



Putting Information in the Hands of Astronomers to Advance Space Discovery and Our Understanding of the Universe

For centuries, humans have aspired to unlock the mysteries of our vast universe. Over the last few decades, astronomy and related technologies have evolved significantly, allowing scientists to look deeply into previously uncharted areas of our cosmos. Observatories once produced a few photos of the night sky, requiring technicians to digitize the photos, store this data on tapes and send them to scientists. Today, these facilities use sophisticated scientific instruments, digital technology and advanced networks to gather thousands of meticulously detailed pictures of space—every minute.

International telescopes, such as those based at the Canada-France-Hawaii Observatory, produce hundreds of gigabytes of world-first images, generating high demand from researchers around the globe. Before astronomers can use this information to further develop our knowledge of the universe, they require an efficient way to manage, analyze and distribute this data. It is a key challenge that scientists at the Canadian Advanced Network for Astronomical Research (CANFAR), with support from CANARIE, aim to address.

The CANFAR team, with leadership from the University of Victoria, brings together participants from the University of British Columbia and the Canadian Astronomy Data Centre (CADC) of the Herzberg Institute of Astrophysics of the National Research Council of Canada. The group is developing a unique system that provides astronomers with more immediate, hands-on and interactive ways to process and share very large amounts of data emerging from astronomical surveys and space exploration missions.

“There are many highly sophisticated telescopes that gather critical information about our universe, including specific galaxies and phenomena such as black holes and supernovae (exploding stars),” says Dr. Chris Pritchet, Principal Investigator at CANFAR and Physics and Astronomy Professor at the University of Victoria. “Leveraging \$2.3 million in funding from CANARIE’s Network-Enabled Platforms (NEP) program, we aim to provide astronomers with a computing environment that allows them to process and use the massive amounts of data generated by instruments across the globe.”

Many astronomers are limited by software tools that are customized to their unique research needs and applications. In addition, they rarely have access to the suite of advanced tools and technologies required to manipulate and store the high volumes of data produced by diverse telescopes. Drawing on the advanced network managed by CANARIE and cloud computing¹ resources distributed across the country, this platform allows researchers to access powerful computing capability, use their own software to store images, analyze the data and share the information with other scientists across Canada and around the world.

Eventually, the CANFAR team aims to evolve the functionality of this research platform, contribute to international data management standards that create a consistent way to manage complex data, and create a common global research environment that helps to accelerate space discovery.

Dr. Pritchet believes this new platform will significantly expand the resources available to astronomers and increase collaboration among scientists and virtual organizations that conduct astronomical surveys. “There are many leading-edge instruments and brilliant people working to observe space,” he says. “This system will help to bring all of these resources together virtually as an integrated and productive team, enhancing our ability to explore the universe and better understand our origins.”

¹ The goal of cloud computing is to provide easy, scalable access to computing resources and IT services over the Internet. Customers can access the service on demand, and use the provider’s application program interface (API) to start, stop, access and configure their virtual servers and storage. http://searchcloudcomputing.techtarget.com/sDefinition/0,,sid201_gci1287881_00.html#