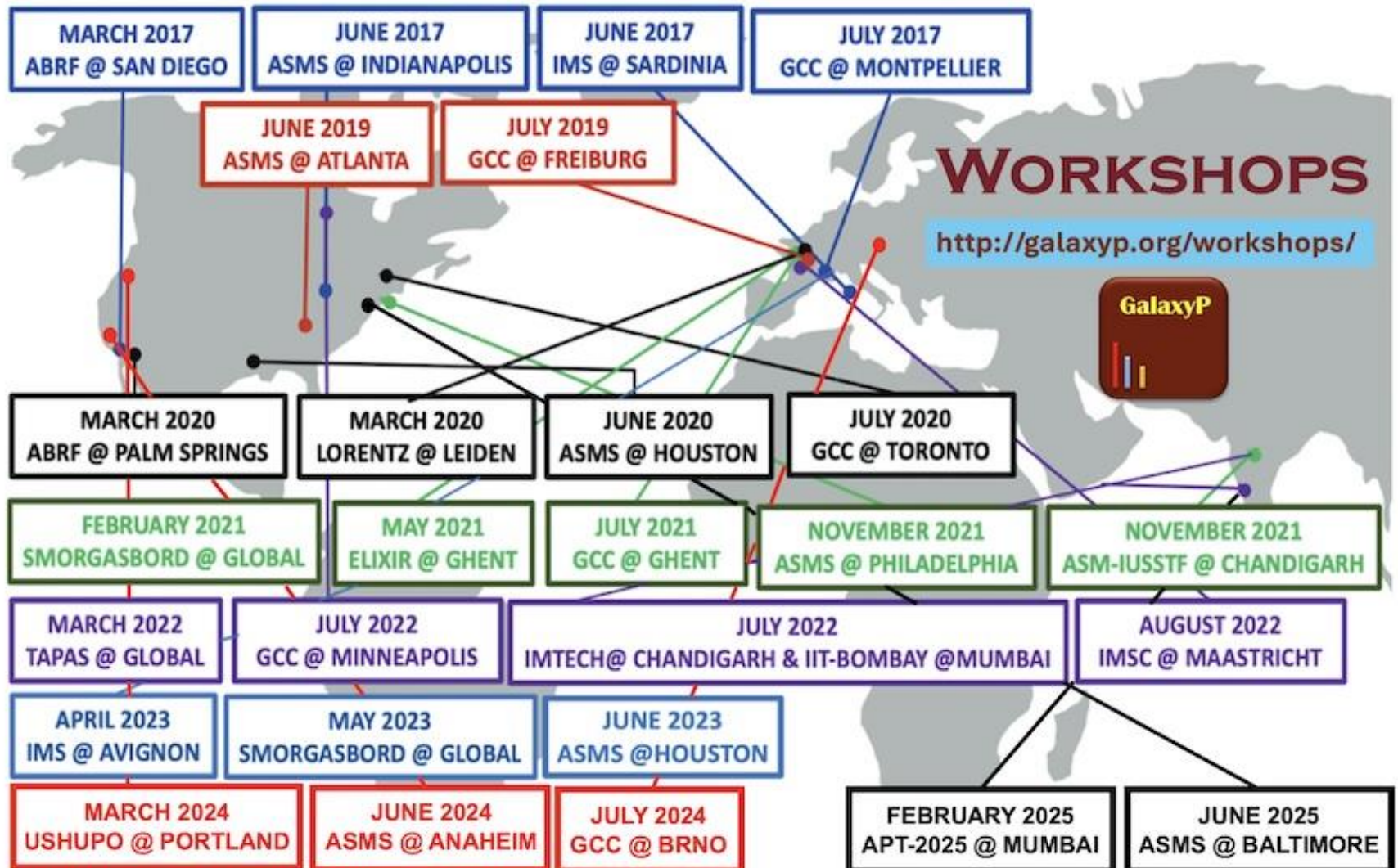
Supports beginners and advanced users

Real datasets with context

Promotes community adoption

Equips researchers with critical computational skills

Global Outreach



Summary and Takeaways



MS is central to multi-omics



Galaxy-P and GTN address training and accessibility



GTN resources empower diverse scientific communities



Broad adoption fosters better science through reproducibility

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