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Infectious Disease

Challenge

Scientists seek to understand how infectious diseases spread among wildlife.

Approach

Sequencing all genomic data from a tissue sample can help researchers identify unknown pathogens associated with diseases.

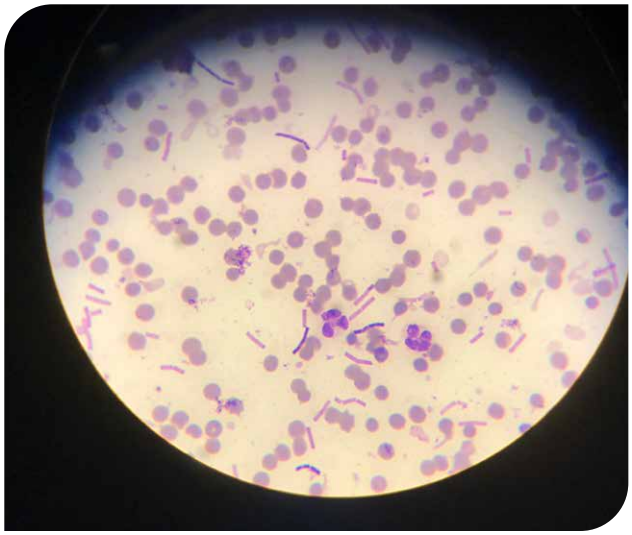
Solution

OSC's high performance computing resources and OnDemand allow scientists to efficiently filter genomic data and compare it to major databases.

Any Device, Anywhere

"The interface was really helpful for a lot of students. Especially for undergraduates, I think it's a bit of a steep learning curve to learn without OnDemand."

— *Pauline Kamath, University of Maine*



University of Maine scientist conducts data-intensive research on pathogen infections in wildlife

University of Maine scientist Pauline Kamath conducts research on the dynamics of infectious diseases that can spread among wildlife, with the use of the high performance computing (HPC) resources at the Ohio Supercomputer Center (OSC). Kamath, an associate professor of animal health, analyzes genetic, ecological, immunological and epidemiological data to study the evolution and transmission of harmful pathogens in animals to better understand how to treat and control infections.

One example is Kamath's study on anthrax-infected zebra populations in southern Africa, where whole genome data from zebras are being used to identify

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genes associated with anthrax susceptibility. Due to the pathogen's ability to infect multiple species, understanding the evolution and transmissibility of anthrax is crucial to protect nearby livestock and human communities.

One data collection method employed by Kamath's team involves taking tissue samples from their subjects from which all of the genomic DNA is extracted and sequenced within the sample without any specific criteria. This allows the researchers to gather large swaths of data for the identification of unknown pathogens associated with disease as well as pathogen surveillance.

The scientific approach also yields a large amount of data that would be unmanageable without external HPC resources.

"We rely on the high performance computing at OSC to filter through this data and compare it against massive pre-existing databases," Kamath said.

An agreement between the University of Maine Advanced Research Computing, Security and Information Management and OSC grants faculty, staff and students at the institution access to OSC's resources.

Kamath's team utilizes the storage at OSC to back up their processed data, which provides an additional level of security and simultaneous remote access to the data.

The team includes graduate and undergraduate students at the University of Maine who do not have prior experience with HPC. OSC OnDemand, the Center's implementation of its open-source HPC portal Open OnDemand, simplifies the complexities of computing, helping to reduce the barrier to access.

"The interface was really helpful for a lot of students," Kamath said. "Especially for undergraduates, I think it's a bit of a steep learning curve to learn without OnDemand."

osc.edu/kamath

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