

Fellows at ESO

Aleksandra Solarz

I was born in Krakow, Poland. Like in other cities, the sky there is not very spectacular, with only a few stars visible on a clear night. Instead of early stargazing, my interest in astronomy was born from an early and brief obsession with dinosaurs. Earth was the domain of those stunning creatures for at least 230 million years and yet it seems like all dinosaurs suddenly ceased to exist about 66 million years ago (with a few exceptions). Almost three-quarters of life on Earth was claimed by a mass extinction event. After learning that their demise could have been caused by the impact of a massive asteroid with a size of ~ 10 km that hit the Earth and drastically changed the climate, my curiosity quickly shifted to astronomy. It was when I started to wonder about other bodies roaming our Solar System, gravity and then, going deeper into the rabbit hole, to distant galaxies. Thankfully, my father has always been very inquisitive himself, and he had answers to all the questions a peculiar 6-year-old could have. He was so adamant about providing explanations that he procured a small telescope for me, through which he showed me the Moon, Venus and Jupiter's moons during summer holidays away from the city. Frequently he would urge me to search for my own solutions by putting doubt in my head and giving me a gentle nudge in the right direction.

When the time came to choose a career path for myself, without any hesitation I applied to study astronomy at Jagiellonian University in Krakow. The astronomy department has its headquarters in the Astronomical Observatory located on the outskirts of the city and is rich not only in optical and radio telescopes but also in violent history. Most of the classes were given inside an old military stronghold (Fort Skala) built in the 19th century. Exploring its many corridors and rooms was one of the highlights between the maths and physics lectures, as it holds many secrets and is shrouded in many mysteries. My favourite one is almost a ghost story about a missing crew of watchmen. When Poland wasn't in a state of war, strongholds across the country were not staffed with soldiers but were manned only by guards. The legend says that during the summer of 1910 the shift



change of guards arrived at Fort Skala but they found the place empty. The door was barred from the inside but the current crew was nowhere to be found, and there were no signs of a struggle. Despite an extensive investigation, no one could establish what happened to the missing crew. As an undergraduate student, I had great pleasure in guiding tourists through both the telescopes and the stronghold.

For my master thesis, I worked under the supervision of Agnieszka Pollo on an infrared photometric sky survey of the north ecliptic pole (NEP) made by the AKARI satellite. AKARI was launched by the Japan Aerospace Exploration Agency (JAXA), and its name is derived from a kanji word meaning "warm light". At that time the NEP field had been observed only at near- and mid-infrared wavelengths, and no optical information was available. My work was focused on developing a method to extract and characterise different types of astronomical objects like galaxies, quasars and stars and create catalogues of these sources for further analysis. This task led me to learn different computing techniques, such as machine learning, which, among other things, automates classification tasks by finding patterns within the data. These techniques have proved to be remarkably more precise and efficient (in terms of time and resources) than the manual approach

usually undertaken by a researcher. The machine learning algorithm can not only deal with significantly more data sets at once but also ensembles in multidimensional parameter space to search for (dis) similarities between different types of celestial objects. Thanks to this work and Agnieszka Pollo's vast collaboration network I was able to continue my work on AKARI data as a PhD student at Nagoya University in Japan, under the supervision of Tsutomu Takeuchi. With the catalogues of different mid-infrared-selected star-forming galaxies I created previously, an investigation of how these types of objects trace the large scale structure of the Universe came naturally.

When I was applying for a PhD position abroad, I wasn't sure how I would handle uprooting myself from Poland and moving to a completely different country with a vastly different culture from my own. From the time perspective, I can honestly say that this has been, by far, the best decision of my life. Not only could I get my PhD degree in the field of my direct interest, continuing the previous work (realised by means of top-notch technology), but also I got a chance to explore the beautiful continent of Asia and meet amazing people.

Despite fulfilling many of my goals I still felt I was missing the experience of work-

ing with ground-based data. I have always been at the ‘top of the data food chain’, where I was working on a science-ready product. I strongly believe that being familiar with different types of data (be it ground- or space-based) is necessary to become a true modern astronomer. I was always fascinated by peeking behind

the scenes of the observatory’s work and seeing what challenges the crew faces on a nightly basis. This was my main motivation to apply for an ESO fellowship in Chile. As a second-year fellow, I still think I have only seen the tip of the iceberg of what the observatory’s work is. At the same time I must honestly admit

that ever since have I joined ESO, every day I go to sleep more knowledgeable than when I woke up. I am both amazed and humbled by having the chance to work with people here, who every day dedicate themselves to creating the smoothly operating organism that Paranal Observatory truly is!

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External Fellows at ESO

In addition to the ESO fellowships, a number of external fellows are hosted at ESO.

Maria Kalliopi Koutoulaki

Born in the Greek island of Crete, a place that is not affected much by light pollution, I remember always being fascinated by the night sky. Being raised in a family working at the archaeological Museum of Heraklion, I would spend my summers at excavation sites learning about the Minoan civilisation. We would go to isolated places without electricity and although in the beginning I was interested in becoming a tomb archaeologist I was unable to resist the night sky above me. I remember looking at the Moon with my first telescope. I was mesmerised by the details I could see and it made me wonder what else could be out there.

Following my passion as a child, I decided to pursue a degree in physics at the University of Crete. I was motivated to learn more about astronomy, so I joined the astronomy club at the university, where we would have discussions about astronomy, do outreach activities to engage the public in astronomy, and of course go every week into the mountains of Crete with our telescopes to explore the night sky. As part of my undergraduate thesis, I had the opportunity to work on the characterisation of interacting galaxies using optical spectroscopy and near-



infrared imaging under the supervision of Andreas Zezas. I had the unique experience of taking my own data from Skinakas Observatory where I learned to operate a professional telescope. This, along with a summer I spent at the University of Texas at Austin, made me realise how wonderful it is to work as part of a research group. Being able to exchange ideas, trying to understand what our results meant, along with finding new ways to answer them convinced me

that I wanted to continue working in such an environment.

In order to gain more experience, I decided to take my research to the next level by moving to Dublin for my PhD. I got a scholarship at the Dublin Institute for Advanced Studies (DIAS) and the University College Dublin (UCD) to conduct research under the supervision of Tom Ray, Rebeca Garcia Lopez, Antonella Natta, and Deirde Coffey. During my PhD,