



GOALS

The purpose of this fellowship program

is to train scholars to conduct research in the area of biomedical informatics. Fellows will gain knowledge and experience in the use of information technology that will allow them to optimize safety and quality for patients in the intraoperative environment, with an end goal of improving short and long-term patient outcomes.

Interacting with faculty mentors in the Department of Anesthesia, Critical Care and Pain Medicine, fellows will participate in a one- or two-year comprehensive program to prepare for roles in developing, implementing and studying clinical information systems. Fellows will gain experience in the field of health services research and biomedical informatics within the academic setting of Massachusetts General Hospital and Harvard Medical School. The program will allow individuals to acquire essential research skills and an understanding of quality improvement methodology, in order to improve patient care.

OBJECTIVES OF FELLOWSHIP PROGRAM

- (1) Produce a new generation of researchers, educators and leaders with the skills to translate advanced research in biomedical informatics into improved clinical practice.
- (2) Utilize technology to transform the healthcare system to improve the outcomes, experience and access of care for patients.
- (3) Enable fellows to acquire knowledge and skills in competency areas necessary for biomedical informatics such as database management, computer science, decision support and statistics.
- (4) Provide a common core curriculum united with a set of diverse experiences.
- (5) Acquire training in a variety of focus areas such as public health, clinical informatics, epidemiological research and data repositories.
- (6) Develop technological innovations that increase the quality of care and decrease the cost.
- (7) Conduct novel research in the area of biomedical informatics and contribute to ongoing research projects in the department with opportunities to present the research results to the biomedical community.
- (8) Meet the current demand for data management, retrieval and analysis.

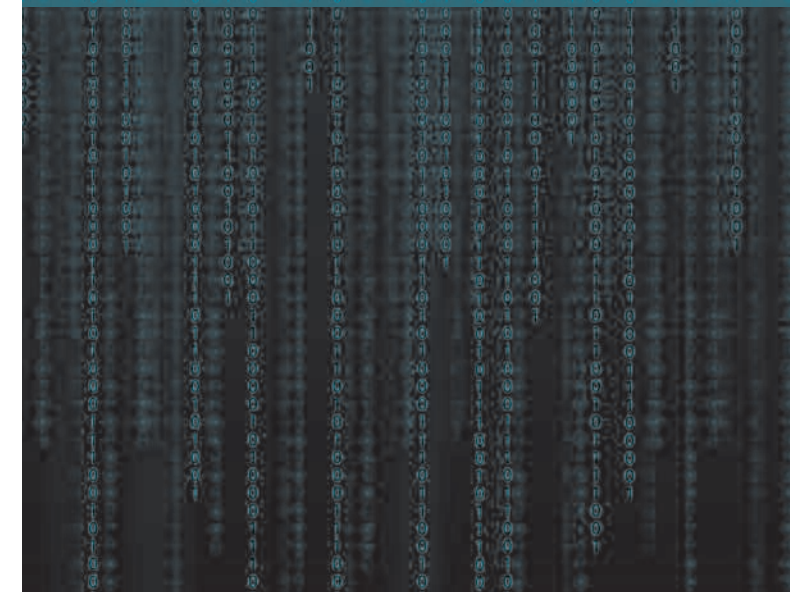
55 Fruit Street, Jackson 458
Boston, MA 02114

ADDITIONAL INFORMATION

Further information may be found on our website:
massgeneral.org/anesthesia



FELLOWSHIP IN BIOMEDICAL INFORMATICS



PROGRAM ADMINISTRATION

The fellowship will take place in the Division of Biomedical Informatics at the Massachusetts General Hospital Department of Anesthesia, Critical Care and Pain Medicine. Under faculty mentorship, fellows will develop research projects in the field of biomedical informatics. Fellows will be encouraged to think critically, assume responsibility for the direction of the research project, and will be responsible for conducting, publishing and presenting the research. In addition, faculty will involve the fellows in current aspects of ongoing research projects in the department and will offer guidance in curricular development, assessment and progress.

The program can be completed as a one-year non-degree fellowship or a two-year degree bearing fellowship (Masters in Public Health or Masters in Biomedical Informatics) in partnership with the Harvard School of Public Health and the Massachusetts Institute of Technology. All fellows will be expected to complete a core didactic curriculum consisting of three courses offered through the Massachusetts Institute of Technology (see "Core Curriculum" below). Fellows also will attend departmental grand rounds and occasional lectures offered through the Harvard Center for Biomedical Informatics in order to enhance the overall educational experience.

SELECTED ONGOING AND COMPLETED PROJECTS

- (1)** Implementation and Evaluation of a Real-Time Intraoperative Critical Alert System
- (2)** Automated Documentation Error Detection and Notification
- (3)** Elimination of Racial and Ethnic Disparities in Perioperative Care
- (4)** Clinical Performance Evaluation of Novel Devices & Technology: Non-Invasive Cardiac Output Monitoring Devices, Double Lumen Endotracheal Tubes, Pulse Oximeters
- (5)** Real-Time Automated Reminders to Control Drug & Supply Costs: Effectiveness and Outcomes
- (6)** Analysis of AIMS-Based Cost Comparison of Disposable vs. Re-Usable Supplies in Anesthesia

- (7)** Safety Perceptions and Operational Impact of High-Velocity Operating Rooms
- (8)** Efficacy of Web-Based Interactive Patient Education Tools
- (9)** Effect of Teaching Style on Patients' Immediate Post-Operative Recall of Instructions
- (10)** Utilization of Anesthesia Information Management Systems for Physician Credentialing

FACULTY ADMINISTRATION



Jesse M. Ehrenfeld, MD, MPH
Instructor in Anesthesia, Harvard Medical School; Physician Lead, Mass General Anesthesia Clinical Research Center; Vice Speaker, Massachusetts Medical Society; Member, ASA Standards & Practice Parameters Committee
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Warren S. Sandberg, MD, PhD
Associate Professor, Harvard Medical School; Team Leader, Operating Room of the Future; Site Miner, Center for Integration of Medicine and Innovative Technology; Physician Director, Anesthesia Engineering & Technical Support; Director of OR Innovation, Technology & Analysis; Principal, Mass General Innovation Support Center
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FACULTY EXPERTISE

Fellows will be supervised by the two program directors and a faculty advisor from within the Department of Anesthesia, Critical Care and Pain Medicine. Our department consists of a diverse group of clinicians, scientists, professors and researchers dedicated to ensuring a successful fellowship for the candidate. The faculty has a wide range of expertise in the following areas:

- Clinical Informatics
- Information Technology
- Information Management Systems
- Database Management
- Perioperative Process Monitoring and Control
- Clinical Systems Design
- Computer Programming
- Data Modeling and Algorithm Design
- Perioperative Quality and Safety
- Medical Device Interoperability
- International Medical Device Standardization
- Intelligent Clinical Monitoring Systems
- Process Control Methodology
- Continuous Quality Improvement

QUALIFICATIONS AND APPLICATION PROCESS

Selection into the fellowship is highly competitive. Individuals with advanced degrees in the health or biological sciences and an avid interest in biomedical informatics are encouraged to apply. Applicants should submit **(1)** a letter of interest, **(2)** curriculum vitae, **(3)** three letters of recommendation, and **(4)** transcripts to be considered for the fellowship. Materials should be sent to the fellowship co-director at the address below. Applications will be accepted September to January and decisions will be made in early spring.

Jesse M. Ehrenfeld, MD, MPH

Fellowship Co-Director
Massachusetts General Hospital
Department of Anesthesia, Critical Care
and Pain Medicine
55 Fruit Street, Jackson 458
Boston, MA 02114

CORE CURRICULUM

The core curriculum consists of two 12-credit courses (HST950 and HST951), and one 1-credit seminar (HST957) that needs to be taken at least twice.

HST 950/6.872 – Biomedical Computing

Analyzes computational needs of clinical medicine, reviews systems and approaches that have been used to support those needs, and the relationship between clinical data and gene and protein measurements. Topics: the nature of clinical data; architecture and design of healthcare information systems; privacy and security issues; medical expert systems; introduction to bioinformatics. Case studies and guest lectures describe contemporary systems and research projects. Term project using large clinical and genomic data sets integrates classroom topics.

HST 951/6.873 – Biomedical Decision Support

Presents the main concepts of decision analysis, artificial intelligence, and predictive model construction and evaluation in the specific context of medical applications. Emphasizes the advantages and disadvantages of using these methods in real-world systems. Technical focus on decision analysis, knowledge-based systems (qualitative and quantitative), learning systems (including logistic regression, classification trees, neural networks) and techniques to evaluate the performance of such systems. Students produce a final project using the methods learned in the course, based on actual clinical data.

HST 957: Biomedical Informatics Research Seminar

Explores hot topics in biomedical informatics and enhances presentation skills.

DEGREE OPTIONS

In conjunction with the fellowship, individuals also may choose to apply to and enroll in either the Biomedical Informatics Master's program at MIT or the Harvard School of Public Health Master of Public Health program. The application process for these degree programs is separate from the application process for the Biomedical Informatics Fellowship, but should be completed in parallel.