

**BCHB-514 Special Topics: Bioinformatics Fall 2007**  
**1 credit Monday 5:00 – 7:30 pm PCS LA2**  
**Tuesdays 3:00 – 5:30 pm Computer Rm, Dahlgren Library**  
**Course Directors: Dr. Jack Chirikjian, Sharon Helling**  
**Instructors: Dr. Medha Bhagwat and Dr. Babru Samal, NIH**

**There will be a mid-term exam (for Fall 2008)**

**BCHB-514 Syllabus Fall 2008**

<b>Lecture 1</b>	<b>Entrez Gene Quick Start</b>	<b>Dr. Medha Bhagwat</b>
<b>Lecture 2</b>	<b>Making Sense of DNA and Protein Sequences</b>	<b>Dr. Medha Bhagwat</b>
<b>Lecture 3</b>	<b>Homology Search (Blast, alignments, etc.)</b>	<b>Dr. Babru Samal</b>
<b>Lecture 4</b>	<b>Primer Design</b>	<b>Dr. Babru Samal</b>
<b>Lecture 5</b>	<b>Functional Genomics Prediction of function from Sequence information (DNA and protein, motifs and cis elements) Gene ontology and Biological Pathways</b>	<b>Dr. Babru Samal</b>
<b>Lecture 6</b>	<b>High Throughput Bioinformatics Review</b>	<b>Dr. Babru Samal</b>
<b>Lecture 7</b>	<b>Test</b>	<b>Dr. Babru Samal</b>

## **Homology search**

- Types of homology
- Homology search engines
- BLAST and FASTA
- Blossum and PAM matrices
- Databases to BLAST against
- Genomic BLAST, BLAT
- BLASTN, BLASTP etc.
- Blast two sequences
- BLAST Advanced Options
- Multiple alignments

## **Primer design**

- Need for primer design
- General guidelines
- Types of primers
- Primer databases
- Primer Design Tools
- Step by step protocol for primer design
- Designing primers for gene expression
- Designing genomic primers
- Quality control

## **Functional Genomics**

- Databases
- Gene regulation
- Protein-protein interaction
- Gene Ontology
- Pathways analysis
- Literature text mining

## **High Throughput Bioinformatics**

- Microarray analysis
- Annotation
- Homology search
- Gene ontology search
- Pathways search
- Co-regulation of genes
- Protein-protein interactio