

BIOINF 800.6 (Module A): Bioinformatics on the Web.

Lectures: Tuesdays 4:00-5:30 (January 8 – February 5, five weeks)
2062 Palmer Common.

Labs: 2:00 – 4:00 PM, Mondays or Thursdays
2036 Palmer Common

Module A Director: Yongqun “Oliver” He (ULAM/Micro)

Course Director (for Module A-C): George Zhang (EEB)

“1 credit

The web resources and tools which all laboratories use for data retrieval, storage and analysis. NCBI and related tools, public databases. Biological analysis of sequence data using these tools.”

Cited from: http://www.bioinformatics.med.umich.edu/bgp_courses/bioinf-800.006

Lecture (A1): Sequence alignment and database searching with BLAST

Instructor: Dr. David States

Time: Jan 8 (Tuesday), 4:00 – 5:30 PM

Topics:

- Homology and sequence alignments
- Sequence similarity and database searching
- Interpreting search results – E value
- The BLAST algorithm

Lab (A1): Using the various BLAST algorithms

Instructor: Dr. Jeff de Wet

Time: 2:00 – 4:00 PM, Jan 10 (Thursday) or Jan 14 (Monday)

Topics:

- Web BLAST interface at NCBI

Lecture (A2): NCBI Bioinformatics Resources

Instructor: Dr. Brian Athey

Time: Jan 15 (Tuesday), 4:00 – 5:30 PM

Topics:

- What are bioinformatics and computational biology?
- History of bioinformatics and NCBI bioinformatics resources
- NCBI databases and tools
- Comparison: EBI, Swissprot, etc.
- Areas of application

Lab (A2): NCBI Bioinformatics Resources

Instructor: Dr. Jeff de Wet

Time: 2:00 – 4:00 PM, Jan 17 (Thursday) or Jan 21 (Monday)

Topics:

Accessing information at NCBI. Where those servers live? Sitemap of NCBI resources, Help documentation, Introduction of individual resources.

Lecture (A3): Genome databases NCBI, Ensembl, and UCSC.

Instructor: Dr. Margit Burmeister

Time: Jan 22 (Tuesday), 4:00 – 5:30 PM

Topics:

Focus on human genome, but also compare to mouse and other genomes
Search genes and gene functions from genome databases, ESTs,
Variation in the genome – dbSNP (includes indel variants now)
(access through entrez-gene)
Genes and disease – OMIM
ENCODE, Hapmap projects

Lab (A3): Genome databases

Instructor: Dr. Jeff de Wet

Time: 2:00 – 4:00 PM, Jan 24 (Thursday) or Jan 28 (Monday)

Topics:

Web interfaces to genome databases NCBI, Ensembl, and UCSC

Lecture (A4): Medical literature data search:

Instructor: Dr. Fan Meng

Time: Jan 29 (Tuesday), 4:00 – 5:30 PM

Topics:

PubMed, MeSH, Google Scholar
Literature mining, citation

Lab (A4) (Led by Dr. de Wet): Biomedical literature search

Instructor: Dr. Jeff de Wet

Time: 2:00 – 4:00 PM, Jan 31 (Thursday) or Feb 4 (Monday)

Topics:

Biomedical literature search using PubMed, MeSH, and other tools.

Lecture (A5): Other bioinformatics resources

Instructor: Dr. Oliver He

Time: Feb 5 (Tuesday), 4:00 – 5:30 PM

Topics:

TIGR bacterial resources, gene prediction

Non-coding genes, microRNA and siRNA
miRBase <http://microrna.sanger.ac.uk/sequences/index.shtml>
miRNA targets <http://cbio.mskcc.org/mirnaviewer/>
GEO
Gene ontology
Others ...

Lab (A5) (Led by **Dr. de Wet**): **Other bioinformatics resources**

Instructor: Dr. Jeff de Wet

Time: 2:00 – 4:00 PM, Feb 7 (Thursday) or Feb 11 (Monday)

Topics:

Similar to the lecture topics