

# **Medical Informatics Education for Nurses, Pharmacists & Physicians**

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# **History of Medical Informatics at Utah**

- 1. Began in 1965 as the Department of Biophysics and Bioengineering in the Engineering School**
- 2. In 1972 it became Department of Medical Biophysics and Computing in the Medical School**
- 3. In 1985 renamed Medical Informatics**
- 4. In 2005 renamed Biomedical Informatics**

# Graduates from the “Medical Informatics” program at Utah

MS Degree - 125 Students

PhD Degree – 108 Students

*See also Patton GA, Gardner RM Medical Informatics  
Education: The University of Utah Experience*

*JAMIA 1999; 6:457-465.*

# **Integration of Nursing & Medical Informatics at Utah**

Since the inception of the Nursing Informatics program at Utah in the early 1990s, Medical Informatics and Nursing Informatics have had a collaborative working relationship.

In the Spring of 2005 Nursing Informatics and Medical Informatics both moved into a new Health Science Education Building and share common space and administrative staff.

# **Educational Tracks in Medical Informatics at Utah**

- 1. Health Information Systems**
- 2. Bioinformatics/Genetic Epidemiology**
- 3. Medical Imaging**
- 4. Public Health Informatics**

## **Educational Programs in Medical Informatics at Utah**

- 1. New Certificate Program – 1 year of courses and short project**
- 2. MS Degree – about 2 years with MS Thesis or 1 Refereed Journal Research Publication**
- 3. PhD Degree – 3 to 5 years with a PhD Dissertation or 3 Refereed Journal Research Publications**

# **Mission Statement Medical Informatics at University of Utah**

The mission of the Department of Medical Informatics at the Utah is to improve health care outcomes through information systems (including health, economic, and satisfaction of consumers and providers) in both the private and public sector of the health care industry.

To accomplish its Mission, the Department of Medical Informatics has assumed 3 major responsibilities:

1. To educate medical professionals, medical informaticists, and the health care community in the field of Medical Informatics
2. To promote and conduct research to broaden medical informatics knowledge, and
3. To serve the health informatics professionals and consumers by participating in relevant professional societies, editorial boards, and continuing education programs, while maintaining medical informatics leadership in the community

**Text Book in Medical Informatics  
Shortliffe & Cimino**

**Third Edition in Final Stages**

**Biomedical Informatics**

**Computer Applications in**

**Health Care and Biomedicine**

*Email Dated 17 April 06*

*<http://www.dbmi.columbia.edu/shortliffe/textbooks.shtml>*

## **New Chapters in 3<sup>rd</sup> Edition**

- 4. Cognitive Science and Biomedical Informatics**  
Vimla L. Patel and David R. Kaufman
- 8. Natural Language and Text Processing in Biomedicine** Carol Friedman and Stephen Johnson
- 9. Imaging and Structural Informatics** James Brinkley and Robert A. Greenes
- 14. Consumer Health Informatics and Telehealth**  
Patricia Flatley Brennan and Justin Starren
- 15. Public Health Informatics and the Health Information Infrastructure** William A. Yasnoff, Patrick O'Carroll, and Andrew Friede
- 18. Imaging Systems in Radiology**  
Robert A. Greenes and James Brinkley

University of Utah  
Medical Informatics Web Site

<http://uuhsc.utah.edu/medinfo/>

The Department of Medical Informatics was established in 1972 in the University of Utah School of Medicine. Located in beautiful Salt Lake City, the department is internationally recognized for its contributions to biomedical informatics research and training.

The department has a National Library of Medicine (NLM) training grant in medical informatics to support its educational programs. We offer M.S. & Ph.D. degree programs and short-term traineeships for students and visiting fellows. Our research affiliations include the University of Utah medical center & clinics, Intermountain Healthcare facilities, the Veteran's Administration medical center and the Utah Department of Public Health. As one of the largest informatics training programs in the world, our faculty and students are a diverse group with a wide range of experiences and interests.

# Health Information Systems

The delivery of medical care is becoming increasingly dependent on the availability of information systems. Health information systems, initially limited to inpatient settings, are now expanding into ambulatory care environments. Training in the concepts necessary to design and implement such systems is one of the most important priorities for the medical informatics community. Healthcare in the future will rely heavily on information systems to assist in disease diagnosis and management, education of health care providers and consumers, and communication among a wide variety of health care entities. Employment opportunities are available in academic, government and business sectors. Individuals trained in the development and implementation of health information systems will be a necessary part of every healthcare enterprise.

# Genetic Epidemiology

Genetic Epidemiology is a Division within the Department of Medical Informatics at the University of Utah School of Medicine. Our relationship with Medical Informatics derives from our retrospective use of computerized medical records linked to genealogy data to find and understand disease and health-related genes, and prospectively from our interest in integrating knowledge about disease predisposition into medical practice.

The Genetic Epidemiology training track is designed to give students a thorough training in Genetic Epidemiology. We offer two Genetic Epidemiology courses (MDINF 6500 and MDINF 6550), which include practical training in the methods and software used in analysis of genetic data. Special topics courses for specific genetic epidemiology topics of interest may also be available at the discretion of faculty members. Training also includes course work in human genetics and statistics in addition to instruction in the specific disease area of the student's choice. This group's primary research interest is in localizing and cloning genes for common diseases; including high risk pedigrees studies, as well as methodological development. Diseases studied to date include breast cancer, prostate cancer, colon cancer, melanoma, intracranial aneurysm, osteoporosis, asthma, celiac disease, schizophrenia, and depression. The group has collaborated in the discovery of multiple cancer predisposition genes, including BRCA1, BRCA2, p16 and HPC2/ELAC2. Research includes familiarity studies, high risk pedigree studies, genetic analysis, methodological development and statistical analysis of gene/environment interactions. The scope of Genetic Epidemiology ranges from genealogical studies of familial occurrence of disease, to the identification of a chromosomal region containing a gene responsible for disease, to the cloning of the predisposing gene, and association analyses of intragenic genetic variants. Genetic Epidemiology encompasses methodologies from theoretical modeling of genetic processes, to statistical methods and software required to analyze genetic data. A major resource of the Genetic Epidemiology group is access to a genealogy/diagnosis database which links a Utah genealogy to Utah Cancer Registry and death certificate data. This resource allows the population analysis of familial diseases as well as the ascertainment of high risk families. The Bioinformatics training track provides opportunities for training in the creation and use of new computer applications in molecular biology, medicine, and human genetics. The scope of the Bioinformatics track expands well beyond the Department of Medical Informatics; we offer an introductory Bioinformatics Course (MDINF 6600) and a Bioinformatics Seminar (MEDINF 6950) in the department, but students are expected to take a variety of classes in different departments at the University in preparation for their research work. The student's Graduate Committee will recommend appropriate course depending on the research topic selected by the student. Our training program focuses specifically on the development of skills for the creation and analysis of large genetic/genomic/biomedical databases, as well as the development of software for the analysis of such data that use advanced computational techniques. The program is closely associated with the Center for High Performance Computing that provides access to large parallel computing facilities and expertise in advanced numerical and data intensive computing. Currently the main research components of this training program are the development of computational statistical methods for analysis and display of complex genetic data with emphasis in graphical modeling and Markov chain Monte Carlo methods, and the development of scalable Parallel Genetic Algorithms for Bioinformatics.

# Medical Imaging

The Department of Medical Informatics has been involved in medical imaging research since the 1970s. Informatics applications in medical imaging are growing in importance and provide students an interesting and dynamic area of study. Significant advances during the past quarter century have propelled medical imaging into one of the major fields of diagnostic medicine. Medical informatics can be expected to provide future leadership in the areas of image acquisition, processing, archival, and communication. The domain of image processing includes such problems as structure mensuration, reconstruction of 3D structure morphology, computer assisted diagnosis, Picture Archival and Communication Systems (PACS), Radiology Information Systems (RIS), and diagnosis-directed image pattern recognition.

# Public Health

There are exciting opportunities in the Salt Lake City area and State of Utah in the field of Public Health Informatics. Although the University of Utah does not have a School of Public Health, the Department of Family and Preventive Medicine has a strong program in public health and each year confers over 50 Masters of Public Health Degrees. In addition, the Utah Department of Health (UDOH), Salt Lake City and Salt Lake County Health Departments, HealthInsight (the quality improvement organization for Utah and Nevada), and the Utah Health Information Network (UHIN) have collaborated on several projects with the Department of Medical Informatics. Dr. Scott Williams, former Director of the UDOH, and Dr. Robert Rolfs, State Epidemiologist for Utah, are currently collaborators on patient safety and bioterrorism research efforts.

Source of Graduate Students coming to  
the University of Utah

Placement of Graduates from  
Department of Medical Informatics at  
University of Utah