Biomedical Informatics Summer Internship Program (BMI SIP)

The Department of Biomedical Informatics hosts an annual internship program each summer which provides high school, undergraduate, and graduate students opportunities to pursue research projects in the field of biomedical informatics under the guidance of research and operational staff and renowned faculty mentors in the Department of Biomedical Informatics. Participants learn useful tools and technologies used in biomedical and clinical research and attend weekly seminars to learn more about the various fields and interdisciplinary interactions biomedical informatics facilitates. Interns also gain very useful presentation abilities through regular lab and programmatic presentation opportunities, including an end-of-program poster session.

Our website: [http://medicine.osu.edu/bmi/careers/students/bmi_internships/pages/index.aspx](http://medicine.osu.edu/bmi/careers/students/bmi_internships/pages/index.aspx)

All student internship positions within the Department of Biomedical Informatics have the potential to be either paid or unpaid, depending on student experience. Most positions have the ability to transition into projects through the school year, and/or count for course credit, depending on performance. Information about our faculty as well as specific internship projects and preferred student skillsets are listed below. If you are interested in getting more information about a specific internship, please email the faculty member directly using their contact information below.

Faculty Information

**James Chen, MD** ([James.Chen@osumc.edu](mailto:James.Chen@osumc.edu))
Assistant Professor, Departments of Biomedical Informatics and Internal Medicine, Division of Medical Oncology

**Research Interests**
Dr. Chen’s research focuses in the fields of translational bioinformatics and integrative genomics as applied to cancer. He is particularly interested in the personalization of medicine through the development of novel biomarkers of molecular pathway activation using high-throughput genomic techniques. These biomarkers may ultimately assist clinicians in customizing treatment regimens for their patients. Dr. Chen has received numerous awards for his work integrating oncology and bioinformatics. He also has a clinical research interest in prostate, bladder, kidney, and sarcoma cancers.

**Potential Projects for Students**
Dr. Chen is currently looking for one student intern to assist him with projects related to translational bioinformatics in the domain of oncology, integrated genomics, and gene expression analysis. Given the multidisciplinary nature of the projects, there are ample opportunities for both clinical research and wet lab projects.

**Eligibility:** Potential students should be familiar with 1 or 2 of the following: 1) basic biology / medicine 2) familiarity with R scripting, Java, or ability to learn programming languages quickly 3) training in computer science 4) or experience in a molecular biology lab. Much of the learning will be on-the-job.
Courtney Hebert, MD, MS (Courtney.Hebert@osumc.edu)
Assistant Professor, Departments of Biomedical Informatics and Internal Medicine, Division of Infectious Diseases

Research Interests
Dr. Hebert is an assistant professor appointed in the Department of Biomedical Informatics and continues to practice clinical medicine as an attending physician in the Division of Infectious Diseases in the Department of Internal Medicine. In addition to these roles she also serves as the director of the MDI-3 initiative at the university. Her research focuses on the secondary use of electronic health record (EHR) data for research and quality improvement. She has previously created risk prediction models using EHR data, including domains such as Clostridium difficile relapse and prediction of readmission in hospitalized patients. She has also used EHR data to study the effect of epidemiologic context on antimicrobial prescribing, as well as to develop a novel way to represent microbiology susceptibility data to enable decision support.

Potential Projects for Students
Dr. Hebert is currently looking for one student to assist her with a project called: creating a learning laboratory within clinical epidemiology. Project synopsis: We are creating automated algorithms for identifying hospital-acquired infections from clinical data. The project will involve using clinical data on patients in the hospital who were and were not diagnosed with a specific hospital acquired infection and trying to create a rule that could correctly identify patients as having one of these infections (without the need for manual chart review). This could then potentially be used prospectively to identify patients with hospital-acquired infections while they are still in the hospital.

Eligibility: Potential students should be familiar with Java and either the R or STATA statistical platforms. Familiarity with medical terminology is preferred but not required.

Kun Huang, PhD (Kun.Huang@osumc.edu)
Associate Professor and Division Director, Division of Computational Biology and Bioinformatics, Department of Biomedical Informatics

Research Interests
Dr. Huang's research interests include computer vision, machine learning, medical imaging, and computational biology. Some of his recent research topics include microscopic image analysis, hybrid system identification with applications in video segmentation, generalized principal component analysis, geometric theories of computer vision, and symmetry-based recognition and matching.

Potential Projects for Students
Dr. Huang is currently looking for 2 students to assist him with projects related to bioinformatics, data analysis, and software development. Specific project topics include 1) integrative analysis of disease and 2) testing innovative ways for integratively analyzing big ‘omics data from multiple types of diseases including cancers and neurological diseases.

Eligibility: Potential students should be familiar with the following: 1) proficient in at least one of the following computer languages: Python, Java, or C++; 2) proficient in one of the following statistical packages: MATLAB or R. Although not required, familiarity with biological and medical terminology are preferred (or a strong interest in learning them), and an understanding in basic linear algebra (e.g., matrix, eigenvalue, and possible SVD) and statistics (t-test and correlation).
Timothy Huerta, PhD (Timothy.Huerta@osumc.edu)
Associate Professor, Departments of Family Medicine and Biomedical Informatics

Research Interests
His principal research agenda focuses upon improving the design of the US healthcare system by developing and validating outcome measures to assist stakeholders in maximizing value for each healthcare dollar spent. This agenda involves process and outcome evaluations, data management, and systems redesign. His most recent publications focus on the analysis of the relationships between efficiency and quality measures.

Potential Projects for Students
Dr. Huerta is seeking 5 student interns to help him with projects this summer. Specific projects include 1) High Touch and High Tech (HT2): Transforming Patient Engagement Throughout the Continuum of Care by Engaging Patients with Portal Technology at the Bedside; 2) Patient Safety Learning Laboratories: Information for the Design of Environments Aligned for Patient Safety (IDEA4PS); 3) Portals in Inpatient Care (PIC): Evaluating the Usability, Use, and Patient Experience Associated with Patient Portal Technology at the Bedside. Students will provide support and assist in research project activities in the Department of Family Medicine, assist with a variety of research-related tasks under the direct supervision of Dr. Huerta, perform literature reviews, assist with coding of qualitative data, and assist with the preparation of reports and research forms.

Eligibility: Potential students should be familiar with STATA and Microsoft Office Suite and have a familiarity with health care and medical terminology.

Albert M. Lai, PhD (Albert.Lai@osumc.edu)
Assistant Professor, Department of Biomedical Informatics
Associate Director of the Biomedical Informatics Program, Center for Clinical and Translational Science (CCTS)

Research Interests
Dr. Lai's research interests include: 1) telemedicine to support chronic disease management, 2) high throughput phenotype modeling and extraction, and 3) the evaluation and usability of human computer interfaces for electronic health records.

Potential Projects for Students
Dr. Lai is currently looking for 2 students to assist him with developing software to combine data from multiple nutritional software systems and other clinical informatics related projects.

Eligibility: Potential students should have familiarity with the Java programming language. Although not required, some background in psychology, biology, or other basic science is generally preferred.
David Liebner, MD (David.Liebner@osumc.edu)  
Assistant Professor, Departments of Internal Medicine, Division of Medical Oncology and Biomedical Informatics  

**Research Interests**  
Dr. Liebner is a practicing medical oncologist and bioinformatician. His current research focuses primarily within the translational bioinformatics area and he continues to be motivated by his research vision, which is to develop and leverage computational tools to improve prognostic and predictive models in Sarcoma and Melanoma. In particular, Dr. Liebner is interested in integrating data from RNA expression, next-generation sequencing, and public cancer databases in order to help guide treatment decisions.  

**Potential Projects for Students**  
Dr. Liebner is currently looking for 2 students to assist him with projects this coming summer. Specific projects include 1) Simulating cancer progression and response to treatment in silico; and, 2) Predicting response to chemotherapy in patients with bone and soft tissue sarcoma using molecular and clinical features. Interns will be expected to assist in software development, familiarize themselves with publicly available cancer genomics data repositories (TCGA, COSMIC). Advanced statistical techniques and machine learning approaches will be explored. Interns will be expected to present at Ohio State conferences and will be encouraged to present their work at appropriate international meetings.  

**Eligibility:** Students will be required to have familiarity with MATLAB statistical programming language. Although not required, a familiarity with Java, R, and C++ are preferred. Preference will be given to applicants with an aptitude in cancer genetics and statistics.

Ewy Mathé, PhD (Ewy.Mathé@osumc.edu)  
Assistant Professor, Department of Biomedical Informatics  

**Research Interests**  
Dr. Mathé’s primary research interest are to leverage epigenomics, genomics, nucleotide variants and metabolic patterns to 1) understand how the genetic and epigenetic landscape affects disease phenotypes, particularly cancer; 2) define cell-type and disease-type specific molecular characteristics to uncover novel biomarkers and guide the search of novel therapeutic targets.  

**Potential Projects for Students**  
Dr. Mathé is currently looking for 2 students to assist her with projects this summer. Specific projects include: 1) coding and testing simple Shiny apps (the code is/will be written, but needs to be integrated in a we app and then tested); and, 2) searching for and organizing publicly available data sets for epigenomics data, working closely with her lab research technician.  

**Eligibility:** Potential students should be familiar with the R programming language; familiarity with the Linux environment and bash scripting. Although not required, familiarity with snakemake, biology, and biological terminology is preferred.
Philip R.O. Payne, PhD (Caitlin.Slevin@osumc.edu)
Professor & Chair, Department of Biomedical Informatics
Director, Translational Data Analytics @ OSU
Associate Director for Data Sciences, CCTS

Research Interests
Dr. Payne's current research interests focus in: 1) knowledge-based approaches to the discovery and analysis of bio-molecular and clinical phenotypes and the ensuing identification of precision diagnostic and therapeutic strategies in cancer; 2) interventional approaches to the use of electronic health records in order to address modifiable risk factors for disease and enable patient-centered decision-making; 3) the study of human factors and workflow issues surrounding the optimal use of healthcare information technology; and, 4) the design and evaluation of open-science platforms that enable collaboration and cumulative approaches to biomedical data analytics.

Potential Projects for Students
Dr. Payne is currently looking for 4 students to assist him with projects surrounding clinical and translational research (largely focusing on survey, observational, and usability studies).

Eligibility: Potential students should have some background in basic research methods and strong computer skills (not programming, but major applications).

Po-Yin Yen, RN, PhD (Po-Yin.Yen@osumc.edu)
Research Assistant Professor, Department of Biomedical Informatics
Director, Biomedical Informatics Summer Internship Program (BMI SIP)
Adjunct Assistant Professor, College of Nursing
Clinical Nurse Scientist, OSUWMC

Research Interests
Dr. Yen's research interests include health information technology usability evaluation, technology acceptance and adoption, structural equation modeling, factor analysis, and systematic review process improvement. Some of her recent research topics include time and motion study, workflow analysis, and network analysis.

Potential Projects for Students
Dr. Yen is currently looking for 2 students to assist her with a project on how to understand user profiles and evaluate usability of various health information technology, such as MyChart Bedside and medication adherence application.

Eligibility: Potential students should have some background in psychology, computer science, a health science-related field (e.g. pre-med, nursing, etc.), or with experience and/or interest in website interface design.