

Literature Resources for Bioinformatics
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Goals of this session:

- Provide an overview of major research literature databases useful in bioinformatics research.
 - Provide a brief demonstration of a citation management program, EndnoteWeb.
 - Provide a brief overview of RSS feeds and how to use them as a current awareness tool.
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Bioinformatics & Computational Biology Resource Guide -

<http://instr.iastate.libguides.com/bcb> Provides “one-stop” shopping for BCB resources.

I. MEDLINE database

- Produced by the National Library of Medicine
- Indexes the health sciences and life sciences literature

II. PubMed <http://www.ncbi.nlm.nih.gov/sites/entrez?otool=usiaslib>

- Freely available version of MEDLINE (your Federal tax dollars at work!)
- Access PubMed (ISU affiliate version) from the library's website. By doing so, you will see the “Get it@ISU” button in every PubMed record. “Get it@ISU” quickly links you to full-text articles if available.
- View photographs of NLM's various computers from the 1960s to the present at:
http://www.nlm.nih.gov/news/history_nlm_computerroom.pdf

III. Using PubMed

- For additional information:
 - PubMed Basics - 2 page handout (PDF) that highlights features. URL:
<http://nmlm.gov/training/resources/pmtri.pdf>
 - PubMed Tutorials and Quick Tours -
<http://www.nlm.nih.gov/bsd/disted/pubmed.html>
- Search Tips
 - Recommend using Boolean operators, AND, OR, NOT. Must be in capital letters!
 - Sample Search: (swine OR pigs) AND (meat OR pork) AND quality AND genetics
 - Click on article title for "Abstract" view.
 - Publisher-provided links to full-text and "Get it@ISU"
- Limits and Advanced Search

- Can limit a search by various parameters, e.g. dates, review articles, language, etc.
- Use the “Search Builder” in Advanced Search to limit your search to a particular field
 - signal transduction AND cell vs.
 - signal transduction AND cell [Journal]
- Other useful fields: Affiliation; Unique Identifier [PMID]
- MeSH (Medical Subject Headings)
 - Controlled vocabulary terms that are assigned by indexers. To view MeSH headings for PubMed records, click on “Publication Types, MeSH terms, Substances” at the end of the abstract.
- Other Features
 - PubMed Bookshelf: collection biomedical and basic science textbooks.
 - My NCBI: can set up searches to run automatically and have results emailed to you

IV. Biosis Previews (part of the Web of Knowledge)

- Comprehensive life sciences database
- Includes some conference proceedings, meeting reports, and patents.
- Covers much of the same literature as MEDLINE. However, this is definitely worth searching if you're working in plant biology, and evolution/systematics.
- Coverage: 1926 - present

V. CAB Abstracts (part of the Web of Knowledge)

- Strong in agriculture, plant science, animal science, and veterinary medicine. **It is the most comprehensive resource for all of these subject areas.**
- Covers many international publications.
- Extensive indexing with descriptors (controlled vocabulary)
- Coverage: 1910 - present

VI. Web of Science (part of the Web of Knowledge)

- Provides access to the ISI Citation Indexes: Science Citation Index, Social Sciences Citation Index, Arts & Humanities Citation Index
- Science Citation Index: Over 7,100 covered journals
- Publications are selected for inclusion in Web of Science based on the following criteria. For more information, visit:
<http://scientific.thomson.com/knowtrend/essays/selectionofmaterial/journalselection/>
 (Note: Newer journals may/may not be included.)
- ISU subscription goes back to 1900 for the Science Citation Index.
- Can search by topic or do cited reference searching
- A **cited reference search** tells you who has cited the article since it was published, so you can search forward in time.

VII. SciFinder Scholar (More information:

<http://www.lib.iastate.edu/collections/db/scifnd2007.html>)

- Searches Chemical Abstracts and MEDLINE
- Important resource for some areas of bioinformatics research, e.g. proteomics, protein folding, mass spectrometry analysis, sequencing technologies.
- Useful for patent searching.

VIII. Computer Engineering Resources (More information: [Electrical & Computer Engineering Resources guide](#) & [Computer Science Resources Guide](#))

- Computer and Information Systems Abstracts - provides broad coverage of journal articles and conference papers dealing with computer and network technology and their applications, as well as developments in theoretical computer science. Coverage is from 1981 - present.
- Computer Science Index - Covers academic journal articles, professional publications, and other reference sources in computer science at a scholarly/technical level. The collection indexes more than 6,500 periodicals and books, with material back to the 1960s.
- Compendex - includes engineering-related journals, conference proceedings, and technical reports. Coverage is from 1884 - present. **Indexes *Lecture Notes in Computer Science*.**
- IEEE Xplore - provides full-text online access to publications of the Institute of Electrical and Electronics Engineers (IEEE) and the Institution of Electrical Engineers (IEE). **Contains full-text proceedings from *IEEE Symposium on Computational Intelligence in Bioinformatics and Computational Biology*; *IEEE Symposium on Bioinformatics and Bioengineering* as well as others.** Most IEEE publications should be indexed in Compendex.
- ACM Digital Library - publications of the Association for Computing Machinery

IX. National Center for Biotechnology Information (NCBI) - <http://www.ncbi.nlm.nih.gov/>

- Created in 1988 as a part of the National Library of Medicine at the National Institutes of Health
- **What does the NCBI do?**
 - NCBI accepts submissions of primary data (e.g. GenBank). Original research data submitted by researchers.
 - NCBI develops tools to analyze these data. (e.g. BLAST)
 - NCBI provides free searching, linking, and retrieval of these data, primarily through the Entrez system.
- **Useful links available from the homepage**
 - More About the NCBI <http://www.ncbi.nlm.nih.gov/About/index.html>

- Science Primer <http://www.ncbi.nlm.nih.gov/About/primer/index.html> A good resource for learning about bioinformatics, microarrays, SNPs, etc.
- Training & Tutorials <http://www.ncbi.nlm.nih.gov/guide/training-tutorials/>
 - NCBI Education page, <http://www.ncbi.nlm.nih.gov/Education/>
 - How-to Guides, <http://www.ncbi.nlm.nih.gov/guide/all/howto/>
 - Fact Sheets, http://www.ncbi.nlm.nih.gov/Education/fact_sheets.shtml

X. Entrez Gene - <http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene>

- database of genes that provides a "gene-based" view of information
 - Example: HTT [sym] AND human [ORGN]
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XI. Other Resources

- Directories of Bioinformatics Resources
 - University of Washington - [BioMolecules](#) - directory of web resources that includes topics such as nucleic acids, proteins, model organisms, gene expression, etc.
 - [Online Bioinformatics Resources Collection](#) - directory of web resources compiled by Ansuman Chattopadhyay at the University of Pittsburgh. This collection was profiled in the *Nucleic Acids Research* (NAR) 2007 Database issue. Article: <http://nar.oxfordjournals.org/cgi/content/short/gkl781v1>
 - [YABI - Yet Another Bioinformatics Index](#) - directory of web resources compiled by ISU Bioinformatics & Computational Biology graduate students.