TO SEEK OUT NEW TALENT AND NEW PERSPECTIVES:
PROMOTING FUNCTIONAL ANALYSIS OF MICROBIOME THROUGH ONLINE EDUCATIONAL RESOURCES VIA THE GALAXY PLATFORM

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Microbiome Research

https://worldmicrobiomeday.com/resources/

https://www.nature.com/articles/d41586-020-00193-3
Microbiome: Microbial genetic potential and response

Multiple studies have shown **correlation of microbial composition with physiological conditions.** Also used to study **interaction with environment.**

**Metagenomics:**
Identifies species present within complex community (16S rRNA and Whole Genome Sequencing).

**DNA** from samples. **16S rRNA** (economical) or **Shotgun sequencing** (expensive).

**Metaproteomics:**
The large-scale characterization of the entire protein complement of environmental microbiota at a given point in time.

**Proteins** from samples.

Multiple studies that **correlate taxonomy with observed phenotype.**

Potential to unravel the **mechanistic details of microbial interactions with host / environment** by analyzing the **functional dynamics of the microbiome.**
META PROTEOMICS: STRENGTHS & CHALLENGES

FUNCTIONAL COMPOSITION
HOST-MICROBIOME INTERACTION
QUANTIFYING BIOMASS CONTRIBUTIONS
PROTEIN EXTRACTION
VARIABILITY & ABUNDANCE
LARGE DATABASES FALSE POSITIVES
TO BOLDLY GO WHERE METAPROTEOMICS HAS NOT REACHED BEFORE...

• Introduce Metaproteomics to New Researchers
• Make Tools and Workflows Accessible to Researchers
• Attract new perspectives and talent
WORKSHOPS

http://galaxyp.org/workshops/
ANALYSIS OF FUNCTIONS EXPRESSED BY MICROBIOMES

Online Workshop (15-24 November 2021) Hosted by CSIR-IMTech, Chandigarh and Galaxy-P Team, Minneapolis

ANALYSIS OF FUNCTIONS EXPRESSED BY MICROBIOMES

Online Workshop
15-24 November 2021

Funded by American Society of Microbiology (ASM) and Indo-United States Science and Technology Forum (IUSSTF).

Hosted by CSIR-IMTech, Chandigarh and Galaxy-P Team, Minneapolis.

https://galaxyproject.org/events/2021-11-microbiomes/home/
ANALYSIS OF FUNCTIONS EXPRESSED BY MICROBIOMES

Online Workshop (15-24 November 2021) Hosted by CSIR-IMTech, Chandigarh and Galaxy-P Team, Minneapolis

- Reached out to students and researchers in India via twitter, emails, etc.
- Selected researchers based on their CV and statement on why they were interested in the workshop.
- 24 registered students from all across India along with 13 students from IMTech attended the workshop.

ONLINE WORKSHOP ON ANALYSIS OF FUNCTIONS EXPRESSED BY MICROBIOMES

15-24 November 2021

APPLICATION FORM: tinyurl.com/funmicro

WHO CAN APPLY: Research scholar, Early career scientists, Faculty from Universities in India
The Inspiration...
GTN Smörgåsbord

Over 1100 Participants and counting!

https://galaxyproject.org/events/2021-02-smorgasbord/
ANALYSIS OF FUNCTIONS EXPRESSED BY MICROBIOMES

Online Workshop (15-24 November 2021) Hosted by CSIR-IMTech, Chandigarh and Galaxy-P Team, Minneapolis

WEEK-LONG ONLINE WORKSHOP

Talks By Eminent Researchers
Introduction to Training Material
Participants run workflows based on instructions
Q & A Session with Instructors
Quiz Sessions to test prior sessions

Analysis of Functions Expressed by Microbiomes
Speakers from across the world and instructors from Galaxy community will teach online courses on microbiome analysis through recorded videos and interactive resources.

Online Workshop at CSIR-IMTech – funded by American Society of Microbiology (ASM) and Indo-US Joint Science and Technology Forum (USISTF)

Practical Information
Where: 15th-24th of November 2021
Support: Black Channel (Upate link) channel event functional microbiome
Contact: Indian (link)
Format: Online, Microsoft Teams Access Link

Program
Below you will find the full program for this event.
Some days will feature practical sessions, with video tutorials you can follow. Click the button below to see the tutorials.

Video Tutorials

Day 1 | November 15

<table>
<thead>
<tr>
<th>Time</th>
<th>Description</th>
<th>Speaker</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:30 - 8:40 AM</td>
<td>Welcome</td>
<td>Manish Kumar (CSIR-IMTech, Chandigarh)</td>
</tr>
<tr>
<td>9:00 - 9:30 AM</td>
<td>Inauguration</td>
<td>Dr. Sanjeev Khola (Director CSIR-IMTech, Chandigarh)</td>
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<tr>
<td>9:30 - 10:00 AM</td>
<td>Introduction to the Course</td>
<td>Prof. Jagapati (University of Minnesota)</td>
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<tr>
<td>10:00 - 11:00 AM</td>
<td>Introduction to Microbiome Research</td>
<td>Robert Ketch (Oak Ridge National Laboratory)</td>
</tr>
<tr>
<td>11:15 AM - 12:30 PM</td>
<td>Introduction to Galaxy Video Tutorials</td>
<td>Dave Clements &amp; Prashant Jagapati</td>
</tr>
<tr>
<td>1:30 - 2:30 PM</td>
<td>Applications within Galaxy</td>
<td>Arvind Bharadwaj (GTN)</td>
</tr>
<tr>
<td>2:30 - 3:30 PM</td>
<td>Ice-Skater (interaction amongst attendees)</td>
<td>Attendees on OTH Slack</td>
</tr>
<tr>
<td>3:30 - 7:00 PM</td>
<td>Q&amp;A for Galaxy Tutorials</td>
<td>Subhash Mohla &amp; Sasikala Hiteshwar</td>
</tr>
</tbody>
</table>

• INTRODUCTION TO GALAXY
• METAGENOMICS
• METATRANSCRIPTOMICS
• METAPROTEOMICS
• META-OMICS
• FEEDBACK
ANALYSIS OF FUNCTIONS EXPRESSED BY MICROBIOMES
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SPEAKERS/INSTRUCTORS

Redesigning traditional proteomic methods to track the functions of ocean microbiomes

Metaproteomics Workflow

Data analysis of a cultured environment in the clouds

Dr. Manoj Kumar
Dr. Pratik Jagtap
ANALYSIS OF FUNCTIONS EXPRESSED BY MICROBIOMES

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- Quality of Talks: 93.75
- Satisfied with the workshop: 93.75
- Will attend future workshops: 90
- Quality of the Quizzes: 98.75
- Quality of Hands-on Workshop: 86.25
- Will use Galaxy for Research: 83.75
ANALYSIS OF FUNCTIONS EXPRESSED BY MICROBIOMES

Online Workshop (15-24 November 2021) Hosted by CSIR-IMTech, Chandigarh and Galaxy-P Team, Minneapolis

The Feedback...

My experience of using galaxy

Command line interface

Galaxy

Learning Execution Learning Execution

Difficult Easy Easy

Easy Easy

The Galaxy

If you ask, you will never know.
But,
If you know, you need only ask...
ANALYSIS OF FUNCTIONS EXPRESSED BY MICROBIOMES

Online Workshop (15-24 November 2021) Hosted by CSIR-IMTech, Chandigarh and Galaxy-P Team, Minneapolis

THE FEEDBACK...

Box in a box information
Exploration
Galaxomics
functional micro-omics
Interactive
Happy to be a part
statisfied
Eminently Excellent
Helpful
Exciting

10days cowabunga journey!
Outstanding
Educational
Interdisciplinary
The Feedback...

❖ **Positives:**
  • Registered attendees learnt about Galaxy platform, metagenomics, metatranscriptomics and metaproteomics.
  • GTN as a Resource for learning about tools and workflows.
  • Great opportunity to listen to eminent scientists (‘learning from artisans’).
  • Quiz sessions were great and educational!

❖ **Room for Improvement:**
  • The workshop levels can be BASIC, INTERMEDIATE AND ADVANCED – with opportunity to analyze your own data.
  • Follow up workshops with ‘hackathon’, ‘Meet the Speakers” as themes.
  • Running and completing workflows was challenging for some (However, could complete it later).
FUTURE PLANS

• Basic, Intermediate and Advanced Workshop

• Follow up after a year with research groups for data-intensive projects

• Workshops in other parts of the world (Africa, South East Asia, South America, etc.

• Improvements to the training material
THANK YOU!

RESEARCHERS WHO ATTENDED TALKS & WORKSHOP

INSTRUCTORS & SPEAKERS