

Fellows at ESO

Martyna Chruślińska

We are almost certainly not entirely correct, and that is part of the game. This was one of the most important realisations that inspired me to pursue an academic career. During one of my first physics lessons at school, the teacher explained the scientific method by telling us about the history of science, showing the winding path that humankind took to reach the current understanding of the laws of nature. Seeing that science is the work of generations and that one person's 'best guess' or idea, even if proven wrong, can still be the starting point for another person to make a breakthrough gave me the courage to start thinking about those daunting questions that seem 'too big' to answer. The questions that bothered me the most turned out to fall within the realm of astronomy: How did the Universe come to be? And how did it end up full of galaxies rich in life-critical elements, not to mention dark matter? My interest in the subject grew further when I joined the nationwide astronomy club and started high school, where my physics teacher was a true astronomy enthusiast. I discovered that I enjoyed the challenging and creative process of solving problems for which there was no ready-made solution. I wanted to become a researcher, whatever that might entail.

I left my home city to study astronomy at the University of Warsaw in Poland. I was trying to find my way by doing projects on different topics (solar physics, magnetic reconnection, binary neutron stars, cosmological simulations of galaxy evolution – to name a few). I am grateful for these experiences and for the academics who could have just sent me away but devoted their time to guiding me back then. I was interested in almost everything. Luckily, the Universe helped me decide what to focus on: in 2015 we witnessed the historical first direct detection of gravitational waves from merging black holes. I became fully immersed in working with the group modelling the formation of such sources, and neutron star mergers became the subject of my Master's thesis. Soon after, the first signal from the merger of neutron stars was detected. This event prompted a successful search for an electromagnetic counterpart,



engaging the global astronomical community and involving all major facilities. This discovery was made possible by large collaborations and research infrastructures, including the ESO telescopes, showcasing the importance of international collaborations in science.

It was a truly exciting time to work on the formation of gravitational wave sources and I started a PhD at Radboud University in the Netherlands in this area. The field of gravitational wave astrophysics was growing rapidly, new questions arose and my career evolved with them. My current aim is to understand the impact of cosmic chemical evolution on the formation of stellar-origin transients observed across the electromagnetic spectrum and detected via gravitational waves. To answer this question, I realised that I needed to expand my expertise. I turned to the chemical evolution of galaxies. This first led me to a postdoctoral fellowship at the Max Planck Institute for Astrophysics and then to ESO, where I am currently a fellow.

At ESO, I started new collaborations and I am learning about the observational side of galaxy evolution which is important for my research. Being part of a large, international, intergovernmental organisation has also taught me the importance of science diplomacy and strategic planning, so that the broad community can pursue

ambitious goals in years to come despite an ever-changing scientific and geopolitical landscape.

Although I am no longer in my early teens, I still think of science as one large team effort spread over generations. I am proud that I can contribute my part, and as one of the scientists I looked up to as a student said, "I would consider my career a success if I wrote one paper that wasn't completely wrong".

Francesca Lucertini

My passion for astronomy has been driven by curiosity from a very young age. My family often recalls that when I was only six years old I was already asking for books about the Universe, and the stars in particular. It may sound like a cliché, but the first event I clearly remember that truly sparked my desire to study the Universe was the night of San Lorenzo, the traditional night of shooting stars.

I was born and raised in a small town on the east coast of Italy. At that time there were still isolated beaches free from light pollution. I remember lying on the sand and watching the sky, while my eyes slowly adapted to the darkness, allowing me to see more and more stars. In that moment I started wondering what else was out there and felt a deep

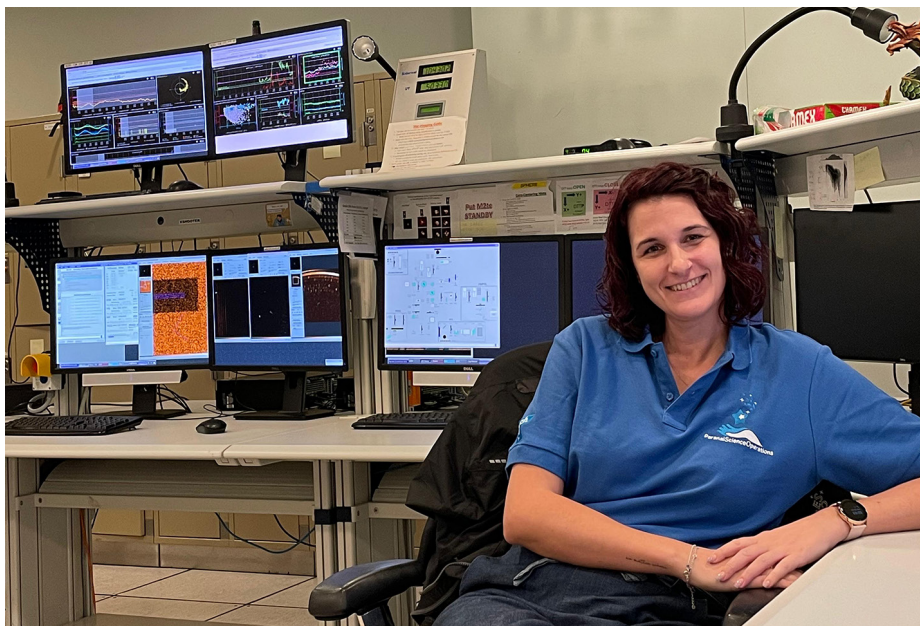
desire to understand that apparently infinite Universe.

At that time I had no idea what it actually meant to become an astronomer or what the job involved. However, the path I wanted to follow always felt clear: attend a scientific high school and then enroll in a university programme in astronomy to study the stars.

I began my studies in astronomy at the University of Bologna. By the end of my Bachelor degree, I knew that I wanted to pursue a career in research. However, I found the programme in Bologna to be very theoretical and strongly focused on cosmology so, in order to follow a more observational path, I continued my career doing a Master in Astronomy at the University of Padova. It was in this context, during a laboratory course, that I had my first experience with a telescope at the Asiago Observatory. That experience confirmed my passion for observational astronomy.

Despite my determination to pursue a research career, I was not able to obtain a PhD position in Italy. With the support of my family, I decided to remain in Padova after completing my Master's degree, with the goal of turning my thesis into what would become my first scientific paper, while at the same time applying for PhD positions abroad. During that period, Giovanni Carraro encouraged me to look toward Chile and the many opportunities that this country offers in astronomy, including those at ESO.

I started my PhD at Andrés Bello University (in Santiago de Chile) in 2019 under the supervision of Lorenzo Monaco and the co-supervision of Elisabetta Caffau from the Université PSL in Paris. In my doctoral research, I used high-resolution optical and near-infrared spectroscopy to derive sulphur abundances in stars in the main components of the Milky Way (the bulge, the disc and the halo). Sulphur is a special and useful element for reconstructing the formation and evolution of galaxies, and it is also one of the elements essential for life. However, measuring sulphur in stellar atmospheres is challenging for several reasons, which is why it has been relatively little studied in the literature.



My first contact with ESO came in 2020, when I was selected to participate in the La Silla Observing Summer School. That experience made me realise that ESO and its observatories were not the symbol of an unreachable dream for a young PhD student in astronomy, but rather a concrete and tangible reality. I applied for and obtained an ESO Studentship in Chile, which allowed me to spend two years of my PhD under the co-supervision of Luca Sbordone. During this period, I expanded my experience in the analysis of chemical abundances in stellar atmospheres, working on elements beyond sulphur and becoming more and more specialised in Galactic archaeology studies.

During the ESO studentship, students are also expected to participate in a technical project at the VLT. After spending a week in Paranal studying the high execution efficiency of the UVES instrument, the enthusiasm I felt for my work and the pride in the path I had taken confirmed that I was in the right place. That feeling motivated me to apply for the ESO Fellowship, a position I obtained immediately after defending my PhD in 2023. Today I am still an ESO Fellow with duties at Paranal on UT3 and Instrument Fellow for CRIRES+. At the same time, I continue to expand our knowledge of sulphur by studying its behaviour in extragalactic systems and by analysing others peculiar

elements that are useful for reconstructing the evolution of our galaxy.

I do not want to make my story sound like a smooth and easy path. I have never considered myself a genius in mathematics or physics, so my studies have often been challenging. Moving to Chile was not easy at the beginning, especially considering the social unrest in 2019 and the fact that I had to conduct the first part of my PhD in quarantine during the COVID-19 pandemic. However, I have been fortunate to receive constant support from my family, friends and excellent supervisors, who have always helped me nurture and sustain my passion and determination to continue pursuing my dream. For this reason, I look back with pride at the path I have taken and at the awards I have received for my research (including Best PhD Thesis 2024 and the ALUMNI UNAB 2025 award). At the same time, I try to share my story with young people who wish to pursue a career in research, to make them aware of the sacrifices that may lie ahead, but also to encourage them to persevere. If you truly want something, it is possible to achieve it.

After all these years, I am still that little girl who looks at the stars with fascination and curiosity, only now I do it from the VLT platform!