



EUROPEAN ASTRONOMICAL SOCIETY **NEWSLETTER**

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EDITORIAL

Most of the articles in the current newsletter are devoted to the activities that took place during JENAM 2010. We commence by the plenary Lecture of Lodewijk Woltjer entitled “The Changing face of Astronomy” in which Prof. Woltjer provides his personal perspective on the evolution of astronomy research, the impact of major facilities, and what one may expect in the future. Following the tradition of the past few years, we also present brief summaries describing the various science sessions of the meeting. On behalf of all us EAS members who could not make it to Lisbon in September, I would like to thank all Session Chairs for finding the time to compile the reports. Since there are often no proceedings associated with the various JENAM sessions, this is a very useful way to document, even briefly, the major results presented during the meetings of the Society. In addition to our usual brief news we also continue the theme of presenting the 24 National Societies affiliated with EAS with a description of the Austrian Society of Astronomy and Astrophysics and the Latvian Astronomical Society.

Finally I would like to draw the attention of all our readers to the fact that the web server of EAS maintains a database of astronomy job openings. One can easily browse or search the database, and more importantly include her/his own announcements of new positions, free of charge! Detailed information on how this can be done is available in a dedicated article of the newsletter. On behalf of the Governing Council of EAS I would like to encourage everybody to explore this possibility, as well as to inform other colleagues or administrators so that they use it in order to reach advertise their new PhD, postdoc, or faculty positions to the community.

Vassilis Charmandaris
University of Crete, Greece

MESSAGE FROM THE PRESIDENT

The EAS council has changed during the general assembly that we had in Lisbon in September. J. Krautter, T. Oliveira, A. Stepanov and M. Huber stepped down while Mary Kontizas, Joao Fernandes, Andrey Finkelstein and Thierry Courvoisier stepped in. Jan Palous, Elias Brinks, Anne Dutrey, Joergen Christensen-Dalsgaard, Karel van der Hucht



and Milan Dimitijevic continue to serve on Council. The new officers would like to express their thanks for the trust expressed in the election process and to the nominating committee chaired this time by Birgitta Nordstroem. All council members are convinced of the importance of a strong European Astronomical Society that can express the views of the

astronomical community at the European level. They are all ready to serve for a new or continued term in the coming years. You will find elsewhere in this newsletter a description of the tasks for which each of the council members will take responsibility for the coming period.

Thanks are in place to Joachim Krautter, to the departing council members, but also to those continuing, for the successes and efforts made over the last years. Some of the most noteworthy achievements of the past council are

- 1) Very successful JENAM meetings now subtitled European Week of Astronomy and Space Science. The 2009 meeting brought close to 1000 astronomers in the UK and set a very high standard for the future. The 2010 meeting is described elsewhere in these pages. While less people attended the meeting in Portugal, it did provide a forum for many discussions in a very convivial form. Our thanks go not only to the past EAS council, but also to all those who made these meetings the success that they are.
- 2) The setting up of the Tycho Brahe Prize, awarded this year to R. Wilson for his most important contribution to the quality of European telescope optics from the NTT onward. The past council also set up of the Lodewijk Woltjer lecture, given this year by L. Woltjer himself. The written version of this lecture is to be found in this issue of the Newsletter. The Tycho Brahe Prize and the Lodewijk Woltjer lecture both offer us ways to express our gratitude and esteem for colleagues who contribute to the progress of astronomy, in particular in Europe. Members of the EAS are invited to make nominations, using the tools available on the web pages of the society.
- 3) A change of the statutes and by-laws that created the category of Organizational members. These are private or public entities that support the European astronomical community through their membership in the EAS. We hope that most European organizations active in astronomy will join and thus help firm up the financial position of the EAS and, therefore, allow council to start new activities. Members are invited to consult Council members for help in approaching potential organizational members in their surroundings.

These achievements contributed to the progress of our society over the past few years. We will build on these steps to pursue the goals of our society with enthusiasm. It is not only council members who express their thanks here for the past achievements, but also all the European astronomers.

Martin Huber stepped in for a year as vice president, for which I'm very grateful. He is working for the EAS on a document that should help all of us to get a synthetic view of all the planning documents that have been produced in different countries and in many European organisms over the last years. Martin will continue this task in the coming months, until a report can be provided to the members in the Summer of 2011.

The Council that took office in Lisbon has a concrete plan of action. This plan was published some time ago in the form of the «European Astropolitical Landscape and the Role of the EAS». This plan shows how the EAS expects to move on the European scene in the coming years. The council will make an extensive use of this document (available on the EAS web site). This plan implies that a significant part of our effort will be devoted to contacts with the EU and with sister societies. Council will be very careful in considering the amount of attention and work that the Society gives to some more «western» aspects of the European astronomical scene so that a proper balance is kept within the EAS.

On a very concrete point, the EAS is setting up a working group to reflect on COSPAR's president statements last Summer expressing that there is a dearth of astronomical space mission in the coming years. The working group will reflect on this question. Following this analysis, and should it be found appropriate, the EAS will issue a formal statement.

Lisbon's meeting is now past and has left us with excellent memories. Many thanks to Andre Moitinho and his team for setting up an excellent scientific program, as well as for providing a warm and nice hospitality at the venue. The coming meeting will take place in Saint-Peterbourg in Russia. This will provide an excellent opportunity to strengthen the links between different parts of our community. I warmly invite all European astronomers and those who feel a strong link with us to join us there.

Thierry Courvoisier
President of EAS

NEWS

NEW EAS COUNCIL

Most members of the Society are probably aware that after the last General Assembly, which took place in Lisbon in September, the composition of the EAS Council changed. The new Council met and decided to assign responsibilities on various key areas among its members in order to increase its efficiency and thus provide better service to the Society. We wish to inform the EAS members on these “assignments” and request that they direct any suggestions or request they have to the appropriate Council Member.

The composition of the new EAS Council is:

Thierry Courvoisier (Switzerland) - **President**
Elias Brinks (UK) - **Secretary**
Anne Dutrey (France) - **Treasurer**

Jan Palous (Czech Republic) - **Vice-President**
Responsibility for: Communication - Liaison with the IAU - Liaison with ESO

Mary Kontizas (Greece) - **Vice-President**
Responsibility for: overseeing the organisation by the LOC and SOC of the next four European Weeks of Astronomy & Space Science (JENAMs) - Liaison with ESA - Mentoring Scheme at EU level

Jørgen Christensen-Dalsgaard (Denmark) - **Councilor**
Responsibility for: overseeing the overall process of the EAS Prizes (Tycho Brahe Prize and Lodewijk Woltjer Lecture)

Milan Dimitrijevic (Serbia) - **Councilor**
Responsibility for: disseminating job market information across the Eastern European members- promoting the publication of PhD theses on the EAS web

João Fernandes (Portugal) - **Councilor**
Responsibility for: Job services of the EAS - liaison with Organizational Members

Andrey Finkelstein (Russia) - **Councilor**
Responsibility for: liaison with the Affiliated Societies - liaison with the Russian Academy and ROSKOSMOS

Karel van der Hucht (Netherlands) - **Councilor**
Responsibility for: assisting Mary Kontizas with overseeing the organisation by the LOC and SOC of the next four European Weeks of Astronomy & Space Science (JENAMs)

EURO-VO NEWS

The EURO-VO International Cooperation Empowerment (EURO-VO ICE) project is a Coordination Action supported by the EU in the framework of the FP7 initiative (INFRA-2010-2.3.3 Research Infrastructures, project 261541), which will support EURO-VO coordination activities at the European and international levels. The project started on September 1st 2010, for a duration of 12 months.

In a continuous effort to make European astronomers aware of everything the VO has to offer, the various EURO-VO partners continued offering VO days and courses to institutes around Europe. The Spanish Virtual Observatory (SVO) organised their 3rd and 4th Practical Courses, that took place at the Universidad Complutense of Madrid in June 2010 and at the University of Barcelona in November 2010, respectively. More than 20 participants registered in each of the events.

The German Virtual Observatory in collaboration with the EURO-VO Facility Centre organised a VO day in Heidelberg in October 2010, with participants from the various astronomical institutes of the city.

The first European Space Astronomy Centre (ESAC) VO School, organised by the European Space Agency VO (ESA-VO) Team, took place at ESAC, Madrid, on October 2010. ESAC has the unique position of hosting two major Virtual Observatory groups: the ESA-VO Team, part of ESA's Science Archives Team (SAT) and the SVO group at LAEX. The school was open to ESAC colleagues and any interested participants from institutes around Spain, with 35 participants attending, and requests for another school in the future.

The 3rd International School in Astronomy, held in Belgrade on June 29 to July 1, 2010, was dedicated to Astrominformatics and the Virtual Observatory. During the three days, the ~25 participants were introduced to the VO and were called to carry out science cases and various exercises using the VO capabilities.

The 7th EURO-VO Science Advisory Committee (SAC) meeting took place at Imperial College, London, in June 2010. During this one-day event, the SAC provided extended input on the VO tools and their functionalities, on the various activities of the EURO-VO, as well as on some International Virtual Observatory Alliance (IVOA) standards, relevant to the construction of Spectral Energy Distributions using data already available in the VO.

The EURO-VO will soon announce the third European VO school targeting PhD students and post-docs, that will take place early next year. During the four days of the school, the participants will be introduced to the various VO capabilities by EURO-VO experts, will carry out science cases using VO tools and services and will even have the possibility to pursue their own projects, with the help of the tutors. More information will soon be available in the EURO-VO pages: <http://www.euro-vo.org>

For more information on the EURO-VO news and activities, the available VO tools and applications and the VO-related workshops and meetings, visit the EURO-VO web pages: <http://www.euro-vo.org> or subscribe to the EURO-VO mailing list by simply inserting your e-mail address in the relevant field in the following

URL: <http://www.euro-vo.org/pub/fe/subscribe.html>

Evanthia Hatziminaoglou
on behalf of the EURO-VO Facility Centre

EAS JOB DIRECTORY

We would like to remind all members of EAS that the web server of the Society hosts an up-to-date database of astronomy related job offers. To view a description of the posi-

tions currently available, as well as the associated deadlines you may visit:

<http://eas.unige.ch/jobs.jsp>

Note that there is no charge for including a job announcement. This is a free service provided by EAS, in order to facilitate the dissemination of information to the community.

All EAS members are strongly encouraged to increase the value of this service by simply using their login details and posting any job openings available in their institutes. It is a really quick and easy process. Other astronomers or human resources administrators may also request a guest login by sending an e-mail to eas@unige.ch or simply provide their job announcement to Joao Fernandes at jmfernand@mat.uc.pt, the EAS Council member responsible for the Job Center.

EUROPEAN WEEK OF ASTRONOMY AND SPACE SCIENCE - JENAM 2011

Dear Colleagues,

We have the pleasure to invite you to attend the European Week of Astronomy and Space Science, the now classical JENAM meeting in July 2011. The meeting will take place July 4 to 8 2011 in Saint-Petersburg, Russia. The venue of the conference is the hotel Park Inn Pulkovskaya. July in Saint-Petersburg is a period known as “White nights”, referring to the almost non ending daylight near the period of the Summer Solstice. It is a very privileged period of the year in this beautiful city, which is also an important centre in the European history of science.

Prof. A. Finkelstein and Prof. I. Papadakis chair the SOC of the meeting. The programme will include 8 EAS symposia of about 2 days and a number of special sessions. The SOC is finalizing the list of events that promises to be of the highest standard. The LOC is chaired by Prof. A. Stepanov and is busy making sure that the venue and organization gives us the best possibilities for a fruitful meeting in a convivial atmosphere.

More information regarding JENAM2011 and the associated deadlines will become available soon via the web page and the electronic newsletters of our Society.

Thierry Courvoisier
President of the EAS

NEWS FROM JENAM 2010

THE CHANGING FACE OF ASTRONOMY

Less than a century ago astronomers worked as individuals, today many of us function in groups of ever increasing size studying ever larger samples of planets, stars, galaxies, quasars and other objects. Most of these are faint and their observation requires powerful telescopes. Large samples are needed and therefore also many researchers to deal with the large volume of data. Both demand much funding and so astronomy has become “big science” in the same way as particle physics has done. Why does Society at large provide us with that funding? Two different motivations exist: utilitarian and more philosophical ones.

The former relate to clocks, to imaging instruments over the whole electromagnetic spectrum, to GPS, to Virtual Observatory Technologies for dealing with large data sets, to impact risks, to the influence of the Sun on the Earth’s atmosphere and climate, to technologies of Earth observation, to mention just a few items that are “useful”. The latter are very different and concern considerations of man’s place in the world at large: The heliocentric solar system and the discovery by Galileo of “myriads of stars” (now with planets), the realization that the Universe is very large, very old, evolving with perhaps some kind of beginning and filled with invisible matter, the nature of gravity, the probabilistic nature of physical law, and an understanding of the origin of the elements. If as the philosopher Dilthey (1834-1911) wrote “*Nature is not only the scene of history. The physical processes and the effects that follow form the substrate of all relations, of the action and reaction in the historical world. The physical world thus constitutes the matter for all domains in which the spirit has expressed its purposes, its values and its essence.*”, a gross understanding of these matters is a prerequisite of rational thought. Unfortunately recent polls show that in the U.S. 55% do not accept human evolution and 67% the Big Bang. The latter is all the more amazing, since one could have expected that belief in a God could go well with a singularity at the origin of the Universe. In the EU and in China the evolution skeptics are less prominent, though still near 30%. Even with less philosophically charged issues like global warming, one sees the limits of the belief in scientific analysis, especially if it leads to inconvenient consequences. Astronomy could have an important role in education by being particularly accessible through its images. It may also be helpful in augmenting the flow of students into other natural sciences. But with willful obscurantism still as widespread as it seems to be, one has difficulty being too optimistic.

Even though science is universal, decisions of where to place the center of one’s efforts in science, and in particular its funding, are not. As the former French minister of science Hubert Curien wrote in 1978 “*The risk of overdependence on the US should, however, not be neglected. One should ensure that the part of our scientific activity that depends on American decisions, taken on the basis of considerations that are not necessarily our own, does not become too preponderant ...*

dependence, independence, interdependence and overdependence, there would be a good subject for an essay and that not only in space.”

In today's more multipolar world these risks have diminished, as cooperative ventures not only with the U.S., but also with China, India, Japan and Russia have become more common. Nevertheless, for every large project a careful evaluation of the pros and cons of possible collaborations should be made.

Today most West European countries are members of ESO and ESA. With Czechia the first middle European country has joined ESA and ESO. Even though there may be problems to be solved, an extension to Eastern Europe would be beneficial in many ways. After all, in the European Astronomical Society the unity of all Europeans from the Atlantic to the Urals has been realized from the beginning twenty years ago.

The Large Projects

Progress in science has come about by advances in technology, by adequate funding and by the gradual accumulation of knowledge which allows future studies and instruments to be planned in a rational way. European ground based astronomy will be dominated by four large projects: the VLT and the E-ELT in the optical/near IR (ESO), ALMA, (mm/submm; ESO/Japan/U.S.) and SKA (cm/dm; “world”). E-ELT (42-m) and SKA (Square Kilometer Array) are still in the planning phase, while ALMA is approaching completion.

In space there are miscellaneous missions in the inner solar system. In addition, observatories study X- and gamma rays, the far IR and the cosmic microwave background, and in the near future a census will be made of a billion stars with individual distances and motions. ESA has a major involvement in the NASA JWST project, a powerful near-to-mid-IR telescope to be launched in 2014 by an Ariane V rocket, while its share in HST continues. Two big projects, Exo Mars and a large X-ray observatory, are being planned or discussed in a time frame extending from the end of the current decade or into the next one. Finally, there is a project of uncertain cost and schedule that has sometimes been discussed under the name of Darwin: a nulling interferometer to image and spectroscopically analyze earth-like planets and their atmospheres around nearby stars. If any astronomical project could create popular enthusiasm in Europe, it would be this. From the preceding summary it appears that Europe is engaged in a coherent, well balanced program in space and on the ground.

The VLT

Until the VLT came along, undisputed leadership in ground based optical telescopes was with the U.S. The same was the case in detectors, sometimes reinforced through U.S. export laws. Change came through the remarkable willingness of some of the European countries to provide some 300 M€ for the initial project, followed by funding for interferometry and additional instrumentation. The initial motivation for the VLT was to build the biggest collecting area for the “available” money and locate it in a place with a low turbulence, dry

atmosphere. First discussions started in 1977; the project was approved in 1987 and completed essentially on budget in 2000 with the erection of the fourth 8-m telescope. In the meantime interferometry has been fully integrated into the VLT with four mobile 1.8-m telescopes added to the four 8-m ones, yielding milliarcsecond angular resolution.

What are the main factors that contributed to making the VLT project successful?

- (1) The early development of the 3.5-m New Technology Telescope which tested a number of technologies later used in the VLT telescopes, in particular the active optics pioneered by Ray Wilson who will discuss that subject later in the present JENAM. Other innovations included direct drives for moving the telescope and a compact, rotating, well ventilated building. These factors contributed to a cost reduction of a factor of three compared to the 3.6-m telescope at La Silla. The fact that the NTT was built well within its approved budget gave confidence that the VLT budget was entirely realistic.
- (2) The flexibility of having four large telescopes each with different, but complementary quasi-permanent instruments and with a perfect systems integration, which in the future will also allow a smooth integration of the nearby 42-m E-ELT. In the past the need to change instruments had frequently led at the 3.6-m telescope to numerous breakdowns.
- (3) The participation of numerous institutes, scientists and engineers in the development of instruments, which created a strong feeling of a European community and ensured that technology became an equal partner in that community. In parallel the interaction with the space engineers led to a much more rigorous approach towards technology in the astronomical institutes with respect to quality control, respecting deadlines and budgets, etc. As a result also a high efficiency quasi-industrial management structure was developed for the operational phase of the VLT.
- (4) The interferometric option which was from the beginning pushed by Pierre Léna and which just now has reached the state where the four large telescopes may be coupled simultaneously to produce images with resolutions of a milliarcsecond in the near IR. For many years all over the world interferometry had led a somewhat marginal existence, but now the excellent engineering of the four large telescopes, the four 1.8-m mobile ones and the delicate combining optics has created a situation where many programs become possible. From just measuring stellar diameters we have now advanced to obtaining high-resolution images of the inner regions of AGN. Several decades of excellent interferometric work may be anticipated.
- (5) The choice of the superior site of Paranal as the location of the project. Though this added significantly to the cost, it has proven to be well worth it both for the quality of the atmosphere and for the total amount of observing time. In fact, no place in the world appears to have such a low cloudiness as the Paranal area. The nearby Cerro Armazones

was found to be equivalent, though somewhat windier, and at the time less accessible. It gives confidence that some 25 years later those two mountains remained at the top in a new survey of possible sites. There are some indications that climate change begins to affect the Pacific, though not necessarily for the worse at Paranal/Armazones. While the quality of the atmospheric turbulence in Antarctica seems to be superior (especially at dome A), the sky coverage would be limited and the access difficult and extremely expensive. So it could only be considered for certain niche projects with relatively small telescopes, but not for projects like the VLT or E-ELT.

The Future

Are we going to build ever-larger telescopes? Plans for the next generation of radio, optical, infrared and X-ray telescopes are in advanced stages or on the way to realization with price tags in the range of 1-5 billion Euros well above those for the previous generation. Will there be the interest and the capacity in Society to continue providing such – or even larger – sums? For a long time in the European, and even more in the American, mindset there has remained a brilliant future on the horizon with vistas of scientific discovery, technological development and economic growth. Characteristic was the influential 1945 report by Vannevar Bush to the U.S. President “Science: The Endless Frontier”. But will scientific development really be endless? An early warning sign may have been the fate of the big particle collider in the U.S., abandoned after several billion dollars had been spent. And at NASA the JWST originally budgeted at less than 1,000 MUS\$ has now reached the 5,000 MUS\$, while having been reduced somewhat in diameter. Of course, the result was that a number of other projects could not be executed. Hence the title of a recent article in *Nature*: “*The telescope that ate astronomy*”. At ESO the 100-m OWL planned in 2000 was wisely downsized to 42 m without much change in budget. So, prudence is called for not to overreach and lose one’s credibility.

But even apart from issues of affordability, the question may be asked if every next step in our instruments will be equally productive? Will the future developments have as large an impact on our image of the world as those of an earlier generation? We may doubt it. The beginning of quantum mechanics was so exciting because it fundamentally changed not just a specialized part of physics but also much of science, including chemistry, astronomy and biology. Similar situations in the future seem rather unlikely. As science becomes more and more narrowly specialized, it may remain very interesting to its practitioners but a disconnect to Society at large seems possible. In that case the way is open to many forms of obscurantism. Education may be helpful in this respect, and it is perhaps there that astronomy has special opportunities.

How Society at large views science has a major influence on the rewards of a scientific career. If the view is positive, the brighter minds are inclined to favor such a career. If not, they will study other subjects. But is not an ageing society likely

to be much less inclined to worry about science – except perhaps for antiaging pharmaceuticals? So while I see a bright future for astronomy in the next half-century or even somewhat beyond that, I believe that thereafter we may well look back to a past golden age, irremediably lost. If so, it might be well if we would plan for a less favorable situation. Of course one may argue about the precise time scale on which future events will unfold. However, it seems difficult to avoid the suspicion that science may not be an infinite frontier after all.

Lodewijk Woltjer

SYMPOSIUM I: FROM VARYING COUPLINGS TO FUNDAMENTAL PHYSICS

Nature is characterized by a number of physical laws and fundamental dimensionless couplings. These determine the properties of our physical universe, from the size of atoms, cells and mountains to the ultimate fate of the universe itself. It is remarkable how little we know about them. The study of the behavior of these quantities throughout the history of the universe is an effective way to probe fundamental physics and search for evidence of a fifth force and light scalar fields.

The symposium ‘From Varying Constants to Fundamental Physics’ was held on the 6th and 7th September 2010. This was the second JENAM symposium on this topic; the first took place in Porto in 2002. There were 117 participants from 32 countries, and 21 oral presentations took place.

The symposium occurred at a particularly exciting time, shortly after the announcement (in an arXiv preprint) of a claim for a cosmological spatial dipole in the value of the fine-structure constant “alpha” which, if true, will have dramatic implications for cosmology and fundamental physics. This prompted a JENAM press release and the symposium was the first forum for the formal presentation of these results [Webb, Flambaum], which were debated very lively.

Various astrophysical measurements yielding null results were also presented [Gutierrez, Petitjean, Thompson, Wendt], as were the constraints at high redshift [Galli] and very sensitive laboratory measurements by means of atomic clocks [Bize, Peik]. The comparison between measurements is often not easy, with different theories such as strings [Zagermann], quintessence [Nunes] or varying speed of light [Magueijo] to complicate things further.

Evidence was also presented [Levshakov] for a tiny variation in the Galaxy of the electron-to-proton mass ratio, which could be a further smoking gun for a scalar field. Finally, the good prospects for future European facilities relevant for this area were illustrated [Molaro]. The spectrographs ESPRESSO, under construction at the combined focus of the 4 units of the VLT, and CODEX proposed for the E-ELT, will allow major advances in this field.

The coming years bear the promise of being particularly exciting. Several groups will use new and improved data to challenge the above claims, and a ‘quest for redundancy’ will also be undertaken, looking for new astrophysical techniques that may allow independent measurements of these couplings, leading to a systematic mapping of their behavior throughout space-time.

In addition to the JENAM 2010 LOC and the EAS, the symposium was supported financially by CAUP and FCT. For those who wish to obtain more information, the slides of most talks are available at <http://www.astro.up.pt/vfc2010>

Carlos Martins (CAUP, Portugal)
Paolo Molaro (INAF-Trieste, Italy)

SYMPOSIUM 2: GALAXY FORMATION AND ENVIRONMENT: 30 YEARS LATER

The effect of environment on the properties of galaxies constitutes a key observable to understand the baryon physics that transforms the primaeval distribution of gas into the galaxies we see today. The year 2010 marks the 30th anniversary of a seminal paper – by Prof. Dressler - on the connection between galaxy formation and environment. The symposium consisted of four main sections, addressing observations of environmental imprints on galaxies at low redshift, high redshift, cluster regions, and theories to model those effects.

The opening talk by Prof. Dressler (Carnegie) gave an overview of the morphology-density relation, including a description of the field in the years up to the discovery of this correlation. The main conclusion was that environmental effects could indeed be a reflection of the more «local» properties of galaxies, in the sense that more massive galaxies end up most likely in high-density environments. Dr. Weinmann (Leiden) reported on the Yang et al. SDSS groups catalogue and its role in discriminating between local and environmental properties. Prof. Aragon-Salamanca (Nottingham) presented the work of the EDisCS and STAGES teams on the effect of cluster environments on the transformation from gas rich spirals into lenticulars.

The modeling session was opened by a review by Dr. De Lucia (Trieste) on the way of incorporating environmental effects in semi-analytical models of galaxy formation. The recipes related to the suppression of gas condensation and gas stripping are still rather simple and need more physical insight. Prof. Kenney (Yale) gave an overview of observational evidence of ram-pressure stripping in galaxy disks. Dr. Khochfar (MPE) presented his work on gravitational heating as an efficient method to suppress gas cooling in clusters today and at early times in the most massive halos, introducing a mass-dependent environmental effect, difficult to separate from more intrinsic mechanisms.

The final discussion session was led by Prof. van den Bosch (Yale) with an interesting number of open questions, the most

important being the need for a proper indicator of environment (with central/satellite classification being a tentative candidate). The impact of environment on morphology is not a solved problem. We still need to pinpoint the essential mechanism to model environment, with a tentative option being strangulation. The discussion had very active participation by the audience, reflecting the state of the field.

The programme of the symposium, including PDF files of the talks, can be found at <http://www.mssl.ucl.ac.uk/~ipf/J10/Programme.html>

Anna Pasquali
(ARI, University of Heidelberg)
Ignacio Ferreras
(MSSL, University College London)

SYMPOSIUM 3: DWARF GALAXIES: KEYS TO GALAXY FORMATION AND EVOLUTION

The JENAM symposium “Dwarf Galaxies: Keys to Galaxy Formation and Evolution” took place on the 9th and 10th September 2010. Its six sessions of 90 minutes each were all extremely well attended, with a vivid participation and a large number of high-quality contributions, including four reviews and several invited and contributed talks. Additionally, poster presentations were given before each evening session.

Evan Skillman who gave a review on outstanding questions and future perspectives of dwarf galaxy research opened the first session. Carme Gallart reported on new results from the “Local Cosmology from Isolated Dwarfs” (LCID) project, that suggests that reionization alone was not able to stop star formation in dwarf galaxies, as had been expected. Janice Lee closed the session with a discussion on the consistency between star formation rates (SFRs) inferred for late-type dwarf galaxies from their H α and far ultraviolet non-ionizing continuum emission. She pointed out that UV yields a higher SFR than H α by factors of two to more than ten, and that possible explanations for this discrepancy include a non-universal stellar initial mass function.

The second session was devoted to star-forming dwarf galaxies (SFDGs) beyond the Local Group both in galaxy clusters and in the field. It was opened by Nils Bergvall who provided us with an overview of the structural, chemical and environmental properties of SFDGs, laying special emphasis on the question of evolutionary links between dwarf irregulars (dIs) and Blue Compact Dwarf (BCD) galaxies, and the role of starburst activity on dwarf galaxy evolution. Jorge Iglesias-Paramo addressed the impact of the cluster environment on the star-forming activity of SFDGs as traced by their H α morphology. An impressive example of the interaction of a SFDG with the intracluster medium (ICM) was presented by Jeffrey Kenney: GALEX UV and WIYN optical images reveal in the Virgo dI IC3418 a spectacular “head-tail” morphology

with a one-sided tail of UV-bright knots connecting with the galaxy. These “fireballs” in the stripped tail are likely formed from dense gas clumps which continue to accelerate outwards through ram pressure, leaving behind streams of newly formed stars. Gerhard Hensler elaborated from the theoretician’s point of view the impact of ram pressure by the IGM on the morphological evolution of SFDGs in galaxy clusters: numerical models show that late-type dwarf galaxies plunging into the ICM can undergo strong morphological evolution, developing a “cometary” (head-tail) appearance.

The third session, concentrating on early-type dwarf galaxies, started with a review by Helmut Jerjen. The speaker highlighted the importance of these numerous, easily overlooked, systems for advancing our understanding of dwarf galaxy evolution and covered their different known species, from Local Group dwarf spheroidals (dSph) and dwarf ellipticals (dEs) all the way to Dark Matter (DM) dominated ultra-faint dwarfs (UFDs). The nature and evolutionary history of UFDs and classical dSphs, including the origin of extremely metal-poor ($[\text{Fe}/\text{H}] < -3$) stars in these systems were two of the key questions addressed by Stefania Salvadori. The speaker concluded that, for reproducing the observed Fe-luminosity relation and the mean Metallicity Distribution Function of dSphs, UFDs must be left-overs of minihaloes formed at $z > 8.5$ and thus the progenitors of classical dSphs. Tobias Goerdt, using numerical simulations, explored two possible scenarios for the formation of ultra-compact dwarf galaxies (UCDs): merging of globular clusters in the centre of a DM halo, or massive stripping of a nucleated dE. Both mechanisms produce density profiles and half-light radii in accord with the observations. However, UCDs formed by the first mechanism turn out to be underluminous and DM devoid. Agnieszka Rys gave an illustration of how stellar kinematical studies with SAURON in conjunction with spectral synthesis models can add new valuable insights into the formation history of nucleated dEs.

The second day of the symposium, devoted to SFDGs, opened with a review by Uli Klein on the properties of the interstellar medium (ISM). The topics addressed by the speaker included the determination of the baryonic and non-baryonic matter from gas kinematics, the observational evidence for starburst-driven gas outflows and the contribution of SFDGs to the magnetization of the ICM and intergalactic medium in the early universe. Erik Wilcots elucidated the impact of massive stars on their environment as the most important internal driver of the evolution of SFDGs using multi-wavelength data. Several impressive examples of the ionization and acceleration of the ISM of BCDs on spatial scales of several kpc away from their starburst region were presented by Gordan Ćirković. The speaker elaborated on various key aspects of starburst activity in BCDs, such as the formation efficiency of Super-Star Clusters (SSCs) and the escape fraction of Ly-alpha photons. Guillermo Tenorio Tagle discussed the interaction of massive SSCs with a dense ambient medium, resulting in efficient gas cooling and positive star formation feedback. Ricardo Amorin addressed the properties of Green

Pea (GP) galaxies, low-mass starburst galaxies at redshifts 0.1-0.3 that were recently discovered through the Galaxy Zoo project. He reported that, while these systems have subsolar gas-phase metallicities, they are offset from nearby SFDGs by more than a factor of two with respect to their mass-metallicity relation. Peter Weilbacher emphasized the significant advantages of integral field unit spectroscopy for the study of chemical abundance patterns, ionized gas kinematics and stellar age gradients in SFDGs. The fate of Tidal Dwarf Galaxies (TDGs), self-gravitating low-mass entities condensing out of material ejected from interacting/merging galaxy pairs constitutes a vivid field of dwarf galaxy research. Pierre-Alain Duc presented observations and numerical simulations of TDGs and stressed the importance of these systems as testbeds for the study of dwarf galaxy formation and the associated feedback processes. Kate Pilkington presented cosmological hydrodynamical simulations, resulting in the reproduction of bulgeless dwarf spiral galaxies. Various quantities extracted from the models (e.g. gas kinematics, density profiles and velocity dispersion) permit a detailed comparison with observations and promise to yield important new clues to the evolution of gas and stars in dwarf galaxies. In this respect, the availability of a large, high-quality set of interferometric HI data for nearby late-type dwarf galaxies is particularly important. Elias Brinks reported on the science drivers and the current status of LITTLE THINGS, a deep HI survey of about 40 nearby dIs with the VLA. Gary Mamon, using a simple model of galaxy formation computed the distribution of mass-weighted stellar age as a function of galaxy mass and redshift, and predicted the frequency of low-mass galaxies with mostly young stellar populations, similar to I Zw 18, at the present cosmic epoch. These models predict about 8 young galaxy candidates in the nearby universe.

The symposium concluded with a thoughtful summary by Evan Skillman and a stimulating discussion, which illustrated once again the crucial and highly interlinked questions in dwarf galaxy research, and its present challenges and future prospects.

A particularly pleasing event was the presentation of several high-quality poster contributions, which unfortunately could not fit within the allocated time for oral contributions.

The organizers would like to thank everyone who has contributed in the symposium, including the speakers, poster presenters and the audience for making this meeting a valuable and enjoyable experience. The Local Organizing Committee of JENAM, in particular Andre Moitinho, deserve our special thanks for their tireless efforts and excellent organization of the conference.

Polychronis Papaderos
Centro de Astrofísica da Universidade do Porto
Elias Brinks
University of Hertfordshire
Jarle Brinchmann
Leiden Observatory

SYMPOSIUM 7: THE SQUARE KILOMETER ARRAY

The Square Kilometre Array is rightly defined as representing the future of radioastronomy. It will provide more than one order of magnitude improvement in sensitivity compared with any existing radio telescope over a wavelength range of several hundred to one, from decametric to microwave wavelengths. It will revolutionize the study of the most abundant element in the Universe, hydrogen, from the epoch of reionization to the present-day, probing the onset formation period of the very first stars, look in depth to proto-planets and, through the precision timing of pulsars, detect the distortions of space-time due to gravitational radiation.

The JENAM2010 SKA Symposium presented in a series of seminal talks the SKA scope and challenges to the attention of both theoretical and observational astronomers working at all wavelengths. It also highlighted the great potential for scientific synergies with other major ground and space facilities like ALMA, ELTs, LSST, JWST, GRE, IXO, Gaia and Euclid and high energy facilities (Auger). SKA will be a sensor machine distributed over distances of 3000km, with a collecting area of more than 1 square kilometer, using technologies of XXIst century and producing a flux of data 200 times that of the total World Internet traffic in 2009.

The morning of the first day was designed to introduce the SKA new science, its challenges and impact. Dave de Boer, from the Australian CSIRO Astronomy & Space Science and ASKAP (an SKA precursor) Project Leader, reviewed the key science projects and the challenges of SKA. These included the technical requirements and cyber-infrastructure that may become available for the distribution and distributed analysis of SKA data. Tom Osterloo from ASTRON reviewed what has been achieved already, as well as the science impact SKA precursors and pathfinders in anticipating SKA science delivery. Simon Garrington from Jodrell Bank discussed the great socio-economic impact and the non-science benefits of SKA as a global project, in the light of the findings of the 2010 COST Workshop. In particular, attention was devoted to the impact of SKA as a driver for Information and Computing Technologies, Green Energy usage, and as a project promoting global linkages between science-society-industry and education and outreach.

In the afternoon Arnold van Ardenne from ASTRON described the new instrumentation that is currently being developed and deployed in Verification Programs. Attention was devoted to Aperture Arrays, a new technology being tested for radioastronomy usage that will provide superior survey capabilities. Heino Falcke from Nijmegen and Giovanni Bignami, ASI Director, explored the powerful known synergies between radio astronomy and the high energy and astroparticle physics, in particular with the Auger Observatory and space observatories like the x-ray mission XMM-Newton and gamma-ray mission FERMI.

Rashid Sunyaev, the MPIA Director, introduced the impact of the SKA census on the cosmic history: from a description of the early Universe and the detectability of recombination lines to the end of dark ages. Steve Rawlings followed, discussing the SKA potential from the Epoch of Reionization signatures to the present. Paolo Padovani from ESO and Raffaella Morganti from ASTRON explored the SKA unique capabilities for detecting nanoJansky sources and imaging of star formation processes, and AGN outflows.

The second day was devoted to high-resolution timing science and the explanation of two other key science projects. Erwin de Blok, from Cape Town University, opened the day exploring the SKA impact on galaxy dynamics and gravity studies and its anticipation by precursors, while Joe Lazio, from JPL and SKA Project Scientist has shown one of the major sciences projects, with potential to reveal new cosmic transients. Marike Harverkorn from ASTRON presented the SKA expected capabilities on mapping galactic and extragalactic magnetic fields with exquisite detail. The afternoon was consecrated to exploration of high spatial resolution capabilities and the extragalactic science enabled by the long baselines (Andrei Lobanov – Max Planck and Yuri Kovalev – Astro Space Center, Moscow). Leonid Gurvits, from JIVE, enlightened the applications to Space Sciences and the use of SKA as an important relay to the Deep Space Network. Patrick Charlot, from Bordeaux Observatory and Joe Lisker from ESO discussed respectively the great synergies between SKA and Gaia (and its impact on International reference Systems) and the ELT (in the line of the Mega-structures science). The conference was closed by a great talk about one of the major science projects, the study of fundamental physics with pulsars by Paulo Freire.

Domingos Barbosa,
Radio Astronomy Group – IT,
Dalmiro Maia and Sonia Anton
(CICGE, U. Porto)

SPECIAL SESSION 2: RADIO ASTRONOMY IN IBERIA

This special session served as a meeting for discussion on the infrastructure and instrumentation collaboration between Portugal and Spain. The strategic importance of establishing close connections between the two communities was recognized based on the following facts: i) The importance of bilateral cooperation between Portugal and Spain in the exploitation of several world class radioastronomical facilities in Spain such as IRAM, the Yebes 40-meter antenna, high-rank developments for ALMA, EVN, space observatories like Herschel, as well as projects in the near-future like RAEGE with Açores, and LOFAR stations planing ii) Portugal has a number of pathfinder experiments like GEM-P, the Porto solar radiospectrograph, SKA demonstrators in deployment in Portugal mainland, and it will host 2 telescopes of RAEGE project in Açores, iii) infrastructure and spectrum protection can be coordinated. Both Spanish and Portuguese scientists

were invited to present strategic research lines and foster collaborations for future cooperation on R&D research, spectrum management, and infrastructures.

The meeting started with a presentation by Domingos Barbosa on instrumentation work done related to the Galactic Emissions Mapping Project in Portugal (GEM-P) and the R&D being developed at the Radio Astronomy Group at the Telecommunications Institute. Dalmiro Maia presented results of the radioastronomy research from the University of Porto, highlighting their radio heliospectrograph. Francisco Colomer and Jose Antonio Lopez Fernandez from IGN, Yebes presented the projects related to An Atlantic Network of Geodynamical Fundamental Stations (RAEGE) for geodetic VLBI and the Instrumentation developments at the IGN. Lourdes Verde-Montenegro described the capabilities and long term directions of Radioastronomy at the Instituto de Astrofisica de Andalucia. The meeting was finalized by Jaime Afonso from ANACOM, the Portuguese Spectrum Regulator, who described the procedures and regulations that can be implemented for spectrum protection of radioastronomy bands.

Domingos Barbosa,
Radio Astronomy Group-IT,
Dalmiro Maia and Sonia Anton
(CICGE-UP)

SPECIAL SESSION 3: ALMA EARLY SCIENCE - OPPORTUNITIES AND TUTORIALS

The Atacama Large Millimetre/submillimetre Array (ALMA) is expected to be the leading observatory at millimetre and submillimetre wavelengths in the coming decades. ALMA is a global collaboration involving East Asia, Europe, North America and the host country Chile. When completed, ALMA will comprise at least 66 high precision antennas equipped with receiver and digital electronics system to observe in the frequency range from 30 GHz to 1 THz and angular resolutions as high as 7mas. Using a fully dynamic scheduling system and innovative calibration strategies, the ALMA system will allow making the best use of the atmospheric conditions on the Chajnantor plateau at an altitude of 5000m in the Atacama desert. ESO is leading the European contribution to the ALMA project on behalf of its member states.

ALMA is currently in an advanced stage of construction and the Commissioning and Science Verification phase has begun in early 2010. We currently expect to be able to release the call for Early Science observations in the coming months. Early Science will be the first opportunity for the users to propose science projects with ALMA. In this initial call, only limited capabilities will be offered: 16 antennas for interferometry, four frequency bands and a limited range of baselines. The capabilities of ALMA will gradually improve during Early Science operations and we currently expect that the ALMA baseline project will be completed and in Full Science Operations by 2013.

The ESO/ALMA session at the JENAM 2010 was organized to inform the European users on the current status of ALMA, its science capabilities and the plans for Early Science and user support in Europe. The European ALMA Regional Centre (ARC) structure and functions were presented together with a set of tutorials on the use of the software tools currently prepared for simulating ALMA observations, preparing ALMA proposals and scheduling blocks and for offline data reduction.

One of the main messages of the session was that the European ARC is the “one stop shop” for all European users. The ARC is the interface between the European users and the observatory in Chile, providing a package of services including assistance in proposal preparation, help with Phase II, data reduction and archival research. In addition to the central ARC at the ESO headquarters in Garching, there is a network of so-called ‘ARC nodes’ being set up throughout Europe. These nodes provide expert face-to-face assistance at the different stages between proposal preparation and data analysis. Each node has particular areas of expertise, such as high frequency observations, high dynamic range imaging, solar observing, mosaicking, polarimetry, etc. The ARC and ARC nodes also organize workshops and tutorials on observation preparation and data reduction, as well as on scientific topics. This activity becomes particularly important leading up to Early Science. By the time ALMA Early Science starts the ARC structure will be in full swing, helping European users to make them effective in an internationally competitive environment.

Leonardo Testi (ESO, Germany)
Martin Zwaan (ESO, Germany)

SPECIAL SESSION 4: EUROPEAN SPACE AGENCY

The ESA Special Session was split into two parts of 1.5 hours each. The first contained presentations of the 3 astronomy missions still in competition for the two medium class mission slots. The cases of Euclid, PLATO and SPICA were outlined by the corresponding study scientists: Laureijs, Fridlund and Isaak (presented by Pilbratt).

The second part of the session focused on the developments of the archives and Virtual Observatory activities. Osuna gave an overview of the ESA data archive group work. Loiseau and Verdugo went into the details for XMM-Newton and Herschel archives respectively. Baines completed the session with a presentation of a science case using Virtual Observatory tools.

Unfortunately the ESA Special Session took place in parallel with the JENAM Symposia. This resulted in extremely low attendance of the well-prepared presentations, which would be good to avoid in future.

Timo Prusti (ESA)

SPECIAL SESSION 5: TOWARDS AN EVEN STRONGER EUROPEAN ASTRONOMY

Today, European astronomy possesses the world's most powerful optical observatory – ESO's Very Large Telescope in Chile, and is an equal partner in ALMA, the world's unique mm radio facility. Europe has also launched a number of first-rank space observatories such as XMM, Herschel, and Planck. Even larger facilities are under way or planned in optical, radio, and particle astronomy. And for the first time in history, the new US Decadal Survey report refers to what Europe intends to do and to the need to coordinate plans with us. European astronomy has truly come a long way by learning to cooperate!

To remain fully competitive in the future, however, we must make even better joint use of national human and financial resources, not just those managed by international organizations such as ESO or ESA. The ASTRONET network of European funding agencies for astronomy was created to develop common long-term planning and coordination for all of European astronomy, from the ground and from space, supported by the European Commission. During its first contract period, 2005-2010, ASTRONET developed its Science Vision and Infrastructure Roadmap reports (see <http://www.astronet-eu.org>).

At the same time, ASTRONET worked to extend its membership to all of Europe, so that now 29 countries with a combined population of 550 million are now involved. ESO and ESA also participate in ASTRONET. We are also working closely with the established discipline-oriented EC networks, such as ASPERA, OPTICON and RadioNet.

With a new EC contract for 2011-2014, ASTRONET will now turn to the implementation of the recommendations of these reports. The purpose of this half-day session, organised by ASTRONET, was to update the European astronomical community on our plans and receive feedback on action for the near-term future. General overviews of the status of ASTRONET, ASPERA, RadioNet and OPTICON were followed by presentations by working groups charged with reviewing the future of the European 2-4m telescopes, options for wide-field spectroscopic surveys, and possible new initiatives on astronomical software and laboratory astrophysics.

The session was well attended and ended with a half-hour of lively discussion, where the future balance between large and smaller programmes on the 2-4m telescopes and the need to specialise and coordinate their instrumentation sparked considerable interest in the audience. We will take these viewpoints on board as we proceed.

J. Andersen
Chair, ASTRONET Board

SPECIAL SESSION 6: NEW TRENDS IN GLOBAL ASTRONOMY EDUCATION

Science Education is acknowledged globally as a major aspect of a modern education system. But it is also known that the interest of the younger generations in science topics has been decreasing. A shift in traditional science teaching methodology is mandatory. Astronomy, and the fascinating developments of the last few years, can be a very powerful tool to achieve this goal. Besides its multidisciplinaryity, it also has the power to attract the interest of different partners. Actually, the recently approved IAU Decadal Strategic Plan foresees the use of Astronomy as a trigger to the development in several nations. This can only be achieved if we steadily invest in training educators and educating students so that they enter the job market properly prepared. The recent success of the International Year of Astronomy (IYA2009) brought a huge wave of interest and raised the awareness of the public in general towards Astronomy. It is mandatory that we use this opportunity to engage European authorities in broader usage of modern tools in schools all over Europe. We must invest in the construction of science culture as an official part of the upbringing of future generations.

During this symposium we had the opportunity to hear about the role of some important Astronomy Education global programs, especially during the International Year of Astronomy 2009. The Galileo Teacher Training Programme (GTTP), a project devoted to train teachers on the use of modern tools for astronomy education has successfully named representatives in nearly 100 nations. Over 5000 teachers were trained under the auspices of GTTP. Strengthening the newly born network and fostering global exchange of good practices and international cooperation is now the major goal of GTTP leaders.

Another good example is the European Hands-on Universe group, recently awarded with the silver medal by the European Commission in the framework of the Lifelong Learning Programme, as being a best practice example for innovative practices in classroom. The group has been establishing the tone for several similar projects around the globe having successfully created a very active community of educators at an European level.

The Chair of the Dark Skies Awareness Programme, another cornerstone of the IYA2009, stressed the importance of the protection of our skies and the effects of light pollution in so many different aspects of our lives, even in unexpected places, such as in communities of migrating bats. More attention and education regarding aspects of the effect of over illumination in our daily lives is a lesson that needs to be taught to all different levels of our communities.

Some very innovative approaches to education in Primary Schools and unsuspected places were also presented. With inexpensive materials, very impressive tools can be created and have a highly educational impact. On the other end of the

road we can find highly attractive tools and resources based on new technologies. Wiki spaces are deemed to be a perfect space for educator communities to interact and exchange experiences and ideas.

The growing problem of the digital divide was also targeted. Although it is far away from the reach of educators to solve this problem, we can be ready to respond to the needs of emerging new communities of educators in developing nations willing to enter this so challenging ICT world. Attention must also be drawn to the inexistence of good literature in local languages in several countries and innovative methods to tackle this problem were presented. A DVD with a very impressive collection of resources is an innovative approach at a ridiculously small cost. A more costly solution though must be adopted to provide real books to children in places where computers are not a reality yet and this is being accomplished by a “one of a kind” programme, the AstroBook Drive.

Science is now done at the speed of light traveling between computers. Students have a big challenge ahead, be ready and capable of using all the amazing new possibilities given to them. Educators need help in updating their training, in assuming more and more the role of a tutor instead of a content deliverer. Scientists must be aware of this whole new community of citizens willing to be part of science and use this true labor force as allies. Cooperation is the keyword, joint and organized growth of communities is the trend ahead.

R. Doran
(Nuclio Interactivo de Astronomia, Portugal)

SPECIAL SESSION 7: EDUCATION AND OUTREACH AFTER IYA2009 IN EUROPE

The special session was divided in three sub-sessions and all were well attended. Its theme was to look back on IYA2009 and to reflect on highlights, evaluations, lessons learned and the legacy for the year. We were delighted that Dr Catherine Cesarsky managed to find time in her incredibly busy schedule to attend for the day and she gave an introductory welcome. Pedro Russo gave the opening talk looking at the global event, which has some amazing statistics and is almost certainly the largest scientific event ever organised with at least 815 million people in 148 countries having participated. We were delighted to welcome two speakers from the USA: Kim Kowal reviewed ‘From Earth to the Universe’ and how it has been continued beyond 2009, especially in the USA; while Connie Walker reflected on the Dark Skies Awareness and how legacy events and programmes have been established a number of countries and how many of the global activities will continue. Lars Lindberg Christensen reviewed the ‘Portal to the Universe’ and the contribution by ESO and announced a revamp of the ‘Portal’ website to ensure that both duplicate content of news is reduced and that press releases from non-traditional sources containing astronomy are not missed. Isabel Perez then told us about how ‘She is an Astronomer’ ran

in Spain and how a number of initiatives will be continued and can be copied by other countries. Finally Ana Noronha described the Ciencia Viva project and how it linked in with the IYA activities and legacy.

The second session focused mostly on reflections from Single Points of Contact for a number of countries, again, looking at highlights, evaluations lessons learned, and the legacy aspects. Joao Fernandes spoke about our host country, Portugal, while Ian Robson covered the UK, Magda Stavinschi Romania and Montse Villar Martin Spain. A common theme was to focus on funding to maintain national websites for events, ongoing networks and overall coordination support between amateur astronomers, professionals, science centres planetariums etc. Lina Canas described what can be learned from operating a non-digital planetarium and how to improvise, and then Rosa Ros described the ongoing IAU-NASE project, that uses the schoolyard as an observatory for teaching and enthusing.

The third session opened with Thilina Heenatigala who spoke about the ‘Global Astronomy Month’, a new annual global event. Sotira Trifourki spoke about a number of initiatives in the education field, many supported through the EU, while Oscar Pinto described the Astroquiz project in Portugal about learning and understanding using simple astronomical questions. Helen Walker then told us about the legacy of ‘She is an Astronomer’ in e-mentoring, something that came directly from the work in IYA2009. Finally, Oana Sandu challenged the audience with thoughts on how to communicate astronomy, especially with young people, by using marketing concepts and the idea of non-traditional ways of thinking. Overall a very interesting and stimulating meeting, reflecting how much success IYA2009 has experienced across the globe and especially within Europe.

A number of posters was also presented including a most interesting series on women astronomers as part of ‘She is an Astronomer’.

Ian Robson, UKATC

SPECIAL SESSION 8: AMATEUR AND PROFESSIONAL ASTRONOMERS IN EUROPE: HOW PRO-AM COOPERATION IS CHANGING ASTRONOMY

During this one-day session, the usefulness and future potential of several aspects of pro-am cooperation, in particular those experienced in the framework of the International Year of Astronomy 2009, were assessed. Some formal and informal institutions and associations involved in that cooperation were presented. The instrumentation available to advanced amateurs for imaging, spectroscopic and radio domain applications was reviewed, together with a selection of observational targets most suitable for the cooperation, such as large-scale structures better studied with wide-field amateur optical instruments (example: stellar tidal streams in

nearby galaxies) and time-dependent phenomena (example: photometry and spectrometry of variable stars) where the sheer number of available observers and observing time is a definite advantage. The methodology of data reduction was presented, with emphasis on the need for standardised, scientifically meaningful procedures.

Open questions about the future improvements in the cooperation were discussed. A definition of the fields falling within the frame of pro-am cooperation should be given. The role of the IAU, exclusively reserved to professionals before the IYA2009, could change if a working group (or maybe one day a Commission) were established. The ways to educate professionals and amateurs to cooperate, and to bring both groups together, should be explored. Professional databases for the amateurs to mine into, and amateur results usable by the professionals, should be identified. Further fields of cooperation include organisational aspects in education, public outreach and astronomical travel infrastructure.

Jean-Luc L. J. Dighaye
(EurAstro, Germany)

Pedro Russo
(IAU/IYA2009/ESO, Germany)

SPECIAL SESSION 11: TEACHER TRAINING SESSION

A new era of education is upon us. Computers, mobile phones, games are the extension of young student's hands. If we are to regain their trust and interest we must engage in a new form of knowledge and content delivery, a more interactive hands-on approach to science education.

The road ahead is clear, although non-trivial. New technologies are opening the world of real research to school students. And this is the key to regain the attention of young generations towards science and its beauty. There is a huge obstacle though; we need to engage the educator's community first. The majority of teachers lack training in Astronomy, have a hard time keeping updated with all the new discoveries and are not aware of the enormous quantity of modern tools and resources that can assist them in their mission.

The solution is not unique but a few things we can state: teachers need training and support by astronomy educators and scientists. The existence of a network of teachers is very beneficial as a space to exchange questions, experiences and success stories. A properly rated repository of resources is highly desirable.

Associating a Teacher's Training Session with a scientific event is a good idea. It allows teachers to have a taste of the science research world and to interact with scientists. It also allows scientists willing to cooperate with schools, to give it a try, and there are a surprisingly large number of scientists aware of the importance of their roles as real science ambassadors.

JENAM2010 was a proof of concept where ideas were exchanged and future collaborations between educators and scientists were established.

In this session we have selected a few good examples of the use of new technologies for the teaching of science content.

- The use of Dark Skies Rangers Programme as a tool to teach different aspects of natural sciences. The effect of light pollution on our daily lives, on the local flora and fauna and repercussions in different aspects, from energy consumption to our health.
- The International Asteroid Search Campaign as a tool to engage students in the use of new technologies. A very user-friendly program gaining more participants every year. In this program students collaborate in the identification of the trajectory of minor bodies really contributing to help NASA identify possible hazards to our planet.
- The use of Robotic Telescopes in the classroom going from the simple acquisition of beautiful portraits of the Universe to real science at school.
- Examples of the use of affordable equipments, in this case a spectroscope, with a very strong potential to bring real science research to the classroom
- How to communicate students' achievements to the local community and to the press.

The session was exciting and participating teachers manifested their interest in continuing investing in this learning path. We hope that this fruitful experience will bring a lot of science awareness to their students and test the efficiency of these methods in a school environment. Moreover we hope that this successful session becomes a trend in all future JENAM meetings.

R. Doran
(Nuclio Interactivo de Astronomia, Portugal)

THE EAS AFFILIATED SOCIETIES

THE AUSTRIAN SOCIETY OF ASTRONOMY AND ASTROPHYSICS

Astronomy in Austria can look back on a long history. An example for outstanding research in the last century is represented by the Nobel laureate Victor Franz Hess, who discovered the cosmic rays in 1911. Nowadays many modern science topics are addressed with astronomical research in Austria being performed at three universities: at the University of Vienna (Institute of Astronomy), the University of Innsbruck (Institute of Astro- and Particle Physics) and the University of Graz (Institute for Physics). Some additional astronomy or astronomy related research is done at various other places like the Institute for Space Research of the Austrian Academy of Sciences. In total there are currently almost 30 staff members, about the same number of post-docs

and nearly 50 PhD students working at the three university institutes. The research topics span a wide range, from solar physics (Graz, www.uni-graz.at/igamwww) over astroseismology, late stages of stellar evolution, planetary system, the interstellar medium, the Milky Way, galaxies, galaxy clusters, history of astronomy and participation in COROT and HERSCHEL (Vienna, astro.univie.ac.at) to planetary nebulae, novae, galaxies, galaxy clusters and astroparticle physics (Innsbruck, astro.uibk.ac.at).

The Austrian Society of Astronomy and Astrophysics (OeGAA) was founded in 2002, above all in order to vigorously support and push the several decades long endeavours to become member of ESO. These efforts were eventually successful: the accession document was signed in 2008 and ratified by the Austrian parliament in 2009. In addition to this originally primary goal the OeGAA from the beginning also has been understanding itself as a society which intends to represent the astronomers and astronomical institutions in Austria with the aims of promoting and propagating astronomy and astrophysics in science, teaching and among the general public. Furthermore, OeGAA considers itself as the national contact point for society, politics, economy and the media and coordinates common interests of Austrian astronomers. All major scientific astronomical institutes as well as a large number of educational organisations are members of OeGAA. More than a hundred individual members involved in astronomical (or related) research, representatives of national educational organisations as well as active amateur astronomers ensure a broad basis of OeGAA in Austria. The OeGAA is affiliated with the European Astronomical Society and is partner of the Astronomische Gesellschaft (AG) within the German-speaking countries.

OeGAA is a non-profit organisation, with an executive board consisting of nine members, elected every two years by a general assembly. All officers are unpaid volunteers, chosen to provide a geographical balance as well as to cover the different fields of scientific research, teaching and public outreach. Prof. Dr. Sabine Schindler, Innsbruck, is presently president of OeGAA. The responsibilities, areas of activity and the subgroups of the society are determined by the articles of OeGAA. The society consists of Full, Supporting and Honorary members. All natural persons, who are particularly interested in supporting astronomy and astrophysics as well as legal entities (e. g. organisations, institutes, companies) with related interests are able to become members. The annual membership fee amounts to 10.- Euro for Full and to 100.- Euro for Supporting members.

Among the various, widespread activities of OeGAA, the Working Groups within the society deserve particular reference. Of great importance was the working group “European Southern Observatory”, however since Austria has joined ESO, this group constitutes the link between the astronomical community, ESO and the science ministry. The working group “Public Outreach and Documentation” aims at acting as a national contact point for astronomical and astrophysical matters. It can arrange contacts between different institutions

and astronomers and assists with non-regional initiatives. The “Support of Young Astronomers and Astrophysicists” is subject of another working group. Its main objective is to award a prize to the best master thesis and to increase the mobility among the young academics. Since astronomy is one of the most attractive natural sciences, this working group also intends to increase the quality and quantity of teaching at high schools and to offer additional training to high school teachers. The fourth working group is devoted to the problems of “Light Pollution”. The increase of the night sky brightness due to manmade light pollution clearly interferes with astronomical observations by both professionals and amateurs. This problem having also cultural, economic and ecological aspects is treated by OeGAA in inter-disciplinary collaboration. Furthermore, a working group was initiated in 2007 to coordinate Austrian activities for the “International Year of Astronomy 2009”. Last not least, the OeGAA tries to tackle the wide-spread believe of people in pseudo-sciences: the main goal of the working group “Pseudo-Science” is to uncover and correct conceptional weaknesses and mistakes of pseudo-astronomical statements, traditions and methods.

More information on OeGAA and its activities is available at its webpage at www.univie.ac.at/oegaa/english.

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THE LATVIAN ASTRONOMICAL SOCIETY

Latvian Astronomical Society (*Latvijas Astronomijas biedriba, LAB*) was originally established in 1947 as Riga unit of the Astronomic and Geodetic Society of the USSR. Taking into account the historic time period of its foundation, *LAB* gained a wide recognition among the whole society. Regular monthly meetings and lectures in Riga planetarium were among the most important activities of the *LAB* during its first years. In 1953 *LAB* started to publish yearly Astronomical Calendar. The members of *LAB* also took an active part in different scientific research projects, including observations of meteors and noctilucent clouds. On June 30, 1954 members of *LAB* organised the first Total Solar Eclipse expedition to Šilute (Lithuania) and J i (Liepaja district, Latvia). This tradition has survived over the years and it is still important activity attracting dozens of amateur and hobby astronomers.

The International Year of Geophysics (1957 – 1958) served as an additional driver for the activities of *LAB*, and a special observation site was constructed in Sigulda to foster the observations of noctilucent clouds. Later on this site was equipped with telescope and other instruments which were used for scientific and educational purposes as well as for public observations. In 1967 the founder and the first president of *LAB* Janis Ikaunieks was awarded a Lenin order – the highest ranked order of the USSR.

In 1961 Matiss Dirikis was elected president of *LAB*. He headed the society up to 1993. In 1962 Riga unit of the Astronomic and Geodetic Society of the USSR was reorganised to

Latvian unit of Astronomic and Geodetic Society of the USSR, which remained as official legal name for *LAB* up to 1990. The members of *LAB* continued their scientific research activities carrying out observations of noctilucent clouds, meteors, Sun and Moon. Theoretical research works were related with minor planets, comets and history of Latvian astronomy. In 1970-ies the members of *LAB* evolved their participation in the educational activities organising the Astronomical Olympiads for Secondary School pupils. These Olympiads are still organised by *LAB* on regular yearly basis.

Several members of *LAB* have been involved in construction of astronomical instruments and telescopes. The 500 mm reflector constructed by Mikelis Gailis was used in Sigulda observatory from 1974 until 1989. This was the largest amateur telescope in the USSR during these years.

In 1986 the Astronomical Observatory of the University of Latvia was opened for public, and the members of *LAB* actively participated in organisation of these observations. Meanwhile the Astronomical Observatory of the University of Latvia and public observatory in Ramkalni are the only observatories offering organised public astronomic observations in Latvia.

Upon collapse of the USSR in 1990, *LAB* gained a status of independent organisation – Latvian Astronomical and Geodetic Society. Three years later it was registered under its current legal name – Latvian Astronomical Society. Ivars Smelds was elected president of *LAB* in 1993, and Maris Krastins was elected president of *LAB* in 2004. According to its By-laws, the main tasks of *LAB* are promotion of astronomical education, scientific research studies, astronomical discoveries and maintenance of astronomical terminology in Latvian language.

Today there are over 75 members of *LAB* represented by professional astronomers, amateur and hobby astronomers. The society is headed by the board of 7 members. The General Meeting is the highest decision making body of *LAB*. It is held on annual basis. Some members of *LAB* are the members of the International Astronomical Union.

Most of the members of *LAB* are involved in organisation of educational and public activities, including public observations in Astronomical Observatory of the University of Latvia, annual star parties, Astronomical Olympiads for Secondary School pupils, publication of articles in quarterly magazine “*Zvaigznoda Debess*” (“Starry Sky”) and maintenance of *LAB* website www.lab.lv.

Main scientific work is carried out in Riga (Astronomical Institute of University of Latvia, including Baldone observatory) and Ventspils (Ventspils International Radio Astronomy Centre).

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