

## Case Western Reserve University

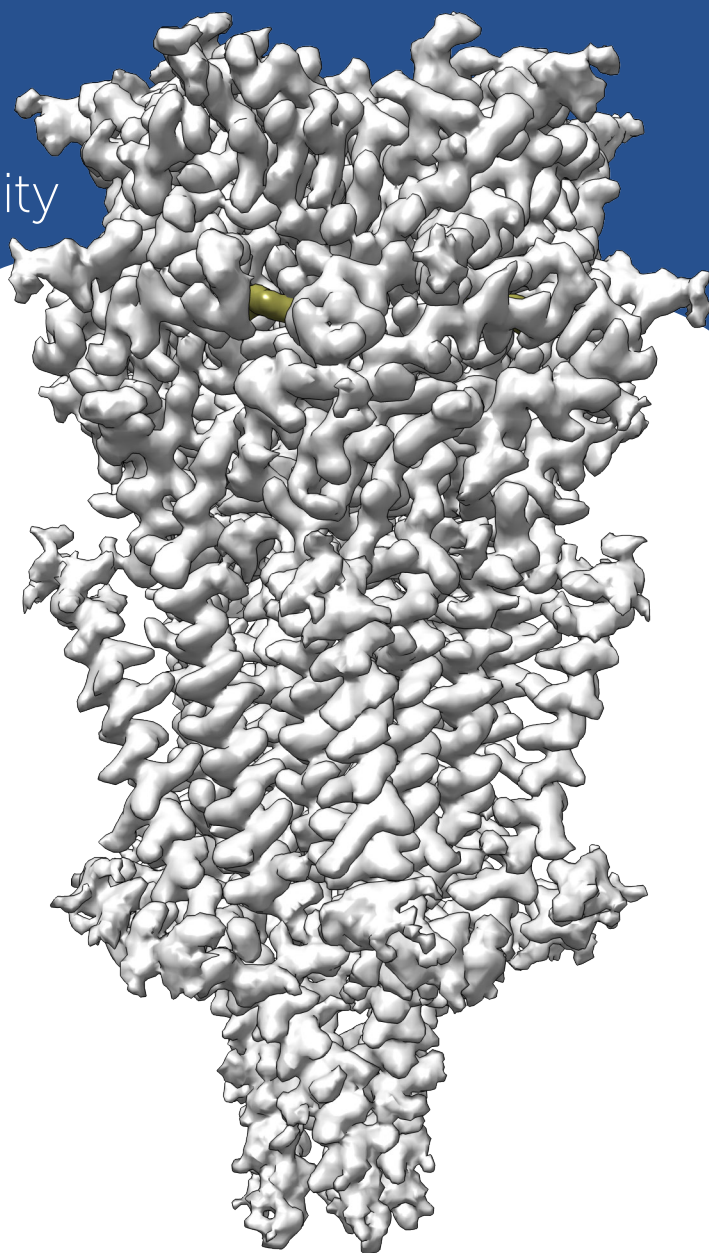


SCHOOL OF MEDICINE

CASE WESTERN RESERVE  
UNIVERSITY

Case Western Reserve University (CWRU) recently established a Cryo-Electron Microscopy Core Facility, which houses state-of-the-art Titan Krios Transmission Electron microscope. The facility is set up to be used with flash-frozen samples for single-particle analysis and cryo- Electron Tomography (Cryo-ET). The infrastructure required for this area of research is very costly and specialized, as the microscopes alone cost millions.

Cryo-EM has emerged over the past few years as a breakthrough area of scientific research. It has been deemed so significant that the Nobel Prize for Chemistry was awarded in 2017 to three scientists for developing cryo-electron microscopy for high-resolution structure determination of biomolecules in solution. Through Cryo-EM, we can view atomic details of complex biological molecules, reconstruct the 3D shape, and uncover how proteins work or malfunction. This breakthrough science aids drug design and development.



A 2.9 Å three-dimensional cryo-EM reconstruction of 5-HT<sub>3A</sub> receptor in complex with alosetron.

*Basak et al (2020) eLife Chakrapani Group*

The research required a highly efficient, reliable and secure workflow, where researchers at the university could easily share data with researchers within their institution as well as with others across the globe.

# Challenges

The Cryo-EM facility manages hundreds of terabytes of data being generated, as well as the compute and storage. The Titan Krios microscope creates a lot of data: 5TB of raw data daily. This data must be transferred to the Case Western Reserve data center quickly and reliably, as the server connected to the microscope has a limited storage capacity of 10 TB. Getting the raw data off the microscope quickly is critical. The team had to come up with a way to sync the files—as the microscope captures new data—and transfer it to free up capacity and ensure that the instrument can continue operating. Researchers within Case Western Reserve, nationally, and internationally needed access to the data. Simple, secure sharing within and outside of CWRU was an important requirement.

## Solution

The [Globus transfer service](#) enabled the data to be quickly transferred to the CWRU data center, thereby freeing up the storage space in the server connected to the microscope.

[Globus Connect Server](#) was installed, and the [Globus sharing capability](#) allowed the facility manager to see the raw data, upload it to a Globus share endpoint, and share the data with researchers, both within CWRU and at other institutions.

With the [Globus Command Line Interface](#) (CLI), the facility managers were able to automate the syncing and resyncing of the files to ensure that all newly created files off the Titan-Krios microscope were properly transferred.

## Quotes

"With Globus Transfer, I have reduced the time it takes to transfer files from days down to just a few hours"

"Globus share gives me an easy way to share data with faculties, not only within CWRU, but also with researchers across the U.S. and even the world. Without Globus, I would not have been able to do this."

"I need to offload data quickly from the microscope, as there is very limited storage space connected to the microscope, and Globus Transfer enables me to do this."



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