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Fellows at ESO

Marie-Lou Gendron-Marsolais

Born in Montréal, I grew up mostly in the Québec countryside, in the Gaspésie Peninsula, that wild piece of land larger than Belgium along the south shore of the majestic Saint Lawrence river in eastern Canada. I spent my childhood between the vibrant cultural life of Montréal and the thick conifer forest covered by snow for six months a year. Very curious, I knew about all the whale species in the world, I would make small experiments to grow plants in the corner of my bedroom window, and I read every book in the village library, imagining myself climbing the Himalayas in our snowy backyard.

My interest in stars and everything beyond came later, after I started enjoying maths in high school, encouraged by a generous teacher. I didn't know what I wanted to become yet, though most likely something related to science. However, "scientific researcher" was not among the options that came out of those career orientation tests, and I had some trouble identifying with "science geniuses" such as Einstein, Newton, Darwin, etc. — even if I admired them deeply. I continued to study science and found in physics an elegant mix of mathematical equations and concepts.

Despite the unclear path ahead, I started a bachelor's in physics in Québec city. Far from home, overwhelmed by the workload and the complexity of numerous new notions, I struggled a bit to find my place in this world. I got a summer job at the Mont-Mégantic national park, hosting a small research observatory with a 1.6-m telescope. I would do astronomy tours, describing all the wonders of our Universe to amazed crowds. It was great. I loved it and learned a lot having this constant connection to the night sky. I got to know the time just by looking at the stars and I would chase comets, auroras, transits and meteor showers. In the meantime, I developed a profound interest in telescopes, these impressive machines in remote and extreme locations. My relentless curiosity for the fundamental rules of our Universe drove me to do a master's in theoretical particle physics when for two years I played with elegant differential equations and laws of symmetry. Meanwhile, I was offered the

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opportunity to do a PhD in astronomy at the Université de Montréal and I moved to an observational study of supermassive black holes.

I started working under the supervision of Julie Hlavacek-Larrondo, analysing observations taken with the Very Large Array, a set of 27 large antennas in New Mexico. It was very challenging — everything was so new, but I quickly caught up with the astronomy world and its vocabulary. My PhD project was focused on a galaxy cluster called Perseus, located 200 million light years away — relatively close for astronomy! Its "proximity" allowed us to take very detailed pictures of what was going on there. With radio observations, I would trace the light coming from the central supermassive black hole of each of those giant galaxies as well as the powerful jets they release. I spent hours staring at those strange, complicated structures, trying to understand their origin. Most of all, the striking beauty of what I was seeing gave me the strength to pursue my work. I loved the feeling of discovering potentially new structures in those observations and being the first human to set eyes on them.

I also had the chance to visit the Harvard-Smithsonian Center for Astrophysics for six months and to work alongside some of the people who invented my field of research. I learned to work with observations from the Chandra X-ray observatory and still remember today the feeling of excitement when I first took a look at data that had been taken from space! I also used the newly installed optical imaging Fourier transform spectrometer SITELLE at the Canada-France-Hawaii Telescope.

This broad range of experiences allowed me to effectively bridge between observations at different wavelengths and gave me a strong set of skills. It also allowed me to build a network of passionate collaborators who, over time, became a strong source of support and motivation.

In my free time, I became involved in the newly formed diversity committee of the physics department of the Université de Montréal. Through my involvement, I learned about the barriers and challenges faced by women in science and getting a better understanding of these issues as well as meeting other astronomers receptive to those ideas helped me find my place. Throughout my studies, I continued my involvement in scientific communication at every opportunity (for example, at science festivals, in schools or at "Astronomy on Tap" events, etc.) — each occasion giving me a burst of confidence and passion towards astronomy as I shared my work.

Over the years, I used many telescopes and visited the observatories of Maunakea and Kitt Peak, the Very Large Array and the Arecibo observatory... but the Atacama Desert had always been the ultimate dream for me. I moved to Chile in October 2018 to start an ESO fellowship with duties at the ALMA observatory. I soon found myself under the southern sky, in command of one of the most powerful telescopes in the world. Being among ESO's rich community of experts in observational astronomy represents a unique opportunity to conduct my research, while allowing me to further develop my professional skills. To date, I still pursue my work on the Perseus cluster of galaxies, every set of new observations revealing a variety of unexpected discoveries. And so my quest for knowledge continues and at the same time my sense of wonder flourishes.

Matias Jones

I was born in Chile, the world capital of observational astronomy and a key window from the Earth to explore the Universe. Just 30 minutes away from my home town of Santiago is a beautiful place called Cajón del Maipo, a place free of light pollution and with clear skies during most of the year. At the age of 14 I joined a group for astronomy and astrophotography. We used to go to Cajon del Maipo to do astrophotography using a 10-cm diameter telescope without a motor, so for long exposures we had to manually track the apparent movement of the stars in the sky. During those years I strengthened my passion for science and realised that I would follow a scientific career in my adult life.

A couple of years later, I entered university to study physics and astronomy and after five years, I got my bachelor's degree. Although I really love experimental physics and I really enjoyed building high-temperature yttrium-barium-copper-oxide superconducting materials or carbon nanoparticles in advanced physics labs, I knew that my future lay in astronomy. So, I started a master's thesis in astronomy at the Universidad de Chile in Santiago. During my master's, I used Type II-P supernovae as extragalactic distance indicators.

Matias Jones

After receiving a master's degree, I finally started a PhD in astronomy, also at the Universidad de Chile, but this time in the area of extrasolar planets. The goal of my PhD thesis was to search for and characterise planetary systems orbiting giant stars, using the radial-velocity method. The main idea behind this project was to study other evolved planetary systems to understand what might happen to our own Solar System after the Sun evolves into a red giant star. During my PhD, I spent dozens of nights at the La Silla observatory, mainly collecting high-resolution spectroscopic data using the Fibre-fed Extended Range Optical Spectrograph (FEROS) and the High Accuracy Radial velocity Planet Searcher (HARPS). I also spent two years at ESO in Chile thanks to the ESO studentship programme. It was during this time that I first had the chance to visit that unique and magical place called Paranal to work on a short observatory project. I really enjoyed those fantastic years at ESO, where I also had the chance to interact with world experts in different areas and to use different observing techniques and instrumentation, when they visited the ESO offices in Chile.

In 2013, I obtained my PhD and moved to the Astro-Engineering Center (AIUC) at the Universidad Católica in Santiago, where I worked on the construction of two high-resolution spectrographs aimed at detecting exoplanets, one of which has been in full operation at La Silla since 2016. The next step in my career was already pretty clear to me. After finishing my position at the AIUC, I applied to the ESO fellowship programme in Chile, having in mind that it would allow me to work with state-of-the-art instruments, deepening my knowledge of instrumentation and new observing techniques. Moreover, getting the chance to work with and operate instruments like the Echelle SPectrograph for Rocky Exoplanets and Stable Spectroscopic Observations (ESPRESSO) or the CRyogenic high-resolution InfraRed Echelle Spectrograph (CRIRES+) was an additional motivation.

I started my ESO fellowship in 2016, with duties in Paranal. Although when I arrived at ESO I expected to work on high-resolution spectrographs, where I could contribute my previous experience in the design, construction and extensive use of these kind of instruments, I was also very motivated to learn new observing techniques and new instruments. I therefore took on a new professional challenge when I joined the team for the Spectro-Polarimetric High-contrast Exoplanet REsearch instrument (SPHERE) on the VLT, which is a high contrast imaging instrument. As a member of the SPHERE instrument team I had the chance to discover the fascinating world of direct imaging. However, this was not easy. I had to learn about extreme adaptive optics and observing techniques that were completely new to me. Although at the very beginning it was difficult to learn about this complex machine — which comprises three sub-instruments plus SAXO, the extreme adaptive optics module of SPHERE — now, after more than 3 years, I have become an expert in this instrument and I am currently the SPHERE Instrument Scientist (IS2). In addition, I am the instrument fellow of CRIRES+ and ESPRESSO, which recently arrived at Paranal and is currently at the commissioning stage.

So far, my experience of working at Paranal has been truly that of a dream come true. The motivation one gets working at the VLT with the most sophisticated instruments in the world, many times pushing the limits of the observational techniques, is simply unique and very rewarding. In addition to that, there is also the fact that the VLT is located in one of the most beautiful places I have ever seen; this simply makes the VLT at Cerro Paranal the most perfect combination. Even after almost 300 nights at Paranal, I don't miss a chance to look at those amazing sunsets, and to look at the endless deep and dark sky, full of mystery and magic during the night. To be honest, I could not think of a better place to work.