Supporting microbiology research at scale: experiences and perspectives

Dr. Patricia Tran

Bioinformatics and Computational Pipeline Scientist Bioinformatics Research Support Service Department of Bacteriology College of Agricultural and Life Sciences University of Wisconsin-Madison

> https://bioinformatics.bact.wisc.edu https://bact.wisc.edu

> > Email: ptran5@wisc.edu

Working with big data in biology



Image sources: Britannica, Bayer et al., 2020, Hudson Alpha, AlphaFold3, Sigma Aldrich, Hug et al., 2016

Prevalence of big datasets





Graphics: https://www.genome.gov/about-genomics/fact-sheets/DNA-Sequencing-Costs-Data; https://ncbiinsights.ncbi.nlm.nih.gov/2020/06/30/sra-rfi/

The rise in data generation and availability in all subfields of biology requires for scalable, flexible, high throughput computing!



Bioinformatics Research Support Service

Department of Bacteriology, University of Wisconsin-Madison

Goals: To support students and researchers of various backgrounds to make the most of bioinformatics and research computing resources so they can advance their scientific and professional goals.

Scope: Microbiologists in the Department of Bacteriology, and occasionally in CALS & across the university



1 department 20 labs 160 researchers

400+ consultations90 researchers36 labs, 3 colleges



Support throughout the lifecycle of a project



Common challenges from learners



In cases where HTC is appropriate for their studies, common reasons for seeking support are:

- HTCondor basics
- Software and containers
- Automatic complex workflows
- Turning local scripts into scripts suitable for HTC
- Troubleshooting infrastructure issues
- Domain-specific analysis and interpretation

E.g.: Field best practices, choosing appropriate software tools, understanding and selecting parameters, data interpretation and visualization



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The case of methicillin resistant Staphylococcus aureus





My Tran, Angel J. Hernandez Viera, Patricia Q. Tran, Erik Nilsen, Lily Tran, Charlie Mo *eLife 2025*

Biological questions & HTC solutions



Lessons learned

- Student impact beyond technical skills
- Research needs and questions naturally evolve over the lifespan of a project
- Each user is unique, but there are common learner profiles. Knowing this can guide outreach efforts.
- Developing rapport & trust with labs and campus partners is essential





Thank you! Questions?

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