

## Fellows at ESO

### Cyrielle Opitom

I was born and grew up close to Liège in Belgium. As far as I can remember, I have always been interested in astronomy, space exploration and science in general, even if at the time I could not imagine that I would someday become an astronomer. I was simply curious to understand how things work, from inside the human body to the distant Universe. Later, in high school, I majored in mathematics and sciences, and I was lucky to have great maths and physics teachers who allowed me to cultivate and develop my interest in science.

After graduating from high school, I vacillated between biology and physics, but I finally decided to follow my first passion and to start a Bachelor in physics, with the intention of specialising in astronomy. The choice of university was easy since Liège University, which was just next door, was the only one in the French-speaking part of Belgium to offer a Masters in space sciences. Because I enjoy sharing my passion for space and astronomy, during my university years I had a summer job at the “Euro Space Center” in Belgium, developing activities aimed at kids and centred on the theme of space exploration. This was a great experience and encouraged me to continue to do outreach.

During my Master’s degree, I took a class called “Small Bodies of the Solar System”. At that time, I became fascinated by comets. In addition to being incredibly beautiful objects, they are types of fossils that allow us to study the history of the Solar System. There is a quote from David Levy, which I think describes comets particularly well: “Comets are like cats; they have tails and they do precisely what they want”. This summarises how, after studying them for more than a century, comets remain mysterious objects and keep surprising us; and it is the reason I chose comets as the subject of my Master’s thesis, during which I had the chance to work with the TRAnsiting Planets and Planetesimals Small Telescope (TRAPPIST) project, which consists of two 60-centimetre telescopes, one each in the northern and southern hemispheres. At the time I worked on it, only the southern telescope existed, which is



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hosted at the La Silla Observatory in Chile.

I really enjoyed this first encounter with research, especially with such fascinating objects as comets. I was lucky enough to get a grant, so could start a PhD in Liège, continuing with my Master’s thesis work to study and compare the chemical composition of a large number of comets observed with the TRAPPIST telescope. Less than two weeks after starting my PhD, I flew to La Silla. This was a technical mission, and my first contact with a professional telescope was with a screwdriver in my hand. I immediately loved being at an observatory, especially working on a small telescope, where you can have direct contact with the instrument you are using. Being part of the TRAPPIST team gave me the opportunity to have an overview and get involved in all aspects of the facility, from technical aspects to scheduling to observing.

From the scientific point of view, I am thankful to my supervisor because I was given a lot a freedom to work on the project my own way as well as pursue new ideas. One of the most exciting parts of my thesis was my involvement in the ground-based support campaign of the ESA Rosetta mission. Sending a space mission to orbit a comet, and eventually landing on its surface was an incredible achievement, and it was a fabulous opportunity to follow the results and new developments of the mission while trying to link those to what we were observing from the ground. It is also in the framework of this ground-based campaign that I came to Paranal for the first time. This

first experience at Paranal in addition to my previous ones at La Silla (and the incomparable beauty of Chile) played an important role in my decision to apply for an ESO fellowship after the end of my thesis.

This is how I ended up in Chile, living abroad for the first time. I have never regretted my decision to come to ESO Chile and highly appreciate the stimulating multi-disciplinary environment and the opportunity to learn about very different scientific topics. I also enjoy the freedom that I have to pursue my own research, and to try to expand our understanding of the composition of small bodies of the Solar System.

ESO offers a lot of opportunities that I would not have elsewhere, especially as a young scientist; I get to mentor students, define my own projects, take up responsibilities, and organise conferences. Thanks to my duties in Paranal, I have learned a lot and gained familiarity with new instruments and new techniques. Being assigned to the HAWK-I infrared imager, I have also participated in the commissioning of its adaptive optics module, working with a really great team. The teamwork is something I particularly appreciate about Paranal. In the future, I hope I can continue to do research and keep observing regularly, as I love being in an astronomical observatory. In any case, I feel lucky to have a family who always encouraged me to pursue a career in astronomy. It made it so much easier to get here.

## Chris Harrison

What a luxury it is to be a professional astronomer. I actually get paid to use huge telescopes to study supermassive black holes destroying galaxies. Yet, perhaps surprisingly, my journey to an ESO Fellowship has not been a clear predefined path towards astronomy after some inspirational events during my childhood. Instead, my route to becoming an ESO Fellow has been filled with indecisiveness, difficult decisions and self-doubt, but also, most importantly, influential and supportive people.

Beyond wanting to go to university in my home country of the UK, at the age of 17, I really did not know what I wanted to do after school. I ordered around 40 university prospectuses and spent hours flicking through the pages looking for inspiration. After a systematic approach to whittle down the options (involving an Excel spreadsheet), I was left with either astrophysics or digital multimedia design. It was almost a flip-of-a-coin decision that resulted in my opting to enroll on an integrated (four-year) Master's Degree in astrophysics at the University of Edinburgh.

After a couple of months of my degree I had my first experience of what is now widely known as "imposter syndrome" and nearly dropped out, believing that I didn't have what it takes. Thanks to support from my parents and a new friend (who ended up being the best man at my wedding), I decided to try a second semester. I eventually found my feet and started to feel a real passion for astronomy. This was especially true for the third-year research projects, particularly when I was using a small telescope on the roof to make colour-magnitude diagrams of stellar clusters under the supervision of Rob Ivison. During this time, I also found great joy in volunteering to do outreach at the Visitor Centre at the Royal Observatory.

Eventually I came to the conclusion that my skills would be best used by becoming a physics teacher. I decided to not take a full Master's qualification, but to leave after my third year with a Bachelor's degree and take the "spare" year to go travelling with my girlfriend (who is now



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my wife). However, on getting wind of this, Rob Ivison took me into his office and said, "you should consider a PhD". Consequently, I thought it might be sensible to make some initial enquiries about doing a PhD when I returned from my travels. This is when I first met Dave Alexander with his infectious enthusiasm for anything related to supermassive black holes.

Four months of backpacking in Southeast Asia and five months of bush camping in Western Africa gave me a considerable amount of time to reflect upon what I wanted from life. I concluded that it might be quite fun to undertake a PhD. I was lucky enough that Dave Alexander was able to take me on as his student at Durham University. He set me off on reducing integral field spectroscopy (IFS) data from the Near-Infrared Integral Field Spectrometer (NIFS). These data were of distant star-forming galaxies that host rapidly accreting black holes, and the goal was to search for evidence of gas being expelled from the galaxies. The project was certainly exciting, and I was delighted to have a set of data that nobody else was working on. Despite this, I briefly felt again that I did not have what it takes to be an astronomer and the other students were much more intelligent and better researchers. However, thanks to supportive people around me, I managed to continue.

My PhD evolved into using Herschel Space Observatory data to study star formation rates in distant active galaxies. Then I started working on data that I had been awarded as Principal Investigator and began to take charge of my own research. During my PhD I also took advantage of many exciting opportunities to do outreach, for example, delivering planetarium shows, giving public talks, and designing exhibitions for science festivals. For my first postdoctoral position, I stayed on at Durham, taking control of large ESO projects involving the *K*-band Multi-Object Spectrograph (KMOS) to study the internal gas kinematics and dynamics on hundreds of distant galaxies; some of Durham's Guaranteed Time on KMOS.

With a wife, a one-year old daughter and a son on the way, it was difficult to decide to move the whole family to Germany in order to take up the ESO Fellowship. However, the pull of the fantastic opportunities that working at ESO would bring, and of living in Munich, were too great to resist. It is such a privilege to be working at the Headquarters, alongside such a broad range of people. I now am working on a range of datasets, from programmes I am leading involving radio interferometry (eMERLIN; VLA; ALMA), more IFS data (ESO/VIMOS; ESO/SINFONI) and X-ray data (Chandra); these are mostly driven by the goal to establish the connection between supermassive black holes and their host galaxies. I am also lucky enough to have two excellent students working alongside me on these projects.

I am elated to be working alongside the Supernova coordinator Tania Johnston on the ESO Supernova Planetarium & Visitor Centre for 25% of my time (my "ESO project"). I feel honoured to have been part of developing the educational workshops and planetarium shows, and I am now getting to see them in action, since we opened in April of this year. At ESO, I also have the role of being one of the fellow representatives, which gives me the opportunity to improve and refine the Fellowship programme for the other ESO Fellows. Indeed, this has lately become a strong ambition — to ensure that astronomy can be a safe, supportive and enjoyable career for everyone. After all, it is a luxury to be able to do this job, and we should all be having a fun time doing it.

## Miguel Querejeta

I was six years old when I first looked through a telescope. It was in a small town called Ezcaray, in the Spanish wine-producing region of La Rioja. I used to spend long summer periods there with my family and those dark night skies always fascinated me; I distinctly remember the feeling of the chilly breeze on a deck chair on the roof terrace, watching shooting stars for hours on end. In such a setting, it seems natural to wonder about the physical nature of those shiny objects — and here I am, more than 20 years later working as a professional astronomer!

However, the fact that I felt such an early fascination for astronomy did not mean that I always wanted to pursue studies in that direction. As a teenager, I seriously considered the option of studying mathematics, neurobiology, classics, and even history of art, which drove my parents a bit crazy. Despite my whims, the support from my parents was always admirable, and they encouraged me to follow my passion for astrophysics. This eventually took me to Madrid, where I studied Physics with Astronomy at the Universidad Complutense.

From 2011–2012, I was fortunate enough to spend a year abroad at the University of Nottingham through the Erasmus scheme, which is a European community action scheme to encourage the mobility of university students. I was guided by a brilliant tutor, Alfonso Aragón-Salamanca, and I had some excellent lecturers there, such as Mike Merrifield, Chris Conselice, and Omar Almaini. The atmosphere of the Nottingham Astronomy Group was very enthusiastic, and I was able to undertake a year-long research project under the supervision of Loretta Dunne: using data from the Herschel Space Observatory to study dusty early-type galaxies — which I very much enjoyed.

That initial research experience at Nottingham motivated me to look further for possible internships, and I obtained a studentship to spend a whole summer at the Instituto de Astrofísica de Canarias, in Tenerife. There, I analysed dynamical resonances in galaxies with John Beckman and Joan Font. I was stunned by the tele-



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scopes in La Palma, and it was one of the most memorable summers of my life.

At that point, I was fully convinced that I wanted to embark on a PhD in astrophysics by the end of my undergraduate studies, and my colleagues from Tenerife informed me about an interesting opportunity: a Marie Curie Initial Training Network called Detailed Anatomy of GALaxies (DAGAL). This included several positions across Europe in the field of nearby galaxies, and I opted for the project in Heidelberg: a decision that I did not regret! I conducted my PhD at the Max Planck Institute for Astronomy, supervised by Eva Schinnerer and working closely with Sharon Meidt, to whom I owe a lot. My PhD area was quite broad and included investigating how stellar mass is distributed in galaxies, molecular gas flows, and nuclear activity, while spanning a wide range of wavelengths and techniques.

Obtaining an ESO Fellowship straight after the PhD was like a dream come true, as it was at the very top of my list of preferences. One of the most attractive aspects of working at ESO is interacting with such a wide range of people; the atmosphere is extremely friendly, and everyone is very approachable and willing to help. As an example of the cooperation among ESO Fellows, I would like to highlight a workshop that we recently organised on galaxy interactions and mergers. The entire journey from the initial seed of a crazy idea to the final event was the result of the fruitful collaboration of five ESO Fellows. The conference took place in Sexten (Italy) in March 2018, and it attracted experts from all over the

world; the result was a most enjoyable and productive workshop, leading to a healthy exchange of ideas and triggering new projects and collaborations.

My main research focus at ESO is trying to understand the factors that regulate the conversion of gas into stars in nearby galaxies; for that goal, I rely on observations from interferometers such as the VLA, NOEMA, and ALMA. This research is largely pursued in the context of international collaborations, and working with such a wide range of people makes it particularly attractive to me. In addition, my functional duties include developing outreach material for the ESO Supernova Planetarium and Visitor Centre, and I am one of the visiting observers for the APEX telescope in Chile.

Ironically, very soon after I started in Garching, I was awarded a permanent position at the Observatorio Astronómico Nacional in Madrid, where I will move in a few months. I tried my luck with the application encouraged by colleagues from Madrid, honestly thinking that my chances were vanishingly small. But life is full of surprises, and if there is one thing that I have learned over the years, it is that one should always try, no matter how hard or unlikely something may seem! In retrospect, I can hardly believe the chain of coincidences that has brought me to where I am. I feel most privileged to work in a field like astronomy, which is so exciting and full of inspirational people.