



## BUILDING BIOINFORMATICS CAPABILITIES IN A PUBLIC HEALTH LABORATORY THROUGH PARTNERSHIPS WITH ACADEMIC INSTITUTIONS

### PARTNERSHIP TESTIMONIALS

#### Building Bioinformatics Computing Infrastructure University of Iowa State Hygienic Laboratory

The State Hygienic Laboratory (SHL) is structured as a part of University of Iowa (UI), facilitating opportunities for collaboration. The UI Argon High Performance Computing (HPC) cluster is designed for use by the entire university. Students, faculty and staff all have free access to low-priority HPC accounts and one terabyte of digital storage, which is useful for developing code, testing new resources and working on projects with limited computational needs.

“A SHL laboratory scientist requested a group account for our team allowing several members of SHL to access the same pipelines. SHL IT programmers are working with our team to install several pipelines on the UI HPC group account, including a CDC-developed phylogenomics pipeline. A benefit of having a PHL staff member as adjunct faculty is that they have access to eight terabytes on a university server, ideal for large datasets and long-term storage. There are many options to rent nodes to gain a higher priority for running jobs and additional HIPPA compliant data storage can be purchased.”

#### One-on-One Bioinformatics Student Experience Michigan Bureau of Laboratories

The Michigan Bureau of Laboratories began a partnership with several academic institutions to learn more about bioinformatics and expand capabilities, while offering a perspective of public health work to students. One PhD candidate, Heather Blankenship, has joined the lab as a formal extern and has actively participated in conference calls, outbreak investigations and data analysis, selection of new computer systems and more. Her externship with the lab has benefited Michigan by providing an informatics resource and has allowed for relationship development with other states. It has also indicated the need for a future full-time bioinformatics scientist or bioinformatician.

“The externship opportunity has given me the opportunity to interact with people working at various levels within public health and across states,” says Blankenship. “It has pushed me to broaden my knowledge outside of the current bioinformatics pipelines that I was using for my doctoral research and expand my knowledge of other microorganisms. Understanding the process of identification, from isolation through the end of sequencing at the bench has given me insight into the crucial need for rapid turnaround and ability to quickly identify emerging outbreaks. At the same time, the externship has helped me identify how to transition into a role within public health after graduation.”

#### Partnering for Bioinformatics Expertise and Training Massachusetts State Public Health Laboratory

The Massachusetts State Public Health Laboratory’s (MA PHL) partnership with Dr. Paradis Sabeti’s laboratory at the Broad Institute of MIT and Harvard (<https://www.sabetilab.org>) is a constantly evolving collaboration that first began as a conversation and impromptu laboratory tour following an Ebola seminar detailing Sabeti’s laboratory work. Sabeti’s team has experience with two of MA PHL’s biggest needs: (1) building bioinformatics infrastructure and (2) expertise in wet-lab NGS and bioinformatics training.

Sabeti’s team is renowned for developing genomic and bioinformatics approaches in challenging situations through their projects in sequencing viral hemorrhagic fever viruses in Africa. They have developed robust cloud computing resources using [DNAnexus](#) to overcome limitations in network/internet connectivity, electrical power instability and the availability of trained staff. The lessons learned from these projects were applicable to addressing the needs of MA PHL, where similar limitations exist, but are due to difficulty advancing IT innovations within state government, rather than inherent infrastructure instability.

In addition to their experience with building sustainable bioinformatics infrastructure, Sabeti’s team has an informed perspective on public health through their experience working directly with international laboratories performing diagnostics and outbreak tracing. Their academic approach to complex infectious diseases and quickly evolving situations requires them to quickly pivot to new projects and to develop tools to process raw genomic data into informative visualizations. This team keeps pace with the release of new bioinformatics tools and continually develops unique ways to glean insights from complex data sets.

While this atmosphere contrasts with the rigorous quality management and CLIA requirements of public health laboratories, Sabeti’s team brings an outside perspective that has helped MA PHL develop creative solutions such as new bioinformatics tools and refining protocols for direct sequencing from clinical specimens. Furthermore, MA PHL has been able to leverage the experience of Sabeti’s team by training research students to provide targeted trainings for public health professionals on bioinformatics concepts and applications. This partnership has been a valuable learning experience for everyone involved, and is fostered by a mutual respect for each other’s work and approach, which allows for the cultivation of new projects, new technologies, and new insights to curb the spread of infectious diseases.