**About the Program**

The Department of Biomedical Informatics hosts an annual internship program each summer, which provides opportunities for graduating high school seniors and current undergraduate and graduate students to pursue research projects in the field of biomedical informatics under the guidance of research and operational staff and renowned faculty mentors. 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.

Many students who have participated in this program have gone on to pursue doctoral degrees in biomedicine, biomedical informatics, computer science, and electrical engineering or to complete degrees in medicine and nursing.

All student internship positions in the Department of Biomedical Informatics are paid, with the hourly wage depending on student experience levels. Many positions have the ability to turn into academic year student employment opportunities.

This year the program will run May 20 to July 27, 2019.

Please contact internship coordinator, Gabrielle Kokanos, gabrielle.kokanos@osumc.edu, with questions.
2019 Faculty Information

Kin Fai Au, PhD
Associate Professor, Biomedical Informatics

--seeking 2 interns for up to 20 hours per week--

Research Interests: Dr. Kin Fai Au is an associate professor of Biomedical Informatics at The Ohio State University. Dr. Au is interested in developing novel statistical and computational/algorithmic methods for analyzing high-throughput biological data, including but not limited to transcriptome and epigenetics sequencing data. For example, Dr. Au's group has developed a set of high-impact statistical and computational methods for analyzing Third Generation Sequencing data (e.g., PacBio and Oxford Nanopore sequencing). Au lab also performs world leading science in stem cell biology, developmental biology and cancer research. We focus on making meaningful advances to understand stem cell biology, developmental biology and cancer, using cutting edge technologies (such as PacBio and Oxford Nanopore Technologies) to create authentic models and gain novel biological insights in transcriptome and epigenetics level.

Potential Projects: The Au lab project will be summarizing the existing Third Generation Sequencing data and applications

Targeted Skills:

James Chen, MD
Assistant Professor, Internal Medicine and Biomedical Informatics

--seeking 1 intern for up to 30 hours per week

Research Interests: The role of predictive analytics and novel biomarkers for drug selection cannot be understated as most treatments in oncology do not benefit all patients. Understanding which patients will benefit would spare other patients unnecessary toxicity. Similarly, the ability to quickly understand the types of drugs that may be used for patients can be expedited using modern genomics approaches. Our work that I have led has centered on exploring different biomarker types from PET/CT imaging to DNA mutations for performing these subset analyses.

Potential Projects: Sarcomas are heterogenous cancers. Each sarcoma subtype can be broken down into further subtypes that may have treatment or outcome implications. Our lab focuses on using omic type data to identify clinically meaningful differences.

Targeted Skills: Basic statistics background, R/Bioconductor a plus
Lijun Cheng, PhD
Assistant Professor, Biomedical Informatics

--seeking 2-3 interns for up to 38 hours a week--

**Research Interests:** Dr. Cheng’s primary research interests are to develop system pharmacology models of statistic and machine learning 1) to predict drug response for either single drug or drug combinations in both in vitro and clinical settings (precision medicine); and 2) to develop better methodologies to identify the optimal molecular stress points will increase the precision of target and drug selection. Her research application includes cancer genomics, precision medicine, system pharmacology, and drug discovery.

**Potential Projects:** Dr. Cheng is currently looking for 2-3 students in this summer. The two specific projects include: 1) develop computational approaches to address optimum drug-targeted selection for single patient based on multi-omics data integration, including TCGA, gene pathway-integration, and drug and protein structure; 2) develop drug response prediction models for individual cancer patients based on his/her multi-view omics data, e.g., genetic mutation mRNA, and protein.

**Targeted Skills:** Potential students should have at least basic training in programming with R, Python, or other programming languages.

Lang Li, PhD
Professor and Chair, Biomedical Informatics

--seeking 4 interns for up to 20 hours a week--

**Research Interests:** Dr. Li focuses his research on drug interaction and precision medicine. His lab uses biomedical informatics, systems pharmacology and statistical approaches to investigate drug interactions and genomics effects on drug efficacies and adverse drug events.

**Potential Projects:** Dr. Li is currently looking for 4 students to assist him this summer. The potential project is to manually curate Electronic Health Records (EHR) phenotypes of adverse drug events from literature data. The goal of this project is to validate the ADE phenotypes extracted from literature text mining.

**Targeted Skills:** Potential students should have biology or pharmacology background.
Qin Ma, PhD  
Associate Professor, Biomedical Informatics  
--seeking 2 interns for up to 30 hours per week--

**Research Interests:** Dr. Ma’s primary research interests are to (1) elucidate the gene regulatory mechanisms from single-cell multi-omics data; (2) annotate the type and/or physiological state of each cell based on to-be-discovered cell-type-specific gene modules and connect them with diseases for novel biomarker identification; (3) discover and analyze the cis-regulatory motifs for the underlying regulatory network construction.

**Potential Projects:** Three specific projects include (1) Develop a novel bi-clustering algorithm for identifying cell-type specific co-regulated gene modules in single-cell transcriptomic data; (2) Identify and annotate the gene signatures for each transcription regulatory signal (TRS), and estimate the level of each TRS in independent tissue data; and (3) develop and maintain an in-house web server for cell-type-specific regulon prediction, its further application and extension.

**Targeted Skills:** Potential students should be familiar with at least one from the following programming languages: R, Perl, Python, C; familiarity with high performance computing skills and the Linux environment. Special skills may be required for specific project, such as PHP and MySQL for web database construction. The students are encouraged to have fundamental knowledge in biology and microbiology. Term-time positions (Ph.D. students) are also available to exceptional candidates.

Ewy Mathe, PhD  
Assistant Professor, Biomedical Informatics  
--seeking 1-2 interns for up to 38 hours a week--

**Research Interests:** My current research interests are to define disease-specific molecular characteristics, using primarily metabolomics and genomics techniques, to guide the search of candidate biomarkers and therapeutic targets for the diagnosis, prognosis, and treatment of disease, including cancer. To accomplish these goals, my lab is developing user-friendly methods to handle an integrate high-throughput omics datasets. More information of current research can be found at [https://u.osu.edu/mathelab](https://u.osu.edu/mathelab).

**Potential Projects:** Analysis and interpretation of metabolomics data and integration with other omics data.

**Targeted Skills:** Fluency in R and basic statistics are required.
Xia Ning, PhD
Assistant Professor, Biomedical Informatics

--seeking 1-2 interns for up to 38 hours a week--

Research Interests: Ning Lab develops Artificial Intelligence methods and computational tools for medicine and healthcare problems such as 1). information retrieval from EMRs; 2). EMR analysis and 3). Adverse drug reaction prediction.

Potential Projects: 1) patient health trajectory analysis; 2) patient similarity analysis; 3). App development for health applications

Targeted Skills: Potential students should have at least basic training in programming with Python, or other programming languages.

Ping Zhang, PhD
Assistant Professor, Biomedical Informatics

--seeking 2-3 interns for up to 38 hours a week--

Research Interests: Dr. Ping Zhang’s research interests include Machine Learning, Data Mining, and their applications to Biomedical Informatics and Computational Medicine.

Potential Projects: The potential projects include: 1) Integrate multiple data sources for drug effect prediction; 2) Explore electronic medical records and claims data for clinical risk prediction.

Targeted Skills: 1) Ideal candidates should be self-motivated and passionate about conducting original research; 2) Students from related disciplines such as computer science, software engineering, informatics, statistics, mathematics, automation, and electrical engineering are strongly encouraged to apply; 3) Extensive programming experience in either Python, R, MATLAB, Java, or C/C++ is highly preferred; 4) Prior knowledge of and research experience in either data mining, machine learning, or biomedical informatics is also preferred.
Yan Zhang, PhD  
Assistant Professor, Biomedical Informatics  

--seeking 1-2 interns for up to 38 hours a week--

Research Interests: Dr. Zhang’s interests span statistical and computational methods and their applications to genomic, proteomic and clinical research, such as (1) integrative analysis of genomic and proteomic data for cancer driver identification; (2) statistical modeling of biological networks.

Potential Projects: 1) Integrate genomic and proteomic data to discover cancer signatures; 2) Help with developing computational tools for genome structural variation detection from sequencing data

Targeted Skills: Potential students should have at least basic training in programming with R, Python, or other programming languages.