RESEARCH GUIDE

BIOINFORMATICS

George Mason University Libraries

This research guide annotates selected library and web resources in bioinformatics, which can be defined as the use of computer and information technology to acquire, store, organize, retrieve, and analyze biological data.

Contents of the research guide:

ENCYCLOPEDIAS

Encyclopedia of Life Sciences

Print: Includes 3,000 entries and 6,000 illustrations. Describes an elucidates understanding of systems, processes, and structures in the life sciences; covers the application of fundamental biology to medicine and other areas of applied sciences.

Fenwick Reference QH302.5 .E54 2002

Online: Contains over 3,000 entries including extensive figures, tables and supplementary multimedia. Accessible at the libraries homepage through the Databases/Alphabetical List, through the direct link at http://www.els.net (on campus) or through a proxy server (off campus).

DICTIONARIES

The dictionary of gene technology: Genomics, Transcriptomics, Proteomics / Kahl, K. 2nd Edition. Wiley: 2001. Includes more than 6000 technical terms; elucidates synonyms, acronyms and technical jargon.

PWL Reference QH506 .K333 2001

Glossary of Genetic Terms

http://www.nhgri.nih.gov/DIR/VIP/Glossary/pub_glossary.cgi

Online searchable glossary of genetic terms compiled by National Human Genome Research Institute.

BOOKS

To find books on bioinformatics, search the library catalog by the following subjects:

Amino Acid Sequence
Base Sequence
Bioinformatics
Bioinformatics Congresses
Computational Biology
Databases, Factual
Gene mapping--Data processing
Genetics--Mathematical Models
Genomes--Data Processing
Genomics
Molecular Biology
Molecular Biology--Computer simulation
Molecular Biology--Data Processing
Molecular Biology--Mathematical Models
Proteins Analysis
Proteins Analysis--Data Processing
Sequence Analysis

Some of the books on bioinformatics at GMU Libraries:

Bioinformatics: the Machine Learning Approach / Pierre Baldi, Søren Brunak. 2nd edition. Cambridge, Mass.:MIT Press: 2001. New second edition, extensively revised. Contains expanded coverage of probabilistic graphical models and of the applications of neural networks, as well as a new chapter on microarrays and gene expression.

PWL Stacks QH506 .B35 2001

Bioinformatics basics : applications in the biological science and medicine / Hooman H. Rashidi, Lukas K. Buehler. CRC Press: 2000. Explores the use of computer technology in the life and medical sciences.

PWL Stacks QH324.2 .R37 2000

Bioinformatics - from genomes to drugs / T. Lengauer (Hrsg.). Wiley: 2001.Two-volume set. Provides a broad, application-oriented overview of bioinformatics. v. I. Basic technologies; v. II. Applications.

PWL Stacks QH506 .B565 2002

Bioinformatics methods and protocols. 2001. Misener, S., ed. Humana Pr.: 2001.
Surveys the key biological software packages, offering useful tips and an overview of current developments.

PWL Stacks QH506 .B535 2000

Bioinformatics: sequence and genome analysis / Mount. D. Cold Spring Harbor Lab.: 2001. A comprehensive introduction to the application of computational methods to DNA and protein science.

PWL Stacks QH441.2 .M68 2001

Introduction to bioinformatics / Teresa K. Attwood and David J. Parry-Smith. New York : Prentice Hall, 1999. Introduces key databases, tools, and resources in bioinformatics.

PWL Stacks QH 506 .A88 1999b

Statistical methods in bioinformatics : an introduction / Warren J. Ewens, Gregory R. Grant. Springer: 2001. Describes some of the main statistical applications in bioinformatics, including BLAST, gene finding, and evolutionary inference.

PWL Stacks R858 .E986 2001

E-BOOKS

Ebooks are full-text electronic versions of published books that library patrons can search, borrow, read, and return over the Internet. Ebooks are available for a 4 hour checkout period and are automatically returned to the library collection when the checkout period expires, making the eBook available for another user. To access e-book collection, go to
http://www.netLibrary.com
Or
search the Mason catalog by title and click on the Electronic Access link within the record

Bioinformatics: A practical guide to the analysis of genes and proteins / Baxevanis, Andreas, and F. Oullette. Wiley: 1998. Provides a sound foundation of basic concepts, with practical discussions and comparisons of both computational tools and databases relevant to biological research.

Bioinformatics: Methods and protocols / Krawetz, Stephen. Humana Press: 2000. Surveys the key biological software packages, offering useful tips and an overview of current bioinformatics developments.

Bioinformatics: The machine learning approach / Baldi, Pierre, and S. Brunak. MIT Press: 1998. Presents the key machine learning approaches and applies them to the computational problems encountered in the analysis of biological data.

Computational molecular biology: An introduction / Clote, Peter, and Rolf Backofen. Wiley: 2000. Provides the background mathematics required to understand why certain algorithms work; guides through probability theory, entropy and combinatorial optimization; covers molecular biology and protein structure prediction; includes algorithms such as DNA segmentation, quartet puzzling and DNA strand separation prediction; contains class tested exercises useful for self study.

Genomics and proteomics: Functional and computational aspects / Sandor, Suhai. Kluwer: 2002. Summarizes the results of recent research in genomics and proteomics, in particular computational and experimental approaches to expression analysis, functional gene identification, functional aspects of higher order DNA-structure, the relationship between protein sequence, structure and function, and genetic and medical aspects of genomics.

JOURNALS

(The GMU Libraries currently subscribe to the following journals. For information about particular volumes/issues, consult the Mason catalog)

Bioinformatics. Publishes full papers, program reviews, new applications and developments for bioscientists.

PWL Periodicals
(also available online through Oxford University Press)

Briefings in Bioinformatics. A review journal for the users of database and analytical tools of genetic and molecular biology.

PWL periodicals
(also available online through ProQuest Research Library)

Bulletin of Mathematical Biology. Devoted to research at the junction of computational, theoretical and experimental biology.

Fenwick Periodicals
(also available online through ScienceDirect)

Computer Methods and Programs in Biomedicine. Discusses the computing methods, and their application in biomedical research and medical practice.

Online only through ScienceDirect

Computers in Biology and Medicine. Focuses on the analysis and synthesis of biomedical systems; special medical data processing methods; medical diagnosis and medical record processing.

Fenwick periodicals
(also available online through ScienceDirect)

Genome Research. Focuses on genome studies in all species, including genetic and physical mapping, DNA sequencing, gene discovery, informatics, statistical and mathematical methods and genome structure as well as technological innovations and applications.

PWL Periodicals

Journal of Biomedical Informatics. Provides current information concerning the use of computers in biomedicine

Online only through ScienceDirect

Journal of Computational Biology. Provides a forum for scientific and technical issues associated with the analysis and management of biological information at the molecular level.

Fenwick Periodicals

Journal of Molecular Biology. Presents original scientific research concerning studies of organisms or their components at the molecular level.

Fenwick Periodicals
(also available online through ScienceDirect)

Nature. Publishes original scientific research reports, review articles, short contributions, letters, and commentary.

Fenwick, PWL, Arlington Periodicals
(also available online through Journals@OVID)

Nature Journals Online. The package includes the following journals: Nature Biotechnology, Nature Genetics, Nature Immunology, and Nature Medicine.

*(Available through e-journal list at **http://library.gmu.edu/phpzone/ej.php**)*

Nucleic Acids Research. International journal on nucleic acids, constituents and analogues. Publishes RFLP sequence reprints, sequence data, NMR assignment data and methods.

Fenwick Periodicals
(also available online through Oxford University Press)

Science. Deals with current events, findings, and new developments in sciences.

Fenwick, PWL, Arlington Periodicals
(also available online through HighWire Press and JSTOR)

DATABASES

Biological Abstracts (BIOSIS). Abstracts. 1980 - present.
One of the most comprehensive databases in the life sciences. Includes abstracts of articles from over 7,000 journals, reports, reviews, and letters.

Elsevier – ScienceDirect. Some full-text. 1995 – present.
Offers access to the Elsevier Science journal collection (over 1,200 titles) in all fields of science, along with journals from scientific societies and publishers.

MEDLINE. Abstracts. 1966-present
Produced by the National Library of Medicine. The premier source for biomedical literature.

Science Citation Index Expanded. Abstracts 1980-present
A multidisciplinary database, covering the journal literature of the sciences.

VIDEO

The human genome project / produced and written by Bill Stonebarger. Madison, Wis. : Hawkhill Video, c1999. A discussion on the Human Genome Project to determine the sequence of the structure of the human DNA.

Johnson Center Videotapes QH442.2 .H91 1999

INTERNET RESOURCES

Bioinformatics Frequently Asked Questions
http://bioinformatics.org/FAQ/
Written by Damian Counsell of the Institute of Cancer Research, UK. Rich in useful information and advice.

BioMed Central
http://www.biomedcentral.com/start.asp
Provides immediate free access to peer-reviewed biomedical journals: BMC Bioinformatics, BMC Genomics, Genome Biology, Journal of Biology, and many others.

Genome Resources at Cold Spring Harbor Laboratory
http://www.cshl.org/public/genome.html
Provides access to genome databases, sequencing projects, and other genome resources.

Guide to Selected Bioinformatics Internet Resources
http://www.istl.org/istl/02-winter/internet.html
Contains definitions, glossaries, and dictionaries, guides, tutorials, primers, images, information about software products, organizations, conferences, and symposia, as well as references and recommended reading.

Human Genome Project
http://www.nhgri.nih.gov/genome_hub.html (From the National Human Genome Research Institute)
http://www.ncbi.nlm.nih.gov/genome/guide/human/ (From the National Center for Biotechnology Information)
Present international research efforts to create a full genetic map of the human genome and read the complete nucleotide sequence of human DNA.

IMAGES

Genetic Illustrations
http://www.nhgri.nih.gov/DIR/VIP/Learning_Tools/genetic_illustrations.html
From the NIH Office of Science Education and Outreach.

Graphics Gallery - Access Excellence Biotech Applied
http://www.accessexcellence.org/AB/GG/
A series of labeled diagrams with explanations representing the important processes of biotechnology.

For more information about this guide and/or library research in bioinformatics, contact Victoria Shelton, Sciences Librarian, at 703/993-8347 or vshelton@gmu.edu
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