massive protostars (Ke Wang). The combination of high excitation molecular lines observed by Herschel and the low excitation lines observable with ALMA allow the role of turbulence in dense molecular clouds to be constrained (Andy Pon).

Herschel observations of protoplanetary discs have allowed us to expand our knowledge of the different evolutionary phases of discs, as initially defined by Spitzer surveys. The far-infrared photometric observations alone are not able to fully constrain the disc structure and evolution, but the Herschel catalogues provide excellent databases for extracting interesting sources for ALMA follow-up (presentations by Alvaro Ribas Gómez and Hector Canovas).

Several presentations focused on the prototypical carbon-rich evolved star IRC+10216, repeatedly observed by both ALMA and Herschel, with surprising outcomes, such as the detection of hydrides or CH_3CN, and even a suspicion of the existence of a toroidal structure around the star (Guillermo Quintana-Lacaci, Luis Velilla Prieto and Marcelino Agundez). The detailed mechanism of molecule formation and evolution in the expanding shells around the star of IRC+10216 can only be traced through extensive and spatially resolved spectral line surveys, complemented by laboratory measurements and models (José Cernicharo).

Finally, observations of the atmosphere of Titan with Herschel and ALMA were also presented. These data, in combination with detailed atmosphere models, allow the chemistry of the satellite and the possible evolution of its atmosphere to be constrained. Future ALMA observations will allow the search for more complex and less abundant molecules and to resolve the vertical structure of Titan's atmosphere (Miriam Rengel).

Other than the astounding scientific results, the main outcomes of the workshop were that synergies between the Herschel and the ALMA data and archives will continue to exist long after the end of Herschel operations, and that both facilities will leave a great legacy behind, thanks to their respective archives.

References

Testi, L., Pilbratt, G. & Andreani, P. 2011, The Messenger, 143, 52

Links

[1] Herschel Science Archive: http://www.cosmos.esa.int/web/herschel/science-archive
[2] ALMA Science Archive: http://almascience.eso.org/aq/

Fellows at ESO

Joe Anderson

I grew up in in the countryside near Carlisle, a small city in the north of England very close to the border with Scotland. As over all of the UK, the skies were dominated by clouds and rain; however during those few clear nights, beautiful star-filled skies could be seen due to the relatively low level of light pollution. In addition, our family used to take a yearly holiday to the west coast of Scotland in a remote village called Glenelg. Many a night was spent around fires on the beach below the stars. While I think that these experiences may have influenced my later life/career choices, at that stage I never thought that I would have a career as a professional astronomer.

At secondary school I excelled at maths and physics, and hence chose to study those (together with chemistry) as A-levels (16–18 year education). When university degree decision time came, I was slightly lost in terms of the direction for my continued education/career. The obvious choice was to continue and study physics further, but the exact details were not clear. In the end I chose to do a physics with astronomy course at the University of Liverpool/Liverpool John Moores University. However my parents still joke that this was simply because "Astronomy" is one of the first courses to appear in university prospectuses!

While I enjoyed the content of many undergraduate courses, it was only when I started my first research project that I really began to feel motivated to push myself further. This first research project introduced me to the topic of supernovae, and formed the basis of my research to complete my MPhys degree. At the same time we were invited to attend

Joe Anderson

seminars at the Astrophysics Research Institute (ARI, Liverpool John Moores University [LJMU]), together with journal

clubs and other general research activities. At this point I saw a clear shift in the learning experience. Whereas previously in school, and at early undergraduate level, it seemed as if the emphasis was on gaining specific knowledge/skills as defined by teachers/lecturers, now the emphasis was almost completely on the student to drive the direction of study/research. Being allowed/encouraged to basically do what one wants motivated me to continue to do research and still motivates me to continue today, where freedom to continue research in the direction of one's personal interests makes the academic research life such an enjoyable one. Hence, the next natural progression was to continue to study for a PhD, for which I stayed in Liverpool and continued the subject of my MPhys research as my thesis topic at the ARI, LJMU. My thesis concentrated on constraining the progenitor characteristics of supernovae through studying their parent stellar populations within host galaxies. Indeed, this is a subject on which I continue to spend significant research time to this day.

After completing my PhD in 2009, I moved to Chile to start a postdoc position at the Universidad de Chile. Chile has long been an important player in the supernova research community, and this position gave me the opportunity to collaborate with many supernova experts. After two years as a postdoc, I was awarded a FONDECYT fellowship (Chilean national research fellowship), and continued my stay at Universidad de Chile for another three years. During this time I also became a father for the first time (we now have a second child) with my Chilean girlfriend, and hence my ties to Chile became stronger. Being awarded an ESO Fellowship enabled me to continue both my family and research life in Chile, while giving me the opportunity to work at the Paranal Observatory.

I very much enjoy my shifts at Paranal, in particular the interaction with non-astronomers which gives one a different perspective to the world of astronomy. Being at the end point of science operations also enables insight into the exact workings of instruments and the intricacies involved in performing the most efficient observations. Indeed, this experience has driven a new project: The All-weather MUse Supernova Integral field Nearby Galaxies (AMUSING) survey, for which I am the PI. This project uses sub-optimal observing conditions to observe supernova host galaxies with the recently commissioned MUSE instrument, with the aims of constraining supernova progenitors, refining the use of supernovae to understand the Universe, and furthering knowledge of galaxy evolution, dynamics and stellar populations. The survey is rekindling my studies on supernova environments, the first field that persuaded me to follow a career in astronomy.

A recurring theme that one encounters as a professional astronomer is the question of spending public money on blue-skies research. This question can be particularly pertinent in Chile/South America, where many people still live in significant poverty, and it is something I am continually debating with non-astronomy Chilean friends and family. There are many standard answers to such a question, many of which concentrate on examples of subsequent benefits to society. However, my opinion (and one that I stress in all such discussions) is simply that this funding is justified because as human beings we always want to know why. From a young child seeing stars on a clear cold night to professional astronomers directing a state-of-the-art telescope at a galaxy far from the Earth, our interest is driven by the question of why. To me this simple fact is sufficient to justify astronomy research and I am honoured to be able to be at the forefront, seeking the answers to the questions of why. My current position as an ESO Fellow allows me to continue this pursuit and continue to learn about the Universe and the technical process of its observation.

Oscar A. Gonzalez

I have been asked many times how I decided to become an astronomer, and my answer is always the same: I think life itself made that decision for me. I grew up in a small Chilean town called Chillán, and although I was always interested in science from reading magazines or books, I never really thought of it as a career path. I was good at maths and physics, and with such a profile in those years, your

Oscar A. Gonzalez

academic path was basically written in stone — studying engineering at the Universidad de Concepcion. During my last year of high school we were invited for a tour of the different departments at the University, and I decided to go and see the Physics faculty. I asked the Professor about astronomy as a career, and his answer was categorical: "You have to be a genius to do that. Only the greater minds would follow such a career." I was discouraged and, despite my maths teacher insisting that the professor was wrong, I became an engineering student.

Life, on the other hand, seemed to have something different in mind for me. During my first year of studies, I was very sick and was forced to spend five months in bed with reduced movement. With such an experience, and having so much time on my hands to think, I decided to make a change. I would do what I wanted to do. I would try to become an astronomer at Pontificia Universidad Catolica (PUC) in Santiago.

It was very scary, moving from Chillán to an enormous city like Santiago to study something I thought I wasn't smart enough for. But once again, life gave me a helping hand. I came across a course given by Manuela Zoccali that involved trips to the observatory of the astronomy department, where we would carry out

observations, try image reduction techniques and data analysis. That was the point I realised that I was finally where I was supposed to be. I continued to work with Manuela for the duration of my studies, and she would always find a way to keep me motivated. I did my Master's thesis under her supervision, studying chemical abundances of Galactic Bulge stars, and enjoyed every minute of it.

Afterwards, it was time to think about a PhD. I wanted to keep working with Manuela, and I wanted to keep studying the Milky Way Bulge, but I had to move from Chile. During the last years of my degree I met Dante Minniti, Principal Investigator of the Vista Variables in the *Vía Láctea* (VVV) survey. This is a tremendous project to study the Bulge in a way that had never been done before, and Manuela was a member of the team. As such, she suggested I apply to the International Max Planck Research School (MPRS) PhD programme at ESO Garching to work on VVV data with Marina Rejkuba. I was lucky to be offered the position, and together we did more than I would have ever imagined. I cannot stress enough how encouraging it is to do a PhD at ESO Garching, where you are constantly surrounded by people who are passionate about science.

After my PhD, I wanted to move back to Chile to finish ongoing projects with Manuela and Dante. But above all, I wanted the chance to put my growing interest in instrumentation into practice. Applying for an ESO Fellowship in Chile was the natural thing to do to achieve this, and the decision has proven itself to be the right one time and time again. I literally get sad when I have to return from my Paranal duties... but don't tell my boss! Great interactions with colleagues and visitors have made me grow as an astronomer.

Whenever I look back, I am amazed at what I went through to get to where I am now. I went from using a little 40-centimetre telescope as a scared student at PUC, to becoming night shift coordinator for the VLT! Everybody should have the opportunity to reach their potential while doing what they are passionate about, and I will always be thankful to the people who helped me get here. Life is too short to spend it doing something you don't love and, as someone told me recently, if you really believe in what you are doing, success is just a matter of time.

Bin Yang

Open a history book, any book — it never lacks stories about emperors, conquerors or adventurers. Rarely do we get to read stories about scientists, of whom so many devote their entire lives to trying to unlock secrets of the Universe through years of toil and yet remain almost unknown. I used to wonder what drove these people to live such lives. Recently, I think I have begun to see why.

I was attracted to science at a very young age because of my family. I was born into a teacher's family in Kunming, a sunny city in the southwest of China. Both my parents suffered through the infamous Cultural Revolution and couldn't pursue advanced degrees. On account of their unfulfilled dreams, they held a special regard for scientists and my bedtime stories were often about mathematicians or physicists. Growing up in this family, I developed a strong interest in the natural sciences. Initially, I was fascinated by insects and wanted to become an entomologist. However, at the time I was applying to universities, very few schools offered courses in entomology, and the ones that did were really about agriculture. So instead of insects, I decided to study astronomy and physics at Beijing Normal University. And this would, no doubt, be a good foundation for an academic career.

In the summer of my senior year, I got an internship to observe asteroids at the National Astronomical Observatory of China (NAOC). There I met Jin Zhu, an energetic and passionate astronomer. Using a 90-centimetre Schmidt telescope, Jin and his team discovered thousands of new asteroids and made his programme the fifth largest asteroid observation project in the world in early 2000. I didn't know much about Solar System studies, but I really enjoyed the experience of observing these mysterious asteroids that were being looked at for the first time by us! After the internship, I did some literature research and found that Solar System

Bin Yang

study is a field full of surprises and evolving fast. I joined Jin's team and finished my Masters at NAOC.

While I was considering going to the US to continue my studies, I met another important mentor in my life: David Jewitt, was a distinguished professor at the University of Hawaii (UH) at the time. Dave visited NAOC and gave a talk about recently discovered objects in the Kuiper Belt, the debris disc of the Solar System. His talk was so interesting and funny. While sitting in the audience, I wished I could work with him someday. A year later my dream came true. I was accepted to the graduate programme at UH and Dave agreed to be my dissertation advisor.

The first year in Hawaii was exciting, but also terrifying. My first-ever observing proposal, which I wrote with Karen Meech, was to observe comet 9P/Temple 1, the target of the NASA's Deep Impact mission, using the Keck Telescope. I was overwhelmed and super stressed because *Deep Impact* seemed so much more important than anything I had worked on before. I still remember the sleepless nights I spent on that project report.

For my dissertation, I studied Jupiter's Trojan asteroids, the two swarms of small asteroids that lead and trail the planet by 60 degrees. This was observationally challenging because Jovian Trojans are small and far from the Sun and the Earth. Since I was pushing the detection limit, I was not afraid of trying new instruments or new techniques.

As a result, I ended up using all the facilities on Mauna Kea, except for the Submillimeter Array. Although I didn't make any ground-breaking discoveries, we were able to set upper limits on the surface water content of Jovian Trojans. The best lessons I learned from Dave are: you should never let self-doubt disturb your focus and that you should not be afraid of trying new things. Another of his mottos will always stay with me: perfection is the enemy of good enough.

After my PhD, I entered the new and expanding field of astrobiology. I was a postdoctoral fellow at NASA's Astrobiology Institute in Hawaii. Besides astronomers, my office-mates included geologists, biologists and oceanographers. Our areas of expertise were so different and yet we were always trying to find common ground between our seemingly disparate fields. I miss the days we spent talking about amino acids, genetic codes and meteoritic chondrules.

After kissing Mauna Kea goodbye, I flew to Chile and started work on Cerro Paranal, the other great temple of telescopes. The first year I spent in Chile turned out to be a very fruitful year. Using SINFONI, we observed the famous Siding Spring comet, C/2013 A1, which made a close approach to Mars, penetrating its atmosphere in mid-October of 2014. Around the same time all the Martian rovers, spacecraft, the Hubble Space Telescope and major ground-based telescopes were focusing on this comet. Using the new extreme adaptive optics instrument, SPHERE, my colleagues and I detected a new satellite of the multiple asteroid system, 130 Elektra. I have truly enjoyed the company of my warm-hearted ESO colleagues and fellows.

One night, I went out to look at the new laser for MUSE, propagating from Yepun. It was a clear night and the orange beam seemed to connect directly with the full Moon, as if the laser was shooting straight out from the Moon. Silver moonlight shone on the domes of the VLTs. Looking at the scene, I understood why people were willing to devote their entire lives to science and remain anonymous. Decoding the mysteries of the Universe is the ultimate reward for so many of us.

Personnel Movements

Arrivals (1 April–30 June 2015)

Europe	
Gunka, Manuela (DE)	Administrative Assistant
Gutierrez Cheetham, Pablo (CL)	Electronic Engineer
Man, Wing Shan (CN/HK)	Fellow
Meyer, Katarzyna (PL)	Budget Controller
Oberti, Sylvain (FR)	AO Physicist

Chile	
Cortes, Angela (CL)	Instrumentation Engineer

Departures (1 April–30 June 2015)

Europe	
Gojak, Domingo (DE)	Electronics Engineer
Lagos Urbina, Claudia del Pilar (CL)	Fellow
Liske, Jochen (DE)	Astronomer
Rakich, Andrew (AU)	Optical Engineer
Tobar Carrizo, Rodrigo Javier (CL)	Software Engineer
Wang, Yue (CN)	Student

Chile	
de Boer, Jozua (NL)	Student
Shultz, Matthew (CA)	Student