

This is the first part of the application process for the internship program in biomedical informatics at OHSU.

The Department of Medical Informatics and Clinical Epidemiology (DMICE) will be hosting its College Undergraduate Biomedical Informatics and Data Science Internship Program again in the summer of 2023.

These internships provide full-time experiences in biomedical informatics and data science to college undergraduates to increase their knowledge and skills in these areas. The program's goals are to provide exposure to biomedical informatics and data science with respect to best practices, impact of research on medicine and health, as well as possible graduate study and career paths. In addition to participation in a faculty-led research project, the experience will include:

- **Knowledge of the motivations, activities, and challenges for biomedical informatics and data science**
- **Skills development in data science through the use of standard data sets and tools**
- **Training in responsible conduct of research**
- **Student-led and faculty-facilitated health data ethics and equity seminar**
- **Summer interns will also attend weekly Informatics Research**
- **Conferences and present their research at the end of the internship at a mini-symposium.**

The overarching goal of this summer program is to support educational activities that encourage individuals from diverse backgrounds, including those from groups underrepresented in the biomedical and behavioral sciences, to pursue further studies or careers in research. Due to the funding agency requirements, this program is open to U.S. Citizens and Permanent Residents only. Some of the positions will be funded by a new program from the US National Library of Medicine to enhance diversity in biomedical informatics and data science.

Please Note: In compliance with Oregon law, OHSU's COVID-19 Immunization and Education policy will go in effect Oct. 18, 2021. Visitors, volunteers and inters who have an in-person experience at OHSU must be fully vaccinated (14 days after last dose). Exception requests will not be accepted. Please be prepared to provide proof of vaccination, or to receive a COVID-19 vaccination, as a requirement for onboarding for your in-person experience at OHSU. You will not be allowed to participate within OHSU if you are not compliant with this policy.

This is a 10 - 12 week opportunity with projects starting June 2023. Interns will work 40 hours per week and will be paid \$15.00 per hour.

Once you complete the online application, the next step will be to provide the following documents:

- 1. Transcripts - unofficial transcripts acceptable, email pdf email to ilgan@ohsu.edu**
- 2. One letter of recommendation, emailed to ilgan@ohsu.edu**

* 1. Please enter the following information to start your application

Name:	<input type="text"/>
Address:	<input type="text"/>
City/Town:	<input type="text"/>
State:	<input type="text" value="-- select state --"/>
ZIP:	<input type="text"/>
Country:	<input type="text"/>
Email Address:	<input type="text"/>
Phone Number:	<input type="text"/>

2. Date of Birth (mm/yyyy)

3. Demographic Information (Optional)

What groups does NIH consider to be in need of a special recruitment and retention plan in order to diversify the biomedical, behavioral, clinical, and social sciences workforce?

A. Individuals from racial and ethnic groups that have been shown by the National Science Foundation to be underrepresented in health-related sciences on a national basis (see data at <http://www.nsf.gov/statistics/showpub.cfm?TopID=2&SubID=27> and the report *Women, Minorities, and Persons with Disabilities in Science and Engineering, 2007*, p. 262). The following racial and ethnic groups have been shown to be underrepresented in biomedical research: American Indians or Alaska Natives, Blacks or African Americans, Hispanics or Latinos, Native Hawaiians or Other Pacific Islanders. In addition, it is recognized that underrepresentation can vary from setting to setting and individuals from racial or ethnic groups that can be convincingly demonstrated to be underrepresented by the grantee institution should be included in the recruitment and retention plan.

B. Individuals with disabilities, who are defined as those with a physical or mental impairment that substantially limits one or more major life activities.

C. Individuals from disadvantaged backgrounds who are defined as:

1. Individuals who come from a family with an annual income below established low-income thresholds. These thresholds are based on family size, published by the U.S. Bureau of the Census; adjusted annually for changes in the Consumer Price Index; and adjusted by the Secretary for use in all health professions programs. The Secretary periodically publishes these income levels at <http://aspe.hhs.gov/poverty/index.shtml>. For individuals from low-income backgrounds, the institution must be able to demonstrate that such candidates (a) have qualified for Federal disadvantaged assistance; or (b) have received any of the following student loans: Health Professional Student Loans (HPSL), Loans for Disadvantaged Student Program; or (c) have received scholarships from the U.S. Department of Health and Human Services under the Scholarship for Individuals with Exceptional Financial Need.

2. Individuals who come from a social, cultural, or educational environment such as that found in certain rural or inner-city environments that have demonstrably and recently directly inhibited the individual from obtaining the knowledge, skills, and abilities necessary to develop and participate in a research career.

http://grants.nih.gov/training/faq_diversity.htm#867

	Yes	No
Are you an Underrepresented Minority?	<input type="radio"/>	<input type="radio"/>
Are you an Individual with a disability?	<input type="radio"/>	<input type="radio"/>
Are you economically disadvantaged?	<input type="radio"/>	<input type="radio"/>

4. Please describe your race/ethnicity.

- American Indian or Alaska Native
- Asian
- Black or African American
- Native Hawaiian or Other Pacific Islander
- White
- Other (please specify)

* 5. Country of Citizenship

Academic Information

6. Please provide us with the following academic information

School attending

Major

Minor

Dates attended

Current class in school

Completed credit hours

Current cumulative GPA

Anticipated graduation date

7. Please provide information about experience/classes you have had in the following areas

Programming experience

Quantitative or Qualitative experience

Statistical skills

Project Opportunities

* 8. Please rank your top 3 internships. In each question, the faculty lead(s), the description, and the skills required are listed.

1st 2nd 3rd

Causal Fairness Analysis

Faculty Mentor: Mohammad Adibuzzaman

Fairness in data-driven decision machines and algorithms is an emerging point of discussion in the scientific, political, and policymaker communities. Common reasons for algorithmic biases include (not limited to) changes in data distribution, real-world interactions, user behavior, and shifts in data capture and management practices. Distinct computational methods are being rigorously developed to tackle this issue; however, there still exists controversy around estimating algorithmic biases and instigating algorithmic fairness.

Our research project investigates the causal pathways to identify, quantify, and address algorithmic bias. The research aims to diminish predictive biases (algorithmic inaccuracies in producing estimates that significantly differ from the underlying truth) and social biases (systemic inequities in care delivery leading to suboptimal health outcomes for specific populations). Using theories of causal inference, we explore structural causal and fairness models to disentangle complex causal puzzles and ways to mitigate these biases. Primarily, we are exploring computational approaches to identify predictive and social bias, point of bias generation, and ways forward for follow-up investigations. Additionally, we are looking for consistent evaluation and assessments of the algorithm over time and for all patient population cohorts. For this exploration, we are using existing benchmark datasets (COMPAS recidivism dataset) and the Cosmos population cohort in Epic. Computer Science/Informatics background recommended and algorithms course a plus!

AI for Retinopathy of Prematurity

Faculty Mentor: Pete Campbell

Our group focuses on the role of imaging, artificial intelligence, and data science/informatics in better understanding retinal disease, in particular retinopathy of prematurity. Specific topics include artificial intelligence for disease screening, diagnosis, monitoring and treatment, and advanced imaging techniques such as optical coherence tomography angiography. In addition, we collaborate with several groups around world to translate the results of our work to improve care of babies in low and middle income countries.

Analyzing the landscape of rare diseases for EHR-based screening

Faculty Mentor: Dr. Aaron M. Cohen

Individual rare diseases occur infrequently in the population but as a whole represent a considerable health issue. Rare diseases diagnosis is often delayed and complicated by sharing symptoms with more common diseases. In this project the intern will help access what are the most common and most distinctive symptoms across the landscape of rare diseases, using a combination of curated resources, manual review, and automated text processing. Python programming strongly recommended.

High Blood Pressure patient-facing clinical decision support

Faculty Mentor: 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.

Evidence Synthesis for Stakeholder Groups

Faculty Mentors: EPC Core Investigators

This position supports evidence synthesis research and related projects for the Pacific Northwest Evidence-based Practice Center (<http://www.ohsu.edu/epc>) which conducts systematic reviews on health care topics for federal and state agencies, professional associations, and other organizations. These reviews report the evidence from research studies and the quality of that evidence for use by clinicians, employers, policymakers, researchers, and others in making decisions about the provision of health care services and health research. Depending on skillset and interests, the intern will participate in project meetings, import and de-duplicate text files of electronic database search results; code and manage EndNote library citations, perform abstract review, contribute to, format, and track report content, and assist with data visualizations. This is a great opportunity to learn more about health care research and systematic reviews.

Improving Matching of Patients to Clinical Studies

Faculty Mentor: Dr. William Hersh

Medical research advances when people volunteer to participate in clinical trials and other studies. One challenge is that patients are not identified or otherwise aware of studies in which they may take part. Our work focuses on using data from the electronic health record to identify patients who might be candidates for clinical studies. Python programming experience recommended.

Data Standardization

Faculty Mentor: Michelle Hribar

In order for clinical data to be used in large-scale projects for AI and machine learning, it has to be standardized. Data collected during ophthalmology exams has yet to be fully standardized, limiting its reuse for data science. Currently, there is a national effort to address this. This project will involve working with ophthalmologist and vision researchers at the National Eye Institute and other prominent academic institutions on any steps of the data standardization process: demonstration of the need for standards, identification of ophthalmic data elements that need standardization, consensus building on about standard definitions, and/or validation of the standards. [Note: there could possibly multiple projects here]

Telehealth

Faculty Mentor: Michelle Hribar

Many age-related eye diseases that result in irreversible vision loss have no advanced symptoms before vision loss, but can be detected early through eye exams and imaging. Unfortunately, access to eye care across Oregon can be limited due to geographic and socioeconomic factors. Casey Eye Institute is partnering with community health clinics throughout Oregon to establish telehealth screening programs to identify eye disease early. This ambitious project is in the pilot phase and will require informatics and data science work to monitor the effectiveness of screenings, patients' follow-up with eye care specialists, screening workflow efficiencies, and technological evaluation as the program is scaled to more clinics.

Understanding the Human Microbiome

Faculty Mentor: Dr. Lisa Karstens

Humans live in a symbiotic relationship with hundreds of microorganisms. These bacteria, fungi, and viruses that make up the human microbiome are essential for understanding human health and, more importantly, disease. To study the human microbiome, researchers often generate large datasets containing sequencing or metabolic information that is then associated with clinical and demographical information to address a clinical question. Intern projects include developing, testing, and improving the pipelines for handling these data for a variety of projects investigating the microbiome's role in relation to human disease, including bladder disorders, rheumatic disease, and cancer. Data include survey and questionnaire data from REDCap, 16S rRNA gene sequencing data, and metabolomics data. 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 in R are preferred but not essential.

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 Mentor: 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!)

Assessing the impact of community nursing services on patient outcomes in rural settings

Faculty Mentor: Dr. Dana Womack

Patients who live with chronic illnesses in rural communities experience unique challenges accessing and utilizing healthcare services. As a project within ANF's Reimagine Nursing Initiative, we are collaborating with community-based Registered Nurses who address patient- and community-level gaps in two rural Oregon towns. We seek a student to support enhanced reporting of services provided by community nurses, and evaluation of the contribution of community nurse services to patient outcomes. Desired skills: experience in one or more aspects of the information systems development lifecycle, and/or familiarity with diagnostic and billing coding systems and value sets.

Essay Question

* 9. Essay Question: Please tell us how your education, experience, skills, and interest make you the best candidate for your top (few) choices.

A large, empty rectangular box with a thin black border, intended for the user to write their essay response. The box is positioned below the question text and occupies a significant portion of the page's vertical space.

Finishing up the application process

* 10. How did you hear about this program?

11. Are you planning to pursue graduate education? If so, in what field.

Thank you for applying to the summer undergraduate internship program in biomedical informatics at OHSU.

The application deadline is February 28, 2023. Candidates will be notified the first of April regarding acceptance into the program.

Please remember to submit the additional documents to complete your application.

1. Transcripts - unofficial transcripts are acceptable, email pdf to ilgan@ohsu.edu
2. One letter of recommendation, emailed to ilgan@ohsu.edu

Specific questions can be directed to Andrea Ilg at ilgan@ohsu.edu