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European Astronomical Society e-Newsletter 6

May 2018

EAS News

New EAS membership arrangements

Proposal to be approved formally by the EAS General Assembly

The EAS aims to represent European professional astronomy and space science, and to do this optimally a large membership base is required. EAS Council has therefore developed a new model for EAS membership, in which membership will be free and practically automatic for most members of one of the EAS Affiliated (National) Societies. The impact of this change on the EAS and its finances has been carefully evaluated, and Council thinks it can be managed.

Read more

EAS will maintain ordinary and junior members, where the latter are PhD candidates. For all EAS members who are proposed by Affiliated Societies and comply with EAS membership criteria, EAS membership will be free of charge. The Affiliated Societies have already been informed and are generally very positive. Affiliated Societies will pass on membership information the EAS, but may well need to ask individual consent from their own members, and may need to inform them of data protection issues. Your own National Society will contact you about this. Colleagues who are not members of an Affiliated Society, or who cannot be (for instance because no such Society exists where they reside) can still become members of the EAS but will have to apply directly. Such 'independent' members will continue to pay a membership fee to the EAS.

The EAS has a number of 'life members' who have been and are among our most loyal supporters. We will offer these life members a refund on the fees that have already paid, in inverse proportion to the number of years that they have been a member. EAS Life Members will be contacted individually in the coming months.

EAS Council has agreed to move towards this new membership scheme, but the proposal will have to be approved formally by the EAS General Assembly. Council will recommend approval to the GA at the next meeting, taking place on 27 August 2018 in Vienna, on the premises of the IAU GA, so until then no irreversible decisions or implementation steps can be taken.

Finally, the EAS Treasurer wishes to remind all EAS members who have not yet paid their 2018 fees to do so soon (the deadline was 31st March 2018).

Johan Knapen, EAS Treasurer

European Regional Office of Astronomy for Development
Joint venture by Leiden University and the EAS

The IAU Office of Astronomy for Development (OAD) was set up in 2011 as a joint venture between the IAU and South Africa to implement the IAU Strategic Plan "Astronomy for Development 2010-2020" and its mandate has been extended. Besides establishing OAD Task Forces for selecting and implementing astronomy-for-development activities, the OAD has initiated nine Regional OADs (ROADs) and three language expertise centres (LOADs) throughout the world. ▾ Read more

So far, most of Europe has not been covered by any of the existing ROADs. Although Europe is a region in which astronomy is highly developed, the use of astronomy as a tool for achieving several of the UN Sustainable Development Goals is very relevant for the Continent. The proposal for establishing a Leiden—EAS European ROAD was approved unanimously by the EAS Council and by the OAD Steering Committee.

Ceremonial signing of agreement for the IAU European Regional Office of Astronomy for Development. From Left: Prof. H. Rottgering, Director, Leiden Observatory; Dr. V. McBride, Acting Director Global OAD; Prof. P. Benvenuti, General Secretary IAU; South African Minister Pandor; Prof. G. de Snoo, Dean Faculty of Sciences, Leiden University; Prof. G. Miley; Prof. R. Davies, President European Astronomical Society; Dr. P. Russo.

An agreement to set up the ROAD was signed by the IAU, the OAD and the Joint Hosts (Leiden and the EAS) in Leiden on 26 February 2018, after a ceremonial address by the South African Minister of Science and Technology, H. E. Naledi Pandor. She had just accepted the award of Leiden University Visiting Oort Professor of Astronomy for Development (see also the IAU press release on the launch of European ROAD). The European ROAD was formally launched at the EWASS in Liverpool.

The new ROAD will carry out and coordinate relevant astronomy-for-development activities in all three Task Force areas defined in the IAU Strategic Plan — Universities/Research, Schools/Children and Public Outreach, focusing on accomplishing the UN Sustainable Development Goals in Europe. These tasks will be carried out in cooperation with existing activities of pan-European and national astronomical organisations.

IAU press release on the launch of the European ROAD

Tycho Brahe Prize 2018 to Andrzej Udalski
Tycho Brahe Prize awarded during the EWASS meeting in Liverpool

The 2018 Tycho Brahe Prize is awarded to Prof. Andrzej Udalski (University of Warsaw, Poland) in recognition of the role as driving force behind OGLE (Optical Gravitational Lensing Experiment), one of the most successful and longest running sky-variability surveys ever undertaken. OGLE has made a significant impact on many fields in modern astrophysics. ▾ Read more

Andrzej Udalski was born in Łódź, Poland. He graduated in 1980 from the Faculty of Physics at the University of Warsaw and obtained there his PhD thesis in 1988. He then moved to York University in Toronto, Canada as a postdoc and returned to Poland after two years. He obtained his habilitation at the University of Warsaw in 1995 and became professor in

2000. He directed the Astronomical Observatory from 2008 to 2016.

Prof. Udalski has won several awards, including the prize of the Foundation for Polish Science in 2002, the highest for a Polish scientist, an ERC IDEAS Advanced Grant in 2009, and the Dan David Prize in 2017 in recognition to his role as a pioneer in the field of time-domain astronomy. He is a member of the Polish Academy of Sciences and the Polish Academy of Arts and Sciences since 2004 and a Foreign Associate of the US National Academy of Sciences since 2012.

Prof. Udalski is the driving force behind OGLE (Optical Gravitational Lensing Experiment), one of the most extensive and longest running sky-variability surveys ever undertaken. He leads all aspects of OGLE, from the scientific goals, construction of the detectors and the dedicated 1.3m Warsaw Telescope (Chile), developing sophisticated data analysis software, and interpretation of the results. Prof. Udalski's work continues to have a considerable impact on many fields in modern astronomy, such as gravitational microlensing, extrasolar planets, variable stars, stellar astrophysics, structure of the Milky Way and the Magellanic Clouds, calibration of the cosmic distance scale, and discovery of Kuiper Belt objects.

Professor Andrzej Udalski's scientific career has been connected with the OGLE survey since the early 1990s. He put into practice the early idea by Bohdan Paczyński to regularly monitor millions of stars to search for sudden brightening caused by gravitational lensing by hypothetical dark massive objects in the halo of the Milky Way. OGLE has produced top ranked discoveries across many fields of modern astrophysics for almost three decades.

Andrzej Udalski designed and constructed detectors for consecutive phases of the OGLE project. The current phase (OGLE-IV) uses a large new generation CCD mosaic camera with 32 detectors, one of the largest scientific instruments of this type worldwide. Prof. Udalski designed and assembled all aspects of this camera — the mechanical parts, electronics, software, and the interface with the Warsaw Telescope, located at the Las Campanas Observatory in Chile. He also implemented the data pipeline software and the efficient real-time data analysis systems, including the Early Warning System, very successfully used for the real time detection of gravitational microlensing events since 1994.

The application of such massive photometry went well beyond the detection of microlensing events, making OGLE one of the largest sky-variability surveys ever undertaken. A vast quantity of data on stellar variability was collected, analysed and made freely available to the astronomical community. The OGLE collection of well characterised periodic variables is the largest in modern astrophysics.

Prof. Andrzej Udalski is the author or co-author of close to 500 publications in peer-refereed journals (including about a dozen articles in Nature and Science), which totalise more than 20,000 citations so far.

EAS News

Lodewijk Woltjer Lecture 2018 to Conny Aerts

Lodewijk Woltjer Lecture awarded during the EWASS meeting in Liverpool

The 2018 Lodewijk Woltjer Lecture is awarded to Prof. Conny Aerts (KU Leuven, Belgium and Radboud University Nijmegen, the Netherlands) for outstanding work in stellar physics, in particular in the field of asteroseismology.

▾ Read more

Prof. Conny Aerts graduated as mathematician from Antwerp University in 1988 and defended her PhD thesis in astrophysics at KU Leuven in 1993. She continued her career as Postdoctoral Fellow of the Research Foundation Flanders until 2001, defining an independent research track and performing numerous stays abroad in Europe, Chile and the USA to achieve it. She was appointed as Lecturer (2001), Associate Professor (2004), and Full Professor (2007) at KU Leuven. Since 2011, she is Director of the Institute of Astronomy in Leuven. Since 2004, she also leads the Chair in Asteroseismology at the Radboud University Nijmegen. She is the recipient of 2 ERC Advanced Grants (2009 and 2016) and was

awarded the Francqui Prize in 2012. Conny Aerts is an Honorary Fellow of the Royal Astronomical Society since 2010, and Commander in the Order of Leopold since 2016, the highest civilian recognition offered through Royal Decree by His Majesty King Philippe for services to the Kingdom of Belgium.

Prof. Conny Aerts is a stellar astrophysicist, working on stellar structure and evolution, with a focus on variable stars. She is a pioneer in the research domain of asteroseismology. This topic received an immense boost thanks to recent space missions, delivering high- precision uninterrupted space photometry. This kind of data brought her to the cores of stars and in particular to their interior rotation and mixing. Conny Aerts and her team developed rigorous mathematical methods to detect and identify non-radial pulsation modes in stars from high-precision spectroscopy and space photometry. Her team also designed and applied supervised and unsupervised statistical clustering methods for big data sets to find variable and binary stars of various kinds, as starting point for follow-up campaigns for asteroseismology. These methods recently led to the discovery and interpretation of numerous gravity-mode pulsators, opening new probing power for stellar interiors. Thanks to her appointment as Chair in Asteroseismology at the Radboud University Nijmegen in 2004, Conny introduced herself to the topic of subdwarf stars, their binarity and pulsations.

In 2009, Prof. Conny Aerts was awarded an ERC Advanced Grant, PROSPERITY to evaluate stellar models from CoRoT and Kepler space asteroseismology. Under her leadership, her PhD students made major contributions, such as the discovery of non- radial pulsation modes, dipole mixed modes, and non-rigid rotation in red giants, following her earlier detections of core overshooting and core rotation in massive stars. This culminated in the prestigious 2012 Francqui Prize, also termed Belgian Nobel Prize. Conny Aerts was the first woman to receive this prize in the option Science & Technology since its creation in 1933. The ERC offered her a second Advanced Grant, MAMSIE, in 2016 to bridge stellar physics and 3D hydrodynamics with the aim of remedying shortcomings in stellar evolution theory of massive stars.

Conny Aerts supervised more than 40 Master students, 25 PhD students, and 15 externally recruited postdocs. She also took part in more than 50 PhD examination committees. She teaches various courses in the Master Astronomy & Astrophysics at Leuven and Nijmegen universities, while she also gives training on gender-related, mentor$mdash;mentee and science communication and outreach topics. Conny Aerts is member of numerous international committees and boards. As Belgian Principal Investigator, she is heavily involved in the ESA M3 space mission PLATO that should get launched by 2026.

EAS News

MERAC Prizes 2018 to Sandrine Codis, Renske Smit and Martin Pertenais

MERAC Prizes for the Best Doctoral Thesis awarded during the EWASS meeting in Liverpool

At the EWASS 2018 meeting in Liverpool, the 2018 MERAC Prizes for the Best Doctoral Thesis were awarded. The winner in the category Theoretical Astrophysics was Dr Sandrine Codis for the study of the imprint of the large-scale structure of the Universe on galaxy formation and cosmology. The prize in Observational Astrophysics was awarded to Dr Renske Smit for the observational characterisation of the physical properties of the galaxies that formed in the first billion years of cosmic time. Finally, the laureate in the category New Technologies was Dr Martin Pertenais for a PhD thesis on cutting-edge concepts of compact polychromatic spectropolarimeters adapted to astrophysical space mission requirements in the UV domain.

▾ Read more

The FONDATION MERAC (Mobilising European Research in Astrophysics and Cosmology) is a non-profit foundation started in 2012 with headquarters in Switzerland to recognise and support young European astronomers. There are yearly three MERAC Prizes awarded by the European Astronomical Society. The prizes of 20,000 Euro are for each of the three categories (Theoretical Astrophysics, Observational Astrophysics, and New Technologies). The prizes alternate by year for Best Early Career Researcher Prizes (on odd years), and Best Doctoral Thesis Prizes (on even years). The awardees are also eligible for further support from the

FONDATION MERAC.

The 2018 MERAC Prize for the Best Doctoral Thesis in Theoretical Astrophysics is awarded to Dr Sandrine Codis (IAP, France). Sandrine Codis graduated from the Ecole Normale Supérieure (Paris) in Mathematics and Theoretical Physics. The PhD thesis of Sandrine Codis was conducted at the Institut d'Astrophysique de Paris (IAP), with a degree delivered by the Université Pierre et Marie Curie - Paris VI, under the supervision of Christophe Pichon (IAP) and Dmitri Pogosyan (University of Alberta). After graduation, she became a CITA post-doctoral fellow in Toronto. She is now a CNRS permanent researcher at IAP, France. Sandrine Codis works on the theoretical modelling of the large-scale structure of the Universe and is particularly interested in cosmology, weak lensing, cosmic web and galaxy formation. She is also a member of the Euclid consortium, an ESA's space mission dedicated to mapping Dark Matter in the Universe and characterising the equation of state of the Dark Energy, potentially responsible for the acceleration of the expansion of the Universe.

Sandrine Codis' PhD thesis focused on the theoretical understanding and modelling of the large-cale structure of the Universe. She was particularly interested in addressing some of the challenges that the field of large-scale structure studies needs to overcome to extract the marrow of the gigantic precision datasets that will be produced by future galaxy surveys like ESA?s cornerstone Euclid mission and LSST. She successfully developed innovative tools to probe (from first principles) the non-linear regime of structure formation and tackle systematic effects such as redshift space distortion and intrinsic alignment of galaxies which compromise high precision large-scale structure measurements. For that purpose, she developed new mathematical models and was involved in the post- processing and scientific analysis of massive N-body and hydrodynamical simulations. Her publications are already references in the field and span a wide range of topics from cosmology to galaxy formation. The quality of her thesis was recently honoured as the best PhD in astronomy by the Société Française d'Astronomie et d'Astrophysique.

The 2018 MERAC Prize for the Best Doctoral Thesis in Observational Astrophysics is awarded to Dr Renske Smit. She earned her undergraduate and PhD degrees at Leiden University in the Netherlands. During her master thesis she secured a scholarship to pursue part of her degree at the University of California, Berkeley. The PhD thesis of Renske Smit was conducted under the supervision of Dr. Rychard Bouwens. She conducted research into the formation and evolution of the first galaxies using cutting-edge observational facilities. She then began her postdoctoral career at the Centre for Extragalactic Astronomy at Durham University. In 2016 she was awarded a Rubicon grant by the Netherlands Organisation for Scientific Research (NWO) based on her thesis work. She is currently working as an independent research fellow at the Kavli Institute for Cosmology at the University of Cambridge, UK.

The three 2018 MERAC Prize winners at the stage in Liverpool: Sandrine Codis, Renske Smit and Martin Pertenais

Renske Smit's doctoral research focused on the study of very distant galaxies, seen in the first few billion years of cosmic history, using the Hubble and Spitzer Space Telescopes. Her studies were among the first to obtain genuine insight into the physical conditions of these galaxies, paving the way for detailed follow-up studies with ground-based instrumentation. Her research established that emission lines associated with the formation of massive, young stars often dominate the broadband flux of distant galaxies. This work resolved a major discord between observations and theoretical models of the evolution of galaxies in the early Universe. Renske Smit's innovative work also enabled her to identify new galaxies in the Epoch of Reionisation;

spectroscopic follow-up of these sources with the Atacama Large Millimeter Array allowed her to obtain the first measurement of velocity structure in galaxies at this early epoch. She participated in efforts to detect even more distant ($z \sim 8—9$) galaxies, spectroscopic follow-up of which yielded spectacular confirmation of their redshifts via the Lyman- alpha emission line, breaking two consecutive records for the most-distant galaxy known to science. As a member of the NIRSpec Guaranteed Time Observations (GTO) Galaxy Assembly team, Renske Smit is now preparing for the forthcoming revolution promised by the launch of the James Webb Space Telescope.

The 2018 MERAC Prize for the Best Doctoral Thesis in New Technology is awarded to Dr Martin Pertenais (DLR, Germany). Martin Pertenais has obtained an optical engineer degree from the prestigious Engineer School Institut d'Optique Graduate School (IOGS) in Paris and a Master in photonics from the University of Jena. He then undertook a PhD thesis in instrumentation for astrophysics at the Institut de Recherche en Astrophysique et Planétologie in Toulouse and at the Paris Observatory on "Stellar UV and Visible spectropolarimetry from space", under the supervision of Coralie Neiner and Pascal Petit. This allowed him in particular to successfully lead the Arago Payload consortium and to innovate in new technologies for spectropolarimetry. After his PhD thesis, he moved on a position at DLR as the Optical System Engineer for PLATO. In parallel, he keeps working on new spectropolarimeter designs and co-supervises a PhD student on this topic for the NASA mission LUVOIR.

The goal of Martin Pertenais' PhD thesis was to find innovative concepts of spectropolarimeters, to build the first ever space mission equipped with a high-resolution spectropolarimeter working on a wide wavelength range including the UV domain. In Toulouse, he performed theoretical calculations and simulations for two different original concepts of polarimeters that he formulated. The first one is an inventive static polarimeter using birefringent wedges as polarisation spatial modulator. The second concept used a classical rotating polarimeter, albeit optimised to get constant efficiencies for the extraction of the Stokes parameters from 123 to 888 nm. The result is an ingenious very compact polarimeter working with the same polarimetric efficiency over a very large spectral range, including the UV. While in Paris Martin Pertenais created prototypes of both concepts to demonstrate experimentally his very encouraging theoretical results. He built and tested both prototypes, which showed excellent experimental results, increasing the Technology Readiness Level for these innovative technologies. Martin Pertenais also tested one of the two prototypes on the sky on real stars. In October 2015 he received the "Young Researcher Award" granted by the French CNES agency. Martin Pertenais was an essential member of the core team of the Arago international space mission project, a M4 and M5 ESA candidate mission.

EWASS in the spotlight
Press Office report for EWASS 2018

Every year EWASS brings together more than a thousand astronomers and space scientists to discuss a plethora of topics in cutting-edge research. It is also a perfect occasion to place astronomy research in the spotlight of the national and international media. At the EWASS 2018 meeting in Liverpool, held jointly with the RAS National Astronomy Meeting, the communication between astronomers and the press was organised by the Press Office, staffed by Robert Massey, Helen Klus, Morgan Hollis, Anita Heward and Marieke Baan.

▾ Read more

A total of 14 press releases on science presented at EWASS 2018 were issued. These press releases were selected from a shortlist of 46 abstracts followed up as possible media stories out of the 1454 total abstracts submitted to EWASS 2018. They covered topics ranging from giant solar tornadoes to magnetic hotspots on neutron stars to 3D maps of the infant Universe. All of these releases were led by authors from European institutions. Five releases featured the work of post-graduate students, giving media experience and profile to early careers researchers.

Three informal press briefings, streamed

Informal press briefing on the ARIEL space mission at EWASS 2018. *(Credit: EWASS Press Office)*

on Facebook Live, were held on the topics of the Square Kilometre Array, ARIEL, and African-European Collaborations. Further short interviews with attendees at the meeting were posted on the RAS YouTube channel.

Journalists attending the meeting included Sue Nelson (ESA TV), Paul Sutherland (freelance), Paul Wood (Nature Astronomy), Dan Clery (Science), Sue Bowler (A&G), Osnat Katz (Popular Astronomy), Josh Hayes (Jodcast) and Keith Smith (Science).

Overall, the volume and quality of the media coverage for EWASS 2018 was extremely good. The top story was the astro-ecology project led by Claire Burke and Maisie Rashman, which was featured on the BBC Six O'Clock News (3rd April), as well as BBC Radio Merseyside, BBC Africa, BBC World Service and Discovery Channel TV in Canada. An interview with Richard Massey on BBC Breakfast (6th April) was followed by a Facebook Live session that had 11K views, and Jane Greaves was interviewed on BBC Radio 4's Today Programme (5th April).

Print and online outlets covering EWASS 2018 included the Independent, the Telegraph (print and online), Sky News, Daily Mail, the Express, the Mirror, Newsweek, the New York Times, Forbes, BBC Mundo, Scientias.nl, Le Monde, El Mundo, Süddeutsche Zeitung, The Hindu, New Scientist, IFL Science, National Geographic, Kijk Magazine, Focus, Science et Vie, Space.com, UPI and Europa Press.

Contributed News

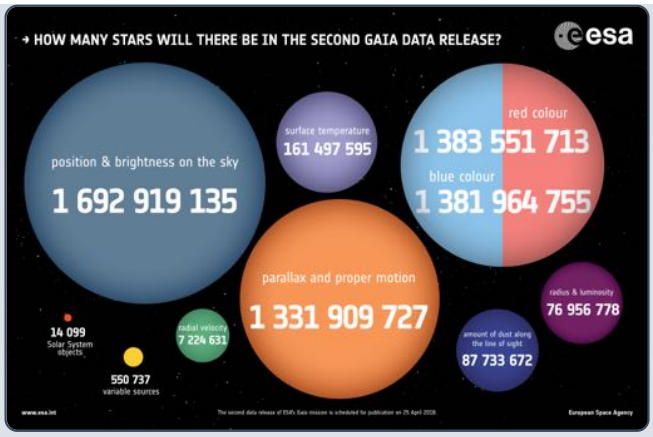
Gaia: the billion-star Galaxy census: at the threshold of Gaia DR2
EWASS 2018 symposium 2

The GREAT (Gaia Research for European Astronomy Training) initiative is a pan-European research network involving over 500 researchers in 20+ countries with a common interest in aiming to maximise the science potential of Gaia. This 11th GREAT network annual plenary meeting was co-located at the EAS 2018 EWASS, constituted as Science Symposium 2. It was organised in six sessions, with 34 presentations, over the days 5-6 April 2018.

Read more

Following the successful open model adopted at the 5th GREAT Plenary in 2012, the community were invited to submit their proposed talk titles and abstracts on the meeting wiki. The final meeting programme was then generated by the SOC based on those contributions. The symposium was attended by well over 100 people. All sessions were well attended, with lively discussion after each presentation.

Three sessions (1, 3, and 4) were dedicated to the presentation of science results obtained by the community on the basis of Gaia DR1 data. Hunt presented his measurement of the solar motion from the TGAS+RAVE data and showed what looks like an intriguing lack of low angular momentum stars near the sun, something he hopes to confirm with Gaia DR2. McDonald presented his efforts to calculate accurate effective temperatures and luminosities for an impressive 1.5 million stars with parallaxes from Gaia DR1. Schoenrich then showed how one can make use of the all sky kinematics of stars in Gaia DR1 to validate the both the distances and velocities derived from the Gaia DR1 data. Deason presented an analysis of the kinematics of the Galactic Halo, based on proper motions from the combined SDSS and Gaia positions. The results on the overall rotation of the halo and the Monoceros ring provide a taster of what can be done with Gaia DR2 data. Danielski presented her derivation of the Gaia G-band extinction coefficient and Gaensicke discussed the prospects for a complete census of the stars in the solar neighbourhood with Gaia DR2.

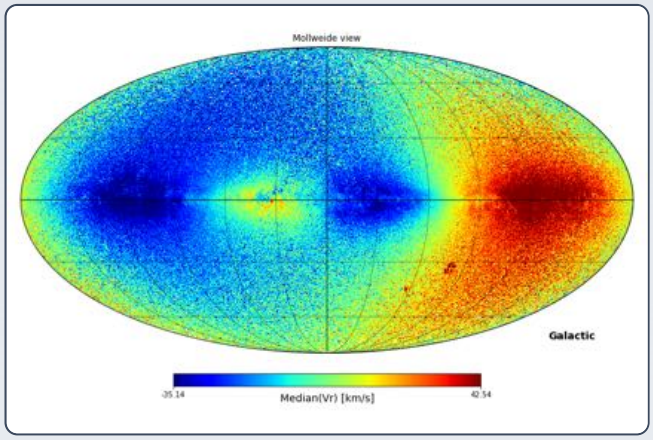


An infographic illustrating the contents of Gaia DR2.

The second session of the symposium was dedicated to an eagerly anticipated preview of the contents of Gaia DR2 (released on April 25 2018). Brown revealed the actual numbers of sources that are contained in the various Gaia DR2 data sets and this was also the subject of an ESA press release at the same time. A short YouTube interview on Gaia DR2 appeared on the same day. In subsequent presentations De Angeli detailed the photometric contents of Gaia DR2, while Hestroffer and Katz covered the solar system objects and the Gaia DR2 radial velocities. Katz showed a spectacular all sky map of the median radial velocities of stars, showing beautifully the differential rotation of the Milky Way disk. Mora closed the session with a demonstration of the Gaia online archive facilities.

The third session continued with a presentation by Prusti on the status of the Gaia mission in which he highlighted the role of the Gaia catalogues in solar system navigation and the study of solar system bodies through occultations. Cropper discussed in detail the radial velocity spectrometer on board Gaia and Walton provided an update on the GREAT networking activities. Kruszynska discussed the possibilities for photometric microlensing studies with the Gaia data, while de Bruijne and Vallenari both presented open cluster studies with Gaia DR1 data.

The topic of open clusters was continued by Casamiquela in the fourth session, where she discussed the results from the OCCASO survey. Silverwood then presented the progress on studies of the local dark matter density and this was followed by two talks on the combination of Gaia and spectroscopic survey data. Anders discussed the prospects for chemo-kinematics with Gaia, while Coronado presented results on the calibration of spectroscopic distance indicators which can be employed to infer distances in cases where the Gaia parallaxes are not precise enough. Mor discussed a new and fast approach to the inference of the Milky Way IMF and star formation history through comparisons of the Besançon Galaxy model to Gaia data. Yen then revisited open cluster studies using a combination of Gaia and HSOY astrometric data.



The mean radial velocity as a function of position on the sky for the stars 7.2 million stars in Gaia DR2 for which a radial velocity was measured. The figure is a beautiful demonstration of Galactic differential rotation, with the outer disk consisting of stars moving at slower angular speed (compared to the Sun) around the Milky Way center, while in the inner region, the pattern inverts because the stars go around at higher angular speeds than the Sun.

In the fifth session Harris advocated the use of A stars for the study of Milky Way disk kinematics and discussed the role of Gaia data. Barstow presented the results of white dwarf studies with Gaia DR1 data and the outlook for Gaia DR2. The stellar halo was revisited by Amarante who combines LAMOST, TGAS, and RAVE data for studies of the kinematics of this Milky Way component. Zocchi presented how rotation in globular clusters can be studied with Gaia and Erkal made a prediction about the effect of the LMC on streams around the Milky Way which he will test with Gaia DR2 data. Kervella closed the session with a presentation on studies of rotating pulsating stars, making use of Gaia parallaxes combined with other data, such as angular diameters from interferometry.

In the final session Font presented her predictions for tidal stream studies with Gaia DR2 data. Sahlholdt presented tests of asteroseismic radii for Kepler stars which are done by predicting parallaxes from the radii and comparing those to the Gaia DR1 parallaxes. Mackereth presented

his mapping of the Milky Way disk in terms of populations of different [alpha/Fe] ratios using the combination of APOGEE and TGAS data. Fusillo discussed the prospects for Milky Way studies through white dwarf populations and the role of upcoming spectroscopic surveys such as WEAVE and 4MOST. The symposium was closed by Pedersen who discussed plans for the use of Gaia parallaxes in the asteroseismic modelling of intermediate- and high-mass stars.

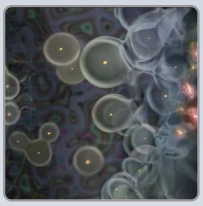
In addition to the main speaker programme, 9 posters were presented.

Anthony Brown, Leiden Observatory, Leiden University, NL
Nicholas Walton, Institute of Astronomy, University of Cambridge, UK
Timo Prusti, ESTEC, ESA, Noordwijk, NL
Pier-Emmanuel Tremblay, Department of Physics, University of Warwick, UK
Oscar Gonzalez, Insitute for Astronomy, University of Edinburgh, UK

EWASS symposium 2 website

Contributed News

Galaxy formation through cosmic time: synergising theory and observations in the era of a large facilities
EWASS 2018 symposium 3



The past few years have seen state-of-the-art observatories, such as the Hubble Space Telescope, Sloan, Spitzer and Subaru, providing tantalising glimpses of galaxy formation, from the earliest galaxies assembling in the infant Universe to evolved systems in the local Universe. These observations have shed light on the redshift evolution of a number of key galaxy properties such as their luminosity functions, the cosmic stellar mass/star formation rate densities, dust masses and (mass-metallicity) scaling relations. ▾ Read more

Despite this progress, a number of compelling outstanding questions, regarding galaxy formation and reionization, persist including:

- What is the key physics governing the formation of early galaxies?
- What is the relative contribution of galaxies and AGN to reionization?
- How did reionization proceed through time?
- How did key (mass-)metallicity relations evolve through cosmic time?
- How did galaxies at different cosmic epochs build-up their dust content?

Our session aimed at bringing together a broad community of observational and theoretical experts in order to build a panchromatic picture of structure formation, galaxy build-up, and reionization and start a discussion on how to generate and exploit synergies between the next generation of observatories. Our session was split into 6 parts each of which began with an invited review and was followed up by shorter talks. Our invited reviewers included Andrew Bunker (Oxford University, UK), Leslie Hunt (Arcetri Observatory, Italy), Masami Ouchi (University of Tokyo, Japan), Darach Watson (Dark Cosmology Centre, Denmark) and Naoki Yoshida (Kavli and IPMU, Japan). Two of the organisers — Simona Gallerani (Scuola Normale Superiore, Italy) and Pratika Dayal (Kapteyn Institute, The Netherlands) — stepped in when a reviewer cancelled a few days before the meeting. In addition to 22 excellent contributed talks over 6 widely attended sessions, we also had 21 posters presented.

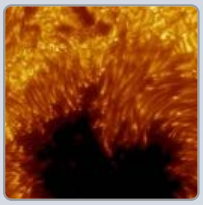
Pratika Dayal would like to acknowledge the support from an ERC starting grant (DELPHI) and from the European Union and the University of Groningen's Rosalind Franklin program.

Pratika Dayal, Kapteyn Institute, NL

EWASS symposium 3 website

Contributed News

High resolution solar physics — the dawn of a new era
EWASS 2018 symposium 4



Within the next decade solar physics will have the opportunity to probe the Sun as never before, with the advent of two 4m ground-based solar telescopes: DKIST (Daniel K. Inouye Telescope), due to see first light in late 2019, and EST (European Solar Telescope) planned to achieve first light in 2027. With state-of-the-art instrumentation, they will provide the most sensitive diagnostics of the thermal, dynamic and magnetic properties of the plasma in the solar atmosphere, at the highest spatial resolution (~25 km), and over the most scale heights available on any solar telescope, on the ground or in space. ▾ Read more

These new facilities will enable us to address fundamental questions related to the emergence and evolution of small-scale magnetic field concentrations, and their role in the dynamo processes that control the cyclic evolution of the global magnetic field, as well as their interaction with pre-existing fields - interactions that drive the solar wind and generate global explosive activity.

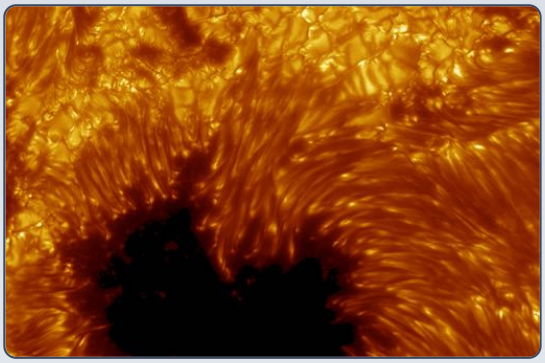


Image taken with the Swedish 1-m Solar Telescope (SST), operated by the Institute for Solar Physics at Stockholm University under the Swedish Research Council.

In recognition of the importance of this new realm of discovery space, it was the goal of Symposium 4 to bring together observers, modellers and theorists to explore the new science that will be achieved with these ground-based facilities, to review the current understanding of how the magnetic field emerges, evolves and drives solar activity and energy transport in the solar atmosphere, and in particular the state-of-the-art in high-resolution observations, theory and simulations. The participants were encouraged to identify how these new facilities could lead to break-throughs in these topics and what new developments are needed from simulations to enable the accurate interpretation of the observations. During the symposium we received status updates for both DKIST and EST and had the opportunity to discuss how the unique capabilities of both telescopes, combined with new generations of space mission such as the Parker Solar Probe, Solar Orbiter and Solar C EUVST, will allow us to study the physical processes in the Sun's atmosphere as never before.

The symposium was very well attended, with 50-60 participants, and poster presenters were given a 3-minute slot to present their work, providing greater exposure for early career researchers.

Sarah Matthews, UCL Mullard Space Science Laboratory, UK
Mihalis Mathioudakis, Queen's University Belfast, UK
Hector Socas-Navarro, Instituto de Astrofisica de Canarias, ES
Manuel Collados, Instituto de Astrofisica de Canarias, ES
Ilaria Ermolli, INAF, IT

EWASS symposium 4 website

The Danel K. Inouye Solar Telesclope (DKIST). Image courtesy of the NSF.

Contributed News

Relativistic astrophysics, in memory of Stephen Hawking
EWASS 2018 symposium 5

During the last 50 years General Relativity has become the main theoretical concept of modern astrophysics and has seen many breakthroughs in the last few years. During the symposium we discussed the current theoretical understanding of relativistic astrophysics and observational frontiers (e.g. including results from missions like XMM-Newton, NuSTAR, INTEGRAL, Chandra and EVN) as well as the developments of new observational facilities (e.g. Virgo and LIGO, GRAVITY, Event Horizon Telescope, and Large Synoptic Survey Telescope). Read more

We organised the discussions of the symposium along the following topics:

- classical and new test of general relativity,
- relativistic compact objects: observation of their direct environment and event horizon measurements,
- accretion onto compact objects and tidal disruption events
- merging compact objects and gravitational waves,
- instrumental developments.

Given the sad death of Stephen Hawking just a few week before the EWASS conference, we devoted the symposium to honour this outstanding physicist, and Lord M. Rees (University of Cambridge) agreed to give an opening talk, "Stephen Hawking - An Appreciation".

The invited talks structured the symposium on the scientific side. Each of the invited talks was excellently presented and highlighted important scientific results:

- J. Centrella (NASA Goddard Spaceflight Center, Greenbelt, USA), The New Landscape of Multi-Messenger Astronomy
- L. Dai (Niels Bohr Institute, Copenhagen, Denmark), General Relativistic Modelling of Tidal Disruption Events
- H. Falcke (Radboud University, Nijmegen, The Netherlands), Event Horizon Measurement of Sgr A*
- M. Kramer, (Max-Planck-Institut für Radioastronomie, Bonn, Germany), Tests of General Relativity with Neutron Stars Binaries
- P. McNamara (European Space Agency, Noordwijk The Netherlands), From Lisa Pathfinder to Lisa
- C. Reynolds (University of Cambridge, United Kingdom), Observing Black Hole Environments through Reverberation mapping

After one last minute cancellation of a female speaker, the percentage of female invited speakers changed to 30%. The sessions were chaired by M. Branchesi, S. Britzen, S. Komossa, P. McNamara, C. Reynolds, N. Schartel, with 50% female chair persons.

Norbert Schartel, ESA, ES
Stefanie Komossa, QNUN, China and MPIfR, DE

EWASS symposium 5 website

Contributed News

Software in astronomy
EWASS 2018 symposium 6

The six-session Software in Astronomy Symposium was held on Wednesday and Thursday, April 3-4. Each of the six sessions focused on a different aspect of research software, covering not only specific software packages, but also computational techniques used in data mining and machine learning, open services, software development training and techniques, and getting credit and citations for computational methods. Several sessions included a free-form period in which participants could ask questions, discuss issues, and share

information. The last session of the Symposium was a lively moderated discussion among attendees with particular interest in software publishing. ▾ Read more

The first session focused on software engineering and sustainability, education for better software, and the ecosystem around Python in astronomy. It set the stage for the Symposium, featuring a variety of topics of importance when discussing astronomy research software. Alice Allen (ASCL, US) moderated the session. In the inaugural talk, John Wenskovitch (Virginia Tech, US) opened his presentation with a quote by computer scientist and professor Carole Goble, stating that software is "the most prevalent of all the instruments used in modern science." This was reiterated by others throughout the symposium. Wenskovitch provided statistics on software use and development activities by academics, among these that 92% of academics use software and 38% spend at least 20% of their time developing software.

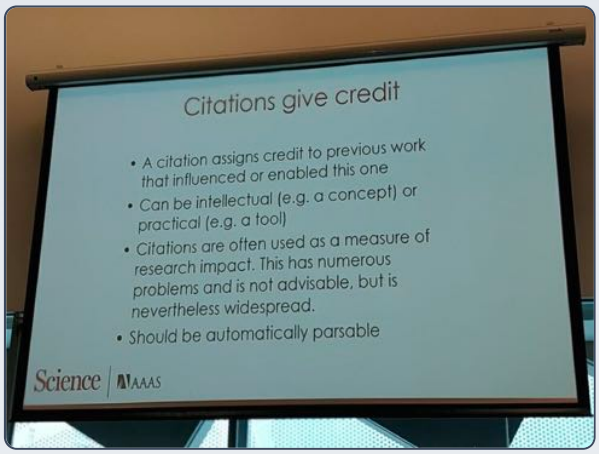
Session number 2 focused on software publishing, impact, and credit. Unlike most of the other sessions in this Symposium, this session had only three short presentations and devoted the rest of the time to an open discussion and Q&A, with the session and discussion period moderated by Rein Warmels (ESO, DE). The software contributions that enable much of the results in astronomy are often not recognized, nor considered for reward or promotion. This session focused on using the available infrastructure to better reward software authors and ways to count these valuable research objects.

A tweet by Amruta Jaodand on the presentation by Maisie Rashman on the use of astronomical software in conservation biology.

Amruta Jaodand (ASTRON, NL) moderated the third session of the Symposium, which featured talks on different software packages. Several novel software packages were presented, including a new cosmological code that should be more than 30 times faster than the well-known Gadget code, and software packages to for handling data cubes. A highlight of the session was the presentation by Maisie Rashman (LJMU, UK) on the novel use of astronomical software in conservation biology. Her team have developed a pipeline using astronomy techniques to identify and track animals; their goal is to create a fully automated system for species identification, population tracking, and combating poaching using drones.

Astronomy leads most sciences in providing many open services, particularly data and ways to get access to and use data. The fourth session of this symposium was devoted to open and transparent data services. It was moderated by Andrew Pollock (USheffield, UK), and highlighted some of the new and ongoing services available to not just professional astronomers, but also to students and other interested parties.

Stephen Serjeant (Open University, UK) moderated the fifth session on machine learning and data mining. This session presented different techniques to, for example, study noise in gravitational wave interferometers, select young stellar object candidates, and directly image exoplanets. The presentations in this session were accessible even to those with no experience in data mining and machine learning, as the techniques used were explained quickly and well before moving on to how they enabled particular research.



A slide from the presentation by Keith Smith (Science, UK), stressing that citations not only enhance reproducibility, but they also assign credit. He provided

Finally, session 6 was devoted to software publishing. This meeting-within-a-meeting

guidelines for citing data and software, sharing bad, better, and good examples, and spoke of a virtuous cycle that will increase reproducibility in addition to the sharing of software and data.

was an opportunity for journal editors and publishers and referees, abstract services, and others associated with research software publication to discuss how best to include research software in the scholarly record, improve the sustainability and reproducibility of research articles, and share information on issues and possible solutions. The session was open to all, and researchers and software authors also attended. The agenda had three main items on it: journal software policies, ratings for numerical reproducibility, and improving instructions for authors and referees. The session was moderated by Rein Warmels (ESO, DE) and Alice Allen (ASCL, US), and was very well attended by editors from, amongst others, Science, MNRAS and the AAS Journals.

All in all, the symposium was a big success, and a more complete coverage of the symposium is posted on the ASCL blog.

Alice Allen, ASCL, US

EWASS symposium 6 website

Contributed News

Supernova diversity: prospects and challenges for next-generation surveys
EWASS 2018 symposium 7

Modern wide-field time-domain optical surveys are discovering supernovae (SNe) at a dramatically increased rate compared to the past. Thanks to the ever-increasing quality and quantity of data from these surveys, it has become clear that there is real diversity in the standard SN classes. However, it is still uncertain if this diversity is predominantly caused by different progenitor channels, explosion mechanisms, binary-star interaction, or properties of the explosion environments. Understanding this diversity is now a key objective in the SN research field and poses serious challenges to traditional SN taxonomy, requiring a rewrite of the historical classification scheme.

▾ Read more

Moreover, among the discovered transients are many rare and peculiar events that fall outside the standard SN classes. New strategies for the next-generation surveys are required to identify these peculiar transients more promptly, in order to avoid potentially unusual SNe being mislabelled as ordinary. This symposium aimed to bring together observers and theoreticians to address these issues and develop new techniques for classification in the modern SN era. The symposium spanned six sessions over two days, with 70-80 participants attending each session. Each block was dedicated to a different topic.

The first session was focused on the diversity of thermonuclear SNe illustrating both the multitude of type Ia SN sub-types identified up to now and the observational variety exhibited among members of the various sub-types. The understanding of this diversity requires us to investigate a variety of progenitor scenarios and environments, to explore different parameter spaces, to exploit new photometric and spectral line indicators, to test different explosion scenarios through multidimensional hydrodynamic, nucleosynthesis, and radiative transfer simulations.

The second session presented ongoing investigations on the diversity of core-collapse (CC) SNe, summarising the current observational constraints on how progenitor properties map to CC SN observations. In particular it was discussed how the diversity of CC SNe can be understood in terms of progenitor mass loss prior to explosion.

The third session was dedicated to illustrating the variety of observational properties of interacting SNe indicating a multiplicity of progenitor channels, from Luminous Blue Variables to Red Supergiants with superwinds, and from Wolf Rayet stars to thermonuclear explosions in a dense circumstellar medium (CSM).

The fourth session was focused on the transients whose observed properties challenge the parameter space easily explained by traditional SN models:

1. superluminous SNe a rare class of transients with peak luminosities 10-100 times brighter than those of normal CC and Type Ia SNe, and whose progenitors and energy sources are still debated;
2. a population of luminous optical narrow-line transients coincident with the nuclear region of Seyfert galaxies;
3. the rapidly evolving transients;
4. a class of events for which the fate as genuine CC SN or a non-terminal explosion is still under debate.

The fifth session was devoted to discussing the question of whether the traditional classification scheme can be modified to meet the new requirements, or whether a radically new approach is necessary, as well as how the determination of SN classes and their photometric classification have been translated into supervised and unsupervised machine learning problems.

The final session was dedicated to the next-generation of surveys such as the Large Synoptic Survey Telescope (LSST), which will compound this classification problem by discovering hundreds of thousands of transient events per year, many of which will push the boundaries of our observationally-defined SN classes.

The discussion in each session was initiated by two invited speakers, followed by contributed talks that introduced recent discoveries, discussed new SN sub-classes, various peculiar kinds of events, and host galaxy studies. In total, we had 12 invited talks and 20 contributed talks. The presenters were from a broad range of European and international countries. Several of the talks were presented by young researchers highlighting the continued interest in this area. Additionally, we aimed for gender balance in this meeting. We therefore made sure that no gender group took up more than half of our invited speakers and chairs. Amongst the contributing speakers, about 35% were female, which is a fairly high ratio, especially in this field of astrophysics, which traditionally has been very male-dominated.

Maria Teresa Botticella, INAF, IT
Kate Maguire, Queen's University Belfast, UK
Christina Thone, Instituto de Astrofisica de Andalucia, ES
Paul Crowther, University of Sheffield, UK
Seppo Mattila, University of Turku, FI
Andrea Pastorello, INAF, IT
Simon Prentice, Liverpool John Moores University, UK
Stephen Smartt, Queen's University Belfast, UK

EWASS symposium 7 website

Contributed News

The ISM as a window onto galaxy evolution
EWASS 2018 symposium 9

Symposium 9 at EWASS 2018 brought together researchers with areas of expertise spanning the entire electromagnetic spectrum, and the full range of cosmic time, in order to highlight the interdependence of all aspects of understanding galaxies through their ISM. In the study of the ISM in galaxies, there can be a disconnect between investigations which explore the cold ISM via FIR-to-radio emission, and investigations which exploit the energetic shorter wavelengths where excited gas emits. We were therefore glad that our symposium featured many pieces of work which showcased the value of combining these two avenues of study.

Read more

Simulations of galaxies - via both hydrodynamics and radiative transfer - are becoming ever more detailed and sophisticated; our symposium's contributors spoke on how simulations of the hot ISM are now directly informing and predicting the environments in colder regions (and vice-a-versa) with increasing precision.

Galactic inflows and outflows are another field where this broad view is necessary. Our symposium heard of evidence, from across the spectrum, of systems where large masses of

both cold and energised gas were being driven from their hosts - but also of other galaxies where, despite intense star formation, only relatively modest masses of gas are being expelled. There also remain open questions regarding the fate of the expelled material. Whether it rains back onto the galactic disc, or stays in the halo - potentially forming stars in-situ. Our symposium also heard discussion of how this ejected material might pollute the large-scale inflows of relatively pristine gas from the IGM; simulations suggest a variety of possible scenarios, and the metal content of inflows has important implications for the presence of metal cooling lines, and dust grain growth, in the outskirts of galaxies.

Until recently, many advances in the study of the ISM at high redshift simply consisted of first-detections of particular classes of object. But our symposium highlighted the fact that we are now uncovering fascinating diversity in the properties of high-redshift galaxies. Of particular interest were observations of multi-object systems, where the various components exhibit an astonishing range of properties - some rich in gas, some poor; some with extensive dust emission and obscuration, others with a marked lack of dust despite the presence of metals. The task of classifying the galaxy "menagerie" - started a century ago at low redshifts - is clearly only just beginning in earnest at high redshift, and the ISM will be the prime window by which advances are made.

Naturally, star formation fundamentally underpins how we come to understand galaxies through their ISM. Several of our symposium's contributors described how we are now attaining a very subtle understanding of long-studied star-formation laws. In particular, we are now coming to understand how the Kennicutt-Schmidt law depends on gas volume density, how it varies at high redshifts, and how its determination depends upon the observational resolution and tracers employed.

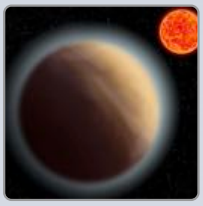
The dust and gas content of galaxies are inextricably linked. In particular, over recent years, dust has been found widespread use as a proxy for the star-forming molecular gas content of galaxies, thanks to how much more efficiently dust can be observed. However, our symposium heard how this the relationship between dust and molecular gas is turning out to be increasingly nuanced - with intriguing systems being observed at both high and low redshifts that will force us to pay more careful consideration to the complex relationships linking these two phases of the ISM.

Christopher Clark, Cardiff University, UK
Michele Cirasuolo, University of Edinburgh, UK
Annalisa De Cia, ESO Garching, DE
Maud Galametz, CEA Paris, FR
Roberto Maiolino, Cavli Institute, UK
Gergö Popping, ESO Garching, DE
Kate Rowlands, John Hopkins University, US
Amelie Saintonge, University College London, UK
Matthew Smith, Cardiff University, UK
Freeke van de Voort, HITS/Yale, US/DE

EWASS symposium 9 website

Contributed News

The physics and chemistry of planetary atmospheres
EWASS 2018 symposium 10



The challenge of correctly capturing the physical and chemical properties of planetary atmospheres across a broad parameter space is one of the biggest challenges in the theoretical modeling of planets. Symposium 10 brought together 1D and 3D modelers which all work on different levels of consistency and complexity. This symposium show-cased newest technology developments, such as the application of neuronal networks in retrieval techniques. An overview of the challenges inherently present in complex modeling and how to overcome them, was also given. ▾ Read more

Alongside the 10 planetary bodies in our own Solar System with significant atmospheres, the more than 4000 exoplanets known include hot lava and giant gas planets, together with both

warm and cool mini-Neptunes and super-Earths. None of these planets resembles our solar system planets. Planetary atmospheres have proven to be incredibly diverse and are comprised of a mixture of materials in different phases (gas, clouds, aerosols, hazes). Understanding the impact, for example, chemical and radiative, of these species and their interplay with the circulation and radiation, particularly in 3D, is vital to correctly interpreting observations from the ground (e.g. VLT) and from space (e.g. ARIEL, JWST, CHEOPS, PLATO).

The symposium kicked off with a session on atmosphere observations where the audience was introduced to high-dispersion spectroscopy as a method to assess the chemical composition of non-transiting exoplanets. The challenge in detecting (and defining!) biosignatures on exoplanets was discussed by Heike Rauer, the PLATO PI. There was a big cheer in the room when the ARIEL team stepped up to the podium as ARIEL had just been selected as ESA's next medium-class science mission. ARIEL will provide chemical fingerprints for Jupiter- and Neptune-size planets and for Super-Earths. Giovanna Tinetti invited the community to engage in this endeavor. The challenge of data interpretation is upon the community. New techniques are under development and Michiel Min introduced the concept of "artful modeling" in AI applications in form of neural networks. PhD student Jacob Arcangeli presented observations for WASP-18b pointing out the effect of H- opacity and the need for more complex modeling.

The next sessions dealt with atmosphere modeling. Understanding exoplanet atmospheres requires a good amount of modeling on global, weather scales and on local, chemical scales in order to derive a concise picture from the snippets of information that are available from observations. Cloud formation on Earth is utterly complex as Ian Boutle from the MetOffice outlined. Yet, a combination of computational chemistry and fundamental physics modeling has provided a good amount of insight for exoplanet clouds as shown by Christiane Helling. She explained why clouds can not form in phase equilibrium. Peter Woitke presented a fast equilibrium gas chemistry code available to the community in combination with an extensive data assessment exercise. Both, code and assessment catalogues are online available. Olivia Vernot presented a beautiful review on 1D kinetic gas-chemistry modeling including all the different models available, and she discussed necessary future improvements for interpretations of the future observations performed with JWST and ARIEL. Modeling gas and cloud chemistry requires a good knowledge about element abundances. Martin Asplund demonstrated which sophistication the element abundance determination for stars has reached and that this methodological knowledge is also available to the exoplanet community.

Various groups presented their 3D global circulation models ranging from exo-Earths (Carone) to hot Jupiters (Dobbs-Dixon, Lee, Lines, Mendonca) and also brown dwarfs as planetary analogues (Charnay). Peter Read reminded us that dimensionless parameters are a superb tool to study atmospheric dynamics in combination with lab experiments. Ludmila Carone's summary emphasizes why this symposium was so timely and why it stimulated very fruitful conversations (despite local security personal shooing us out of the room):

- Clouds in which the constituent exists in three fundamental states of matter (and maybe even in all four fundamental states of matter if we add lightning) are the biggest challenge in modeling exoplanet atmospheres.
- Managing expectations: What's up with the west-ward shift in thermal maximum of some exoplanets when we expect eastward shift? There is something weird going on that we don't understand yet.

Symposium 10 had an extraordinary attendance thanks to our excellent speakers and exciting programme. We thank the EAS for providing us with the opportunity to share our research within the European community of astronomers and planetary researchers.

Christiane Helling, Centre for Exoplanet Science, University of St Andrews, UK

EWASS symposium 10 website

Contributed News

Royal Society Publishing photography competition
One of the five categories devoted to astronomy

The Royal Society Publishing photography competition returns for 2018! The competition is run by Royal Society Publishing?s portfolio of journals, and celebrates the power of photography in communicating science to a wide audience. This competition is split into 5 categories, including astronomy, and is free to enter. ▾ Read more

The overall winner will receive a prize of £500 (or currency equivalent) and winners of the categories not chosen as the overall winner will receive £250 (or currency equivalent). The closing date for entries is 31 August 2018. Full details can be found here.

"Lunar spotlight, South Pole, Antarctica", by Daniel Michalik.

The winner in the category astronomy in the 2017 edition was Daniel Michalik, who was wintering at the South Pole and working for the 10m South Pole Telescope. His picture, "Lunar spotlight, South Pole, Antarctica", was taken as one single long exposure in -60°C at the out-of-this-world frozen Antarctic plateau. It shows a rare optical phenomenon, a light pillar underneath the Moon, created by ice crystals suspended in the atmosphere. The cold dry atmosphere at the Geographic South Pole favours this and similar phenomena (sun/moon dogs, halos, arcs); they are much more often seen at the South Pole than in the non-polar regions. Three of the telescopes located at the South Pole are visible to the right of the picture. A flag line helps finding the way to the telescopes during the five months of continuous darkness. Jupiter is visible as a bright spot left of the Moon.

About the EAS and the e-Newsletter

The European Astronomical Society (EAS) is a society of professional astronomers founded in 1990 and aiming at promoting and advancing astronomy in Europe. Its contact point is the EAS Office, located at the University of Geneva, Switzerland.

Started in 2016, the e-Newsletter is a prime communication tool between the society and its members, and it is issued three to four times per year.

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If you would like to contribute, please contact Maarten

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Baes (Ghent University, Belgium), the EAS e-Newsletter editor.