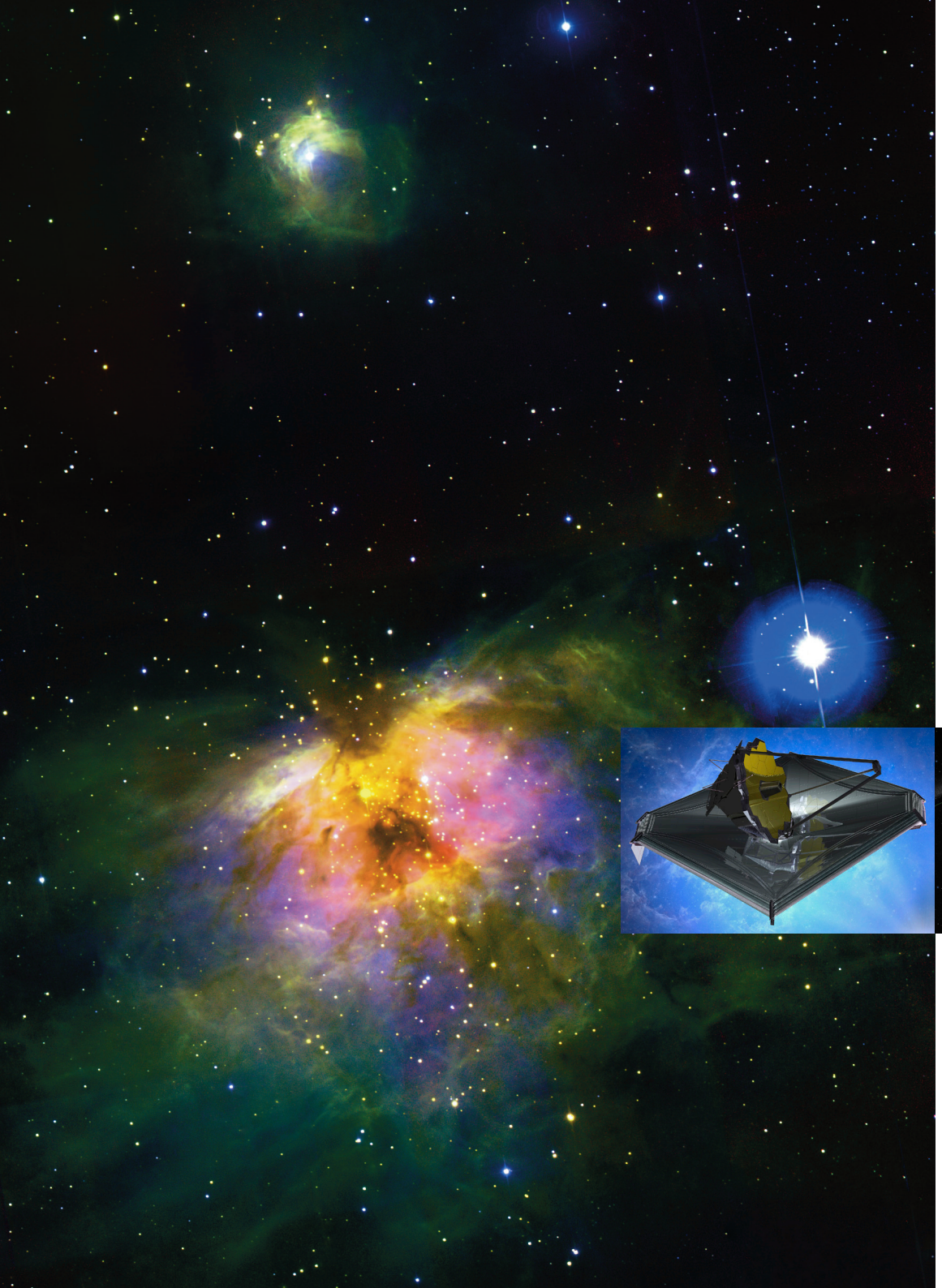
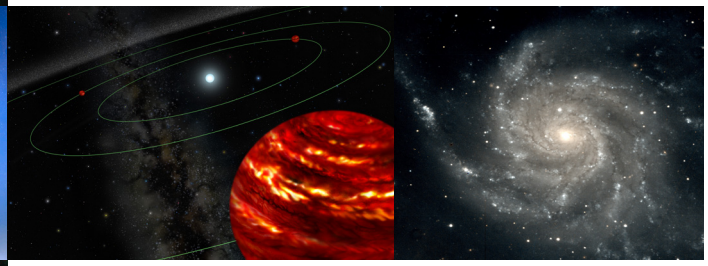
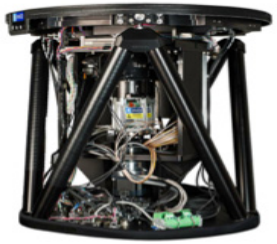


OBSERVATOIRE
DU MONT-MÉGANTIC

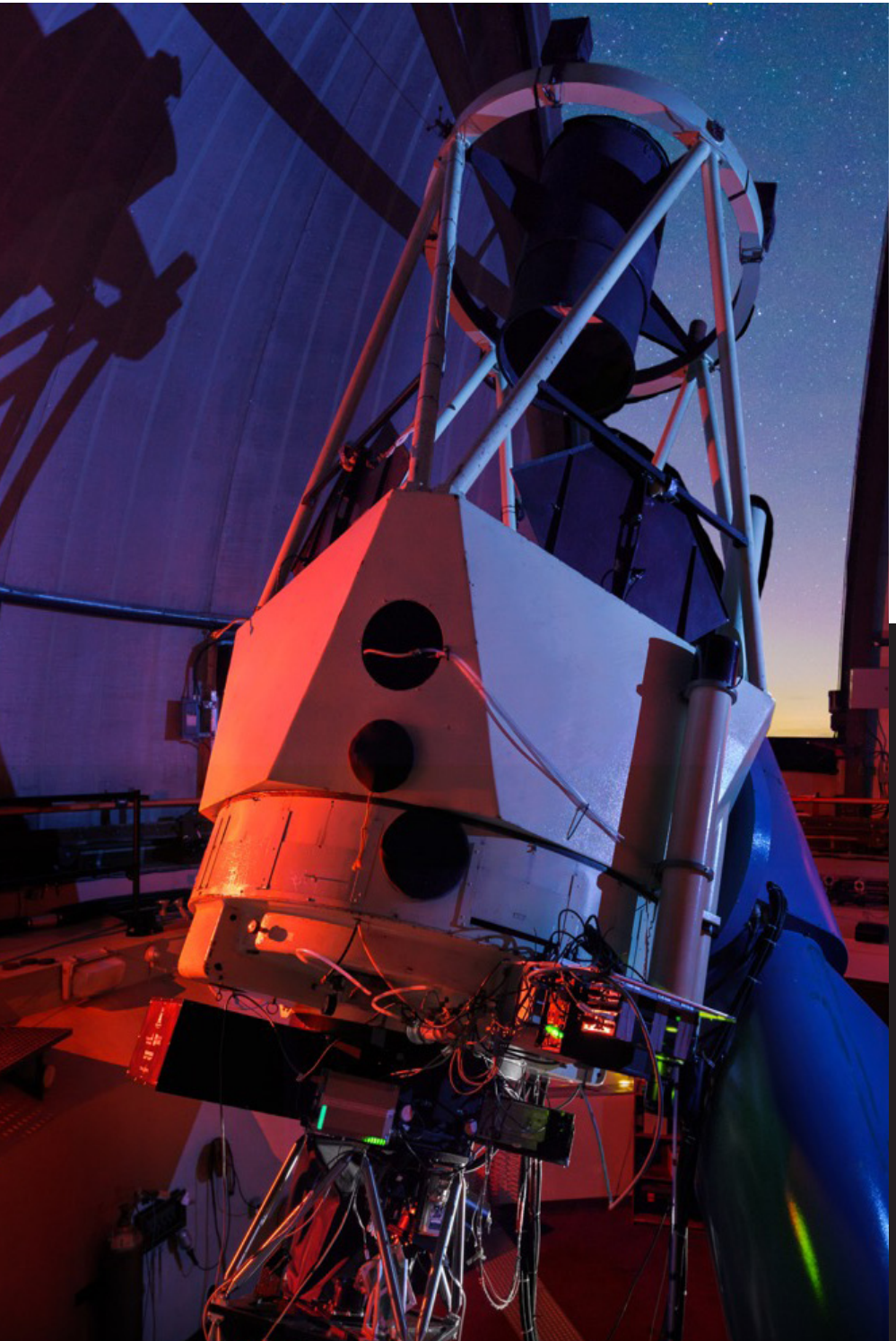




CRAQ

Université de Montréal

UNIVERSITÉ LAVAL



The OMM constellation

The Observatoire du Mont-Mégantic (OMM) is a scientific infrastructure jointly managed by the Université de Montréal (UdeM) and Université Laval (UL). It includes the Laboratory for experimental astrophysics (LAE) on both campuses and the telescope atop Mount Mégantic, in the Eastern Townships. The OMM telescope is a major infrastructure dedicated to basic research in astrophysics whereas the LAE experts, in close collaboration with industrial partners, design high-tech instruments for large ground-based and space-based telescopes.

In addition to the R&D mission, the OMM also offers academic training for young graduate students. These highly qualified individuals are then hired as academic, industrial or government researchers, as well as science teachers and communicators. The OMM is also very involved in public outreach activities. Along with ASTROLab, the visitor's centre of the Parc national du Mont-Mégantic, the observatory attracts more than 20,000 visitors a year in this region of Quebec; economic benefits (recreation and tourism, in particular) are estimated at several million dollars.

World-renowned experts

The OMM staff is dedicated to the development of state-of-the-art astronomical instrumentation not only for its telescope, but also for major national and international observatories, both ground- and space-based. These projects are realized in close collaboration with high-tech industrial partners in Quebec (ABB Bomem, INO, Nüvü Camēras), in the rest of Canada (COM DEV), also with the Canadian Space Agency (CSA), the National Research Council of Canada (NRC), major Canadian universities and international partners such as NASA, the European Space Agency (ESA) and other universities in the United States and Europe, particularly in France. OMM researchers are the leaders of major international instrumental research projects.

Examples include the first picture of an extrasolar planetary system in 2008, a major scientific breakthrough and the development of an advanced instrument for the James Webb Space Telescope (JWST).

René Doyon, professor at Université de Montréal and OMM director

The heart of Mount Mégantic

The Observatory is located at an altitude of 1111 m atop Mount Mégantic, in the Eastern Townships, about 250 km from Montreal and Quebec City. The Observatory is at the heart of a unique starry-sky reserve, the International Dark Sky Reserve of Mont-Mégantic (the Réserve internationale de ciel étoilé du Mont-Mégantic or RICEMM), covering an area of about 5500 km^2. This reserve was created in 2007 to preserve the quality of the night sky, a crucial ingredient to sustain the astronomical research and education activities at OMM, one of Canada's largest university research centres in astronomy and astrophysics.

While preserving for everyone access to a true dark sky experience, the RICEMM also enhances the recreational and touristic potential of ASTROLab and the Parc national du Mont-Mégantic. Its creation is the result of a partnership with Hydro-Québec which generated significant energy savings. The success of the RICEMM stimulates similar projects not only elsewhere in Quebec but also around the world.

Parc national du Mont-Mégantic
Astrolab

A unique tool for scientific public outreach in Quebec

Astronomy is a science that fascinates everyone, young and old. There are thousands of amateur astronomers in Quebec. Astronomy is part of the curriculum of primary and high schools in Quebec. Also, astronomy is often the entrance gateway to natural sciences for young boys and girls.

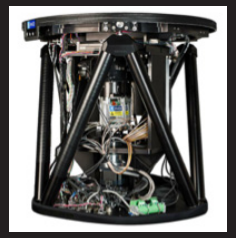
OMM researchers take advantage of this fascination to promote science to a vast audience. They are regularly called upon by media, both printed and electronic, to comment on the most recent astronomical discoveries. They are also frequently invited to give public lectures. The OMM is also very active on various social networks.

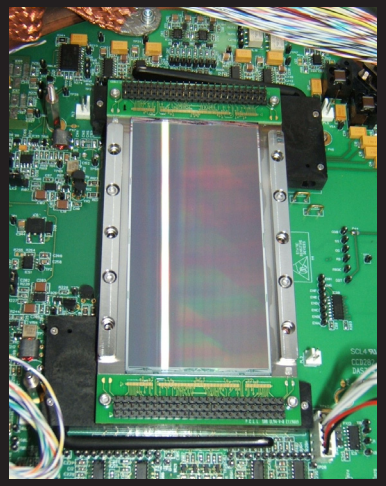
The 1.6 m telescope

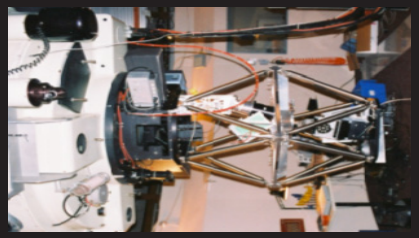
The OMM telescope is a Ritchey-Chrétien design with a 1.6 m primary mirror. It is the largest telescope in eastern North America. Despite the modest size of its mirror, the range of scientific instruments provided at OMM makes it one of the world's most versatile telescopes. These instruments, based on cutting-edge technology, allow imagery, spectroscopy and polarimetry observations both in the optical and infrared.

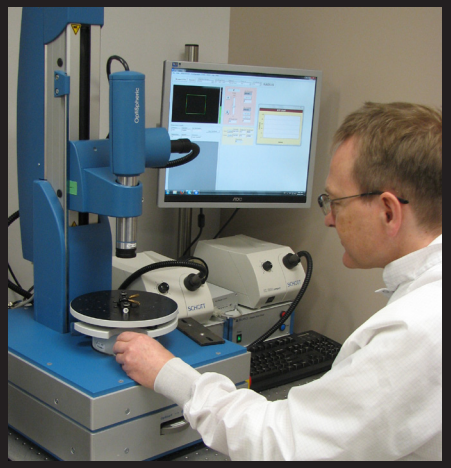
Powerful instrumentation

The instrumental suite available at the Mount Mégantic telescope is one of the most versatile and modern from a technological point of view. Recent grants from the Canada Foundation for Innovation along with special provincial programs from the government of Quebec were used to upgrade the infrastructure and its telescope. Our observatory and astrophysical laboratories are now Canadian leaders in conception, design and construction of astronomical instruments.









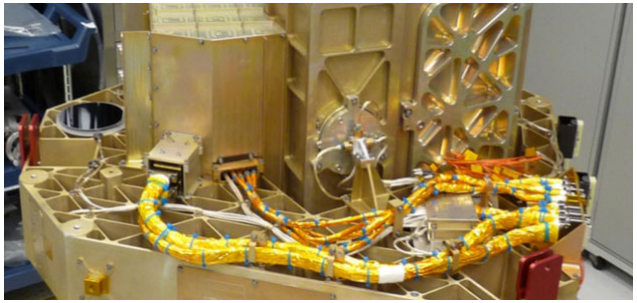
A nestful of skills

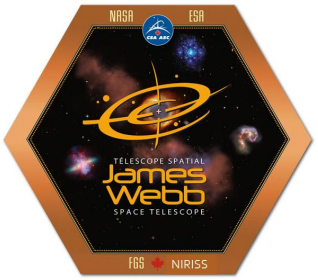
Because it is one of the only university-based astronomical observatories in Canada, the OMM provides a unique training environment. Every year, more than twenty graduate students (MSc and PhD) are enrolled at OMM. Over the last decade, professors and researchers at UdeM and UL have trained 25% of all Canadian PhDs in astrophysics despite the fact that they represent only about one-tenth of all Canadian professional astronomers and astrophysicists. Once they receive their diploma, all our students find a job! Researchers, both men and women, trained at OMM end up in all sectors of society, whether academic, industrial, financial or governmental. Also noteworthy, parity between men and women among graduate students in astrophysics is now a fact.

OPIOMM

All the astronomical images used for this brochure were obtained by OMM's graduate students as part of a project nicknamed OPIOMM.

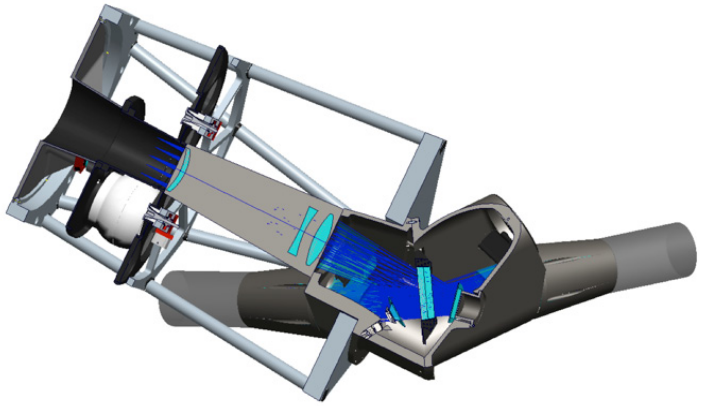
A research laboratory for international projects





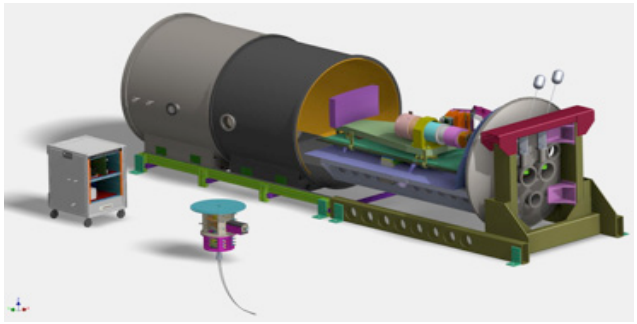
FGS/NIRISS for the James Webb Space Telescope

Led by Professor René Doyon (UdeM), the LAE team designed the FGS/NIRISS instruments for the James Webb Space Telescope (JWST), successor to the Hubble Space Telescope in 2018. NIRISS is designed to discover and study exoplanets about the size of the Earth as well as the most distant galaxies. FGS's role is to maintain guidance and pointing accuracy when JWST will be 1.5 million km from Earth.



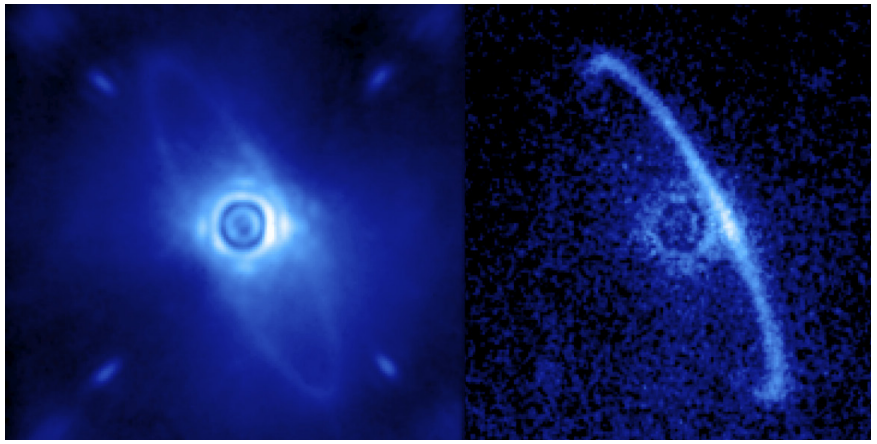
SITELLE: OMM's hyperspectral power at CFHT

SITELLE is a new imaging Fourier-transform spectrometer for the Canada-France-Hawaii Telescope (CFHT), which is modeled on the design of SpIOMM, an instrument currently in operation at OMM. SITELLE is design to obtain the spectrum of each light source in a wide field of view with exceptional spatial and spectral resolutions. The project is led by Professor Laurent Drissen and his team (UL).



Spirou: discovering exoearths at CFHT

The infrared spectropolarimeter (SPIRou) is a spectrograph that will measure the radial velocities of low-mass stars with a precision accurate enough to detect planets the size of the Earth in the habitable zone (the distance from the star at which surface water remains liquid). Once implemented on CFHT in 2017, SPIRou is expected to be used very extensively by the astronomical community - supporting in particular several future key space missions such as TESS, JWST and PLATO.

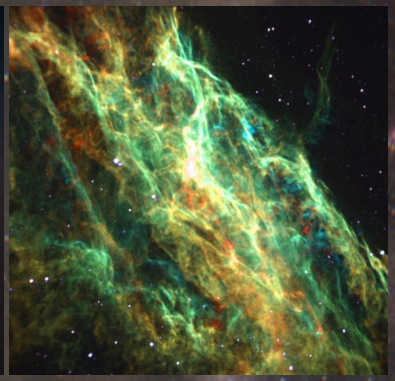


GPI: the exoplanet imager for the Gemini telescope

GPI (Gemini Planet Imager) is an imaging instrument capable of detecting the faint infrared light emitted by young giant gaseous planets orbiting their stars, just as were Jupiter and Saturn in our solar system when it formed. GPI saw its first-light in January 2014.

A laboratory for training the next generation

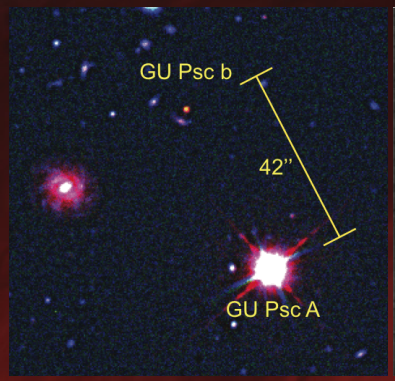
As part of her doctoral thesis, Laurie Rousseau-Nepton (UL) measures the chemical properties of spiral galaxies using the imaging spectrometer SpIOMM. The goal of this project is to better understand the evolution of these galaxies. Only two nights of telescope time are needed to acquire the data for an entire galaxy! She presented the results of her work at international conferences in China, Austria and Burkina Faso.

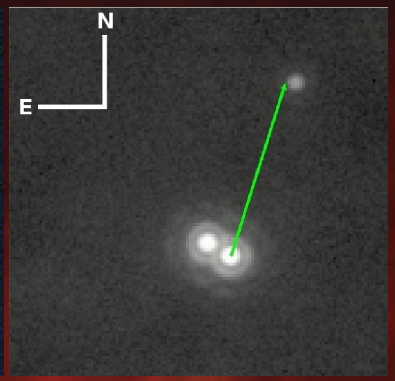


For his doctoral thesis, Alexandre Alarie (UL) studies two supernovae remnants of different age - Cassiopeia A (350 years old) and the Veil Nebula (10,000 years old) – in order to understand how the explosion of massive stars at the end of their life alters and chemically enriches the interstellar medium of the Milky Way. In collaboration with a colleague from Mexico, he uses a theoretical model to interpret the data obtained with three of the most sophisticated instruments at OMM.

OBSERVATOIRE
DU MONT-MÉGANTIC

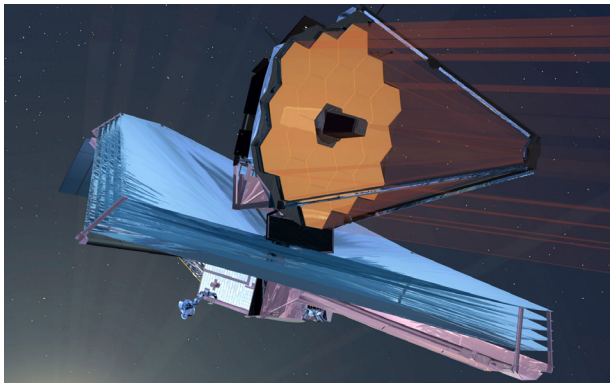
Marie-Eve Naud's (UdeM) doctoral thesis is geared towards the detection of planetary mass companions around low-mass young-stars using direct imagery. She uses the results of these observations to assess the frequency of such companions. OMM infrared camera CPAPIR allowed her to confirm the presence of a planet about 11 times the mass of Jupiter orbiting the star GU Psc, an object that has attracted considerable interest among the international scientific community as well as among a broader audience.

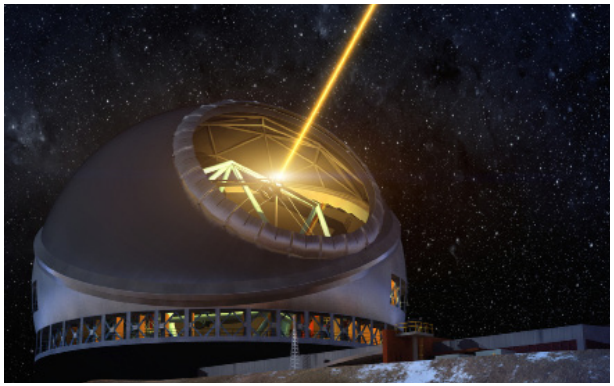




The PhD project of Jonathan Gagné (UdeM) is to search for brown dwarfs and low-mass young-stars that are members of kinematic associations in the solar neighborhood. Kinematic associations are relatively young very loose star clusters (10 to 150 million years old) that are formed within the same molecular cloud. A few million years after the star-formation process is complete, most of the interstellar gas initially present is dispersed, and the stars begin to move away from each other.

Collaborations with academic, governmental and industrial partners





NASA

CSA ASC

NRC-CNRC From Discovery to Innovation...

CRSNG NSERC

cnrs dépasser les frontières

LAM Laboratoire d'Astrophysique de Marseille

irap astrophysique & planétologie

Développement économique Canada pour les régions du Québec

Canada Economic Development for Quebec Regions

INNOVATION.CA

CANADA FOUNDATION FOR INNOVATION | FONDATION CANADIENNE POUR L'INNOVATION

TMT

THIRTY METER TELESCOPE

ESO

LNA

CFH

GEMINI OBSERVATORY

Exploring the Universe, Sharing its Wonders

Photon etc A spectrum of solutions

nüvü caméras

TELEDYNE DALSA Everywhereyoulook™

INO

ABB

COM DEV

Université de Montréal

UNIVERSITÉ LAVAL

CRAQ


OBSERVATOIRE
DU MONT-MÉGANTIC