UMMC BIOINFORMATICS COLLABORATIVE

INTEREST MEETING

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Dr. Lavanya Challagundla, Robert Gilmore, & Shaurita Hutchins

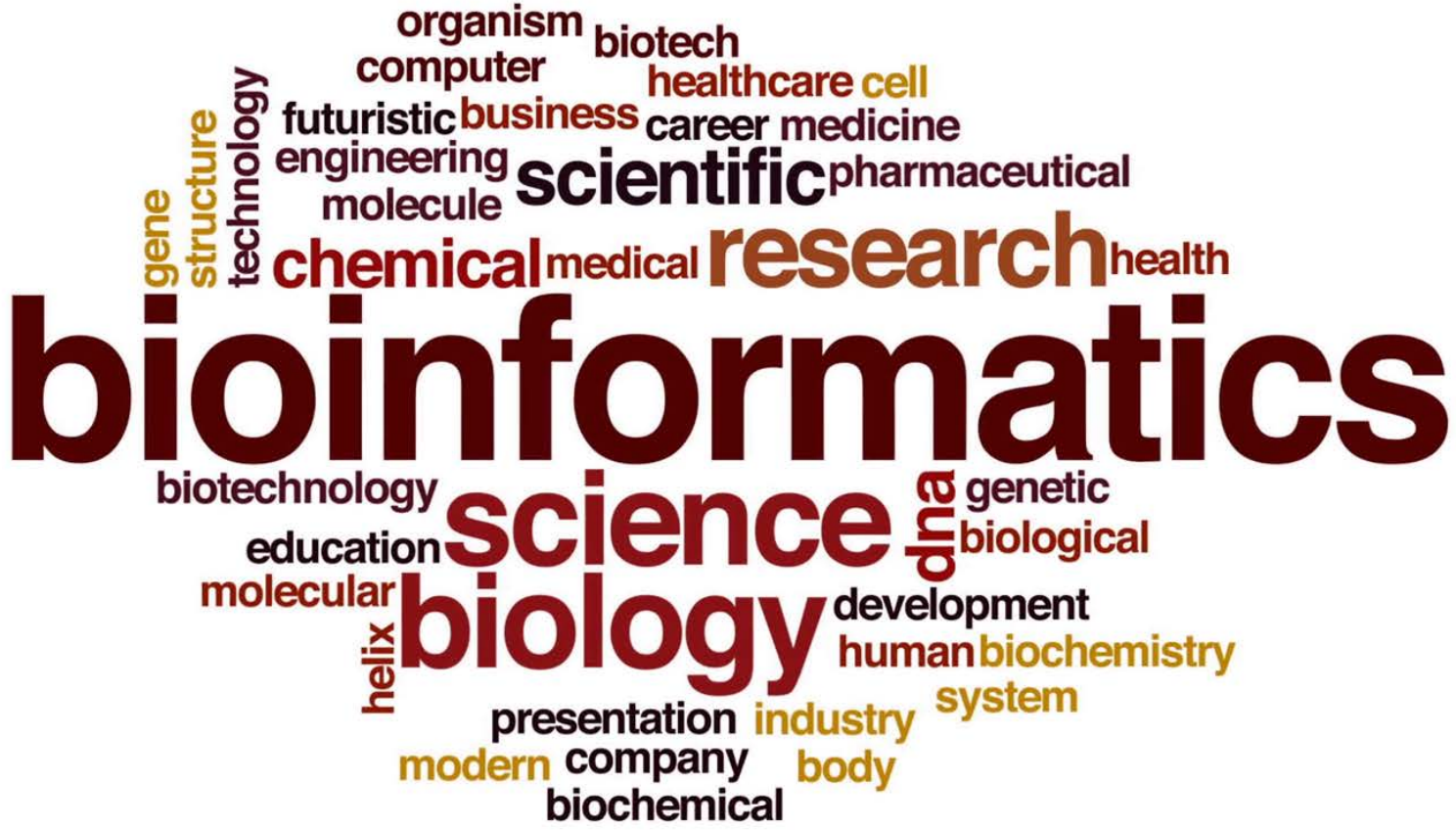
WHAT IS BIOINFORMATICS?

Bioinformatics - a definition[1]

> *(Molecular)* **bio** – informatics: bioinformatics is conceptualising biology in terms of molecules (in the sense of physical chemistry) and applying "***informatics techniques***" (derived from disciplines such as applied maths, computer science and statistics) to ***understand*** and ***organise*** the ***information*** associated with these molecules, on a ***large scale***. In short, bioinformatics is a management information system for molecular biology and has many ***practical applications***.

[1] As submitted to the Oxford English Dictionary

WHAT IS BIOINFORMATICS?



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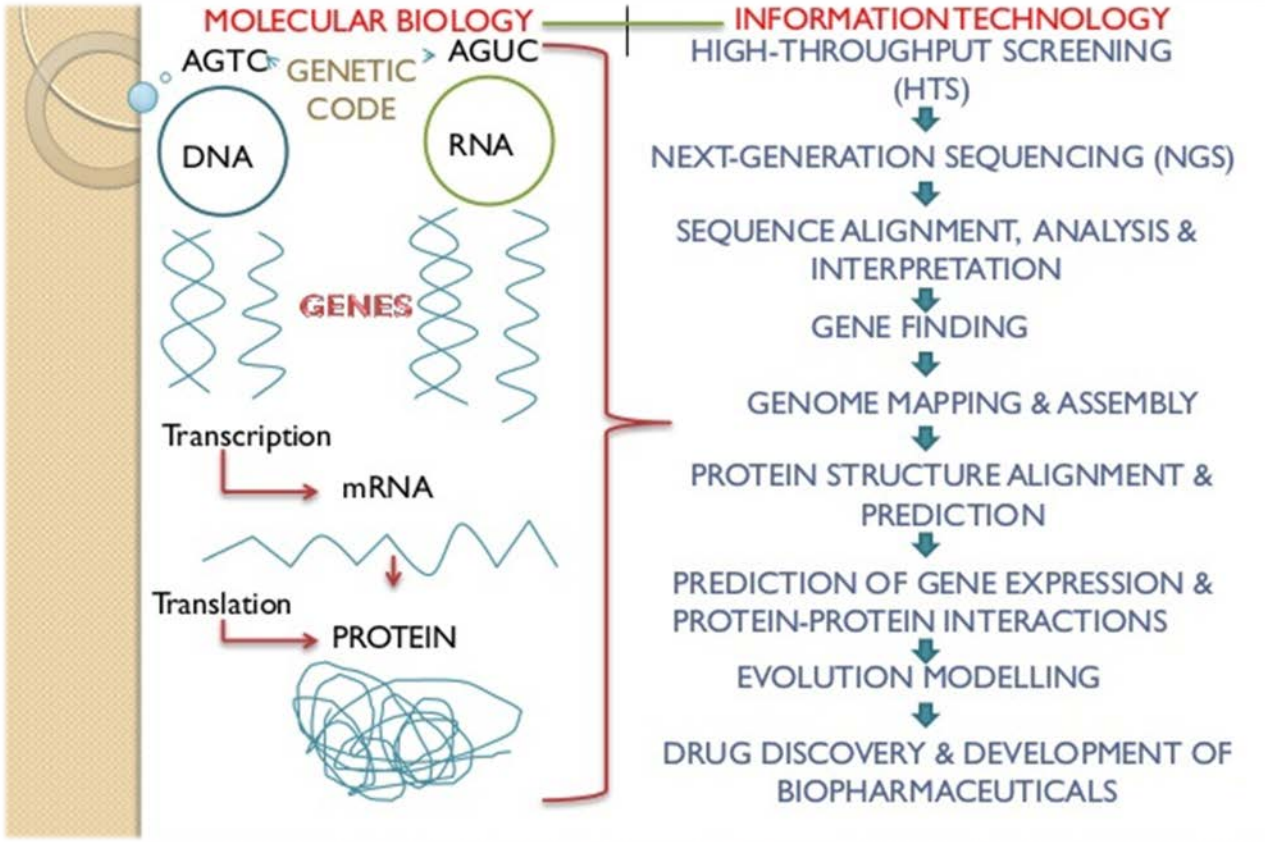


WHY A BIOINFORMATICS “COLLABORATIVE”?

- Lack of a strong computational infrastructure at UMMC
  - Data storage issues, software installation issues
- Lack of access to existing resources
- Lack of opportunities for collaboration
- Lack of standards for Bioinformatics-related research
  - Existing pipelines, workflows, do’s/dont’s
- Lack of a coalition or united voice

GOALS

- Organize a Bioinformatics community at UMMC and to promote collaboration and knowledge-sharing and ultimately, harness the ingenuity of current faculty, staff, students
- Become a chapter of the MidSouth Computational Biology and Bioinformatics Society
- Invite distinguished speakers to discuss their research and for education/informational sessions.
- Foster interdepartmental collaborations
- Expose students, faculty, and staff to current topics and tools in Bioinformatics

CREATING A COMMUNITY

- Using our SLACK team as a means of informal communication
  - tinyurl.com/ummcbc
  - SLACK provides group and private messaging, creating channels, sharing documents, and numerous integrations (GitHub, Email, Google, etc.)
- GitHub Organization
  - github.com/ummc-bc
  - Documentation of events/meetings, blog, and collaborative projects.
- Blog/Website
  - ummc-bc.github.io
  - Demo currently available

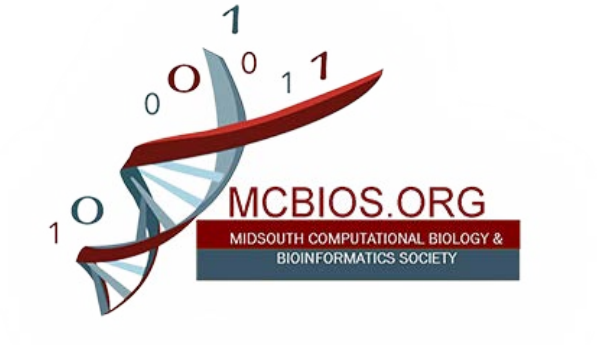
SHARING KNOWLEDGE

- Sharing pipelines, code, and documentation
- Sharing Bioinformatics tools internally created
  - Creating an index of tools available
- Making currently available UMMC resources (from software to datasets to server access) more transparent
- Sharing skillsets by collaborating on projects

Examples

- Currently working with microbiome data from the Genomics Core
  - Xiao Zhang (PhD. student in Neuroscience) needed a heatmap
  - For us it was unclear how to proceed
  - After trial and error, we discovered BIOM, Nephele, and heat-trees
  - Created robust analysis, resulting in better data analysis and visualization
- GitHub/GitLab for UMMC
  - These tools could be used for standardizing the microbiome workflow
  - Xiao's GitHub Page (ask for permission)

WHAT IS MCBIOS?



- MidSouth Computational Biology and Bioinformatics Society
  - Mississippi Chapter
    - Previously at Ole Miss under Dr. Dawn Wilkins in the Deptartmentof Computer and Information Science & currently inactive
  - Provides an opportunity for networking
  - Strengthening of the greater Bioinformatics community

The 15th Annual MCBIOS Conference
March 29 - 31, 2018
Genomics and Big Data
Starkville, MS

MEETING TYPES

- Seminars
  - To expose UMMC faculty, staff, & students to relevant research & resources
  - Ben Pharr – Interim Director of the MCSR - TBD
    - Seminar to all UMMC faculty, staff, students & potentially a private workshop for a smaller group
- Article or research discussion meetings (journal club format)
  - To cover bioinformatics methods & how they're used to answer specific biological questions
- Workshops
  - To learn new technologies
  - To learn best practices given current (UMMC) infrastructure

POTENTIAL TOPICS

- Cloud Computing
- “Big Data” Storage and Management
- Data Analysis & Visualization
- Novel Bioinformatics Tools & Methods
- Utilization of the Mississippi Center for Supercomputing Research (MCSR)
- Discussion of projects encompassing Next-Generation Sequencing (NGS), RNASeq, Phylogenetics, Genomics, Proteomics, Whole-Genome Sequencing

FEEDBACK AND FURTHER DISCUSSIONS

- SLACK - tinyurl.com/ummcbc
- GitHub - github.com/ummc-bc

Dr. Lavanya Challagundla
Dr. Robert Hester
Dr. Eric Vallender – Bioinformatics Collaborative Advisor