

GUIDELINES FOR SCHOLARLY CONCENTRATIONS

Purpose:

To provide interested students an opportunity to receive an expanded and enriched learning and scholarly experience in a broad area of emphasis while completing their 4-year medical curriculum. It is expected that the Scholarly Concentration will be interdepartmental and interdisciplinary.

Program content and duration:

Scholarly Concentrations will entail a defined combination of required, elective and selective student experiences during years 1-4 (e.g., coursework, Blue-Book credit, seminars, journal clubs, shadowing, etc), in addition to the scholarly project requirement (see below). The total time commitment will generally approximate the equivalent of 5 months (including time for required and elective course work, shadowing, conduct of the scholarly project, etc.). A variety of configurations with regard to timing is possible.

Scholarly project requirement:

Scholarly Concentrations must require a scholarly project and product for successful completion. The product should be able to be peer reviewed and disseminated and should represent the culmination of the student's four-year immersion in the field. It is highly recommended that the initial work on the project begin no later than the summer between years 1 and 2. It is expected that Scholarly Concentration Directors will hold these projects to a high standard of excellence.

Student recognition:

Successful completion of all Scholarly Concentration requirements will result in special recognition in the commencement program; a program-specific certificate of completion; and a program-specific scholarly designation on the student's academic transcript. Participation will also be reflected in the student's "Medical Student Performance Evaluation."

Student support:

Limited program administrative and student support may be provided through the Office of the Dean. However, Scholarly Concentrations should be prepared to provide significant resources to support their program and their students' scholarly projects.

Approval:

Proposals for Scholarly Concentrations should first be submitted for review to the Scholarly Concentration Advisory Committee (using the standard "Scholarly Concentration Proposal Form") prior to submission to the Curriculum Committee for its approval.

SCHOLARLY CONCENTRATION APPROVAL FORM

Name: Biomedical Informatics

Director/Co-director:

Elmer Bernstam, MD

Reynolds and Reynolds Professor of Biomedical Informatics

Associate Dean for Research, School of Biomedical Informatics

Professor of Internal Medicine, McGovern Medical School

Administrative coordinator: Jamie Hargrave

Mission:

The goal of the biomedical informatics scholarly concentration is to provide a background in biomedical informatics, focusing on clinical informatics that will position the student to:

- 1) Participate in projects involving IT and informatics such as those related to electronic health records (EHRs) including the selection, implementation and management of EHRs
- 2) Prepare students for a career as a clinical informatics leader in academic medicine
- 3) Involve the student in informatics research including asking research questions, designing experiments to address the research question, conducting the experiment and publishing the results in a peer-reviewed forum such as an informatics or clinical journal

At the completion of the biomedical informatics scholarly concentration, students will:

- 1) Apply clinical informatics principles
- 2) Complete a research or applied informatics project leading to submission of a publication to a peer-reviewed forum

Informatics competencies:

At the completion of the biomedical informatics scholarly concentration, students will:

- 1) Apply the fundamentals of biomedical informatics including:
 - a. Information science and technology
 - b. Social and behavioral science
 - c. Human factors and socio-technical systems
- 2) Communicate across professional boundaries

Maximum number of students/year: 3

Student selection process: Interview with the program director

Concentration requirements (didactic and experiential):

Students will be required to complete a well-rounded curriculum to include at least the two introductory courses in biomedical informatics (HI 5300 and 5310), reading of peer-reviewed journal articles and participation in the SBMI weekly research seminar. Students will also be required to complete at least one month-long elective in biomedical informatics. Student will be encouraged to attend conferences. Submission of a publication (conference presentation or journal/conference paper) describing the student-led project to a peer-reviewed forum is required for completion.

Timeline (years 1-4) for student completion of concentration requirements:

MS1

- Required:
 - Application and acceptance into the program, including interview
 - Attend weekly SBMI research seminar during the semester (can be done remotely via GoToMeeting; attend a minimum of 50% of sessions)
 - Complete BMI 5300 Introduction to Biomedical Informatics (can be done remotely during any semester of the MS1 year)
 - Identify a project mentor
 - Submit project proposal → iterate with project mentor until the project proposal is accepted
 - Apply for Summer Research Program
- Optional:
 - Present a research seminar

MS2

- Required:
 - Attend weekly SBMI research seminar during the semester (can be done remotely via GoToMeeting; attend a minimum of 50% of sessions)
 - Complete BMI 5310 Foundations of Biomedical Informatics (can be done remotely during any semester following BMI 5300 during the MS2 year; must be completed by start of MS3 year)
- Optional:
 - Present a research seminar
 - Conduct and submit a review (systematic or scoping) of the literature on a specific topic in biomedical informatics
 - Attend AMIA Fall Symposium (with mentor approval)

MS3

- Required:
 - Attend weekly SBMI research seminar during the semester (can be done remotely via GoToMeeting; attend a minimum of 50% of sessions)
 - Continue work on project approved during MS2 year
- Optional
 - Present a research seminar during any semester with the project mentor as sponsor/supervisor
 - Complete an elective rotation in biomedical informatics (dedicated research elective)
 - Attend AMIA Fall Symposium (with mentor approval)

MS4

- Required:
 - Attend weekly SBMI research seminar during the semester (can be done remotely via GoToMeeting; attend a minimum of 50% of sessions)
 - Present a research seminar during any semester with the project mentor as sponsor/supervisor
 - Complete project
 - Complete and submit publication (submission is the requirement, not acceptance)
- Optional
 - Complete an elective rotation in biomedical informatics
 - Attend AMIA Fall Symposium (with mentor approval)

Scholarly projects

- a) indicate the types of faculty-mentored student scholarly projects available to students (e.g., basic research, clinical research, public health analysis, curriculum development, literature review, etc.):**

In general, projects will involve the following steps:

1. Identify some important problem in biomedicine; this can be a clinical problem (e.g., diagnosis of systemic lupus erythematosus [SLE] is often delayed → need earlier diagnosis of SLE) or research problem (e.g., identifying driver mutations in colon cancer)
2. Identify the underlying information problem (e.g., What is the probability of SLE in patients who do not yet have this diagnosis based on what is currently known about them including history, physical, laboratory studies, etc.?)
3. Implement some system or intervention, that may involve a computer program, to solve the information problem (e.g., decision support to alert clinicians when undiagnosed SLE is likely)
4. Determine whether the system or intervention solved the clinical problem

This process may involve:

Basic science research
Clinical research
Public health research
Curriculum development
Literature review and data analysis

- b) indicate the procedure used to review and evaluate the students scholarly projects and outcomes (scholarly product):**

The scholarly product is expected to result in at least one submission to a recognized, peer-reviewed forum such as a journal or (appropriate) conference (journal preferred). Acceptance of the submission is not required as there may be a long delay between submission and acceptance (or rejection). However, submission requires that the project mentor and co-authors (if any) approve the submission.

- c) indicate strategies for dissemination of the scholarly product:**

As above, in addition to the required a traditional student-authored abstract describing his/her project and its outcome

Scholarly Concentration Faculty Mentor

Faculty Name	Contribution(s) to Concentration	Department
Elmer Bernstam	Director clinical data warehousing	MMS/SBMI
Todd Johnson	Co-Director Human factors, visual analytics	SBMI
Hulin Wu	Project mentor Biostatistics, data science	SPH
Kevin Hwang	Project mentor Consumer informatics, online patient support, clinical informatics	MMS
Kirk Roberts	Project mentor Information retrieval, question answering, text processing	SBMI
Hua Xu	Project mentor Natural language processing	SBMI
Xiaoqian Jiang	Project mentor Machine learning, artificial intelligence	SBMI
Linda Li	Project mentor Decision support	MMS/SBMI
Sahiti Myneni	Project mentor Consumer informatics, graph analytics	SBMI
Robert Murphy	Project mentor Applied informatics, decision support	SBMI