

**Lectures on Informatics:
An Introduction to Computers and Informatics in the Health Sciences**

Dates: February 23rd through May 10th 2016
Time: Tuesdays from 2pm to 2:55pm
Place: LSUHSC Human Development Center Room 133 (411 S Prieur St, New Orleans, LA)
Remote: Lectures are available for remote viewing via lecture series website
Website: <http://metagenomics.lsuhsu.edu/lectures/introinformatics/>
Forum: <https://groups.google.com/forum/#!forum/lecturesoninformatics>
(Request to join the forum to receive updates and info on the lecture series)

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Content: This lecture series will provide a practical introduction to computers, critical concepts in computing, and their application to informatics problems in the health sciences arena. My goal is for you to walk away from these sessions with a much deeper understanding of the internal workings of computers armed with an array of practical knowledge that you can apply to your everyday interactions with computer systems. I also intend for this material to lay the foundations necessary for entry into more detailed study on specialized computational topics such as DNA sequence analysis, genomics, and bioinformatics.

Prereqs: No prior preparation, knowledge or training is presumed.

Evaluation: This lecture series is not graded, but you get out of it what you put into it. You are highly encouraged to participate in the exercises presented in the lectures and to pursue these topics outside of the official meeting time.

Lectures:

1. Introduction, Logistics and Philosophy: A Practical Approach (February 23rd)
The first lecture will provide an introduction to the goals of this lecture series, what to expect, the logistics of participating in the lectures, and an explanation of the philosophy underlying my approach to teaching informatics.
2. Basic Computer Architecture I: Bits, Bytes & Busses (March 1st)
We will provide an overview of the critical components of a computer system, hardware organization, operating systems concepts, the structure of data, data storage technologies, data caching, and data transit.
3. Data Wrangling with Atom I: Basic Data Manipulation (March 8th)
We will introduce the free Atom advanced text editor. This is a powerful text editor that allows you to perform complex data manipulations easily and will become an essential tool for your data wrangling needs.

3. Basic Computer Architecture II: Programming, Processes & Networking (March 15th)

This lecture will provide an overview of software architecture, computer programs, computer networks, network interconnects, network protocols, computer processes, and multiprogramming.
5. The Markdown Language: Learning Markdown in Atom (March 22nd)

Markdown provides an easy and intuitive way to organize your notes and is supported in many web forms for advanced text formatting. We will introduce the markdown language and provide tips and tricks for better note taking and documentation.
6. Data Wrangling with Atom II: Advanced Data Manipulation (March 29th)

We will cover regular expressions using find and replace, complex data manipulations using advance selection features of Atom, and advance navigation features that will enhance and streamline your data wrangling.
7. Keyboard Shortcuts: Giving Your Mouse a Vacation (April 5th)

The less you touch your mouse, the more productive you can be. Often times reaching for the mouse can break the flow of your work and learning useful keyboard shortcuts can allow you to enhance your productivity at the computer. We will cover a variety of keyboard shortcuts with tips and trick that allow you to perform common interface operations with the press of a few keys. We will primarily focus on operating system shortcuts that can be used while interacting with any program (or switching between programs) but will also cover several useful tricks within specific programs you may commonly use.
8. Sequencing Intro: Common File Formats and Visualization Software (April 12th)

We will introduce common sequencing file formats including fasta, fastq, bed, sam and bam along with ways to interact with, visualize and manipulate sequencing data using a free genome browser. We will also discuss integrating publicly available data sets into visualization of your own sequencing data.
9. Sequencing Application I: Sequencing of Microbiome Data (April 19th)

We will introduce 16S rDNA amplicon sequencing as a technique to assess the composition of bacteria in an environmental or clinical sample. The theory and practice behind this technique will be discussed and we will investigate an example dataset.
10. Sequencing Application II: Analysis of Microbiome Data (April 26th)

We will introduce free and open source computing tools such as UPARSE and QIIME that can be used to perform the stages of analysis of microbiome data continuing the analysis of our example dataset.
11. Sequencing Application III: Visualization of Microbiome Data (May 3rd)

We will cover visualization of microbiome data using QIIME and other free tools to further explore our example data set.
12. Sequencing Application IV: Discussion of Metagenomic Methods (May 10th)

Alternative methods to microbial community assessment such as metagenomic sequencing will be discussed along with benefits and drawbacks to employment of such techniques.