

Semi-structured Information Retrieval in Clinical Text for Cohort Identification

Faculty: William Hersh, MD; Steven Bedrick, PhD; Aaron Cohen, MD

The overall goal of this project is to process electronic health record to identify patients who are potential candidates for clinical studies. Identifying patients and recruiting them to participate in specific studies can be very difficult. In this project, we are using a large data set of patient records to develop generalized approaches to address this problem. The project involves programming, with different aspects of the project requiring Python, R, or Java. The specific part of the project and language required will depend on the project needs and student capabilities. On campus intern required.

Care Management Plus

Faculty: David Dorr, MD

Care Management Plus focuses on understanding how data, information, and knowledge can improve the health and well-being of our most vulnerable populations, including older adults and those with multiple chronic conditions. Working with this team might include focusing on risk stratification, predictive analytics, or studying models of care intended to improve coordination and management of high needs patients.

Integrating care through standards-based information exchange between a patient risk assessment tool and electronic health record

Faculty: Karen Eden, PhD; Ben Orwoll, MD; Heidi Nelson, MD, MPH; William Hersh, MD

Although computer-based decision aids have guided health care for years, they are typically standalone applications that fail to connect with the patient's larger healthcare experience. Clinicians and health systems seek further integration of decision aids into point of care encounters with patients as well as into the electronic health record (EHR) itself. Decision aids could be enhanced by connecting directly to the EHR to leverage existing data, improve accuracy and consistency of patient information, and reduce data collection efforts of patients and clinicians. Integration would also provide the patients and clinicians opportunities to verify, update, and correct information. We are working toward such an integration, and we seek the help of a student to develop an interface between the EHR and Mammocare (mammocare.org) using the emerging Fast Health Interoperability Resources (FHIR, hl7.org/fhir) standard and the Substitutable Medical Apps, Reusable Technology (SMART, smarthealthit.org) framework. Initial work will include configuring a test environment and a simulated dataset that can be used to prototype the integration. Basic experience with Javascript or a similar programming language is required. This internship could be completed remotely or on campus.

Evaluation of EHR system implementation and workflow at an academic medical center.

Faculty: Drs. Michael Chiang & Michelle Hribar

Ongoing projects involve analysis of outcome measures such as speed, efficiency, and documentation quality; as well as optimization of clinical workflow using EHR data and computer simulations. Skills: statistical analysis (e.g. R), computer programming. On campus intern preferred.

Artificial Intelligence for Diagnosis of Retinal Disease

Faculty: Drs. Michael Chiang, Jayashree Kalpathy-Cramer, and Kemal Sonmez:

This project involves design and evaluation of diagnostic algorithms (e.g. machine learning, deep learning) and comparison to interpretation by human experts. Skills: computer programming, database architecture, statistical analysis. On campus intern preferred.

Understanding the Role of the Microbiome in Bladder Health

Faculty: Lisa Karstens, PhD

Understanding the role of the microbiome in bladder health. The overall goal of this research is to understand how the microbiomes of the gut, vagina, and bladder contribute to bladder health and overactive bladder symptoms. Intern

projects include developing, testing, and improving the pipelines for handling the clinical data associated with these projects (using REDCap), and bioinformatic pipelines for handling 16S rRNA gene sequencing data as well as NMR metabolomics data (primarily in R). The projects will provide experience of analysis and biological interpretation of so-called 'big data' that arises from the rich and complex datasets generated by high throughput techniques used in basic research. Excellent record-keeping skills and self-motivation are essential. Some familiarity with programming and statistical analysis are preferred but not essential.

Understanding the brain – bladder connection

Dr. Lisa Karstens, PhD - In collaboration with Drs. Damien Fair and Rahel Nardos, we are using advanced neuroimaging techniques to understand how the brain regulates bladder function and if there are functional and structural differences between women with overactive bladder syndrome and healthy controls. Interns will become exposed and learn state of the art neuroimaging techniques and data analysis, including using the Human Connectome Project (HCP) pipeline for data processing. Familiarity with command line programming and statistics are beneficial but not necessary. Self-motivation and organization skills are essential.

Reactome Biological Pathway Knowledgebase

Dr. Guanming Wu

Reactome is the most comprehensive open source biological pathway knowledgebase, widely used in the research community as a systems biology platform for biological big-data visualization and analysis. Intern projects will help the team to implement new features to the project's web application (www.reactome.org) and/or its Cytoscape app, ReactomeFIViz (<http://apps.cytoscape.org/apps/reactomefiplugin>) and facilitate the project's software infrastructure. By working with these projects, interns will learn how to work in a globally collaborative open source project within an academic setting, acquire valuable experience with modern software development techniques and practice, and expose to bioinformatics and computational biology, especially systems biology. Skills: Java programming with biological related course work, self-motivated and willing to learn.

Qualitative Study of Electronic Health Record Use by Medical Scribes

Faculty: Joan S Ash, PhD

This ethnographic study aims to describe best practices for the safe use of electronic health records by medical scribes who are assisting providers with documentation. The intern will assist with data analysis and presentation of results. Excellent writing skills and familiarity with qualitative methods are essential; experience with qualitative data analysis software is preferred but not essential.

Evaluation of Epic-built Predictive Models in an OHSU Setting

Faculty: David Dorr, MD; Peter Graven, PhD (SPH)

OHSU has recently implemented various Epic-built predictive models into clinical workflows in ambulatory and inpatient settings. These models were assessed based on published performance and deployment assessments. To test the effectiveness of the models, we need assistance from a person who can help extract performance data, provide data validation, assist with statistical analysis, and report results. The role will be part of collaborative work between Department of Medical Informatics and Clinical Epidemiology (DMICE) and Business Intelligence and Advanced Analytics (BIAA). The specific models that will be tested include inpatient sepsis, deterioration index, risk of admission or ED visit, and heart failure admission or ED visit.

Land Ho! Mapping clinical informatics competencies by navigating DMICE courses - it's not quite Magellan's voyage, but it is a journey of discovery especially if you are interested in pursuing a career in clinical informatics.

Faculty: Vishnu Mohan, MD

Our core clinical informatics (CI) courses are utilized by students in our graduate certificate, masters, PhD and clinical informatics subspecialty fellowship program. We want to map the content of these core CI courses to defined competencies in the field, and develop an updated matrix that will help us understand how the courses we teach meet

the competencies defined for clinical informatics. As an intern, you will survey eight CI courses, and review their syllabi, learning materials and associated content. You will get a comprehensive, in-depth exposure to one of the largest and most innovative CI programs in the nation. Plus you will help to improve the training of informaticians, which is always a good thing (especially if you intend to be one of those informaticians trained!)