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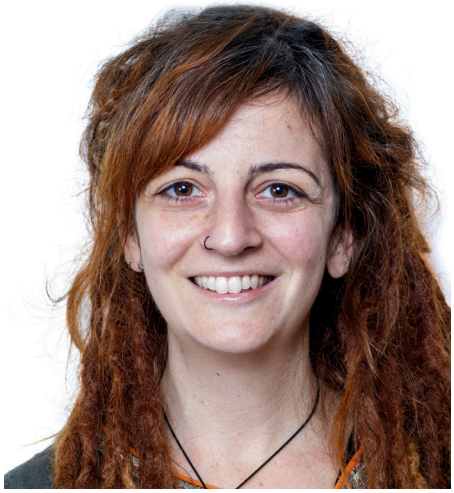
Fellows at ESO

Evgenia Koumpia

I've been fascinated by space ever since I was a child, something I think I owe in part to the clear, dark skies that Greece has to offer most days of the year. In 1996–1997, when I was aged about twelve, comet Hale–Bopp became visible with the naked eye from Athens. I still remember vividly how fascinated I was, and how witnessing something so beautiful in the sky (even in daytime) boosted my interest in astronomy and the mysteries of the sky even more. I became very curious about where it came from, and why it suddenly started showing two tails instead of one, but no one around me could provide answers to those questions. This is when I started to read popular magazines about astronomy and science, and the more I was learning the more I wanted to know about how stars, planets, galaxies, and the Universe itself form and behave. That was of course a child's dream but in my mind back then an unreachable one too. I didn't know what one needed to do or study to become an astronomer, or if such a thing even existed in modern Greece. At the age of fifteen a school excursion to the National Observatory of Athens helped me realise that I could in fact pursue what I had considered an impossible dream. During the observatory tour, our guide asked "...and how can someone become an astronomer in Greece?" After a few seconds of me hanging on his next words, he followed up with the answer, "one first needs to go to University to obtain a degree in physics". And that was it! This was the moment I realised that my interest in maths and physics could be put together with my genuine curiosity about space. It was then that I set my first lifetime goal — to obtain a physics degree and try to follow the path of becoming a professional astronomer.

A few years later, I started my undergraduate studies in physics at the University of Patras, where I chose, without a second thought, to follow the Theoretical and Mathematical Physics and Philosophy of Science Division, since it was the only division offering courses related to astrophysics. During the last year of my studies, I wrote an optional undergraduate thesis on the determination of fundamental parameters of planetary nebulae.



My expectations of gaining experience and knowledge through this process were fortunately fulfilled, while my love for research grew even more. After a year off, I started my master's degree in the Department of Physics at the National & Kapodistrian University of Athens in the Astrophysics, Astronomy & Mechanics section. My master's thesis, entitled "Fundamental Parameters of 4 Massive Eclipsing Binaries in Westerlund 1", on which I worked with Alceste Bonanos at the National Observatory of Athens, turned out to be the strongest motivation I ever had. Not only did I work in the same environment where I once got the inspiration and information on how to actually become an astronomer — and it is a place which remains close to my heart — but working with an active researcher gave me the advantage of getting a pretty good idea of how research works, and getting a complete picture of the procedure to be followed from the step of data analysis to the step of writing a paper. After the completion of my master's I had the great luck to be sent to the Las Campanas Observatory in Chile to perform two long observing runs (of two weeks each) as a solo observer/operator at the Swope telescope, which I still cherish as one of the best experiences of my life. This was the time that I actually felt my dream come to life and all the effort and study finally made sense; it was just me, the dome and the sky, and a huge smile on my face. This is also the point where another lifetime goal became even stronger: it was the point where I confirmed to myself that I didn't just want to become an astronomer, I wanted to become an astronomer who works at an observatory.

Soon after, I moved from Athens to Groningen in the Netherlands to start my PhD studies under the supervision of Floris van der Tak at SRON/Kapteyn Astronomical Institute. My PhD focused on understanding the physical and chemical processes that take place in regions forming both low- and high-mass stars and addressing the early evolutionary stages of star formation. To do so, I used (sub-)millimetre observations (for example, at the JCMT and the IRAM 30-metre) and sophisticated radiative transfer techniques. During my PhD years, I dealt with intellectual, emotional, cultural, and even climate challenges (naïvely, I wasn't expecting the last). And of course, during a five-year period, many things can happen in one's life that can feel a bigger burden if you live abroad. Altogether this resulted in a 15-month academic break after I obtained my PhD. During this time I travelled in Asia, worked in IBM in Groningen as a programmer/web-developer, and volunteered/trained as a Seal Rehabilitator Assistant in the Seal Rehabilitation and Research Centre in Pieterburen, a Dutch village close to Groningen. My time in IBM made me realise how much I missed working in a scientific environment, how much I missed astronomy, and how much I was diverging from my dream and my self. This made me ultimately quit my post and move to the UK where I joined the group of René Oudmaijer (to whom I am eternally grateful) as a postdoctoral fellow in star formation at the University of Leeds. During those four postdoc years, I focused on the formation of high-mass stars, an area where many open questions still exist. My studies relied, and still rely, heavily on high-angular-resolution techniques (for example, PIONIER, GRAVITY on the VLTI, ALMA).

I joined ESO in December 2021 as a fellow, with ALMA as a duty station. My research focuses mostly on observations of massive stars during their formation (but also during the final stages of their lives) at the smallest scales available, using the ESO facilities at multiple wavelengths. I chose to apply for this

fellowship for many reasons but the most dominant was the distribution of science and operations time, and this is something I experience with great fulfilment. Not only can I work with ESO's state-of-the-art research facilities and carry out my research projects independently (in a sunny country), but I can combine science with operational duties at one of the world's most powerful telescopes. The observational duties of this position were and still are very exciting to me, and a very powerful drive in my professional life. And a small secret: I may currently be truly enjoying pointing antennas at the sky, but I'll always have an eye on the large mirrors too.

Kevin Corneilus Harrington

Recently, on Cape Cod in Massachusetts, I spoke with my high school astronomy teacher about the trajectory of one's life and the various pursuits of our bliss as human beings. He is now retired, and I happened to be the only student in his 30 years of teaching to have become a professional astronomer. He encouraged me to view my life as a mesa — with a broad mountaintop, instead of following a single journey to a single mountain peak. I can think of how this may apply to my research: for example, not just focusing on galaxy evolution but broadening to become more of an expert in the physics of the various phases of the interstellar medium, and further broadening from a focus on galaxies in the early Universe to studies of local galaxies as well. These discussions reminded me a lot about my experience in his class. Without a strong physics/maths background, his astronomy class was my main motivation for pursuing a degree at the University of Massachusetts, Amherst (UMass). I studied there and also received a separate degree in Psychological and Brain Sciences. Science is interconnected in so many ways, and the disciplines of study within neuroscience provided a unique insight to compare with astronomy and astrophysics.

I have always been connected to radio astronomy. At the time I arrived as a student at UMass, the world's largest single-dish submillimetre telescope was just being constructed after decades of discussion: the 50-metre Large Millimeter

Carla Arce-Tord

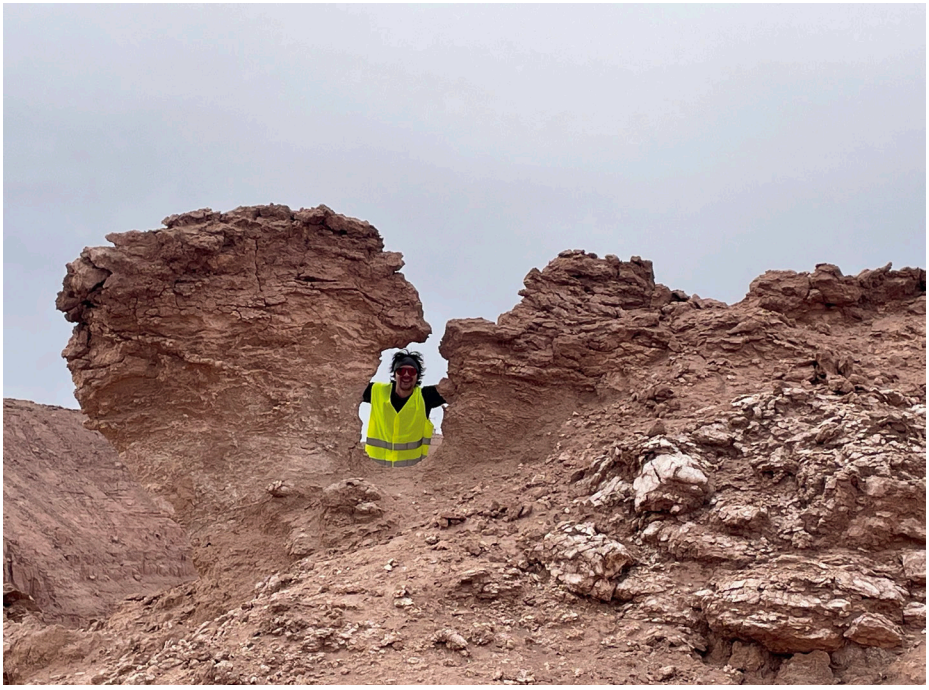


Figure 1. Outside San Pedro de Atacama, near the APEX basecamp.

Telescope (LMT) in Mexico. My first internship was at UMass, during the summer after my first year. I matched the catalogues of the Herschel and Planck submillimetre space telescopes. I identified candidate sources to follow up during the commissioning phases of the LMT and went to Mexico to observe for the first time the following year. My supervisor and I detected CO emission from our target sources, placing them at a distance corresponding to roughly 11 billion years ago and confirming them as some of the most infrared-luminous objects on the entire sky.

The next summer was spent in Puerto Rico at the Arecibo Observatory — which has now unfortunately collapsed. I remember playing my box drum 'cajon' almost daily down by the 300-metre-diameter dish. That summer I studied massive star-forming complexes within the W51 region of our Milky Way galaxy and learnt how to reduce and analyse spectroscopic radio data to identify hydrogen radio recombination lines.

My final summer as a university student was spent in Green Bank, West Virginia in the heart of the radio-quiet zone region of the United States. Here I worked as a summer student for the National Radio Astronomy Observatory at the Green Bank Telescope (GBT), now the Green Bank Observatory. For my project there, I was able to look at the centre of the Milky Way using data from the 100-metre GBT. The idea was to further identify hydrogen clouds that are entrained within an outflow from the Milky Way; evidence from the ATCA telescope in Australia had first pointed towards this peculiar population of high-velocity clouds that are not following the galactic rotation. My supervisor in Green Bank had an established collaboration with the group in Australia and obtained more data for me to dig into, which eventually led to a publication down the road.

While at Arecibo my mentors had encouraged me to consider applying for a PhD programme in Europe — specifically pointing my attention to the International Max Planck Research School (IMPRS) for astronomy and astrophysics in Bonn, Germany. I kept this in the back of my mind and continued working on what would become my first lead author publication while finishing my studies at UMass. This paper had formally presented the LMT detections dating back to

when I was a very young student confirming the target list during my observations in Mexico. This publication set the stage for future follow-up because: 1) there were many more targets than there were in this pilot study; 2) these objects are gravitationally lensed, offering unique observational advantages to study the interstellar medium of galaxies in the early Universe; and 3) they are intrinsically gas- and dust-rich, and forming a plethora of stars, such that they truly are some of the brightest objects on the sky.

I had applied to do my doctoral studies at the IMPRS, which partners with the Max Planck Institute for Radio Astronomy in Bonn, the Argelander Institute for Astronomy of the University of Bonn and the Physics Institute of the University of Cologne. After receiving an offer, I decided I would go, and it was where I was encouraged to apply two years before. I hit the ground running with lots of lead-author proposals to keep pursuing these bright, dusty starburst galaxies and developed a systematic study of their molecular gas content as a focus for my thesis work. In over four years in Bonn I was able to travel to the IRAM 30-metre telescope in Spain and the APEX telescope in the Atacama desert in Chile to observe and acquire first-hand experience observing the invisible skies at millimetre wavelengths.

It was while at APEX that I spoke to one of the long-time operators about my next steps. He encouraged me, in a very Chilean manner, to definitely apply for the ESO Fellowship. I knew that observations are at the heart of who I am as a person — I observe when I meditate, I meditate while I observe, and I enjoy the process and adventure involved with each observing run. The ESO Fellowship allows me to continue this, as sustained observations and operations are at the core of ESO. The balance that comes into the equation of observing duties and focused science research is something that is always being navigated. I have had amazing experiences being able to go to observe at APEX and ALMA in the past year and a half — with breathtaking views of what looks to be Mars, but it is in fact our planet Earth. I am always inspired to do more science as I am observing, and if there is a quiet time during the observing shift I will play my djembe or another small hand drum and think about how wonderful it really is to be paid to do this: to go and observe and study the Universe.

What was initially a pilot study during my university studies has led to more than the basis of my PhD research. It has now grown into an international collaboration with multiwavelength datasets spanning all the major optical/radio/submillimetre facilities, named the Planck All-Sky Survey to Analyze Gravitationally lensed Extreme Starbursts (PASSAGES) — which I am now leading as project manager. The ESO Fellowship has allowed me to strike the balance between developing my career and my role as an experienced observer, providing the freedom and flexibility to be an independent researcher. I am looking forward to continuing this work for the next two years, and to meeting others who may end up being more lifelong friends.

ESO/B. Tafreshi (twanight.org)

ESO operates the Atacama Pathfinder Experiment, APEX, at one of the highest observatory sites on Earth, at an elevation of 5100 metres, high on the Chajnantor plateau in Chile's Atacama region. APEX is a 12-metre-diameter telescope, operating at millimetre and submillimetre wavelengths — between infrared light and radio waves. Submillimetre astronomy opens a window onto the cold, dusty and distant Universe, but the faint signals from space are heavily absorbed by water vapour in the Earth's atmosphere. Chajnantor is an ideal location for such a telescope, as the region is one of the driest on the planet and is more than 750 metres higher than the observatories on Maunakea, and 2400 metres higher than the Very Large Telescope (VLT) on Cerro Paranal.