

Spring 2009, BMB/MMG/PLB 400/810

Introduction to Bioinformatics:

Basic Computational Skills for Biological Data Handling & Analysis

Instructor: Shin-Han Shiu (shius@msu.edu)

Time & Place: Monday & Wednesday 9:10-11am, BPS 2245

Credit: 3 for both undergraduate and graduate students

• *What is bioinformatics and why is it important?*

Bioinformatics is the science of organizing and analyzing biological data. The advent of various 'omics tools allows the rapid generation of enormous amounts of data, including biological sequences, gene expression profiles, and protein-protein interactions. How do you deal with these massive amounts of data and make sense out of them? Here is where bioinformatics becomes extremely useful and essential for the next generation of biologists.

• *What will you learn?*

- The biological questions that can be addressed using large-scale data.
- How the basic bioinformatics tools and their algorithms work.
- How to choose the parameters when running bioinformatics programs
- How to handle large-scale datasets with simple programming.
- The strengths and limitations of the computational approaches to biology.

• *Who will find this course useful?*

- You have lots of data but have difficulties dealing with them.
- You want to be exposed to interdisciplinary research in genomic and computational biology.
- You want to find out what kinds of questions can be asked and what kinds of work can be done using increasingly abundant biological data.

• *What are the prerequisites?*

- You should have basic knowledge of molecular genetics and regulation of biological processes at the molecular level. Knowledge on genomics will be helpful but not required.
- You should have a basic statistics background including an understanding of probability, distributions, and hypothesis testing. No background in computational science is required.

Any question? Contact shius@msu.edu for more details.