

**Biomedical Informatics**  
**Internship Projects – Summer 2021**  
**Oregon Health & Science University**  
**Summer Projects**

**Comparison of Methods for Information Retrieval (Search) of COVID-19 Scientific Papers**

Faculty: Dr. William R. Hersh

Information retrieval (also known as search) systems are used to search for information about many scientific and other topics. One of the challenges of COVID-19 and search is the volume of scientific papers and reports. Recent research in search shows the value of machine learning techniques to improve search systems, but these have not been tested with real searchers. This project will perform experiments to compare different search systems to evaluate how well they perform. Students should have programming experience in Python, Web, and Jupyter notebooks.

**Electronic Care Planning for Patients with Multiple Chronic Conditions**

Faculty: Dr. David Dorr

Collaborating on plans of care for patients with multiple chronic conditions can be challenging. Aligning patients' values, goals, and preferences with medical evidence and many care teams' input requires substantial work. A new application using Fast Healthcare Interoperable Resources that has both patient- and care team-facing components is being implemented at OHSU, and a student is sought to help design, implement, and evaluate usability and usefulness testing.

**High Blood Pressure patient-facing clinical decision support**

Faculty: Dr. David Dorr

High blood pressure is one of the most common chronic conditions in adults older than 50, and the most common contributing factor for heart attacks and strokes. Significant evidence exists about both pharmacologic and non-pharmacologic methods to lower blood pressure, but they require substantial shared decision making and patient motivation. The intern will help us with our patient-facing HBP application; depending on their skill set, help programming, testing, or evaluating the tool with patients and care teams.

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

Faculty: Dr. 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.

**Understanding the Role of the Microbiome in Bladder Health**

Faculty: Dr. Lisa Karstens

The overall goal of this research is to understand how the microbial communities 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.

**Data Science and Analytics**

Faculty: Anita Walden

An important aspect of an informaticist is to understand how to work with various types of data especially electronic health record data. The student will participate with members of the N3C Analytics team to perform analytical tasks. They will assist [multi-discipline teams](#) (can choose which one) to analyze data to answer clinical research questions; assist with identifying patient cohorts; enable quality control and validation of codelists; and implement analytical workflows.

The student will work closely with members of the Domain Teams and senior Data Scientist who will assign tasks, answer questions, and provide general guidance. Training will be provided through online training modules and open office hours. The student will be required to attend a 30min weekly check-ins with their mentor to address questions, monitor progress and for overall support. Other meetings will be required as needed.

Training Needed and Provided: OMOP Clinical Data Model, Apache Spark, R and GGplot, Javascript (maybe) Background Information Reading Material: N3C Marker Paper and Cohort Paper

### **Long COVID**

Faculty: Anita Walden

There are people who are suffering with symptoms after the onset of COVID-19. These individuals are known to have Long COVID, also known as long-haul COVID. There are many questions that need to be answered to help these individuals such as: what types of medications may protect against severe Long COVID symptoms; how do vaccines impact long-term symptoms; do asymptomatic individuals develop Long COVID; is there a resurgence of symptoms in the future; and which symptoms seem to take the longest to resolve. The student will participate with members of the Long COVID Domain Team to answer similar questions. They will assist multi-discipline teams to analyze data; assist with identifying patient cohorts; and perform investigation using the N3C Data Enclave and other publicly available datasets.

The student will work closely with members of the Domain Teams, senior Data Scientist and other project members who will assign tasks, answer questions, and provide general guidance. Training will be provided through online training modules and open office hours. The student will be required to attend a 30min weekly check-ins with their mentor to address questions, monitor progress and for overall support. Other meetings will be required as needed.

Training Needed and Provided: OMOP Clinical Data Model, Apache Spark, R and GGplot, Javascript (maybe) Background Information Reading Material: N3C Marker Paper and Cohort Paper