INTERNATIONAL ASTRONOMICAL UNION

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Preface

In this edition of the Information Bulletin, we look back at the outstandingly successful International Year of Astronomy IYA2009 and look forward to the first stages in the implementation of the IAU Strategic Plan, with the selection of the South African Astronomical Observatory as the host for the Office for Astronomy Development (OAD) and the start of the process to recruit its Director.

The IYA2009 created an astronomy network that must be the largest in history. 148 countries, from Afghanistan to Zimbabwe, joined together to encourage and enable people from all walks of life to 'discover the Universe.' The levels of participation achieved were far beyond even our most ambitious expectations, and the connections between the public, amateurs and professionals that developed during IYA2009 should stand the test of time.

The International Year of Astronomy 2009 was never intended to last just one year and then fade into the past. It was always intended as a stimulus for collaboration, self-sustaining activities and innovative concepts for the communication of astronomy. Thus there is an exciting 'legacy' programme, set out in this *Information Bulletin*, which will ensure that the momentum created by IYA2009 will be maintained. Most of the IYA2009 Cornerstone projects will continue beyond 2009. One of the priorities of the legacy programme is the maintenance of the IYA2009 networks, so that the global networks continue to operate and engage millions of people.

A full report on IYA2009 is being compiled, but already we can see that the bare statistics are staggering. At least 815 million people were reached by the IYA-2009. There can be little doubt that IYA2009 was the largest, and probably most successful, science education and public outreach event in history. Our thanks therefore go to all those who made it possible, and particularly to Franco Pacini who started the ball rolling, Catherine Cesarsky who took up the baton and finally Pedro Russo and colleagues at the IYA Secretariat who made sure it all happened.

The IAU Strategic Plan 2010-2020 "Astronomy for the Developing World" (subtitle: "Building from the IYA2009") met with an enthusiastic response when it appeared and was warmly endorsed at the 2009 General Assembly. When we announced the opportunity to host the Office for Astronomy Development, a key element in the plan, we had no idea what to expect. We received 40 expressions of interest, which culminated in 20 proposals – far exceeding our initial hopes! Selecting the host from so many excellent proposals was a difficult task for the Executive Committee, but after very careful evaluation, the South African Astronomical Observatory was chosen. They have contributed a short piece to this Bulletin. We are now advertising for the Director, a joint appoint-

ment of the IAU and the SAAO, and members are encouraged to draw this to the attention of anyone they may feel could rise to the challenge.

The core activities of the Union continue. An exciting programme of symposia for 2011 has been selected: details are in this Bulletin. You are reminded that the selection of the scientific programme for the 2012 General Assembly in Beijing starts at the end of this year – letters of intent for Symposia, Joint Discussions and Special Sessions are due by 15 September and proposals by 1 December. Details and submission templates are available on the IAU web site at <http://www.iau.org/science/meetings/proposals/>.

There is, as always, a strong education and development programme under Commission 46, and an update is given in this Bulletin.

Once again it is my pleasure to thank my colleagues on the Executive Committee, and Vivien Reuter and Jana Žilová in the IAU Secretariat, without whose contribution the IAU would be a much less effective organisation.

Ian Corbett
General Secretary
Paris, June 2010.

EVENTS AND DEADLINES

2010

21-25 June	**IAU S271, *Astrophysical dynamics – from stars to galaxies***, *Nice, France*
19-23 July	**IAU S272, *Active OB stars – structure, evolution, mass loss, and critical limits***, *Paris, France*
23-26 Aug	**IAU S273, *Physics of Sun and star spots***, *Los Angeles, USA*
6-10 Sept	**IAU S274, *Advances in plasma astrophysics***, *Catania, Italy*
13-17 Sept	**IAU S275, *Jets at all scales***, *Buenos Aires, Argentina*
15 Sept	Due date for Letters of Intent proposing IAU Symposia in 2012
20-24 Sept	**IAU S276, *The Astrophysics of planetary systems formation, structure, and dynamical evolution***, *Torino, Italy*
1 Nov	Due date for contributions to IAU IB 107
1 Nov	Due date for agenda items and documents for Officers' Meeting, January 2011
8-12 Nov	**XIII Latin American Regional IAU Meeting (LARIM 2010)**, *Morelia, Mexico*
30 Nov	Due date for applications for the Peter and Patricia Gruber Foundation Fellowship 2011
1 Dec	Due date for proposals for IAU Symposia in 2012
13-17 Dec	**IAU S277, *Tracing the ancestry of galaxies (on the land of our ancestors)***, *Ouagadougou, Burkina Faso*
15 Dec	Deadline for nominations for the Peter and Patricia Gruber Foundation Cosmology Prize 2011

2011

5-14 Jan	**IAU S278, *Archaeoastronomy and Ethnoastronomy: Building Bridges between Cultures***, *Lima, Peru*
24-26 Jan	Officers' Meeting 2011
10-14 April	**2nd Middle East Africa Regional IAU Meeting (MEARIM 2011)**, *Cape Town, South Africa*
18-22 April	**IAU S279, *Death of Massive Stars: Supernovae and Gamma-Ray Bursts***, *Nikko, Japan*
24-26 May	EC89 with Division Presidents, Prague, Czech Republic
29 May-3 June	**IAU S280, *The Molecular Universe***, *Toledo, Spain*
4-8 July	**IAU S281, *Binary Paths to the Explosions of type Ia Supernovae***, *Padova, Italy*
18-22 July	**IAU S282, *From Interacting Binaries to Exoplanets: Essential Modeling Tools***, *Tatranska Lomnica, Slovak Republic*
25-29 July	**IAU S283, *Planetary Nebulae: an Eye to the Future***, *Puerto de la Cruz, Tenerife, Spain*

26-29 July	**XI Asian-Pacific Regional IAU Meeting (APRIM 2011)**, *Chiang Mai, Thailand*
5-9 Sept	**IAU S284, *The spectral energy distribution of galaxies (SED2011)***, *Preston, UK*
19-23 Sept	**IAUS 285, *New Horizons in Time Domain Astronomy***, *Oxford, UK*
3-7 Oct	**IAU S286, *Comparative magnetic minima: characterizing quiet times in the Sun and stars***, *in Mendoza, Argentina*

2012

20-31 Aug	**IAU XXVIII General Assembly**, *Beijing, China*

2015

3-14 Aug	**IAU XXIX General Assembly,** *Honolulu, Hawai'i, USA*

1. The International Year of Astronomy 2009

1.1 Review

by Pedro Russo <prusso@eso.org>, Lars Lindberg Christensen, Mariana Barrosa and Lee Pullen on behalf of the IYA2009 EC WG and IYA2009 project

The International Year of Astronomy 2009 (IYA2009) was launched by the International Astronomical Union (IAU) and the United Nations Educational, Scientific and Cultural Organization (UNESCO) under the theme "The Universe, Yours to Discover." From the beginning, IYA2009 was planned to be more than just a series of activities occurring over 12 months. It was designed and implemented as a springboard for the popularisation of astronomy with a much longer timeframe in mind.

Replete with grass-roots initiatives and global projects, this venture has been highly visible, and its impact will last for years. Perhaps the most impressive statistic from IYA2009 is the sheer scale of the astronomy network that has been created, the largest in history: 148 countries, from Afghanistan to Zimbabwe, joined together to work toward the common goal of making astronomy accessible to all. The International Year of Astronomy 2009 truly has been international, with individuals and groups in all of these countries collaborating both internally and across borders on projects beneficial to all. The relationships forged between scientists, communicators, teachers, and enthusiasts during IYA2009 should remain far into the future, and it is hoped they will become even stronger with time. Sharing resources and expertise is a win-win situation, as IYA2009 has shown.

The preliminary numbers from National Nodes and Global Projects are mind-blowing: working with a budget of 13.5 million Euros, they reached at least 815 million people. Although many reports are still outstanding, these figures already make, these figures already make IYA2009 the largest science education and public outreach event in history. IYA2009 was a record-breaking year in many ways. More than one million Canadians experienced a so-called "Galileo moment," an engaging astronomical experience that opened their eyes to the Universe. In Portugal, more than 300,000 people participated in the year's astronomy-themed Oceans festival. The event featured a Guinness World Record 4.8-km long canvas painted with the help of enthusiastic volunteers. In Japan, more than 7 million people took to stargazing during 2009.

The IYA2009 presence in the new media sphere has been tremendous: the number of IYA2009-related blog entries and tweets reached millions. The IYA2009 Cornerstone Project Cosmic Diary, a blog where 60 professional astronomers from around the world blogged about their lives, families, friends, hobbies and interests, as well as their work, had more than 250,000 visitors and more than 2100 blog entries. More than 10,000 people participated in Meteorwatch on Twitter, making this the first event of its kind, and also one of the biggest mass-participation events of IYA2009. On both nights of the Perseid meteor shower, it was the n°1 top "trending topic" – by far the most-discussed subject on the Twitter network anywhere in the world!

The global IYA2009 projects have been more successful than anyone initially dared to imagine. Two worldwide star parties were held in 2009: "100 Hours of Astronomy" in April and "Galilean Nights" in October. Over 3 million people got involved, with many seeing night sky objects such as planets and the Moon through a telescope for the very first time – a life-changing experience. A highlight of "100 Hours of Astronomy" was the unprecedented 24-hour live webcast called "Around the World in 80 Telescopes." Featuring astronomical research observatories both on and off the planet, the webcast gave members of the public a snapshot of life at research observatories around the world during a single 24-hour period, showing viewers the wide range of astronomers' activities at an array of very different observatories. The marathon webcast, which attracted at least 200,000 viewers worldwide, offered a striking demonstration of the global diversity of astronomical research.

Some projects crossed national borders in a literal sense. The GalileoMobile was a science education itinerant project that spent two months bringing life-changing experiences and the excitement of astronomy to young children in Chile, Bolivia and Peru. In total the GalileoMobile visited around 3,000 children in 30 schools, covering a distance of 7,000 km. Tunisia's Astro-Bus was a similar project. From January to September, the Astro-Bus visited around 60 regions all over the country, covering approximately 15,000 km and sharing its content with 100,000 Tunisians of all ages. Telescopes have also travelled more than

20,000 km across Argentina, providing thousands of people with the opportunity of observing the firmament through a telescope.

Seventeen developing countries – Macedonia, Nepal, Uganda, Mongolia, Nicaragua, Nigeria, Kenya, Ethiopia, Gabon, Rwanda, Uruguay, Tajikistan, Ghana, Trinidad & Tobago, Mozambique, Pakistan and Tanzania – have received seed grants to stimulate astronomy educational and outreach. The activities extend from astronomy education workshops for teachers, to recording and preservation of indigenous astronomy knowledge, to production of school astronomy education resources in local languages and beyond. Thanks to "Developing Astronomy Globally" and also to the general networking effort, developing nations have enjoyed increased links with astronomy groups and organisations at home and abroad. New openings and opportunities instigated during IYA-2009 at both the professional and amateur level are set to continue, allowing expertise within these countries to be maximised and helping global astronomy research and science communication. The IAU has been at the forefront of these efforts, and consolidating links between the IAU and developing nations is seen as a priority in the recently launched "IAU Strategic Plan for Astronomy Development."

Political interest in IYA2009 was encouragingly high. The U.S. House of Representatives passed a resolution supporting IYA2009, the Spanish Congress of Deputies passed a law supporting astronomy in the framework of IYA2009, and many Heads of State were keen to express their support for the Year: the President of the Portuguese Republic, Aníbal Cavaco Silva, personally presided over the Portuguese IYA2009 Honour Committee. The President of the Republic of Slovenia, Danilo Turk, became the patron of IYA2009 in Slovenia. Lech Kaczynski presided over the Polish IYA2009 Honour Committee, while Prince Felipe of Spain (Prince of Asturias) did the same for the Spanish IYA2009 Honour Committee. The former Belgium Prime Minister and current President of the European Council, Herman Van Rompuy, voiced his support of astronomy during an IYA2009 event in Belgium held in April 2009, as did the former European Commissioner for Science and Research and present European Commissioner for Environment, Janez Potočnik, during the European opening of IYA2009 in Prague. The event celebrating IYA2009 at the White House with U.S. President Obama and the First Family on 5 October 2009 made headlines. In Nepal, the total solar eclipse observation event on 22 July 2009 was attended by Prime Minister Madhav Kumar together with thousands of members of the public. During his inaugural speech at the 3rd International Astronomy and Astrophysics Olympiad in Tehran, Iran's President Mahmoud Ahmadinejad recognised the opportunity that IYA2009 provided for young scientists to develop a more vivid vision of man's future. Pope Benedict XVI gave an eloquent speech in which he said, "*The International Year of Astronomy is meant not least to recapture for people throughout our world the extraordinary wonder and amazement which characterised the great age of discovery in the sixteenth century.*"

IYA2009 has fostered public awareness that we are living in an extraordinary era of discoveries about the Universe and conveyed a modern image of astronomers and the work they do. It has provided a clear demonstration that a career in astronomy is also for women and minorities, promoted the creation of international networks of scientists, communicators, teachers and amateurs, and witnessed the birth of many vocations at the professional and amateur level which should remain in existence far beyond 2009. A plethora of educational material on astronomy, books, films for cinema and television, DVDs, theatre, planetarium shows, and music related to astronomy have been produced and widely distributed. And finally, IYA2009 and the partnership with UNESCO have led to the inception of a new set of goals for the IAU that is embedded in the Strategic Plan.

To supplement the documentation of the year, the IYA2009 Secretariat is in the process of collecting and analysing inputs from the nodes and projects, including quantitative information and evaluation metrics. The data will cover organisational structures, main achievements, most successful events, budgets, etc.

This information will be analysed and structured to produce:

- a comprehensive final online-only report of 1000-1500 pages addressing the origin of IYA2009, the organisational structure, national and organisational nodes, global projects, resources and highlights, as well as lessons learnt and recommendations;
- a printed Executive Summary extracted from the final report and summarising the main achievements, lessons learnt, and recommendations;
- a coffee table book presenting a digest of the highlights of the final report and illustrating the global celebration of IYA2009 around the world. The book will have a strong visual component, with brief, clear texts. A partnership with a publisher will be sought.

Similar products may be realised by the participant organisations and countries.

Education was a strong theme during the Year, emphasised in particular by the "Galileo Teacher Training" Cornerstone, and there is much potential for building upon the existing efforts to extend the reach of science in general, and astronomy in particular, on a world level. Combining increased opportunities for developing nations with improved education, the "Universe Awareness" project (UNAWE) tackled difficult issues head-on. With its aim of creating an international awareness of our place in the Universe and on Earth, targeted at children in underprivileged environments, this programme has inspired many and clearly must continue in 2010 and beyond.

Among the manifold educational materials generated and distributed in connection with IYA2009, Celestron and Japanese "You are Galileo" telescopes, as well as large numbers of Galileoscopes have been donated, mainly to developing

countries. The Galileoscopes, low-cost telescope kits resulting from one of the IYA2009 Cornerstones, enable educators to utilise high quality yet accessible tools to improve their astronomy communication. Galileoscopes will continue to be sold after 2009, but at a higher price.

The International Year of Astronomy 2009/Mani Bhaumik Prize for Excellence in Astronomy Education and Public Outreach

The International Year of Astronomy 2009 featured tens of thousands of events worldwide. These were organised and implemented by many professionals, amateurs and volunteers who together built IYA2009 into the most successful science education and public outreach project ever undertaken. The IYA2009 Prize for Excellence in Astronomy Education and Public Outreach, financed by IYA2009 patron Mani Bhaumik, was established to reward several of the most ambitious contributions towards improving public awareness of astronomical achievements and stimulating the use of astronomy for the promotion of scientific education and culture in 2009. Thirty submissions were accepted from 21 countries and nine transnational organisations. After a very careful evaluation of all submissions and much difficult deliberation, "From Earth to the Universe - FETTU" was selected as the winner.

"From Earth to the Universe" showcases the incredible variety of astronomical images available today. The exhibit shows how astronomical objects look when viewed across the electromagnetic spectrum, from ultraviolet and visible light to infrared, X-rays and gamma rays. FETTU continues to be shown in non-traditional public venues such as parks and gardens, shopping malls, metro stations and airports in major cities around across the world. The large-format FETTU images have been selected for their stunning beauty and ability to engage members of the general public who might normally ignore or avoid astronomy. With short but informative captions on each panel, FETTU introduces the basics of the science behind each image, enhancing and extending the visual impact. The FETTU project, partly supported by NASA, comprised more than 500 exhibits in over 70 countries. A grassroots initiative with an open source approach to education and public outreach, FETTU has made all its material freely available upon request. Exhibitions in more than 30 countries are planned for 2010. "*We are really pleased to award the prize to From Earth to the Universe, a project which has really captured the spirit of the contest and of IYA2009 as a whole.*" says Dr. Mani Bhaumik, the IYA2009 Patron.

Three additional projects from the very high quality field were selected as runners-up in the contest. The first is "Around the World in 80 Telescopes," a 24-hour live webcast presenting observatories and astronomical research around the world, as part of the global project "100 Hours of Astronomy." The webcast featured eighty professional telescopes on seven continents and reached well

over 110,000 viewers in 24 hours. Many more are still watching online every day from all around the world.

The "Galileoscope" and "Galileo Teacher Training Program" shared the second runners-up prize, for their outstanding contributions to all aspects of education during IYA2009. The "Galileo Teacher Training Program" helped more than 5000 educators in more than 40 countries improve their methods of teaching astronomy and bringing it to the classroom, while the "Galileoscope" project created a low-cost telescope kit that enabled children and adults worldwide to relive Galileo's sense of discovery. More than 180,000 of these have been produced and distributed to individuals, astronomy clubs, planetariums, science centres, museums, schools and other groups.

"It was very difficult to select the winners, as so many initiatives deserve acclaim for what they've done. All of the projects help contribute to the legacy of IYA2009 and its important mission of astronomy education and public outreach," says Ian Corbett, IAU General Secretary and member of the prize jury. *"Those on our final list showed ambition and scope far above and beyond conventional science communication ventures, and this was an important factor in our decision."*

The winner received €3500, the first runner-up received €1500, and the two second runners-ups, €750 each. The awards and certificates were bestowed in March during the "Communicating Astronomy with the Public" 2010 Conference (CAP2010), in Cape Town, South Africa. Kimberly Kowal Arcand, who co-chairs FETTU together with Megan Watzke, gave a keynote talk at the conference. FETTU is headed by the NASA Chandra X-ray Center in Cambridge, Massachussets, USA.

1.2 The IYA2009 Legacy – Roadmap to IYA2009's Living Heritage

The International Year of Astronomy 2009 was never intended to be a "one-off" event for one year, but rather a means of creating lasting structures for collaboration, self-sustaining activities and innovative concepts for the communication of astronomy. Within the IYA2009 project, this "living heritage" goes under the name "IYA2009 Legacy."

Legacy Resources

Beyond IYA2009 logo
With the logo figures in particular having become iconic, it is important to maintain the common branding beyond 2009. The "Beyond IYA2009" identity can be used in the different products beyond 2009. The new legacy logo will be soon available on: <http://www.astronomy2009.org/resources/branding/>.

IYA2009 online resources
The online resources produced during IYA2009 by the Secretariat, the various projects and stakeholders will be preserved after 2009. The main IYA2009 website will be maintained by ESO, and a commitment from the ESO Education and Public Outreach Department exists.

Individual countries are encouraged to find ways to keep their national websites and resources, following some guidelines from the IYA2009 Secretariat. Tools like webZIP <http://www.spidersoft.com/webzip/default.asp> or HTTrack <http://www.httrack.com/> can be used to download entire websites and keep them available for offline use. The IYA2009 Secretariat can also provide support for this task, if needed.

Copyrights and permissions for images, videos and other multimedia resources
Besides the public domain astronomical images, numerous pictures have been used and produced during IYA2009, namely images from the Cornerstone project "From Earth to the Universe," photographs on the IYA2009 Flickr group, and the images available on the main IYA2009 website. The permissions and copyrights of the images are in the process of being cleared by the Secretariat to enable the community to use them in the framework of astronomy EPO activities in the future. When using national and project resources, including images, videos and other multmdia resources, we recommend registering a distribution license, as offered, for example, by Creative Commons Licenses <http://creativecommons.org/choose/>.

Future of the networks created for IYA2009
A large network of stakeholders in Education and Public Outreach was established for IYA2009. These included: national nodes, organisational nodes, organisational associates, cornerstone projects, special projects, media partners and task groups. The maintenance of these networks is one of the priorities of the IYA2009 legacy and should be carefully considered. The central hub for the network could e.g. be transferred from the IYA2009 Secretariat in the second half of 2010 to the new IAU Office for Astronomy Development.

Single Points of Contact
In some countries the SPoCs will cease their EPO activities, and in these cases, it is recommended to find new contacts to keep an open channel between the IAU and the national/organisational stakeholders for communication of astronomy with the public. These "IAU EPO contacts" could be of paramount importance for maintaining permanent and systematic contact between the IAU and the different countries.

Amateur Astronomers
A high degree of coordination among amateurs was achieved thanks to different global projects, most notably the "100 Hours of Astronomy" and "Galilean

Nights." These networks must be preserved, and registries of associations, organisations and institutions will need to be kept up-to-date. A natural host for a global registry of amateurs could be the "Portal to the Universe." A future IAU Commission 55 Professional-Amateurs Working Group could possibly play a role as well. Discussions have taken place among the stakeholders, but in consideration of the manpower demands of this task, no commitments have been made.

Professional Astronomical Facilities
During the project "Around the World in 80 Telescopes," an unprecedented number of professional facilities took part in a world-wide event. Much outreach material was produced, including multimedia presentations for the individual observatories. These videos are already hosted on the ESO website, but an index of facilities along with press information and outreach contacts could also be maintained on the "Portal to the Universe" web site. Together with the index of amateur astronomers, this will become a comprehensive directory and be very useful for journalists and the public alike.

Cornerstone projects

100 Hours of Astronomy
The line between professional and amateur is now more fluid than ever before. Both the amateur and professional communities took part in the most important parts of 100HA, often working together. The 100HA Task Group and organisational effort was an unusual blend of experienced informal outreach people and professional astronomers dedicated to outreach and education. The professional community has come to recognise that amateurs do more outreach than the professional community ever could, to everyone's benefit. This relationship between communities that share common goals should continue to grow after IYA2009.

The network created in the framework of 100HA is probably the most important legacy of this project. This network will also be useful in creating a database of amateur astronomy clubs worldwide, a goal of both "Astronomers Without Borders" (AWB) and "Portal to the Universe" (PTTU), and that effort is being discussed. A follow-up of 100HA took place 2-5 April 2010, led by AWB, one of the organisations that organised 100HA. For more on this and future events, please see: <http://www.100hoursofastronomy.org/>.

Commercial sponsorship should be easier to obtain in future, now that it has been shown what is possible. Interest in sponsorship increased markedly as 100HA approached and companies saw that it would be much more than just another event. Now, they will have a better understanding in advance. Admittedly, the project will no longer benefit from the cache of an IAU/UNESCO-endorsed IYA2009 Cornerstone project to attract funding; but this will be at

least partially compensated by AWB's increasingly high profile and growing list of outreach projects.

AWB is using video conferencing to connect groups around the world more effectively in a way that is exciting and educational. The first AWB remote observing session was already a great success, with people using a chat box to discuss the objects and ask questions; having video participation will be even better. Thus 100HA follow-up will be enhanced by the support generated by the larger overall AWB programme. The April 2010 events saw these newly developed tools brought into play.

Cosmic Diary - the blog

The "Cosmic Diary" blog has reached a point where it practically runs itself, requiring only a minimum of maintenance. Predictably, not all the 60+ astronomers who agreed to take part in the project have been actively posting. At the end of 2009, those who did not actively participate were excluded from the blog, while the active contributors were asked if they want to remain. With enough positive replies, the blog can continue indefinitely, and new people can be invited to join. All that was written for the "Cosmic Diary," both posts and feature articles, will still be available on line.

The "Cosmic Diary" book, entitled *Postcards from the Edge of the Universe*, is an anthology of the feature articles written for the blog throughout 2009. It is a perfect illustration of the spirit of the "Cosmic Diary": the different people, scientific backgrounds, fields of research, ages and genders, and the places in the world where professional astronomers live and work. The book will be published by Wiley and will have international distribution. It will be the perfect legacy of the "Cosmic Diary" project.

In early 2010, the Cosmic Diary Task Group will prepare an evaluation report centered on the analysis of <www.cosmicdiary.org> visits, budget allocation and cooperation with other IYA2009 Cornerstones and partners. Regarding the future management of this blog, there are several options: the larger scientific institutions involved in the project, such as ESO, ESA, JAXA or NASA, can be asked to take it on. As the blog is now operating, two or three working hours per week should be sufficient. Another option would be to ask one of IYA-2009's Media Partners to assume responsibility. *Sky & Telescope*, *Astronomy Now* or *Physics World* would be the most obvious choices, given their international scope and their strong online presence.

Dark Skies Awareness

One of the most productive DSA programmes that can hopefully be sustained is "GLOBE at Night." See <http://www.darkskiesawareness.org/gan.php>.

The posters, brochures and displays of "The Great Light Switch Out: A Home-owner's Guide to Quality Outdoor Lighting" will continue to be downloadable from the International Dark-Sky Association (IDA) website for the foreseeable future. Parts of the planetarium programme and the resources on the two DVD sets will be placed online and downloadable. The DVDs and educational kit will remain available as long as resources permit.

"Earth Hour" has its own source of funding and so will continue after 2009. DSA has been involved in promoting the campaign and will continue to support it without any need for funding. Similarly, DSA will continue to promote "World Night in Defence of Starlight" and the "International Dark Sky Week" without any need for funding.

The "Dark Skies Discovery Sites" in Scotland are expanding throughout the United Kingdom this year and have secured funding to do so. In the USA, the DSDS programme led by the Astronomical League is not faring as well and is in need of funding to continue. The U.S. National Parks Service has started a Sky Ranger programme and will attempt to secure its own funding to continue some aspects of "Nights in the National Parks."

UNESCO, the IAU and colleagues have been instrumental in creating a formal "Starlight Declaration" to recognize that dark skies have been an inspiration throughout time and that measures are required to raise public awareness. The IYA2009 Dark Skies Awareness Cornerstone Project has helped to promote the declaration through initiating the IAU B5 resolution. And during the year, DSA has also supported the concept of the Starlight Reserve, i.e., a site where a commitment has been made to defend and preserve the night sky quality. In the same vein, DSA has also supported IDA's International Dark-Sky Communities, Parks and Reserves, a certification program to promote the establishment of special protection areas for natural night skies. See <www.darksky.org> and <www.starlight2007.net/StarlightReserves.html>.

While "Dark Skies Awareness" can continue to promote the IDA "Dark Skies Places" programme without funding, funding could be used to continue the following activities:

- improve and expand the GLOBE at Night website;
- extend the Dark Skies Ranger programme, in cooperation with the Galileo Teacher Training Program and UNAWE;
- continue to produce and distribute Dark Skies Education Kits;
- further develop the programme to analyse the data from GLOBE at Night;
- maintain the How Many Stars and the Great World-Wide Star Count programmes;
- participate in Dark Skies Discovery Sites (led by the Astronomical League).

Funding could furthermore be used to enhance

- networking with the different communities involved in IYA2009;
- advertising and marketing all of the Dark Skies Programs listed above as programmes continuing beyond IYA2009;
- providing updates to the IYA community.

Galileo Teachers Training Program

The resources created in the framework of GTTP will be freely available to the community. While some nations may charge for training, the majority of training sessions will be at no cost, and GTTP will arrange for e-learning material and online training sessions to be available for free. The network created in the framework of GTPP will embrace newcomers and guarantee the continuation and enhancement of the newly built GTTP community.

GTTP plans to create an online evaluation form to be used by all trained teachers and promoters. Feedback gathered thus far has shown that

- it is important to produce training material that is available online;
- the English language can be a barrier for teachers and educators in some nations;
- it is important to train students for the future as quickly as possible, especially in developing nations where young people are being left behind.

It is paramount for success to join hands with other similar projects. There is an urgent need for these types of efforts and only a handful of promoters. The network created under IYA2009 and the possibility to use all the resources created in 2009 will redefine the way things are done in the future. For GTTP it was extremely important to have the support of the IYA2009 Secretariat and the endorsement and support of IAU. The continuation of institutional support and/or influential individual public recognition of the programme are decisive for the successful accomplishment of the GTTP mission.

Among the possible sources of funding to continue the GTTP activities, the most plausible are: national contributions, European Union FP7 funding and local support of national contact institutions.

From Earth to the Universe

The goal of the "From Earth to the Universe" (FETTU) project has been to engage the largest possible number of peope, in particular those who might not seek out science or have the opportunity to be engaged in astronomy. Based on the preliminary results of the evaluations, this project – the first of its kind as a large-scale, worldwide astronomy outreach in non-traditional locations – has been a tremendous success. The series of images, with captions now translated into dozens of languages, has appeared in nearly 70 countries and on every continent except Antarctica.

With some 300 separate exhibitions over the course of IYA2009, it can be said that the presence of astronomy has been felt in countries of all sizes, regions, and politics through FETTU. This includes recent displays in halls of the Iranian Parliament, in the heart of Moscow, in a prison in Portugal, and across Bolivia. From public parks to airports to art festivals to shopping malls, FETTU has found its way into a huge array of places.

From the outset, FETTU's organisers made provisions to allow the project to continue beyond 2009, e.g. by ensuring that the images from the telescopes and astrophotographers in the FETTU collection could be used through 2010. (This is with the understanding that the exhibits will continue to be used in free-access locations while they are in good physical status.) It is also planned to update the collection with astronomical images that have been released since late 2008.

There are thousands of large-format astronomical images around the world that have been created for FETTU. It would be a terrible waste for them to go into storage or be discarded at the end of IYA2009. To avoid this as far as possible, participants can submit information on the online prototype "FETTU swap" that has been established at <http://www.fromearthtotheuniverse.org/blog/>. The concept is quite simple: local organisers who are finished exhibiting their FETTU panels can advertise the availability of their materials, and at the same time, aspiring local organisers can post their needs. The "FETTU swap" is intended to serve as a venue for these groups to connect and hopefully make arrangements to share materials. Ideally, enough funds can be raised to make this swap possible for developing countries who can not pay for transportation. Plans to advertise the swap and put it into action are still in development.

The FETTU team is searching for new sources of support to enable a more active continuation of FETTU in select areas. For example, in the United States, federal funding agencies have been approached with the plan to create a smaller FETTU exhibit that would be cheaper and easier to disseminate in more rural or under-served areas of the country during 2010 and beyond. NASA anchor exhibits are finding long-term homes e.g. in the Children's Hospital in Chicago. An application has been filed for additional monies to keep the current version of the NASA-funded travelling FETTU exhibits for sighted and non-sighted communities distributed throughout the USA.

As with virtually all of the IYA2009 efforts, a network of individuals and organisations worked diligently on a volunteer basis to make this project such a success. Via FETTU, it was possible to establish connections with major agencies such as IAU, NASA, AAS, ESO, etc., as well as many smaller, regional organisations and individuals. In other words, there is now a "standing army" of people who have experience and interest in participating in this type of astronomy and science outreach.

Possible sources of future funding
The Chandra X-ray Center, where FETTU was conceived, designed, and run, has already committed much in the way of in-kind contributions to the logistic support of the Cornerstone project. Support from the IAU has also been key to keeping the FETTU web site replete with the materials and information for exhibits and also keeping the site up-to-date with the constant influx of exhibition results. The team hopes to find necessary funds to continue to deal with logistic issues, maintain web presence and document the reach of the exhibit in the future.

There is clearly an appetite around the world for such efforts. The FETTU model could be used for other astronomy and outreach projects, as well as applied to science festivals and informal science learning organisations in other fields, such as the upcoming International Year of Chemistry 2011.

The Portal to the Universe
In its first 6 months of operation, the "Portal to the Universe" (PTTU) had over 250,000 visitors and featured more than 3500 press releases, almost 2100 podcast episodes and 21,000 blog posts.

The Portal now has an Editor-in-Chief, Adam Had-hazy, who has taken the lead in exploiting the Portal's potential. A new section for astronomy twitter feeds has been made, as well as an intelligent algorithm to sort astronomy-content from non-astronomy content. The latter has proved to be very important, since much good astronomy content is produced by "mixed" channels that include social science and many other non-astronomy stories.

ESO, together with ESA/Hubble, has provided the portal infrastructure and partly sponsored the first part of the project. For the future of PTTU, ESO's education and Public Outreach Department (ePOD) has agreed to continue funding the operation of the portal at least throughout 2010. This includes the salary for the Editor-in-Chief, infrastructure, technical improvements, etc. There are still many ideas for the improvement of PTTU, and these will be initiated as other IYA2009 and ESO infrastructure projects are completed.

She is an Astronomer
Funding from IYA2009 has kept the "She is An Astronomer" (SIAA) website and forum running beyond the end of the year. The resources created in the framework of SIAA will continute to be freely available and accessible to the community on the website, which is hosted by the Royal Astronomical Society and has the address <www.sheisanastronomer.org>.

There are currently three people looking after the website and three people moderating the web forum, and it is hoped that they will be willing to continue supporting "She is an Astronomer" for as long as there is interest within the

community. The forum requires regular attention (also to eliminate spam and inappropriate content), while the website can persist with minimal maintenance.

A final conference for "She is an Astronomer" was held at the end of April 2010. Participants were challenged to think of ways to help improve the situation and support and encourage female astronomers in their careers. These will be used to help the IAU fulfil the resolution passed in Rio to "encourage and support female astronomers."

SIAA is currently being evaluated with standard web tools. The most important lessons learned so far:

- Active researchers are needed to find material and generate material for the resources pages. The Task Group must be more proactive in finding and generating content.
- Many people are "interested," but they want to receive content (such as talks they can give) rather than supply it.
- There is still work to be done generating "good practice" ideas that build upon the IAU Resolution at the XVII General Assembly.
- There is a consensus across that board that countries are not doing enough to get/keep women at senior levels.

There is evidently much interest and goodwill in this area. Once they are made aware of the situation, countries and groups appear keen to help raise the profile of women in astronomy. One legacy from "She is an Astronomer" will be to gather these ideas and assist groups in planning activities and events in the future. It will be a resource that organisers can consult from time-to-time for new ideas.

Galileoscope

The Galileoscope Cornerstone Project was designed to solve a long-standing problem in astronomy education and outreach: the lack of a high-quality but inexpensive telescope that is available worldwide. The project successfully addressed this problem through the design and production of the Galileoscope kit and the creation of educational and outreach materials in various countries, providing guidance on effective use of the Galileoscope. An extensive design effort was undertaken to optimise the optical and mechanical capabilities of the telescope and to make assembly by the user as easy as possible.

By the end of 2009 the Galileoscope Cornerstone project delivered 110,000 telescope kits to recipients in more than 95 countries worldwide; another 70,000 kits were delivered during the first half of 2010. They have enabled people everywhere to experience the thrill of observing lunar mountains and craters, Jupiter's Galilean satellites, the rings of Saturn, and bright star clusters like the Pleiades through a telescope that offers superior optics and mechanics and demonstrable educational value at an astoundingly low cost.

Efforts to develop a manufacturing partnership with an existing telescope company having failed, a new company Galileoscope LLC was formed to execute the project. Galileoscope LLC partnered with Merit Models of Racine, Wisconsin, for manufacturing and with Leman USA of Sturtevant, Wisconsin, for distribution and shipping. In the course of IYA2009, Galileoscope LLC has had a turnover of approximately $2.8 million. Careful management of company financials and contributions of personal funds by members of the Galileoscope team, combined with volunteer efforts, have made the venture financially viable and resulted in the success of the project.

The Galileoscope team is keen to continue this project beyond IYA2009. Negotiations are underway to transition manufacturing and order processing to an established educational-products company. As the project evolves from a volunteer effort to a professional, commercial enterprise, there will be notable improvements in customer service and reductions in the waiting time from order to delivery. 25,000 Galileoscopes are currently in stock ensuring that orders are met promptly, both now and in the future.

The educational networks through which Galileoscopes have been distributed remain largely intact. In the USA, for example, Galileoscopes have been distributed through networks of small science centers, through the Association of Science-Technology Centers, through outreach centers of observatories and through professional teachers' organisations. Online training has been offered to representatives from many of these organisations, and the National Optical Astronomy Observatory consolidated the newly created training resources online in early 2010.

Special Projects Legacy

StarPeace

Upon joining the IYA2009 as a Special Project, the StarPeace core team aimed to satisfy four goals of the IYA2009 vision:

- To encourage astronomy groups to cooperate with neighbouring countries, form and foster relationships and create a network of active astronomy groups in the region.
- To focus especially upon cooperation with astronomy groups in countries with restrictive borders, many of which are developing countries. Such cooperation is key to strengthening their astronomical communities and helping them to survive.
- To organise star parties, lectures and exhibitions of astronomy photographs to help to improve the knowledge and scientific insight of residents of different countries, thereby promoting durable peace amongst them.
- To offers memorable experiences for people worldwide through sky observation by means of instruments.

Over the year, StarPeace held more than 20 joint Star parties near national borders. With 34 active astronomical clubs from 25 countries, the StarPeace project that began with IYA2009 is set to continue.

Naming Pluto

"Naming Pluto" held a prestigious position within the IYA2009 Special Project global platform, and Father Films is proud to have had the endorsement of the IYA2009 Working Group Committee in furthering global awareness of the story of Venetia Burney Phair, the 11-year-old English schoolgirl who named Pluto in 1930.

Father Films is currently approaching Science Education departments for 9 to 11 year olds to enable continued dissemination of the film. 2010 celebrates the 80th anniversary of Pluto's discovery – an apt occasion to add this film to Science History DVD collections in classrooms around the world and render Venetia's story accessible to those who will be truly inspired by it.

With the secondary support of cross platform science publications that promote educational resources to educators, the aim is for "Naming Pluto" to reach the next generation of astronomers, scientists and astronomy educators by the time the New Horizons probe reaches Pluto in 2015.

BLAST!

The movie BLAST! takes the viewer on a journey around the world and across the Universe to launch a revolutionary new telescope on a NASA high-altitude balloon. BLAST! started the year with a screening at the prestigious UNESCO-sponsored IYA2009 opening ceremonies in France. In the course of the year, BLAST! screened in 13 film festivals around the world, as well as at over 20 alternative venues including universities, high schools, science centers, special events and meetings. In June, BLAST! enjoyed a successful NYC theatrical premiere which garnered positive reviews and generated wide coverage – notably in *The New York Times*, on NPR's talk show Science Friday, and on the television programme The Colbert Report. BLAST! has also been broadcast worldwide on networks such as BBC, Discovery Canada, and NHK Japan. The BLAST! Educational DVD was released independently in the autumn.

BLAST! will continue to play around the world throughout 2010 and beyond. Among the screenings scheduled for early 2010 was a presentation at the American Astronomical Society's annual meeting in Washington, DC. The home DVD was released in the spring of 2010 and can be purchased via the BLAST! website. BLAST! will carry the spirit of IYA2009 well into the future, inspiring and encouraging young people to pursue careers in astronomy.

GalileoMobile

GalileoMobile (GM) started as an itinerant science education project designed to bring IYA2009 to Latin America. Thanks to new contacts with various institutions in Argentina, Brazil, Colombia, Chile, Mexico, Paraguay and Uruguay, it will be able to continue and expand in the future. In the long run, the project also aspires to reach countries on other continents, such as Asia and Oceania. GM will soon start a fundraising campaign to follow-up the project, perform its evaluation and prepare a forthcoming trip.

Some additional resources are being created that will be made available to the community, such as:

- the GalileoMobile documentary;
- activities (*cartilla*) that can be downloaded from the GM and ESO websites. Some copyright issues may have to be resolved before making the materials available.

GM will keep in touch with the teachers and people who helped during the project, as well as establish new contacts (in other countries or cities not included in the original roadmap), and encourage them to interact.

GM's ongoing evaluation will involve:

- collecting press releases and articles on GalileoMobiles released by various newspapers and online-websites and assessing the impact in local and global media;
- evaluating the success of the distribution of the documentary;
- using the feedback from the communities/teachers/children visited;
- preparing a log book with a summary of the actions taken and money spent, a description of how the project was organised, and an estimation of the number of people it reached directly (e.g. through school visits) and indirectly (through the documentary, "open doors" at institutes, press releases, etc.).

GM will keep in touch with the teachers and people who helped during the project and make use of teachers' networks such as Explora in Chile to establish new contacts (also in other countries or cities not included in the original roadmap) and encourage them to interact.

The team is considering applying to copyright the label "GalileoMobile" and founding a non-profit organisation.

Future of National Structures and Activities

In addition to all the above initiatives, there are a number of projects that could be developed and implemented at the national level:

- creation of astronomical clubs in schools, universities and communities;

- creation of nation-wide networks, built on the existing IYA2009 network;
- establishment of a web portal for national or regional astronomy activities, perhaps as a joint initiative of research institutions and amateur astronomers organisations;
- updating and refurbishment of old observatories for public outreach;
- regular observing nights;
- public events and talks;
- practical courses in astronomy for university students;
- declaration of an Astronomy Week and Day;
- astronomy festivals;
- global projects, such as 100 Hours of Astronomy;
- teacher training;
- educational activities by professionals in schools;
- introductory astronomy courses at university level;
- coordination between amateur and professional astronomers;
- Olympiads of Astronomy;
- UNAWE activities;
- establishment of National Astronomical Networks;
- publishing of handouts, DVDs, CDs;
- distribution of Galileoscopes in schools.

2. Office for Astronomy Development

2.1 Selection of Host Site

As a first step in the implementation of the decadal strategic plan "Astronomy for the Developing World – Building from the IYA2009," (please see: <http://iau.org/static/education/strategicplan_091001.pdf>), the International Astronomical Union (IAU) invited bids to host the Office for Astronomy Development (OAD).

In response to the Announcement of Opportunity published in October 2009, the IAU received 40 Expressions of Interest followed up by 20 Proposals. This response was much greater than anticipated and shows the very strong support for, and interest in, the IAU Strategic Plan for Astronomy in the Developing World. We would like to thank most sincerely all those who took the time and trouble to participate.

Of course, choosing a host site from such a range of excellent proposals was extremely difficult, but after very careful consideration the Executive Committee, meeting at EC88 in Baltimore 11-13 May, selected the South African Astronomical Observatory (SAAO) as the host site for the OAD. A detailed Agreement between the IAU and the SAAO is now being developed.

The SAAO has contributed the following short article to describe itself and its plans for the OAD.

> "The development of astronomy and the contributions of astronomy to global development have been high on the agenda of the IAU, as emphasized in the last IAU General Assembly in Brazil in 2009 where the decadal plan entitled "Astronomy for the Developing World" was launched. A key component of this visionary plan was the establishment of an Office for Astronomy Development (OAD) which would oversee and coordinate its implementation. At the 88th meeting of the IAU Executive, after the assessment of 20 proposals, South Africa was selected as the host country of the OAD, with the South African Astronomical Observatory (SAAO), a facility of the National Research Foundation (NRF), being selected as the host institution. This note is to communicate to the IAU membership the perspective of the SAAO and what this selection means for the field.
>
> At the outset it must be pointed out that the SAAO and all relevant reporting levels have publicly expressed great enthusiasm and excitement about this selection, from the SAAO director, to the NRF president, to the South African Minister of Science and Technology. There has also been a large amount of congratulatory correspondence from all over the world, especially from institutions across Africa. However, it is also important to recognise that the success of the OAD will depend on close collaborations with individuals and institutions from across the world, and the SAAO welcomes all potential collaborators to explore possibilities with us. To further encourage these collaborations it is important to communicate efficiently and regularly with the international astronomy community, in order to enhance the impact of this OAD. This note represents one of many such communications.
>
> The SAAO felt it was important to express to the rest of the IAU membership the motivations and benefits, from our perspective, of hosting the OAD here:
>
> ***Why South Africa?***
> South Africa is undeniably among the leading nations in the developing world, especially in terms of its leadership role in Africa, nurtured and built upon since the presidency of Nelson Mandela. The country's ability to stimulate science and technology on the African continent (through programmes such as NEPAD, New Partnership for Africa's Development, for example) is unique and effective. South Africa's status as a G20 country, combined with its ethnic diversity (African, Asian, European), places it in an ideal position not only to enhance "South-South" but also 'North-South' relations, thus 'bridging the gap'

between developed and developing countries. Above all South Africa is a country of hope, vision and passion. The spirit of the country, as articulated in its world-renowned constitution, provides for the perfect environment to house and drive the objectives of the OAD. In a world where there is a global need to 'devolve' science initiatives beyond the traditional centres (viz. in the developed world), South Africa stands ready to embrace the responsibility of the OAD, and to inspire the world as it has done so many times before.

It is no secret amongst the international scientific community that South Africa is driven in the field of astronomy, demonstrating our ambition through visionary projects such as SALT (Southern African Large Telescope), MeerKAT (Karoo Array Telescope) and the bid to host the SKA (Square Kilometre Array). We are also closely involved in HESS in Namibia. The foundation of our science policies and cross-cutting strategies within the DST are based firmly on the famous white paper on Science and Technology of 1996 which states 'Scientific endeavour is not purely utilitarian in its objectives and has important associated cultural and social values … Not to offer "flagship" sciences (such as physics and astronomy) would be to take a negative view of our future – the view that we are a second class nation, chained forever to the treadmill of feeding and clothing ourselves.'

In South Africa, people involved in the astronomy field, from those working on the ground to the highest levels of government, are driven by the vision that astronomy will play a significant role in the development of society, and our commitment to this vision has been demonstrated by our actions. The development activities that we have been involved in over the last few years are driven, through no coincidence, in alignment with the IAU's strategic plan. We have set out to stimulate astronomy development in as many countries as possible, and we have led, by example, the incorporation of astronomy into school curricula, as well as public outreach events. South Africa's vision for astronomy development is one with the IAU's, and we have, through our actions, built ourselves up to this point where hosting the OAD is the most natural thing for us to take on.

Benefits to Africa:

Placing the global coordinating office of a high-profile international project in Africa immediately raises the status of the continent and brings attention to Africa's ability to play a leadership role in global development, as well highlights Africa's commitment to education. African scientists and astronomers would have access to the knowledge and resources of the OAD, with geographical closeness enabling greater consultation and coordination of activities in the region –

especially with the realisation of envisaged sub-regional offices across Africa. Development of astronomy would result in enhancement of the fundamental sciences of physics, mathematics and chemistry, as well as engineering and computer science. South Africa will be hosting the 2nd IAU Middle East and Africa Regional Meeting (MEARIM 2) in 2011. Having the OAD in the host country would raise the profile of the conference and help to raise funds and grants for this and future important regional meetings.

Benefits to the IAU:

South Africa is rich in development projects and expertise, an invaluable resource to the OAD. It is also a good testing ground for pilot projects, due to the diversity of its population. Africa remains an area of global focus for development funding and aid. Funding from development organisations could thus be sought much easier from an office in Africa. The IAU would also have direct access to one of its development focus areas viz. sub-Saharan Africa, whilst still enjoying the benefits of being associated with a world-class observatory with good internet connectivity. South Africa is easily accessible with flights from most major cities around the world. Cape Town is a particularly modern city with all the amenities that first world citizens are accustomed to. This enables the OAD to be used as a base for the dissemination of skills and projects across Africa. The investment in astronomy by the South African government, supported by high level policies and legislation, provides an excellent example for other developing countries to follow. The SALT Collateral Benefits Programme within the SAAO is a model of deriving tangible societal benefits from astronomy and astronomical observatories. Other developmental experiences of the SAAO would be readily available and at the disposal of the IAU for the enhancement of the effectiveness of the OAD.

Who is the SAAO?

The SAAO is a facility of the NRF, an organisation established through an Act of Parliament in 1999 and whose objective is to support and promote research through funding, human resource development and the provision of the necessary research facilities, in order to facilitate the creation of knowledge, innovation and development in all fields of the natural and social sciences, humanities and technology. The SAAO itself is the premier optical/infrared astronomy research facility on the African continent and has a long tradition of astronomy research, dating back to 1820. It is headquartered in Cape Town, where it houses its research astronomers and technical staff, IT equipment, laboratories, workshops, library, auditorium and administration. SAAO's research telescopes are located 360km away in the Northern Cape Province on its Sutherland observing plateau, together with a hostel for visiting

staff, plus site staff housing, workshops, visitor centre and recreation centre. A regular shuttle service operates between the two sites.

The largest telescope at Sutherland is the 10-m class Southern African Large Telescope (SALT), which the SAAO operates on behalf of an international consortium. The NRF is the leading partner in this consortium, with a 1/3 share. SAAO also operates an existing suite of "small" telescopes, e.g. the 0.5-m, 0.75-m, 1-m and the 1.9-m telescopes. These telescopes are available to students of astronomy and engineering and have served as invaluable training tools for young astronomers, technicians and engineers. Over the years, the SAAO has built a reputation for producing world-class, cost-effective research and astronomical instrumentation, and has a significant fraction of the SA astronomy PhD contingent on its staff, including postdoctoral researchers and SALT operations personnel. SAAO is part of an extensive network of international collaborations and uses its position in the global community to further the creation of quality PhDs in Astrophysics and Space Science on the African continent, as well as to promote astronomy through its vast education and outreach programmes. Within South Africa, SAAO has close links and collaborations on many levels with South African universities, the radio astronomy community, the mathematical, theoretical and computational groups, the high energy community, as well as the larger physics community and the science outreach community.

Other benefits of hosting the OAD in South Africa:

- The SAAO is part of a consortium of 9 South African Universities and 3 National Facilities, which also involves the USA National Society of Black Physicists. They run the SA National Astrophysics and Space Science Programme (NASSP) for training postgraduate students from all over Africa so as to prepare them to do PhDs anywhere in the world. NASSP is based at the University of Cape Town, close to the SAAO headquarters.
- South Africa is involved in numerous international bilateral and multilateral programmes which would benefit the OAD in terms of collaborations and fundraising.
- The recent initiatives to set up the African Physical Society and subsequently the African Astronomical Society will serve as strong examples of a regional development model.
- The SAAO telescopes at Sutherland serve as excellent training facilities for students.
- The SAAO has conference facilities to host meetings, workshops and schools.
- Easy geographical access to a large professional astronomy community based at SAAO and surrounding universities

- Also around Cape Town (and easily accessible to the OAD) are collaborators from the mathematical, computational and theoretical fields (e.g. African Institute for Mathematical Sciences - AIMS).
- The success of AIMS has led to a network of satellite institutes springing up all across Africa (called AMI-Net). This serves as an excellent example for building skills in developing regions, a model which the OAD could learn from and expand on.
- Efficient communication systems are available within the SAAO (telephone, fax, Internet) with appropriate technical support to ensure 24 hour operation.
- The OAD would have access, through the SAAO (NRF) and on its own, to networks of science centres and dedicated science outreach organisations active in South Africa.
- Many collaborators from around the world have expressed written support for the OAD to be based in South Africa and some have even offered a variety of special in-kind resources.

In conclusion:
The locating of the OAD in Africa, and in particular South Africa, will have a direct impact on one of the most underdeveloped regions of the world - yet it will be situated in a country which has modern world-class infrastructure and services (currently being demonstrated as South Africa hosts the FIFA World Cup) necessary to fulfil the purpose of the OAD. The experience gained by the officers of the OAD, by being situated in this region, will be translated and expanded to developing regions across the world. South Africa has already positioned itself, through activities such as the coordination of the "Developing Astronomy Globally" IYA2009 Cornerstone Project, as an ideal venue out of which astronomy development can be coordinated. We are extremely excited about the IAU selection and remain ready, as ever, to collaborate closely with partners across the world and to serve the international astronomy community, as well as society at large, as the host for the IAU's OAD."

2.2 Director of the IAU Office for Astronomy Development

The OAD will be a joint venture between the IAU and the SAAO to lead and coordinate the development activities of the IAU globally.

We expect to advertise for an outstanding individual to fill the role of Director for the OAD to provide the necessary leadership and spearhead the effective implementation of the IAU strategic plan. The success of this important initiative will be critically dependent on the performance of the OAD and its Director, whose drive and commitment will be essential in building up the ambitious programmes envisaged by the IAU.

The person we will be looking for can be expected to satisfy the following minimum requirements:

- an honours degree or equivalent in astronomy or a closely related field and a strong affinity with astronomy;
- proven track record in education and capacity building activities at an international level;
- demonstrable strategic vision and experience of change management;
- managerial experience, including people and financial management;
- demonstrable record of leadership and achievement, as well as a strong international reputation.

Experience in fundraising will be a significant advantage.

We expect the tasks of the Director to include:

- worldwide management, coordination and evaluation of IAU programmes in the area of development and education and establishment of their annual budgets;
- liaison with the chairs of relevant IAU program groups/sector task forces and other relevant stakeholders in planning and implementing the relevant programs;
- building up IAU regional astronomy development nodes and liaison with the IAU regional coordinators and nodes in planning and implementing relevant programs;
- implementation of new activities, as outlined in the IAU decadal strategic plan;
- managing the OAD and its staff, including recruitment, establishment and control of the OAD budget, interfacing with the SAAO as host organisation and appropriate regular reporting;
- proactive coordination and initiation of fund-raising activities for astronomy-driven capacity building activities.

We do not expect the selection process to start before *15 August 2010*.

The post will be formally advertised as soon as possible. For further information please contact the IAU General Secretary, Ian Corbett.

2.3 Establishment of Regional Centres

As foreseen in the Strategic Plan, the next step after the establishment of the OAD and the appointment of the Director will be to call for Expressions of Interest in hosting Regional Centres. It is hoped that this can be done in the third quarter of 2010. The number of Regional Centres is not fixed but will depend on the offers received and the funding available. It is expected that a start will be made with a few Regional Centres and the number progressively increased with time.

3. Women in Astronomy: IAU Statistics

Summary
Statistics have been gathered from countries around the world and compared to IAU figures. Almost every country has a lower percentage of women members in the IAU than in its population of astronomers, and the Gender Advantage is always in favour of the men. Gathering statistics helps us as scientists to understand the situation and encourages attempts to improve it.

Introduction
When asked to present a paper on international statistics about women in astronomy, I thought: how can I do this? I knew that, despite the efforts of the IAU Working Group on Women in Astronomy and of the International Year of Astronomy (IYA2009) Cornerstone Project 'She is an Astronomer,' there are few statistics gathered in a consistent fashion. But I decided to rise to the challenge, wrote letters and obtained some numbers and curves, which are displayed and commented here. The data are inhomogeneous, but do allow to make some interesting remarks, and perhaps this study will foster more rigorous ones in the future.

The International Astronomical Union (IAU) is an international organisation with 68 countries as national members, so its membership and its variation with time is a good set of data to use as a comparison with figures from individual countries. In many countries, to become a member of the International Astronomical Union (IAU), the person must have obtained some level of recognition. Thus, at the start, I made the assumption that, if in a country women have difficulties in recognition, retention, promotion, they will be at a higher percentage in the population of astronomers than in that of the IAU; the ratio of the two percentages is then an indicator of discrimination, glass ceiling or any other impediment for women to strive in their careers.

IAU Statistics
Some numbers are easy to get, since we have just had a General Assembly of the International Astronomical Union (IAU) in Rio de Janeiro in August 2009. The Local Organising Committee (thanks to Norma Tavares) counted 667 women amongst the 2109 people attending the IAU, so this tells us that 31.6% of the people attending the IAU were women. We know that very few sessions had 31.6% of their talks given by women and only one of the ten plenary reviews and invited discourses was given by a woman (10%). Every three years the IAU has new members elected, and in 2009 the total number of members exceeded 10,000 members. The number of women is increasing – in 2003 it was 12.1%, in 2006 it rose to 12.9%, and it now stands at 13.6%, an increase of 0.7% per triennium. So the percentage of invited speakers at the IAU reflects the percentage of female members in the IAU.

Table 1, taken from the website of the IAU Working Group on Women, shows the percentage of female members of the IAU per country; I have only selected countries which have more than 40 members. Argentina, at 35.8%, has the highest percentage of women by far, and I am very happy and proud because this is where I did my first studies. Only six of these countries have more than 20% female members in the IAU: Ukraine, Italy, Bulgaria, France, Brazil and Hungary. The USA are at 12%, and since they encompass a high percentage of the IAU population, they carry most weight in the IAU total average. Seven countries are below 10%: in decreasing order, Denmark, Switzerland, Germany, China Taipei, Israel, India and Japan.

country	**# members**	**% total**	**% women**
Argentina	134	1.3	35.8
Ukraine	188	1.9	27.1
Italy	568	5.6	24.7
Bulgaria	57	0.6	24.6
France	700	6.9	24.3
Portugal	43	0.4	23.3
Brazil	172	1.7	22.7
Hungary	48	0.5	20.8
Ireland	44	0.4	20.5
Austria	49	0.5	18.4
Spain	303	3.0	17.8
Mexico	111	1.1	17.1
Russian Fed	368	3.6	17.1
Finland	67	0.7	16.4
Greece	108	1.1	15.7
Chile	90	0.9	15.6
China (Nanjing)	409	4.0	15.4
Belgium	117	1.2	15.4
Australia	262	2.6	15.3
South Africa	71	0.7	14.1
Sweden	111	1.1	13.5
Poland	149	1.5	13.4
Czech Republic	92	0.9	12.0
Canada	245	2.4	12.2
USA	2594	25.5	12.1
UK	524	5.2	11.6
Netherlands	208	2.1	11.5

Egypt	56	0.6	10.7
Korea	109	1.1	10.1
Denmark	63	0.6	9.5
Germany	532	5.2	9.4
Switzerland	76	0.8	9.2
Israel	75	0.7	8.0
China (Taipei)	51	0.5	7.8
India	222	2.2	7.7
Japan	598	5.9	5.5

Table 1. Percentages of women in the IAU in 2009

Asia

The lowest percentages of women are found in Asia, so I looked into this in more detail. According to the IAU membership in 2009, 5.5% of Japanese members were women (33 women). Yuko Motizuki sent me more up-to-date statistics showing that the total population of women in astronomy, including post-doctoral researchers, is 12%, out of the 1500 members of the Astronomical Society of Japan. The number of women has risen from zero in the early 1960s, with a steep increase in the last decade, so this a situation which is changing rapidly; of course it means that most women are young and it will take them some time to become eligible to IAU membership. The other Asian country to supply information (through Yanchung Liang) is China Nanjing (see *Table 2*), which now in 2009 has 15.4% female membership in the IAU, significantly higher than the figure in 2006 (12.4%). NAOC in *Table 2* stands for National Astronomical Observatories, Chinese Academy of Science.

Organisation	**Women/ Total**	**Percentage**
Members of Chinese Astronomical Society	422/2131	19.8
Members of Beijing Astronomical Society for NAOC	95/312	30.4
NAOC staff with permanent position	84/300	28.0
NAOC staff with contract	60/155	38.7
Peking University, Dept. of Astronomy + Kalvi Institute for Astronomy & Astrophysics	3/15	20.0
Beijing Normal University, Dept. of Astronomy	8/40	20.0
Nanjing University, Dept of Astronomy	2/20	10.0

Table 2. Statistics of Women in Astronomy in China Nanjing

Here we clearly see selection effects with the comparison between populations of astronomers and the percentage in the IAU. A higher percentage of women are on contracts in the NOAC than have permanent positions, showing women have the more exposed jobs. Yanchun Liang reports that women in China are found at every level, but the ratio is lower at the highest levels, for example there are 7 women among the 70 professors (10%) in the NAOC and currently none of the five vice-directors is female. However the Director of the Nanjing Institute of Astronomical Optics and Technology (NIAOT) is female (Prof. Xiaoqun Cui, whom I often see in meetings) and the Director of the Urumqi Observatory of NAOC-CAS is female (Prof. Na Wang). The most famous female astronomer in China (Prof. Shuhua Ye) is a CAS Academician. The picture is improving here too.

Latin America

The women astronomers seem to be doing comparatively well in Latin America. In Argentina, 36.7% of the IAU members are female (in 2009), and this compares well with the percentage of the 175 tenured researchers and professors (34.9%). The male-female ratio of graduate students and young researchers is 50-50. At the most senior level, with the distinguished and emeritus researchers, 2 out of 14 are female (14.2%). Gloria Dubner reported these figures – she has recently been appointed Director of her institute, a very important institute in Buenos Aires, in which the percentage of women is 50%. Marta Rovira is the President of the Argentina National Council of Scientific and Technological Research (CONICET), and she is now a Vice President of the IAU. There has been an important advance in CONICET recently; the maximum age limit for access to fellowships and permanent positions has been relaxed for women whose careers were put on hold because of maternity (everything, of course, is based on the quality of the applicants).

Venezuela has a small number of members in the IAU (19 members in 2009) but they are 26% female, and although the numbers are small, this shows a similar high percentage for researchers and professors with 15 men and 7 women (32%), and doctorate and masters students (9 men and 6 women giving 40% female). In Mexico, in 2006, it was 17.5% women in the IAU, which compares with 20% of tenured researchers and 20% non-tenured posts (short-term contracts and post-docs) being female. There is a much higher percentage of women amongst the students (doctorate and masters) of 39%, showing the field is expanding. When everyone is included the percentage of women in astronomy in Mexico is 28.3%. Numbers were difficult to obtain for Brazil, but the IAU members are 22.3 % female in 2009, and the membership of the Sociedade Astronomica Brasileira (with 479 members) is 25% female.

Europe

The European Commission has been very active in the last ten years, with an enormous effort to bring women into scientific careers, in a similar manner to

what is happening in the USA. There was the Helsinki conference in 1998 and the European Union (EU) Action Plan in 1999 'Women in Sciences', and the Action Plan in 2001 'Science & Society.' The Helsinki group has remained in place to monitor progress and build synergies. There is now 40% female representation in EU programs. In 2005, a set of rules for hiring was created, paying a lot of attention to flexible working conditions, childcare support, and gender-balanced representation at all levels. Special groups have been set up, such as Women in Industrial Research (WIR) and European Platform of Women Scientists (EPWS). Statistics were gathered between 2003 and 2006 by the SHE group. For all scientists across Europe, 29% are women.

In the rest of this section, I use statistics gathered for 'sciences of the universe,' which is roughly astronomy + earth sciences. Although the percentages vary from country to country, there are some persistent patterns. Strangely, when compared to European politics, and women are well-represented in the European parliament, it appears that in countries where there are a lot of female astronomers, there are few female politicians and vice versa.

The EU uses a number called the 'Gender Advantage,' using scientists at levels from post-doc to the most senior levels, and this shows how much more work is needed in Europe, see *Table 3*.

$$\text{Gender Advantage} = \frac{\%\text{ men at top level relative to men at all levels}}{\%\text{ women at top level relative to women at all levels}}$$

If the Gender Advantage is > 1, it shows women are not promoted as often as men.

Gender Advantage	**Country**
1.0 to 1.2	Belgium, Italy, Sweden
1.3 to 1.5	France
1.6 to 1.8	Denmark, Norway
1.9 to 2.1	Austria, Finland, Germany, Netherlands, UK
2.4	Switzerland

Table 3. Gender Advantage ratios in Europe

Danielle Alloin gave me the figures for France (the IAU membership is 24.3% female), using the 'sciences of the universe' figures. For the last 20 years the situation has been stable, with 26% of the scientists at CNRS being female, and astronomers are a significant part of CNRS. However, at the most senior levels the number is 21% female, as is the figure for the mid-level. The Gender Advantage at the mid and junior levels is 1.5. Only 10% of Laboratory heads are female, but women do make up 24% of the hiring/evaluation committees. In French universities, 16% of the professors are female (compared to the EU

mean of 11%) and women make up 38% of the mid-level and junior grades (compared to the EU mean of 30%). The recognition of women's work in this field in France is low, with none of the 6 CNRS Gold medals awarded to women (in fifty years), 14% of the Silver medals (in six years) and 25% of the Bronze medals (in six years). In the French Academy of Sciences, only 10% of the members in this section are female.

Spain has 17.8% female membership in the IAU, and although statistics were hard to find, SHE figures for 2006 for sciences of the universe + biology yield 25% female – not too bad. The situation has been changing in Italy, which now has 24.7% female membership in the IAU. In 2002 the percentage of women in astronomy was 18.5%, in 2005 it was 24%, and in 2007 it was 27%. The Istituto Nazionale di Astrofisica (INAF), according to Ginevra Trinchieri, has 2 women out of 5 members on the executive board (40%), 5 women out of 12 members of the scientific council (42%), and 3 women out of 19 institute directors (16%). The major problem is that 40% of the people on soft money are female. The percentages over the years (Table 4) are difficult to compare, because in 2005 there was a merger of Observatories with CNR institutes and in 2007 there was a major 'job requalification' where, for example, the number of women at the most senior level almost doubled (from 7 to 13) and the next level dropped from 31 to 28. The percentages for universities in 2007 refer only to astrophysical science.

Scientific staff	**2002**	**2005**	**2007**	**2007 (University)**
Senior	10.9	11.3	19.1	~4
Associate	15.7	19.3	17.5	~6
Researcher	20.6	28.2	32.6	~22

Table 4. Percentages of female staff at INAF

The Russian Federation has about 17.1% female membership of the IAU, but no female astronomers in the National Academy of Science, while the community could be almost 40% female.

The situation in the UK, which has 11.6% female membership in the IAU, is bad. The sciences of the universe figures show that the percentage of female astronomers drops from 22% at the junior levels (starting post-doc) to 12% at mid-level, 10% of lecturers and 4% of professors. No Laboratory heads are female. These numbers are very similar to the figures produced by the Royal Astronomical Society, according to Helen Walker. Francesca Primas looked at ESO Faculty members in 2005, and found that although 18.7% of the staff were female, only around 3.4% of the top level staff were women, and around 16% of the mid-level. The Gender Advantage ranged from 6.4 to 1.2. These numbers are not good, and efforts have been made to improve them.

Conclusion
Gathering statistics over a period of many years is very important. As you can see from some of the numbers, a snapshot does not give enough information. Almost no country has equal percentages of women in the IAU and in its population of astronomers, so we could say the Gender Advantage is always in favor of the men. Gathering statistics helps us as scientists to understand the situation and make attempts to improve it. One such example is the Resolution approved by the International Astronomical Union at its recent General Assembly, urging astronomers to support and encourage the female astronomers in their community to break down barriers and to ensure that men and women are given equal opportunities.

I thank all the colleagues who provided me with the information that allowed me to prepare this paper, Norma Tavares, Yuko Motizuki, Yanchun Liang, Gloria Dubner, Danielle Alloin, Ginevra Trinchieri and Helen Walker. I further thank Helen, who chairs the IYA "She is an Astronomer" cornerstone, for her help with this manuscript. Finally, I thank Anne Kinney for organising this interesting meeting, for having my speech transcribed, and most of all for her patience.

Catherine Cesarsky
IAU President 2006 - 2009

n.b.
This article will appear in the Proceedings of the Women in Astronomy 2009 Conference, available on the web site: <http://wia2009.gsfc.nasa.gov/>.

4. Prizes and Awards

4.1 The PPGF Cosmology Prize 2010

The 2010 Peter and Patricia Gruber Foundation Cosmology Prize has been awarded to Charles Steidel, the Lee A. DuBridge Professor of Astronomy at the California Institute of Technology, "in recognition of his revolutionary studies of the most distant galaxies of the universe." For more information, see the press release of 2 June, 2010, on <www.petergruberfoundation.org/index.php>.

The gold medal and unrestricted $500,000 cash prize are presented annually. Since 2001, the Cosmology Prize has been cosponsored by the International Astronomical Union. The closing date for nominations is 31 December, 2010. Please see <www.petergruberfoundation.org/GruberPrizes/Cosmology.php>.

4.2 The PPGF Fellowship Award 2011

The winner of this year's PPGF Fellowship is Smadar Naoz, a post-doc at the Northwestern University's Center for Interdisciplinary Exploration and Research in Astrophysics (CIERA). Smadar is working with Professor Vicky Kalogera and with Professor Fred Rasio on the connection of the first generation of galaxies to Globular Clusters and massive black holes.

Smadar graduated from the Racah Institute at the Hebrew University. For her Master's, she studied the spiral arms of the Milky-Way. During her PhD studies in the Department of Astronomy and Astrophysics of Tel Aviv University, she focused on the formation of the first generation of galaxies and the use of 21cm fluctuations as a probe for this era.

Smadar describes the focus of her research as follows:

> "In recent years, the first and last chapters of the cosmic story have been unfolded. Observations of the cosmic microwave background (CMB) radiation have revealed the chapter in the history of the Universe that took place only a few hundred thousand years after the Big Bang. The last chapter has been uncovered using observations of the morphology and distribution of galaxies in the local Universe. However, the main event of the story is still missing. Basic questions regarding the transformations of the uniform early gas into the galaxies we see today, and what were the different properties of these objects, are still open. This is the main focus of my research. During my PhD studies, I have shown that precise analytical calculations of the growth of over-densities both in the linear and non-linear regimes have important implications for our understanding of the first objects in the Universe. The mass abundance of dark matter halos as a function of redshift, and the formation of the first generation of galaxies are significantly different from previous calculations.
>
> The formation of a luminous object inside a dark matter halo requires two conditions. First, enough gas should exist in the halo and second, the gas pressure should not be high enough to suppress the collapse. I showed that the effect of pressure in the formation of the first galaxies is only moderate, and also studied the gas fraction in halos. Also, using smoothed particle hydrodynamics simulations I studied the gas fraction in early halos, and found it to be higher than previous estimations.
>
> Over the next few years, new observations in 21cm wavelength, will unfold the chapter in cosmic history at the era of the first galaxies and re-ionization, probing the first radiation sources. The UV radiation from stars at that era coupled the properties of the 21cm signal with

the distribution of the first galaxies. I have conducted an accurate analysis of this coupling including the ionized gas bubble around each galaxy. From that I predicted a clear signature on the 21cm signal which can be used to detect and study the population of galaxies that formed just 200Myr after the Big Bang.

As a PPGF fellow I plan to investigate the connection between the early galaxies in the Universe and globular clusters and black holes. Globular clusters (GCs) are perhaps the most ancient objects in our Universe today, and they therefore provide a window into the formation of the first generations of galaxies. A consistent model for the formation of GCs still poses a challenge. I intend to study the global properties of galactic GC systems, using state-of-the-art cosmological simulations. This can provide strong constraints on our current understanding on both high-redshift proto-galactic structures and the galaxies we observe today. The second subject involves black holes in the early galaxies. The presence of black holes in the centers of galaxies influences the star formation and the total radiation released from these galaxies. Galaxies with central black holes go through an active galactic nucleus (AGN) phase in which they release high energy radiation as feedback into the intergalactic medium (IGM), while galaxies without central black holes tend to release softer radiation. I plan to study the dynamical characteristics of the black holes formed in early galaxies and the population of ejected massive black holes recoiled following the merger of their host galaxies at early times in the Universe."

5. Executive Committee

5.1 Officers' Meeting, Paris, 25-27 January, 2010

The Officers met at the IAU Secretariat from Monday, 25 January, to Wednesday, 27 January, 2010. The meeting opened with a review of progress on the actions arising from EC87 (August 2009).

After the problems of the past, it is pleasing to note that the Secretariat is running smoothly, with an efficient distribution of tasks between the two full-time and one part-time staff. Some aspects of the accounting have now been outsourced, and the Secretariat has entered into a more extensive contract for the auditing of the annual accounts. The new data base assistant is working well and has a good rapport with the IT staff at ESO. Feedback tells us that the IAU website is considered a valuable source of information for astronomers around the world. Good progress has been made in structuring and maintaining the IAU archives.

The Officers received an update on the financial status of the IAU, including an overview of National Members' contributions, and examined the draft accounts

for 2009. They also reviewed the proposed Commission 46 programmes and the budget agreed by the Development Oversight Committee (DOC).

Implementation of the Strategic Development Plan was an important topic, and the Officers noted that 40 Expressions of Interest for hosting the OAD had been received. The proposed selection criteria and methodology were discussed and refined. These were later approved by the Executive Committee in a teleconference.

Other topics discussed included the future status of the Central Bureau for Astronomical Telegrams (CBAT), the success of the IYA and the proposed 'Legacy' programme, as well as proposed changes within the Commissions and Working Groups structures. A topic of particular interest was the proposed re-establishment of the EC Working Group on Future Large Scale Facilities and possible cooperation with COSPAR.

The AGS reported on the scientific meetings planned for 2010, the selection of the IAU symposia for 2011, and the status of the publication of symposia proceedings. The Officers expressed concern that the manuscript for IAUS 260 had not been delivered to CUP and was now at least 6 months late.

5.2 Executive Committee Meeting EC88, Baltimore, 11-13 May, 2010

EC88 was held at the Space Telescope Science Institute in Baltimore, Maryland, USA, at the invitation of IAU President, Robert Williams.

The most important item of business was the selection of the host for the Office for Astronomy Development (OAD), for which 20 proposals had been received. The bids had been carefully evaluated by the EC members in preparation for EC88. After thorough discussion, the EC voted unanimously in favour of the South African Astronomical Observatory, which has since accepted the invitation to host the OAD. The EC subsequently discussed the draft Agreement with SAAO and the process of recruiting a Director for the OAD.

The EC reviewed the Educational Programs of Division XII / Commission 46, with reports from ISYA2009, WWDA and TAD. For summaries of the reports, please see Section 9 of this Information Bulletin.

There is still some concern over the non-payments of dues by some National Members, and the problem cases were discussed. There was a general consensus that the IAU should enforce the rules as set out in the Statutes and Bye-Laws.

The Executive Assistant presented an overview of the IAU accounts for 2009, approved by the auditors. The balance is positive for a General Assembly year, and the EC thanked former GS Karel A van der Hucht for his efforts which made this possible.

The Central Bureau for Astronomical Telegrams CBAT has recently moved from the Smithsonian Astrophysical Observatory to the Dept. of Earth and Planetary Sciences at Harvard University. The EC decided to ask Comm. 5 and Comm. 6 to give their perspectives on the evolution and complementarity of handling data and emission of notifications of information on transient and time variable events, and then to ask Div. XII, with Commissions 5 and 6, and copies to Div. V and Div. IV, to establish a task group to investigate a long-term solution for the handling and dissemination of information on transient and time variable events.

The IAU will continue to sponsor the Minor Planet Center, the EC having re-confirmed that IAU involvement remained important.

Following an updated report on the success of IYA2009, the EC agreed that links with amateur astronomers would be central to IYA Legacy activities, and hoped that these would be pursued by the IYA Legacy team and Comm. 55.

There was a brief report on preparations for the 2012 GA in Beijing, where several changes are being introduced to improve communications. For example, it is expected that the Abstract Book will be distributed on USB sticks (or equivalent) only and will be available for downloading from the GA website. Programme updates will be displayed on electronic notice boards as well as communicated by email. There will be no pigeon holes; rather, each participant will be requested to provide an email address. The organisers will work on the implementation of electronic security badges.

Kevin Marvel from the AAS joined the EC Meeting to sign the MoA for the 2015 GA in Hawai'i. He reported that preparations were well on track and that the AAS is aiming for an attendance of over 4000. The registration fee can be kept low, since there will be a very large exhibition hall.

The EC returned to the topic of the Working Group on Future Large Scale Facilities. The perceived role of the IAU is to provide a forum, increase accessibility of information and help to form a science-driven picture of what is required, but it cannot be expected to give priorities or make recommendations on specific projects. The WG could produce a short report and is expected to organise a Special Session at the 2012 General Assembly.

A paper on "Women in Astronomy" submitted by the Past-President was reviewed. It was considered most useful and is reproduced in this Bulletin. Another version of the paper, coauthored by Catherine Cesarsky with Helen Walker, has appeared in the RAS journal "A & G".

While opinions varied as to the efficacy of the current Division structure, all members of the EC agreed that a review of the historical structure was timely and specific proposals should be brought to and discussed at EC89. The AGS

was requested to chair an EC Task Group to evaluate and propose revisions to the divisional structure of the IAU for discussion/decision at EC89.

Production of the Proceedings of IAU Symposium 260 had been a concern at the Officers' Meeting in January. The EC was alarmed that, despite many promises, the manuscript had still not been submitted to CUP.

5.3 Executive Committee Meeting EC89, Prague
24-26 May, 2011

The next meeting will be EC89: 2011, 24-26 May in Prague, Czech Republic. EC90 will take place in Paris, April/May 2012. A representative of the Local Organising Committee for GA2012 will be invited.

6. IAU General Assemblies

6.1 IAU XXVIII General Assembly, Beijing, China
20 – 31 August, 2012

Preparations for this event are proceeding. The NOC consists of the current (November 2006 - October 2010) and next (October 2010 - October 2014) executive members of Chinese Astronomical Society (CAS), and heads of major astronomical institutes in China. The president of CAS is the chair of the NOC. The NOC currently includes: Gang ZHAO (Chair), Li CHEN, Xiangqun CUI, Mingde DING, Guoxuan DONG, Zhanwen HAN, Jinxin HAO, Xiaoyu HONG, Weiqun GAN, Ji GUO, Peiwen JI, Xiangdong LI, Yan LI, Xinhao LIAO, Chunlin LU, Jufu LU, Na WANG, Xuebing WU, Jun YAN, Ji YANG, Yefei YUAN, Shuangnan ZHANG, Yongheng ZHAO, Jin ZHU, Zonghong ZHU. They will be joined by the members of the next CAS executive committee, following elections in October 2010.

6.2 IAU XXIX General Assembly, Honolulu, Hawai'i, USA
3 – 14 August, 2015

A memorandum of understanding has been signed with the organiser, the American Astronomical Society. The AAS has published an announcement of the event in its May/June 2010 Newsletter Issue n° 152 (see page 6).

6.3 IAU XXX General Assembly in 2018

Deadlines:
Letters of Intent to host must be received by 1 November, 2011.
Proposals to host must be received by 1 April, 2012.

7. IAU Divisions, Commissions, Working Groups and Services

7.1 Updated Overview

DIVISION I – *FUNDAMENTAL ASTRONOMY*

president Dennis D. McCarthy (USA)
vice-president Sergei A. Klioner (Germany)
past president Jan Vondrák (Czech Republic)

OC members: Daffyd W. Evans (UK), Catherine Y. Hohenkerk (UK), Mizuhiko Hosokawa (Japan), Chengli Huang (China), George H. Kaplan (USA), Zoran Knežević (Serbia), Richard N. Manchester (Australia), Alessandro Morbidelli (France), Gérard Petit (France), Harald Schuh (Austria), Michael H. Soffel (Germany), Jan Vondrák (Czech Republic), Norbert Zacharias (USA)

Div. I / Comm. 4 – *Ephemerides*

president George H. Kaplan (USA)
vice-president Catherine Y. Hohenkerk (UK)
past president Toshio Fukushima (Japan)

OC members: Jean-Eudes Arlot (France), John A Bangert (USA), Steven A Bell (UK), William M. Folkner (USA), Marin Lara (Spain), Elena V. Pitjeva (Russian Federation), Sean E. Urban (USA). Jan Vondrák (Czech Republic)

Div. I / Comm. 7 – *Celestial Mechanics and Dynamical Astronomy*

president Zoran Knežević (Serbia)
vice-president Alessandro Morbidelli (France)
past president Joseph A. Burns (USA)

OC members: Evangelia Athanosoula (France), Jacques Laskar (France), Renu Malhotra (USA), Seppo Mikkola (Finland), Stanton J. Peale (USA), Fernando V. Roig (Brazil)

Div. I / Comm. 8 – *Astrometry*

president Dafydd W. Evans (UK)
vice-president Norbert Zacharias (USA)
past president Irina I. Kumkova (Russian Federation)

OC members: Alexandre H. Andrei (Brazil), Anthony G.A. Brown (Netherlands), Naoteru Gouda (Japan), Irina I. Kumkova (Russian Federation), Petre P. Popescu (Romania), Jean Souchay (France), Stephen C. Unwin (USA), Zi Zhu (China)

Div. I / Comm. 19 – *Rotation of the Earth*

president Harald Schuh (Austria)
vice-president Cheng-Li Huang (China)
past president Aleksander Brzezinski (Poland)

OC members: Christian Bizouard (France), Benjamin F. Chao (China-Taiwan), Richard S. Gross (USA), Wieslaw Kosek (Poland), Zinovy M. Malkin (Russia), Bernd Richter (Germany), David A. Salstein, Oleg Titov (Australia); and representatives from the International VLBI Service for Geodynamics (IVS), the International Earth Rotation and Reference System Service (IERS) and the International Association of Geodesy (IAG)

Div. I / Comm. 31 – *Time*

president Richard N. Manchester (Australia)
vice-president Mizuhiko Hosokawa (Japan)
past president Pascale Defraigne (Belgium)

OC members: E. Felicitas Arias (France), Zhang Shou Gang (China), Philip A. Tuckey (France), Vladimir E. Zharov (Russian Federation)

Div. I / Comm. 52 – *Relativity in Fundamental Astronomy*

president Gérard Petit (France)
vice-president Michael H. Soffel (Germany)
past president Sergei A. Klioner (Germany)

OC members: Victor A. Brumberg (Russian Federation), Nicole Capitaine (France), Agnès Fienga (France), Bernard R. Guinot (France), Cheng Huang (China), Sergei A. Klioner (Germany), François Mignard (France), P. Kenneth Seidelmann (USA), Patrick T. Wallace (UK)

Div. I / WG – *Numerical Standards in Fundamental Astronomy*

chair Brian J. Luzum (USA)
past chair Brian J. Luzum (USA)

Div. I / WG – *Astrometry by Small Ground-Based Telescopes*

chair William Thuillot (France)
past chair William Thuillot (France)

Div. I / WG – *Second Realization of International Celestial Reference Frame*

chair Chopo Ma (USA)

Div. I-III / WG – *Cartographic Coordinates and Rotational Elements of Planets and Satellites*

chair Brent A. Archinal (USA)
past chair Brent A. Archinal (USA)

Div. I-III / WG – *Natural Satellites*

chair Jean-Eudes Arlot (France)
past chair Jean-Eudes Arlot (France)

DIVISION II – *SUN AND HELIOSPHERE*

president Valentin Martínez Pillet (Spain)
vice-president James A. Klimchuk (USA)
past president Donald B. Melrose (Australia)

OC members: Gianna Cauzzi (Italy), Lidia van Driel-Gesztelyi (France, UK, Hungary), Natchimuthuk Gopalswamy (USA), Alexander Kosovichev (USA), Ingrid Mann (Japan), Karel J. Schrijver (USA)

Div. II / Comm. 10 – *Solar Activity*

president Lidia van Driel-Gesztelyi (France, UK, Hungary)
vice-president Karel J. Schrijver (USA)
past president James A. Klimchuk (USA)

OC members: Paul Charbonneau (Canada), Lyndsay Fletcher (UK), S. Sirajul Hasan (India), Hugh S. Hudson (USA), Kanya Kusano (Japan), Cristina H. Mandrini (Argentina), Hardi Peter (Germany), Bojan Vršnak (Croatia), Yihua Yan (China)

Div. II / Comm. 12 – *Solar Radiation and Structure*

president Alexander Kosovichev (USA)
vice-president Gianna Cauzzi (Italy)
past president Valentin Martínez Pillet (Spain)

OC members: Martin Asplund (Germany), Thomas J. Bogdan (USA), Axel Brandenburg (Sweden), Gianna Cauzzi (Italy), Jørgen Christensen-Dalsgaard (Denmark), Lawrence Edward Cram (Australia), Weiqun Gan (China), Laurent Gizon (Germany), Petr Heinzel (Czech Republic), Vladimir D. Kuznetsov (Russian Federation), Marta G. Rovira (Argentina), Nataliya Shchukina (Ukraine), P. Venkatakrishnan (India), Wayne Warren, Jr. (USA)

Div. II / Comm. 49 – *Interplanetary Plasma and Heliosphere*

president Natchimuthuk Gopalswamy (USA)
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Discontinued Division and Commission Working Groups

Div. I / Comm. 20 / WG – *High-frequency & Sudden Variations in Earth Orientation*
past chair Markus Rothacher

Div. III / Comm. 20 / WG – *Motions of Comets*
past chair Julio A. Fernández (Uruguay)

Div. III / Comm. 20 / WG – *Distant Objects*
past chair Brian G. Marsden (USA)

Div. III / Comm. 22 / WG – *Meteor Shower Nomenclature*
past chair Petrus M.M. Jenniskens (USA)

Div. III / Comm. 22 / WG – *Professional-Amateur Cooperation in Meteors*
past chair Galina O. Ryabova (Russian Federation)

Div. III / Comm. 15 / WG – *Physical Study of Comets*
past chairs Tetsuo Yamamoto (Japan), Daniel C. Boice (USA)

Div. III / Comm. 15 / WG – *Physical Study of Minor Planets*
past chair Ricardo Gil-Hutton (Argentina)

Div. IV / Comm. 26 / WG – *Binary and Multiple System Nomenclature*
past co-chairs Brian D. Mason (USA), William I. Hartkopf (USA)

Div. V / WG – *Spectroscopic Data Archiving*
past chair Elizabeth Griffin (Canada)

Div. VI / WG – *Star Formation*
past chair Franceso Palla (Italy)

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7.2 Central Bureau for Astronomic Telegrams - CBAT

CBAT has recently moved from the Smithsonian Astrophysical Observatory to the Department of Earth and Planetary Sciences at Harvard University. For more information, see: <http://www.cfa.harvard.edu/iau/cbat.html>. Dan Green <dwe_green@eps.harvard.edu> continues as Director.

7.3 Standards of Fundamental Astronomy

SOFA (Standards of Fundamental Astronomy) is an IAU Service that operates under Division I (Fundamental Astronomy). It has developed a set of software routines that implement official IAU algorithms for fundamental-astronomy computations. A new release of the software was made on 2009 December 31. The total number of routines is 165, comprising 113 astronomy routines supported by 52 vector/matrix routines. The release incorporates the new IAU precession model that came into force at the start of 2009. There is a "cookbook" that introduces the SOFA routines associated with precession-nutation and Earth rotation.

The most significant change since the previous release is the introduction of five new routines (available in both Fortran and C) to support transformations between geodetic and geocentric coordinates.

The Web address of the SOFA home page has been changed and is now <http://www.iausofa.org/>. Further information on the new release is available at <http://www.iausofa.org/2009_1231.html>.

Patrick Wallace has stepped down as chair of the board of SOFA after 14 years in the role. His successor is Catherine Hohenkerk of Her Majesty's Nautical Almanac Office. The IAU would like to thank Patrick for his contribution and is pleased that he has agreed to remain on the SOFA Board.

8. IAU SCIENTIFIC MEETINGS

8.1 Post-meeting Reports 2009

IAU S260	**The Role of Astronomy in Society and Culture**
Date and Place	19-23 January 2009, in Paris (UNESCO), France
Contact:	David Valls-Gabaud <david.valls-gabaud@obspm.fr>

Report not provided.
Proceedings not provided.

IAU S261	**Relativity in Fundamental Astronomy: Dynamics, Reference Frames, and Data Analysis**
Date and Place	27 April -1 May 2009, in Virginia Beach, VA, USA
SOC chairs:	Sergei A. Klioner: <sergei.klioner@tudresden.de> Kennneth P. Seidelmann: <pks6n@virginia.edu>

The symposium had the purpose of bringing together people from different areas of fundamental astronomy, metrology, physics, engineering and space navigation to review the current applications of the theory of relativity and to discuss the future requirements, tests, and applications of this theory.

The Past

Albert Einstein published his General Theory of Relativity in 1916. The theory became one of the cornerstones of the new physical thinking. In 1919, the theory was confirmed by the eclipse observations. In the 60s, relativity was started to be introduced into planetary ephemerides. In the 70s, the IAU started to introduce relativity into the reference systems and time scales. In 1985, an IAU colloquium, "Relativity in Celestial Mechanics: high precision dynamical theories and observational verifications," was held in Leningrad, USSR. In 1992, revisions of the reference systems were initiated, and in 2000 the reference systems were defined with specific relativistic metrics. Since the last colloquium on this subject in 1985, Leningrad has become St. Petersburg, the USSR has separated into Russia and many other countries, and there have been significant improvements in accuracies in time scales, astrometry, observations, and reference systems. Now there are cesium fountains, Hipparcos star positions, VLBI based reference frame, GPS positioning and observations, extrasolar planets, Hubble Space telescope observations, and dark matter and dark energy.

The Present

All accurate Fundamental Astronomy programs are now using a relativistic theory. Currently, the data analysis for ephemerides, VLBI, lunar laser ranging, satellite laser ranging, Hipparcos, Gaia, time keeping and time transfer, pulsar timing, and GPS are all compatible with the IAU reference system resolutions and the theory of relativity. There is a synergy between different fields and the application of general relativity. The ephemerides and pulsar timing, gravity waves and astrometry, mass measurements and binaries, time keeping and satellite navigation, to mention a few. All these high-precision observations allow one to test routinely whether the Einsteinian theory of relativity is adequate, or whether one or another extension thereof should be considered.

The Future

Higher accuracy models are going to be required for improved accuracies for VLBI, radar ranging, lunar laser ranging, and satellite navigation systems. For the future accuracies, the PPN metric terms need to be expanded, as there

emerges a need for a post-post-Newtonian approximation. The BCRS definition needs to be expanded to meet the needs of cosmology. Observations of the highest precision are needed to confirm or deny the Einstein's theory of relativity. Tests of relativity will come from Cassini, VLBI, LISA, SKA, and binary pulsars. Also the Gaia, BepiColombo, ACES, Microscope, and SIM space missions will test various aspects of the theory. However, the focus of testing theories of gravity in the 21st century will move towards strong-field gravity, gravitational waves, and extreme-range gravity. Any violations of General Relativity will have to be confirmed by multiple techniques. No one will believe a single experiment that indicates a violation of general relativity. Only agreement of several experiments of different physical nature will do the job.

IAU S262 **Stellar Populations: Planning for the Next Decade**
Date and Place: 3 - 7 August, 2009, in Rio de Janeiro, Brazil

SOC chair: Gustavo R. Bruzual <bruzual@cida.ve>

IAU Symposium 262 provided a stimulating environment for the presentation and discussion of the newest results in the various fields of study usually covered in stellar population meetings. The main scientific highlights of the meeting can be summarized as follows:

- Inclusion of the latest results from atomic physics (e.g. opacities for different element mixtures) in the calculation of stellar evolution models, producing new generations of models that are in closer resemblance with observations than those previously available. The treatment of the TPAGB phase, even if still far from understood, has reached levels of refinement that allow realistic interprettation of the role of these stars in stellar populations, especially in the Magellanic Clouds.

- Important progress has been made on the study of the effects of alpha-enhancement on stellar evolution models, i.e. alpha-enhanced tracks have been computed for different alpha ratios. Parallel efforts developing model atmospheres for the same chemical mixtures have made it possible in the recent past to model self-consistently alpha-enhanced stellar populations.

- Great progress in understanding the mass assembly history of the universe. Numerical simulations of galaxy formation including improved modeling of SN feedback and chemical evolution produce more realistic galaxies.

- The study of resolved stellar populations in the Milky Way and nearby galaxies, using both imaging and spectroscopy, has reached a high level of sophistication, allowing in many cases the reconstruction of the star formation and chemical enrichment histories in these systems with considerable detail.

- The availability of large databases of observations and theoretical models which can be queried and cross-linked provide flexible tools to study stellar populations in galaxies at all redshifts. Large surveys of galaxy spectra have been have been studied by means of simulations providing a clear view of the star formation history in these systems.

- Extremely deep infrared spectra of very high redshift galaxies provide access to the rest-frame optical spectra of these systems, that can then be studied in terms of the stellar populations present in these galaxies.

- A challenge for modelers of stellar populations is to develop well-calibrated and extensively tested models in the rest-UV and rest-NIR. This requires modeling the late phases of stellar evolution (BHB, TP-AGB) with the same degree of accuracy that is achieved for main sequence stars. Expected progress in the modeling of stellar populations with non-solar abundance ratio should allow to trace galaxy assembly from the chemical pattern observed in galaxies.

- There is a consensus among modelers and model users that there is a need to study systematically the uncertainties in model predictions and how they translate into uncertainties in the inferred properties of stellar populations at various redshifts.

- In the next decade the imaging and spectroscopic study of spatially resolved stellar populations will reach moderately distant galaxies thanks to instruments like GAIA, JWST, and ELT; the first generations of massive stars at the highest redshift will become observable; LMT, ALMA, EVLA, SKA will provide constrains on the gas content of galaxies at various redshifts. Models and tools to understand all these new developments are required.

- Understanding the formation and survival of thin discs in cosmological simulations remains a major issue.

IAU S263 **Icy Bodies of the Solar System**
Date and Place: 3-7 August, 2009, in Rio de Janeiro, Brazil

SOC chairs: Julio A. Fernandes <julio@fisica.edu.uy>,
Sylvia Ferraz-Mello, Rita M. Schultz

IAU Symposium 263 was approved as part of the scientific program of the XXVIIth IAU General Assembly. This was the only symposium fully devoted to planetary sciences, an area that has had a great development in the last decades, and that we wished to be due represented in this assembly. In particular, there are several groups of planetary scientists working in South America, so we

wanted to attract them, taking advantage of this unique opportunity of a General Assembly being held in this part of the world. More in general, we wanted to attract scientists with a broad geographical distribution, as it is customary for meetings organised by the IAU, which offers for this purpose a generous allotment of travel grants to assist colleagues with financial difficulties. We are happy with the result: we received about 190 registrations, from which about 130 finally attended the symposium from 22 different countries. We had 11 invited speakers, plus one key general review, we distributed 48 oral contributions in 15 scientific sessions, and 72 poster contributions in three poster sessions. We organised the scientific sessions according to the following 11 topics:

1. Formation conditions of icy bodies
2. Physical processes of ices
3. Dynamics of icy bodies and transport mechanisms
4. Delivery of water to the primitive Earth
5. Icy satellites, surface and interiors – Titan
6. Kuiper belt objects
7. Icy dwarf planets
8. Activity in comets
9. Transition objects
10. Observations and physical models of comets
11. Space missions to icy bodies. Projects and results

From the above list we can see that the topics addressed in the symposium covered different aspects of icy bodies, going from formation conditions in the protoplanetary disk, reservoirs and dynamical transport within the solar system, the influence of the early galactic environment on shaping the Oort cloud, physics, space missions with special focus on the upcoming Rosetta and New Horizons missions, and the comet-asteroid transition objects, the latter a hot topic given the observation of activity in some main-belt asteroids. The question on where the Earth's water comes from was also discussed, bearing in mind the discrepancy between the deuterium/hydrogen (D/H) ratio found in Earth and that found in comets. The outer part of the asteroid belt appears as a promising source of Earth's water, idea that has been strengthened by the discovery of activity in a few outer main belt asteroids, suggesting that they might be ice-rich. Deep Impact results and new ground-based observations of comets were presented, providing us a more refined view of their physical structure and size distribution. These results give new support to the view that comets are very fluffy, weakly consolidated structures (mean density ~ 0.5 g cm^{-3}). Last but not least, the relevance of icy bodies for life on Earth and elsewhere in the solar system was also addressed, in particular given the possibility that some large icy satellites of the Jovian planets might contain subsurface oceans. In this regard, the Cassini mission has uncovered geysers on Enceladus which points to a very active body powered by the energy released by tidal friction, and the real possibility that the ice in its interior has melted. The symposium was very fruitful to

assess the state of the art of our knowledge in this field today, and what are the new problems that challenge us for the next few years.

IAU S264	**Solar and Stellar Variability Impact on Earth and Planets**
Date and Place:	3 - 7 August, 2009, in Rio de Janeiro, Brazil
SOC chairs:	Alexandre H. Andrei <oat1@on.br>, Alexander Kosovichev, Jean-Pierre Rozelot

This symposium brought together a large scientific community, including solar and stellar physicists, and also some astrobiologists and specialists in climate and space weather effects. The science papers presented at the Symposium can be divided in four main groups.

In the first group, fundamental properties of the solar variability were discussed, including the total solar irradiance, the solar radius and shape, and solar abundances. The role of a shallow layer below the photosphere (the leptocline) was underlined as playing a key role in several physical mechanisms of the solar variability.

In the second group, the solar and stellar variabilities were discussed together through the common dynamo processes. In particular, the importance of the differential rotation and convective processes in the Sun and young Sun analogs was emphasized. It was recommended to further develop 3-D simulations for better understanding the structure and dynamics of the solar tachocline and also deep solar and stellar interiors. The unusually long declining solar cycle 23 was discussed in several papers, including a presentation of novel data assimilation methods for modelling and predicting solar activity cycles. The potential role of the interplanetary magnetic fields as a key indicator of activity was emphasized.

The third group of papers was devoted to solar and stellar magnetic energy release events: flares (nanoflares) and coronal mass ejections (CME), including their effects on space weather, space climate and related planets. It was emphasized that the observed variations of the total solar irradiance are not sufficient to explain the past correlation between solar activity and Earth climate. It was recommended to investigate long-term observing series of CME's to better establish their connections with terrestrial effects. This may justify the development of new detailed 3D atmospheric models.

The last part of the Symposium was devoted to discussions of the current and future observational programs. Among the highlights were presentations of new results on stellar variability from the COROT mission and the first results from the Kepler mission. Also, first images from the balloon-born observatory SUN-

RISE and a new heliometer from the Brazil National Observatory were presented.

Perhaps, the most significant highlight of the Symposium, which received coverage in science news, was the presentation of new results showing that compared to middle-aged stars like the Sun, newly formed stars spin faster generating strong magnetic fields that result in emission of more intense levels of X-rays, ultraviolet rays and charged particles — all of which affect the formation and evolution of planetary atmospheres and have a dramatic effect on the development of emerging life forms.

IAU S265 **Chemical Abundances in the Universe: Connecting First Stars to Planets**

Date and Place: 10 - 14 August, 2009, in Rio de Janeiro, Brazil

SOC chair: Katia Cunha <kcunha@noao.edu>

The science program of Symposium 265 was opened with a plenary lecture by Stan Woosley entitled "The Origins of the Elements," which was an excellent introduction to this broad field and set-the-stage for the following 5 days of the science sessions. This opening talk was well attended with a large audience. Some of the important topics noted in Woosley's lecture included the importance of stellar rotation in very low-metallicity stars, mass loss, the mystery of the exact physical mechanism which drives the r-process, and the general question of how massive stars die. The symposium that followed the opening lecture was organised into 5 broad science topics, consisting of Primordial Nucleosynthesis and the First Stars; First Stars in the Galaxy; Chemical Abundances in the High Redshift Universe; Chemical Constraints on Mass Assembly and Star Formation in Local Galaxies and the Milky Way; and Extrasolar Planets: The Chemical Abundance Connection.

Primordial Nucleosynthesis and the First Stars in the Universe: The topic of Big Bang Nucleosynthesis (BBN) was discussed and It was pointed out that among the elements H, D, He, and Li, it is deuterium that is the superior baryon density monitor. There were talks and subsequent lively discussions on the primordial 7Li abundance and whether measurable amounts of 6Li were synthesized (by undetermined processes) in the early universe. The quantitative abundances derived for the lithium isotopes depend on certain input physics, such as 3-D modelling or non-LTE calculations. One important topic in this session concerned the epoch of reionization, the first stars, and the mass function of these first, zero or near-zero metallicity stars. It was argued that the masses of these early objects were heavily biased towards very large masses. Of equal importance to the masses, was the nature of the nucleosynthesis that took place in these massive stars and by what mechanisms these new heavy elements were

then returned to the interstellar medium of the young, rapidly evolving universe. Neutron captures via the s- and r-processes were reviewed in this session and it was emphasized how there are really two and only two distinct processes.

First Stars in the Galaxy: There was a lot of discussion, both in the talks and in the following question-and-answers, about important effects that take place in low-metallicity stars. One process is rotation whose effects become even more important in the early metal-poor environment. Rotational effects will lead to major changes in both nucleosynthesis and mass loss when compared to models with no rotation. Details of the physics of mixing were also covered, again with a connection to mixing. The carbon-enhanced metal-poor (CEMP) stars, whose fraction increases dramatically at extremely low iron abundances ([Fe/H]< -3), were an important topic that elicited considerable discussion. Various aspects of model atmospheres wrapped up the talks of this session, with questions about how realistic are the most current models, as well as detailed reviews of 3-D models of the solar photosphere.

Chemical Abundances in the High Redshift Universe: Gamma-ray bursts were an important topic in this session, where it was shown how these energetic events can be used to probe the chemistry of the ISM in the host galaxies at high redshift. Subsequent talks then covered other energetic objects, including chemical evolution in very luminous star-forming galaxies, using quasars to probe chemical abundances in the IGM, and rapid chemical enrichment in the regions around quasars.

Chemical Abundance Constraints on Mass Assembly and Star Formation in Local Galaxies and the Milky Way: This was a rather large session, with a number of talks detailing abundance patterns in a wide variety of galactic environments, and how the elemental abundance distributions can be used to trace star formation and chemical enrichment histories. The types of galaxies or galactic populations included dwarf galaxies (especially dwarf spheroidals), the recently discovered ultra faint dwarf galaxies, chemical structure in the Galactic halo, the bulge and Milky Way center, and an Omega Centauri tidal stream. Special emphasis was placed on discussions of the Galactic thin and thick disks, disk metallicity gradients, and models of Galactic chemical evolution. Modelling topics also included the s-process in a low-metallicity evironment and thermohaline mixing as a possible solution to the longstanding 3He problem.

Extrasolar Planets: The Chemical Abundance Connection: This session began with a review of how metallicity might influence planet formation in both the gravitational instability model and the core-accretion model. The discussion of theory was then followed by a review of observations of chemical abundances in stars, both with and without planets. There is a clear connection between chemistry and planetary architectures, but the exact connection remains elusive. Additional talks included the possibility that some Li-rich red giants may have accre-

ted, or ingested, large planets leaving a chemical signature. The possible accretion of chemically fractionated material by our own Sun was the focus of one discussion item, with the suggestion that the presence of a solar system-like terrestrial planet family may be imprinted in the abundance pattern of the parent star.

IAU Symposium 265 concluded with a few talks on the next generation of large telescopes, such as the various Extremely Large Telescope (ELT) projects, and their instrumentation. Future large surveys and strategies for their implementation rounded out the end of "Chemical Abundances in the Universe: Connecting First Stars to Planets."

IAU S266	**Star clusters: Basic galactic building blocks throughout time and space**
Date and Place	11-14 August, 2009, in Rio de Janeiro, Brazil
SOC chairs:	Richard de Grijs <grijs@kiaa.pku.edu.cn>, Jacques R. D. Lépine

IAU Symposium No. 266 in Rio de Janeiro (Brazil) was organised as one of six Symposia approved during the IAU's XXVIIth General Assembly (GA). It was scheduled in the second week of the GA, so that participants would have the chance to attend the complementary Symposium on Stellar Populations (N° 262) during the first week.

The registered participants, as well as those who opted to "dip in" on occasion, witnessed a broad scientific programme, covering seven distinct sessions in 48 review, invited and contributed talks, which were all of high quality and most contained significant new results, making the meeting scientifically outstanding.

The seven sessions included:

1. Physics and modes of star cluster formation;
2. Massive star clusters: formation, evolution, feedback, destruction;
3. Star cluster systems in context;
4. Globular cluster chemical evolution;
5. Complementary insights from multi-wavelength coverage;
6. Dynamics; and
7. Star clusters as laboratories of stellar evolution.

Session 4 replaced the originally proposed session on stellar populations (given the complementarity of IAU Symposium No. 262), at the request of the IAU EC, and covered the scientific themes of a Joint Discussion proposal submitted by J. Lattanzio and J. Th. van Loon.

Star clusters are laboratories of stellar evolution and dynamics, as well as building blocks to study the properties of external galaxies, such as their cosmological formation and assembly, star-formation history (SFH) and chemical evolution.

Star clusters are ideal places where to study the formation of stars in a statistical way. Researchers at the meeting agreed that stars form out of dense CO cores inside molecular clouds. In addition, all stars form inside star clusters, and tend to group together in hierarchical structures. This model emerges from and seems to be confirmed by recent and ongoing extensive sub-mm, IR, optical and X-ray surveys. The major role that ALMA will play in this context was emphasized. The study of very young clusters or associations helps us to probe the first moments of the star-formation process and the complex interplay between stellar evolution and stellar feedback and interactions.

The discovery and characterisation of intriguing multiple stellar populations in Galactic globular and rich, old LMC/SMC clusters (the "standard" single stellar populations) through extensive photometric and spectroscopic campaigns is boosting major theoretical efforts. We need to understand how this complicated mix of populations formed, i.e., how a cluster could retain processed material from first generation stars to produce second- or even third-generation stars.

The competing roles of rotating massive stars and evolved stars on the asymptotic giant branch were discussed, although without reaching a clear conclusion. In addition, a new scenario in which the gas necessary for the second generation is expelled from first-generation binary systems, was proposed. The enhanced/-normal He-content debate as a possible explanation of secondary blue sequences in colour-magnitude diagrams is a clear example that there must be some missing ingredient in our current understanding of stellar evolution.

Studies of brown dwarfs in young clusters, He-burning stars in the horizontal-branch phase, blue stragglers and white dwarfs (WDs) in intermediate-age and old systems were presented. These may potentially change our understanding of aspects of stellar structure and evolution (mass limits, lifetimes, role of binaries) in the very near future.

The study of star clusters in external galaxies is lively. Such star clusters are used as test particles. Quantities such as luminosity functions, age-mass relationships, mass functions and colour distributions are derived to determine the stellar initial mass function (IMF), the star-formation history and – more generally – the possible cosmological formation scenario (either monolithic or hierarchical) of the parent galaxy. Critical issues related to measurements of these quantities were discussed, such as limitations of the integrated photometry, proper filter selection and binning techniques. It was argued that better communication among researchers and data exchange can help solve unnecessary conflicts.

Feedback from massive stars and their interaction with the environment determine how long a cluster with a given initial mass can survive, and possibly when mass segregation occurs. The role of the IMF and its universality was discussed in this context, together with the never-sufficiently-stressed importance of binary stars, WDs and black holes.

N-body models are getting more and more complicated, and we heard that the coupling of stellar evolution with dynamics is progressing quickly, although significant differences in the results from different codes are sill present. However, N-body plus stellar evolution models for individual clusters already show an impressive level of detail and a remarkable similarity to actual observations.

Globular clusters are used to probe the formation of the Galactic halo, and increasingly detailed chemical studies attempt to clarify whether halo stars originate from globular clusters.

Isotopic abundances are leading to very different opinions, which hopefully will converge when more data will become available.

The results presented during the conference triggered lively and important discussions and major progress in the various subfields discussed at the meeting seems imminent.

IAU S267	**Co-evolution of supermassive black holes and their host galaxies**
Date and Place:	10-14 August, 2009, in Rio de Janeiro, Brazil
SOC chair:	Bradley M. Peterson <peterson@astronomy.ohio-state.edu>

IAUS 267 was divided into seven topical sessions:

1. The first galaxies and black holes;
2. Multiwavelength properties of AGNs and their hosts;
3. Black hole masses, scaling relationships and their evolution;
4. Quasar and supermassive black hole demographics;
5. Accretion and feeding;
6. Outflows and feedback; and
7. The Big Picture: large-scale effects of feedback on galaxies and their environments.

Each session featured review talk by a senior scientist who works in the relevant area, 3-4 invited talks, and typically 3-4 contributed talks. The well-attended plenary talk was given by Timothy Heckman (Johns Hopkins University, USA) and the summary talk was given on Friday by Roger Blandford (Stanford Uni-

versity, USA). Nearly 200 papers were accepted for poster display, and approximately 2/3 of these were actually displayed during the Symposium. Approximate counts indicated that the sessions were typically attended by about 200 to 250 individuals.

There were numerous scientific highlights. The overall tenor of the meeting reflected the increasing maturity of the field of active galactic nuclei (AGNs) both on the theoretical and observational fronts. There was limited discussion on the primary methods of measuring the masses of supermassive black holes (stellar and gas dynamics and reverberation mapping), but much discussion on secondary methods that allow large-scale demographics to be probed. The true focus of the meeting was how these black holes interact with their hosts: there is a broad consensus that AGNs do not simply trace the evolution of their host galaxies, but AGNs are agents of that evolution: massive direct and indirect evidence was presenting demonstrating that AGN activity inhibits star-formation and the AGN phase is what moves galaxies from the "blue cloud" (gas-rich star-forming galaxies) to the "red sequence" (gas poor galaxies without recent star formation). There was additional discussion about how the accretion and outflow processes occur, and it is clear that tremendous progress has been made over the last decade. Especially high impact factors have been the Great Observatories (Hubble, Chandra, and Spitzer, in this context), ground-based 8-m-class telescopes (VLT, Gemini, and Keck), and the Sloan Digital Sky Survey. Collectively, these resources have revolutionized AGN astronomy.

IAU Symposium 268
"Light Elements in the Universe"
Geneva (Switzerland), 9-13 November, 2009

Contact: Corinne Charbonnel <corinne.charbonnel@obs.unige.ch>

The meeting was organised in 5 sessions:

1. Production of the light elements in the first minutes of the Universe (day 1)
2. Abundances of D, 3He, and 4He - Observations (days 1 and 2)
3. Abundances of LiBeB - Observations (days 2 and 3)
4. Sources and sinks of light elements (day 4)
5. Evolution of light elements in the Universe (days 4 and 5)

Four discussions of 45 minutes each were organised:

1. What is the local ISM value of D? How can we explain the dispersion of extragalactic D values (leader Dr M.Tosi)
2. What is the 4He from HII regions? What needs to be done to better understand systematic effects? (leader Dr G.Ferland)

3. The stellar yields in 3He, 4He, and 7Li: Main sources, observational constraints, and problems (leader Prof. A.Maeder)
4. Observational problems with LiBeB: Did we really detect 6Li in stellar atmospheres? How do the LiBeB abundances vary with metallicity? Which mechanisms are responsible for the Li dip and the Li "plateau"? (leader Dr P.-E. Nissen).

Poster sessions were held during the coffee breaks, and on the evening of November 9 a Wind & Cheese Poster Viewing Session was organised in the poster room.

An "Historical perspective" was presented as the first review at the beginning of the Symposium by Dr D. Lambert and the "Concluding remarks" were presented by Dr R. T.Rood.

The Symposium was held in the Museum of Natural History of the City of Geneva, downtown Geneva. A welcome reception was held in the Musée d'Histoire des Sciences on the Geneva lakeshore on the afternoon of 8 November. The conference was opened by the director of the Museum of Natural History, Dr. Danielle Decrouez, and by the director of the Geneva Observatory, Prof. Gilbert Burki. On the evening of November 9, a Wind & Cheese Poster Viewing Session was organised in the poster room. The Recteur and the General Secretary of the University of Geneva, Prof. Jean-Dominique Vassalli and Dr. Stéphane Berthet, presented a welcome address on the evening of 10 November before the cocktail offered by the University of Geneva. A Women Networking Lunch was organised on 11 November, and was attended by 32 ladies (this lunch was completely financed by the University of Geneva). The Conference Dinner was held on November 12 at the Château de Penthes close from ONU.

On the evening of 11 November, a public conference entitled "Deuterium, helium, lithium: From the Big Bang to the contemporary civilisation" was presented at the University of Geneva and attended by about 600 persons. The speakers were Dr. Hubert Reeves (The saga of the light elements), Prof. Johannes Geiss (The Apollo landings on the Moon: what did we learn?), Dr. Guy Laval from the French Science Academy (Light elements and nuclear energy on Earth), and Dr. Jean-Michel Aubry, psychiatrist from the Geneva Hospitals (Lithium and bipolar diseases).

8.2 Meetings in 2010

8.2.1 IAU Symposia

IAU S269 **Galileo's Medicean Moons: their Impact on 400 Years of Discovery**

Date and place: 6-9 January, 2010, in Padova, Italy

Coordinating Division: III - Planetary Systems Sciences
Chairs of SOC: Cesare Barbieri (Italy), Angioletta Coradini (Italy), Michael Mendillo (USA), Toby Owen (USA)

Members of SOC: Sushil Atreya (USA), Antonella Barucci (France), Supriya Chakrabarti (USA), Marcello Coradini (France), George Coyne (Vatican), Therese Encrenaz (France), Manuel Grande (UK), Donald Hall (USA), Wing Ip (China, Taipei), Torrence Johnson (USA), H. Uwe Keller (Germany), Sohichi Okano (Japan), Robert Pappalardo (USA), Robert Williams (USA), Nick Schneider (USA), Alexander Zakharov (Russia)

Chairs of LOC: Francesca Ferri, Monica Lazzarin, (Italy)
Members of LOC: Stefano Casotto, Mauro D'Onofrio, Elisa Segato, Lara Vanzan (Italy)

Editors of Proceedings: Cesare Barbieri (Italy), Marcello Coradini (France), Supriya Chakrabarti (USA)

Topics

1 - The discovery of the Medicean Moons, the history, the influence on science and humanity
2 - The Medicean Moons, Jupiter's system, the legacy of NASA Galileo mission, future missions to Jupiter
3 - Our solar system after Galileo Galilei, the grand vision
4 - New telescopes, new solar systems, new people out there?

Contact: Cesare Barbieri <cesare.barbieri@unipd.it>
URL: http://www.unipd.it/astro2009/iniziative.html

IAU S270 **Computational Star Formation: Playing by the Numbers?**

Date and Place: 31 May-4 June 2010, in Barcelona, Spain

Coordinating Division: VI - Interstellar Matter
Chairs of SOC: J. Alves (Spain), B. Elmegreen (USA), V. Trimble (USA)

Members of SOC: T. Abel (USA), J. Ballesteros-Paredes (Mexico), I. Bonnell (UK), F. Bournaud (France), A. Burkert (Germany), C. Dobbs (UK), G. Gensler (Austria), J. Girart (Spain), W-T. Kim (Republic of Korea), R. Klessen (Germany), M. Krumholz (USA), J. Makino (Japan), F. Nakamura (Japan), A. Nordlund (Denmark), R. Pudritz (Canada), A. Tutukov (Russia)

Chairs of LOC: J. Alves, J. Girart (Spain)
Members of LOC: J. Isern, R. Estalella (Spain)

Editors of Proceedings: J. Alves (Spain), B. Elmegreen (USA), V. Trimble (USA)

Topics

1 - Computer and algorithmic techniques for gas dynamics and particle dynamics
2 - Special purpose versus generalized hardware
3 - Simulations of single star formation
4 - Simulations of star formation in clusters
5 - Simulations of early phase cluster evolution
6 - Simulations of late phase cluster evolution
7 - Simulations of the IMF
8 - Simulations of young galaxy evolution
9 - Simulations of star formation triggering during galaxy interactions
10 - Simulations of star formation in normal galaxies

Contact: Joao Alves, <jalves@caha.es>
URL: http://www.iaus270.org

IAUS 271 **Astrophysical Dynamics: from Stars to Galaxies**
Date and Place: 21-25 June 2010, in Nice, France

Coordinating Division: IV - Stars
Chair(s) of SOC: Nic Brummell (USA), Allan Sacha Brun (France)

Members of SOC: Kwing Chang (China, Nanjing), Paul Charbonneau (Canada), Joergen Christensen-Daalsgaard (Denmark), David Galloway (Australia), Douglas Gough (UK), Siraj Hasan (India), Mark S. Miesch (USA), Keith Moffatt (UK), Yannick Ponty (France), Annick Pouquet (USA), Steve Tobias (UK), Nigel Weiss (UK), Ellen Zweibel (USA), Jean-Paul Zahn (France)

Chairs of LOC: Allan Sacha Brun, Yannick Ponty (France)
Members of LOC: Nicolas Bessolaz, Pascale Chavegrand, Laurène Jouve, Stephane Mathis, Sylvie Szeles, Bruno Thooris (France)

Editors of Proceedings: Nic Brummell (United States), Allan Sacha Brun (France), Yannick Ponty (France), Mark S. Miesch (USA)

Topics

1 - The Sun and Stars: Observational constraints, theory and models
2 - Galaxies: Observational constraints, theory and models
3 - Nonlinear Astrophysics
4 - Astrophysical turbulence
5 - Cosmic magnetism

Contact: Allan Sacha Brun <sacha.brun@cea.fr>, Nic Brummell <brummell@soe.ucsc.edu>
URL: http://irfu.cea.fr/Projets/IAUSymp271

IAU S272 **Active OB stars: structure, evolution, mass loss, and critical limits**

Date and Place: 19-23 July 2010, in Paris, France

Coordinating Division: IV - Stars
Chair of SOC: Coralie Neiner (France)

Members of SOC: J.-C. Bouret (France), L. Cidale (Argentina), J. Fabregat (Spain), M. Gagne (USA), D. Gies (USA), E. Janot-Pacheco (Brazil), G. Meynet Switzerland, G. Peters (USA), T. Rivinius (Chile), H. Saio (Japan), R. Townsend (USA), G. Wade (Canada)

Chairs of LOC: E. Alecian, M. Floquet, A.-M. Hubert, O. Martins, A. Oger (France)
Members of LOC: B. de Batz, F. Espinosa, Lara B. Leroy, C. Neiner, T. Semaan, S. Taburet, S. Kimmel, L. Gareaux (France)

Editors of Proceedings: C. Neiner (France), G. Wade (Canada), G. Meynet (Switzerland), G. Peters (USA)

Topics

1 - internal structure of active massive stars: pulsations, rotation, magnetism, transport processes
2 - their evolution: stellar environment, formation, binaries, late stages (including magnetars and GRBs)
3 - their circumstellar environment: disks, magnetospheres, the Be phenomenon, wind, clumping
4 - active massive stars as extreme condition test beds: critical rotation, mass

loss, radiation fields
5 - 'normal' massive stars as calibrators: fundamental parameters, astronomical quantities
6 - populations of massive stars: stellar population studies, tracers of galactic structure, cosmic history

Contact: Coralie Neiner <coralie.neiner@obspm.fr>
URL: http://iaus272.obspm.fr/

IAU S273 **Physics of Sun and Star Spots**
Date and Place: 23-26 August, 2010, in Los Angeles, California, USA

Coordinating Division: II - Sun & Heliosphere
Chairs of SOC: Debi Prasad Choudhary (USA), Klaus G. Strassmeier (Germany)

Members of SOC: Jan O. Stenflo (Switzerland), Carsten Denker (Germany), Eric Priest (UK), Edward Rhodes (USA), T. Sakurai Japan, Haimin Wang (USA), Cristina Mandrini (Argentina), Donald B. Melrose (Australia), Z. Hongqi (China, Nanjing), Oddbjørn Engvold (Norway), Brigitte Schmieder (France), Michal Sobotka (Czech Republic), Suzanne Hawley (USA), Ashoke K. Sen (India), Siraj Hasan (India), Karel A. van der Hucht (Netherlands)

Chairs of LOC: Ana Cristina Cadavid, Debi Prasad Choudhary, (USA)
Members of LOC: Gary Chapman, Anna Cristina Dadavid, Jan Dobias, Dora Preminger, John Lawrence, Dora Preminger Cristian Damian, Angie Cookson, John Hodgson, (USA)

Editors of Proceedings: Debi Prasad Choudhary (USA), Klaus G. Strassmeier (Germany)

Topics
1 - Formation and Decay of Sunspots
2 - Solar Magnetism
3 - Origin of Solar Activity
4 - Formation and Evolution of Star Spots
5 - Stellar Magnetism
6 - Star Spots and Stellar Activity
7 - Observational Techniques
8 - Unified Approach in Understanding Sun and Star Spots

Contact: Debi Prasad Choudhary <debiprasad.choudhary@csun.edu>
URL: http://www.csun.edu/PhysicsAndAstronomy/IAUS273.htm

IAU S274 **Advances in Plasma Astrophysics**
Date and Place: 6-10 September, 2010, in Catania, Italy

Coordinating Division: II - Sun & Heliosphere
Chairs of SOC: A. Bonanno (Italy), E. de Gouveia dal Pino (Brazil), R. Rosner (USA), A. Kosovichev (USA)

Members of SOC: A. Brandenburg (Sweden), A. J. Green (Australia), M. Goossens (Belgium), G. Haerendel (Germany), Eun-Jin Kim (UK), H. Ji (USA), K. Shibata (Japan), R. Lovelace (USA), G. Belvedere (Italy), Michael Shats (Australia), K. Otmianowska-Mazur (Poland), L. Vlahos (Greece), L. Zeleny (Russia), D. Wu (China, Nanjing)

Chairs of LOC: A. Bonanno, G. Belvedere (Italy)
Members of LOC: D. Recupero G.Santagati, G. Umana, C. Trigilio, P. Romano, S. Ivanovski, N. Gammino, S. Tudisco (Italy)

Editors of Proceedings: A. Bonanno (Italy), A. Kosovichev (USA)

Topics
The symposium topics will focus on recent observational, theoretical and experimental efforts in understanding the basic plasma processes in the Universe, with broad synergies with many areas of astrophysics, including the origin and dynamics of magnetic fields (the dynamo problem), the origin of x-ray emitting coronas and the role of magnetic reconnection, acceleration of charged particles and cosmic rays, the ejection of winds and jets from highly-evolved stars and supernova remnants, plasma radiation processes, MHD turbulence in astrophysical objects and in the interstellar medium and the solar wind, and other key problems in modern plasma astrophysics.

Contact: Alfio Bonanno <abo@oact.inaf.it>
URL: http://plasma.oact.inaf.it/

IAU S275 **Jets at All Scales**
Date and Place: 13-17 September, 2010, in Buenos Aires, Argentina

Coordinating Division: XI - Space & High Energy Astrophysics
Chair of SOC: Gustavo E. Romero (Argentina)

Members of SOC: Tomaso Belloni (Italy), Alberto J. Castro-Tirado (Spain), Stephane Corbel (France), Elena Gallo (USA), Marat Gilfanov (Germany), Elisabete M. de Gouveia Dal Pino (Brazil), Jochen Greiner (Germany), Emrah Kalemci (Turkey), Amir Levinson (Israel), Sera Markoff (Netherlands),

Shin Mineshige (Japan), Josep M. Paredes (Spain), Rita M. Sambruna (USA), Rashid Sunyaev (Germany), Jörn Wilms (Germany)

Chair of LOC: Gustavo E. Romero (Argentina)
Members of LOC: Deborah Aguilera (Argentina) Ileana Andruchow (Argentina), Sergio A. Cellone (Argentina), Sofía A. Cora (Argentina), Jorge A. Combi (Argentina), Leonardo Pellizza (Argentina), Mariana Orellana (Chile), Matías Reynoso (Argentina)

Editors of Proceedings: Gustavo E. Romero (Argentina), Rashid Sunyaev (Germany), Tomaso Belloni (Italy)

Topics
1 - Formation and content of astrophysical jets
2 - Jets from protostars
3 - Jets from microquasars
4 - Jets from Active Galactic Nuclei
5 - Jets from Gamma-Ray Bursts
6 - Accretion and its relation to jets
7 - Black hole physics
8 - Neutron stars and jets
9 - Multiwavelength observations of jets
10 - Radiative processes in jets

Contact: Gustavo Romero <romero@iar-conicet.gov.ar>
URL: http://jaas.iar-conicet.gov.ar/

IAU S276 **The Astrophysics of Planetary Systems: Formation, Structure and Dynamical Evolution**
Date and Place: 11-15 October, 2010, in Torino, Italy

Coordinating Division: III - Planetary Systems Sciences
Chair of SOC: Alessandro Sozzetti (Italy)

Members of SOC: Yann Alibert (France), Pawel Artymowicz (Canada), Isabelle Baraffe (France), Alan Boss (USA), Eric Ford (USA), Raffaele Gratton (Italy), Wilhelm Kley (Germany, Maciej Konacki (Poland), David Latham (USA), Gregory Laughlin (USA), Michel Mayor (Switzerland), Tzevi Mazeh (Israel), Tatiana Michtchenko (Brazil), Richard Nelson (UK), Ji-Lin Zhou (China, Nanjing)

Chair of LOC: Alessandro Sozzetti (Italy)

Members of LOC: Maria Teresa Crosta, Mario Lattanzi, Roberto Morbidelli, Maria Sarasso, Alberto Vecchiato (Italy)

Editor of Proceedings: Alessandro Sozzetti (Italy)

Topics
1 - Multiple-Planet Systems: Observations
2 - Multiple-Planet System: Models of Formation, Structure, and Evolution
3 - Multiple-Planet Systems:
4 - Long-Term Dynamical Evolution

Contact: Alessandro Sozzetti <sozzetti@oato.inaf.it>
URL: http://iaus276.oato.inaf.it/IAUS_276/index.htm

IAU S277 **Tracing the Ancestry of Galaxies (on the land of our ancestors)**

Date and Place: 13-17 December, 2010, in Ouagadougou, Burkina Faso

Coordinating Division: VIII - Galaxies & the Universe
Chairs of SOC: Claude Carignan (Canada), Ken C. Freeman (Australia)

Members of SOC: Leo Blitz (USA), David Block (South Africa), W. J. G. de Blok (South Africa)**,** Martin Bureau (UK), Françoise Combes (France), Stéphane Courteau (Canada), Kambiz Fathi (Sweden), Natascha M. Förster Schreiber (Germany), Rafael Guzman (USA), Claudia Mendes de Oliveira (Brazil), Julio Navarro (Canada), Max Pettini (UK), Yoshiaki Sofue (Japan), Matthias Steinmetz (Germany)

Chairs of LOC: Monique Mujawamariya (Canada), Juliette Bouda (Burkino Faso)
Members of LOC: Hamado Tougri (Burkina Faso), Juliette Bouda (Burkina Faso), Pierre Sanon (Burkina Faso), Zacharie Kam Sié (Canada & Burkina Faso), Yacouba Djabo (Canada & Burkina Faso), Luc Turbide (Canada), Marie-Maude de Denus-Baillargeon (Canada), Olivier Hernandez (Canada)

Editors of Proceedings: Claude Carignan (Canada), Ken C. Freeman (Australia), Françoise Combes (France)

Topics
1 - Multi-wavelength surveys of deep fields
2 - Multi-wavelength surveys of large nearby galaxy samples (UV, optical, IR, CO, HI, …)

3 - 3D surveys of low, intermediate and high redshift galaxies
4 - Interpretation of high redshift kinematical data (mergers, star bursts, …)
5 - High redshift progenitors of local galaxies
6 - Downsizing, high redshift red galaxies, bimodal galaxy populations, scaling relations
7 - Baryon acquisition and settling of baryons in cold disks
8 - Integrated and resolved stellar populations
9 - Star formation and mass assembly history of galaxies

Contact: Claude Carignan <claude.carignan@umontreal.ca>
URL: http://www.iaus277.org/

8.2.2 LARIM-2010
XIII Latin American Regional IAU Meeting

Date and Place: 8-12 November, 2010, in Morelia, Mexico

Coordinating Division: X - Radio Astronomy
Chair of SOC: Luis F. Rodriguez (Mexico)

Members of SOC: Luiz P. R. Vaz (Brazil), Rene Mendez (Chile), Gustavo Romero (Argentina), Vladimir Avila-Reese (Mexico), Gonzalo Tancredi (Uruguay), Anna K. Vivas (Venezuela)

Chair of LOC: Enrique Vazquez-Semadeni (Mexico)
Members of LOC: Adriana Gazol, Yolanda Gomez, Ricardo Gonzalez, Jane Arthur, Will Henney (Mexico)

Editors of Proceedings: Will Henney (Mexico), Silvia Torres-Peimbert (Mexico)

Topics
1 - Solar and Planetary Astronomy
2 - Stellar Astronomy
3 - Interstellar Medium
4 - Galactic Structure
5 - Extragalactic Astronomy
6 - Cosmology
7 - Multiwavelength Astronomy
8 - Instrumentation and telescopes

Contact: Luis F. Rodriguez <l.rodriguez@crya.unam.mx>
URL: http://larim2010.crya.unam.mx/

8.2.3 Co-sponsored meetings 2010

Journées 2010 "Systèmes de référence spatio-temporels - New Challenges for Reference Systems and Numerical Standards in Astronomy"

Date and place: 20-22 September, 2010, in Paris, France

Coordinating Division: I - Fundamental Astronomy
Chair of SOC: N. Capitaine (France)

Members of SOC: A. Brzezinski (Poland), V. Dehant (Belgium), C. Hohenkerk (UK), I. Kumkova (Russian Federation), D.D. McCarthy (USA), M. Soffel (Germany), J. Souchay (France), J. Vondrák Czech Republic), Ya. Yatskiv (Ukraine)

Chair of LOC: N. Dimarcq (France)
Members of LOC: P. Baudoin, O. Becker, D. Gambis, A.-M. Gontier, S. Lambert, M. Pailler, J.-Y. Richard (France)

Editors of Proceedings: N. Capitaine, *et al.*

Topics

1 - The astronomical constants, SI units and future developments in numerical standards
2 - Solar system ephemerides and their comparison
3 - Progress in astrometric catalogs in optical and radio wavelengths
4 - Recent developments in theory and observation of Earth rotation and related reference systems
5 - Pulsars timing, relativity and time transfer

Contact: Nicole Capitaine <n.capitaine@obspm.fr>
URL: http://syrte.obspm.fr/journees2010/

8.3 Meetings in 2011

8.3.1 Symposia 2011

IAU S278 Archaeoastronomy and Ethnoastronomy: Building Bridges between Cultures

Date and Place: 5-14 January, 2011, in Lima, Peru

Coordinating Division: XII - Union-Wide Activities
Chair of SOC: Clive Ruggles (United Kingdom)

Members of SOC : Juan Belmonte (Spain), Jarita Holbrook (USA), Stanisław Iwaniszewski (Mexico), Stephen McCluskey (USA), Ray Norris (Australia), Frank Prendergast (Ireland), Ivan Sprajc (Slovenia), Magda Stavinschi (Romania), John Steele (USA), Jonas Vaiskunas (Lithuania), Johnson Urama (Nigeria), Shi Yun-Li (China Nanjing)

Chairs of LOC: Clive Ruggles (United Kingdom), Ivan Ghezzi (Peru)
Members of LOC : Maria Elena Herrera (Peru), Flávia Pedroza (Brazil), Alejandro Martín López (Argentina)

Editor of Proceedings: Clive Ruggles (United Kingdom)

Topics

1 - methodological and theoretical issues in cultural astronomy,
2 - key issues in cultural astronomy.
3 - ethnographic and historical approaches,
4 - cultural astronomy in the Americas,
5 - cultural astronomy in Europe,
6 - cultural astronomy in the Asia/Pacific region
7 - cultural astronomy as a tool for breaking barriers in society and as a tool for fostering science in developing nations.

Contact: Ray Norris <Ray.Norris@csiro.au>
URL: t.b.d.

IAU S279 **Death of Massive Stars: Supernovae and Gamma-Ray Bursts**
Date and Place: 18-22 April, 2011, in Nikko, Japan

Coordinating Division: XI - Space & High Energy Astrophysics
Chairs of SOC: Nobuyuki Kawai (Japan), Elena Pian (Italy), Peter Roming (USA)

Members of SOC: Zi-Gao Dai (China Nanjing), Massimo Della Valle (Italy), Johan Fynbo (Denmark), Neil Gehrels (USA), Sheila McBreen (Ireland), Maryam Modjaz (USA), Ehud Nakar (Israel), Ken'ichi Nomoto (Japan), Paul O'Brien (United Kingdom), Sandra Savaglio (Germany), Brian Schmidt (Australia), Stephen Smartt (United Kingdom), Alicia Soderberg (USA), Shoichi Yamada (Japan)

Chair of LOC: Keiichi Maeda (Japan)
Members of LOC: Katsuaki Asano, Masaomi Tanaka (Japan)

Editors of Proceedings: Peter Roming (USA), Nobuyuki Kawai (Japan), Elena Pian (Italy)

Topics
1 - Progress in our understanding of core collapsed supernovae (CCSNe) & gamma-ray bursts (GRBs)
2 - GRB-SNe connection
3 - Environments of CCSNe & GRBs
4 - Progenitors of CCSNe & GRBs
5 - CCSNe & GRB mechanisms and early evolution
6 - Continuum between CCSNe & GRBs?
7 - CCSNe & GRBs as cosmological tools

Contact: Pete Roming <proming@swri.edu>

IAU S280 **The Molecular Universe**
Date and Place: 29 May-3 June, 2011, in Toledo, Spain

Coordinating Division: VI - Interstellar Matter
Chairs of SOC: Ewine van Dishoeck (Netherlands), Eric Herbst (USA)

Member(s) of SOC: Y. Aikawa (Japan), J. Black (Sweden), G. A. Blake (USA), P. Caselli (United Kingdom), J. Cernicharo (Spain), G. Garay (Chile), M. Guelin (France), U. Jorgensen (Denmark), S. Kwok (China Nanjing), J. Maier (Switzerland), K. Menten (Germany), T. Millar (United Kingdom), F. Salama (USA), I. Sims (France), A. Sternberg (Israel)

Chairs of LOC: J. Cernicharo, R. Bachiller (Spain)
Members of LOC: M. Castellanos, A. Fuente, S. Garcia-Burillo, J. R. Goicoechea, J. R. Pardo, P. de Vicene (Spain)

Editors of Proceedings: J. Cernicharo, R. Bachiller (Spain)

Topics
1 - Star-forming regions
2 - Protoplanetary disks
3 - Extragalactic astrochemistry
4 - Exoplanets and their atmospheres
5 - Solar system objects
6 - Evolved stars
7 - Diffuse clouds and PDR's
8 - Basic molecular sciences
9 - Tools for the analysis of spectral data
10 - Hot topics from Herschel
Contact: Eric Herbst <ericherb@gmail.com>
URL: t.b.d.

IAU S281 **Binary Paths to the Explosions of type Ia Supernovae**

Date and Place: 4-8 July 2011, in Padova, Italy

Coordinating Division: V - Variable Stars
Chairs of SOC: Marina Orio (Italy), G.C. Anupama (India)

Members of SOC : Solen Balman (Turkey), Lars Bildsten (USA), Domitilla Di Martino (Italy), Rosanne Di Stefano (USA), Lilia Ferrario (Australia), Rosario Gonzalez-Riestra (Spain), Laura Greggio (Italy), Margareta Hernanz (Spain), Mariko Kato (Japan), Rubina Kotak (United Kingdom), Joanna Mikolawjeska (Poland), Dina Prialnik (Israel), Pilar Ruiz-Lapuente (Spain), Jeno Sokoloski (USA), Paula Szkody (USA)

Chair of LOC: Marina Orio (Italy)
Members of LOC: Antonio Bianchini, Stefano Ciroi, Valentina Cracco, Daniela Faro, Valeria Zanini (Italy), Anita Makuluni (USA)

Editors of Proceedings: Rosanne Di Stefano (USA), Marina Orio (Italy)

Topics

1 - SNe Ia in different environments - clues to the progenitors
2 - Distribution of the delay times of SNe Ia – prompt and tardy events
3 - History of mass transfer, thermonuclear flashes and nova winds, including magnetic accretion
4 - Supersoft X-ray sources in the Local Group and beyond
5 - Recurrent novae and symbiotics systems on the SN Ia path
6 - Indications from the nova rates and their relation with the environment
7 - Massive binary systems as SNe Ia progenitors
8 - High resolution X-ray spectra of hydrogen burning white dwarfs
9 - High timing resolution X-ray observations of hydrogen burning white dwarfs
10 - The 2010's are the epoch of large surveys: using the new data.

Contact: Marina Orio <orio@astro.wisc.edu>

IAU S282 **From Interacting Binaries to Exoplanets: Essential Modeling Tools**

Date and Place: 18-22 July, 2011, in Tatranska Lomnica, Slovak Republic

Coordinating Division: V - Variable Stars

Chairs of SOC: Mercedes Richards (USA), Ivan Hubeny (USA)

Members of SOC : Dmitrij Bisikalo (Russia), Ján Budaj (Slovakia), Osman Demircan (Turkey), Gojko Djurasevic (Serbia), Edward Guinan (USA), Petr Hadrava (Czech Republic), Petr Harmanec (Czech Republic), Ladislav Hric (Slovakia), Pavel Koubsky (Czech Republic), Panagiotis Niarchos (Greece), Geraldine Peters (USA), Theodor Pribulla (Slovakia), Philippe Stee (France), Paula Szkody (USA), Juraj Zverko (Slovakia), Simon Portegies Zwart (Netherlands)

Chairs of LOC: Theodor Pribulla, Ladislav Hric (Slovakia)

Members of LOC: Anna Bobulová, Ján Budaj, Drahomir Chochol, Richard Komžík, Augustin Skopal, Juraj Zverko (Slovakia)

Editors of Proceedings: Mercedes Richards, Ivan Hubeny (USA)

Topics

1 - Multiwavelength photometry and spectroscopy of interacting binaries (compact & non-compact binaries, CVs, Algols, contact binaries, binaries in external galaxies)
2 - Observations and analysis of exoplanets and brown dwarfs in binaries
3 - Imaging techniques: adaptive optics, interferometry, polarimetry, tomography
4 - Model atmospheres of stars, interacting binaries, disks, exoplanets, and brown dwarfs
5 - Synthetic light curves, velocity curves, and spectra of binary stars and accretion disks
6 - Spectral disentangling techniques for interacting binaries, brown dwarfs, and exoplanets
7 - Formation and evolution of binary stars, brown dwarfs, and planets
8 - Hydrodynamic simulations of exoplanets and mass transfer in interacting binaries

Contact: Mercedes Richards <mrichards@astro.psu.edu>

IAU S283 **Planetary Nebulae: an Eye to the Future**
Date and Place: 25-29 July 2011, in Puerto de la Cruz, Tenerife, Spain

Coordinating Division: VI - Interstellar Matter
Chairs of SOC: Arturo Manchado (Spain), Letizia Stanghellini (USA)

Members of SOC : Mike Barlow (United Kingdom), You-Hua Chu (USA), Shuji

Deguchi (Japan), Adam Frank (USA), George Jacoby (USA), Sun Kwok (China Nanjing), Alberto López (Mexico), Walter Maciel (Brazil), Roberto Méndez (USA), Quentin Parker (Australia), Detlef Schoenberner (Germany), Albert Zijlstra (United Kingdom), Romano Corradi (Spain)

Chair of LOC:	Arturo Manchado (Spain)
Members of LOC:	Romano Corradi, Anibal Garcia-Hernandez, Miguel Santander, Eva Bejarano, Judith Araoz, Tnaja Karthaus (Spain)

Editors of Proceedings:	Arturo Manchado (Spain), Letizia Stanghellini (USA), Detlef Schoenberner (Germany)

Topics

1 - Planetary nebulae, stellar evolution, chemical abundances, AGB and post-AGB stars
2 - infrared astronomy, X-ray astronomy, UV astronomy
3 - collimated fluxes, interaction with the ISM, hydrodynamical simulations, magnetic fields
4 - molecules, dust, extragalactic population
5 - planetary nebulae luminosity function, intracluster population.

Contact: Arturo Manchado Torres <amt@iac.es>

IAU S284	**The spectral energy distribution of galaxies (SED2011)**
Place and Date:	5-9 September 2011, in Preston, UK

Coordinating Division:	VIII - Galaxies & the Universe
Chairs of SOC:	Cristina C. Popescu (United Kingdom), Richard J. Tuffs (Germany)

Members of SOC : Gustavo Bruzual (Venezuela), Francoise Combes (France), Andy Fabian (United Kingdom), Jay Gallagher (USA), Yu Gao (China Nanjing), Hidehiro Kaneda (Japan), Nick Kylafis (Greece), Renee Kraan-Korteweg (South Africa), Carol Lonsdale (USA), Vladimir Ptuskin (Russia), Elaine Sadler (Australia), Laura Silva (Italy), Jacqueline van Gorkom (USA), Barbara Whitney (USA)

Chairs of LOC:	Gordon Bromage, Cristina C. Popescu (United Kingdom), Richard J. Tuffs (Germany)
Members of LOC:	Emma Kelly, Dmitrij Semionov, Catherine Pennington (United Kingdom), Meiert Grootes, Ellen Simmat, Gabi Wiese (Germany)

Editors of Proceedings: Richard J. Tuffs Max (Germany), Cristina C. Popescu (United Kingdom)

Topics

1 - Quantitative modelling of the propagation of light in galaxies and its emergence in the form of direct and dust-reradiated light
2 - The application of such models to multiwavelength data to elucidate properties and relative importance of stellar populations and accretion-powered sources of photons in galaxies
3 - Quantitative modelling of observations of the multiphase interstellar medium of galaxies and its connection to the intergalactic medium through outflows and inflows
4 - The Integrated Background light from galaxies in the X-ray, UV, optical and infrared, including SED modelling of galaxies in the context of n-body/hydrodynamical simulations for the formation and evolution of galaxies
5 - Linking the gas and stellar content of galaxies through cosmic time
6 - Comparative studies of different estimates for star formation rates in galaxies, derived from different indicators such as radio, infrared, optical spectroscopy and X-rays
7 - Modelling the panchromatic view of the Milky Way (included as this is the galaxy for which we have the most extensive multiwavelength coverage and linear resolution)
8 - Linking high-energy and low-energy properties of galaxies through multiwavelength observations. We envisage this covering a number of subtopics. Examples are the radio-IR correlation, gamma rays as a probe of molecular gas content, and constraints on inverse Compton gamma-ray emission from interstellar radiation fields inferred from dust emission measurements.

Contact: Cristina Popescu <cpopescu@uclan.ac.uk>

IAUS 285 **New Horizons in Time Domain Astronomy**
Date and Place: 19-23 September 2001, in Oxford, UK

Coordinating Division: XII - Union-Wide Activities
Chairs of SOC: Elizabeth Griffin (Canada), Robert Hanisch (USA)

Members of SOC : Dipankar Bhattacharya (India), Nick Cross (United Kingdom), George Djorgovski (USA), Arne Henden (USA), Keith Horne (United Kingdom), Aris Karastergiou (United Kingdom), Don Kurtz (United Kingdom), Dante Minniti (Chile), Guy Monnet (France), Tara Murphy (Australia), Masatoshi Ohishi (Japan), Rob Seaman (USA), Alicia Soderberg (USA), Mark Sullivan (United Kingdom), Patricia Whitelock (South Africa)

Chairs of LOC: Aris Karastergiou, Mark Sullivan (United Kingdom)
Members of LOC: t.b.d.

Editors of Proceedings: Elizabeth Griffin (Canada), Robert Hanisch, Rob Seaman (United States)

Topics
1 - Serendipitous variations: transients, flickers, flares and flashes
2 - Period variations and scientific spin-offs: RVs, light-curves, pulsations
3 - Secular variations: explosions and modulations
4 - Aperiodic variations: events that repeat but not periodically
5 - New science by coordinating technology and collaboration
6 - Software tools for discovering and interpreting variability
7 - Database requirements

Contact: Elizabeth Griffin <elizabeth.griffin@hia-iha.nrc-cnrc.gc.ca>

IAU S286 **Comparative magnetic minima: characterizing quiet times in the Sun and stars**
Date and Place: 3-7 October 2011, in Mendoza, Argentina

Coordinating Division: II - Sun & Heliosphere
Chairs of SOC: Sarah Gibson (USA), Hebe Cremades (Argentina)

Member(s) of SOC : Alisson Dal Lago (Brazil), Daniel Gomez (Argentina), Manuel Güdel (Switzerland), Gustavo Guerrero (Sweden), Margit Haberreiter (USA), Joanna Haigh (United Kingdom), Kanya Kusano (Japan), Cristina Mandrini (Argentina), Georgeta Maris (Romania), Valentin Martinez Pillet (Spain), Barbara Thompson (USA), Andrey Tlatov (Russia), Ilya Usoskin (Finland), Adriana Valio (Brazil), David Webb (USA), Peter Fox (USA)

Chair of LOC: Cristina Mandrini (Argentina)
Members of LOC: Hebe Cremades, Marcelo López Fuentes, German Cristiani, Maria Luisa Luoni, Laura Balmaceda, Sergio Dasso (Argentina)
`

Editors of Proceedings: David Webb (USA), Cristina Mandrini (Argentina)

Topics
1 - Solar and stellar minimum definition; is there a "ground state" of the heliosphere?
2 - Origins of solar and stellar variability: magnetic dynamo and flux transport processes

3 - Surface magnetic flux differences between cycle minima
4 - Total and spectral irradiance differences between cycle minima
5 - Coronal and heliospheric structure and activity differences between minima
6 - Cosmic rays at the Earth differences between minima
7 - Earth's space environment and upper atmosphere differences between minima
8 - Historical and cosmogenic records of solar minimum differences
9 - Solar and stellar grand minima: origins
10 - Solar and stellar grand minima: implications for planetary space environments and climates

Contact: Sarah Gibson <sgibson@ucar.edu>

8.3.2 Regional Meetings 2011

MEARIM 2: **2nd Middle-East Africa IAU Regional Meeting**
Date and Place: 10-14 April, 2011 (t.b.c.), in Cape Town, South Africa.

Chair of SOC: to be confirmed
Chair of LOC: to be confirmed

Topics: All areas in Astronomy and Astrophysics.
Contact: P Charles <pac@saao.ac.za>

APRIM 2011: **XI Asian-Pacific Regional IAU Meeting**
Date and Place: 26-29 July, 2011, in Chiang Mai, Thailand

Coordinating Division: I - Fundamental Astronomy
Chairs of SOC: Boonrucksar Soonthornthum, Busaba Kramer (Thailand)

Chairs of LOC: Boonrucksar Soonthornthum (Thailand), Sampan Singharajwarapan (Thailand)

Topics: All areas in Astronomy and Astrophysics.
Contacts: <busaba@narit.or.th> or <kbusaba@gmail.com>

8.4 Other meetings of astrophyisical interest

COSPAR Capacity Building Workshop on: X-ray Astrophysics; an advanced school for Latin American astronomers
July 2011 in San Juan, Argentina

Jointly organised by the Instituto de Ciencieas Astronómico de la Tierra y del Espacio, ICATE-CONICET, the Universidad Nacional de San Juan, and the Observatorio Astronomico de La Plata

9. Educational Meetings and Activities

9.1 International School for Young Astronomers – ISYA

9.1.1 31st ISYA

held 7-18 December, 2009, at the University of the West Indies, Trinidad and Tobago

The 31st ISYA was the first one that benefited from the grant donated by the Norwegian Academy of Sciences. It was one week shorter than usual in order to reduce the cost to the host in difficult financial times; at the same time, it exceptionally had a special enlarged outreach component related to the International Year of Astronomy. However, the astrophysical content of the programme was hardly affected by the latter, as it was run in parallel to the normal ISYA programme.

The ISYA was held at the Department of Physics in the University of the West Indies (UWI) in St Augustine, Trinidad. The student accommodation was at the Hermitage, a Catholic retreat on Mount St Benedict – about 10 minutes from the main campus. Breakfast and dinner was provided at the main hall of the Hermitage. Professors were housed in 3-bedroom university housing about five minutes from the campus. Each person had a separate room. These houses were air-conditioned, fully furnished with 2 ½ bathrooms each and full kitchen facilities. All basic grocery items were provided for breakfast. The lecturers were transported to and from campus on a daily basis.

Out of 42 candidate students, 34 were selected for participation. Four did not come (2 from Brazil, 2 from Uruguay), and one extra student from Trinidad participated. There were in total students from 12 nationalities participating, including two from outside the region (one from Nigeria, one from Macedonia). The gender distribution was 51% female, 49% male.

The students were met at the airport, and transport in groups in small buses was arranged to bring the lecturers to their housing and the students to their dormitories. Departures were handled in the same way. The Opening Reception was offered by the Principal of the UWI, Prof. Clement K. Sankat. Unfortunately, due to illness, the Principal could not welcome the students, so this office was fulfilled by the Dean of the Faculty of Sciences and Agriculture.

Lectures started at 9 a.m. and finished at 5.30 p.m. Several lectures were also followed by labs to exercise the presented material. Each lecture or lab lasted 90 minutes. There were two teaching slots in the morning, and two in the afternoon, each separated by a coffee/tea break of 30 minutes. The lunch break lasted from 12.30 am till 2 pm. The lecturers and their topics were as follows:

- Planetary astrophysics: D. Schulze-Makuch (USA)
- (Eclipsing) Binary stars, exoplanet detection, extrasolar planets, planetary science: E. Guinan (USA)
- Stellar and binary evolution, and sessions for secondary school teachers and children: J-P De Greve (Belgium)
- Virtual observatory: Data reduction, queries of databases and related practical activities: R. Barba (Chile)
- Stellar atmosphere (radiative transfer), stellar fundamental parameters, sessions for secondary school teachers and children: M. Gerbaldi (France)
- Cosmology: S. Alexander, Department of Physics and Astronomy, Haverford College (USA)
- Using remote telescopes and preparing observations: Vanessa Stroud (Venezuela)
- Seminars on writing observing proposals, and workshop for children: Louise Edwards (Caltech, born in Trinidad).

An important aspect of the first week was the preparation of the observations to be carried out in the second week. Thanks to the Faulkes Foundation, ISYA had access to the 2 meter robotic Faulkes telescopes on Maoui, Hawai and in Australia. Several slots of 2 hours were offered throughout the two weeks of the ISYA (through the appreciated support of Paul Roche). Support and instruction was given by Vanessa Stroud, a PhD student of Paul Roche. In the first week, the students were asked to organise themselves into teams and to develop and propose a feasible observing project. In the second week observations were carried out and reduced.

In the first week the students had to give the topics for their presentations, and a schedule was developed within the slots foreseen in the second week. Several of the students consulted Ed Guinan and/or Jean-Pierre De Greve for the content of their powerpoint presentation. The presentations took place in five 1.5 hour slots, with 15 minutes allocated for each presentation and discussion. The lecturers agreed that the presentations were well prepared and of high quality.

Additionally, seminars were given on topics related to the scientific career:

- How to write and publish a research paper (J.P. De Greve, Belgium)
- How to make a scientific presentation (E. Guinan, USA)
- How to prepare a proposal for observing time (L. Edwards, Caltech).

The outreach and extra-curricular activities relating to the International Year of Astronomy included three television appearances:

- J-P De Greve and Shirin Haque spoke on the CNC3 Early Morning Show about the 31st ISYA and different astronomical topics.
- Edward Guinan prerecorded an interview for the TV6 Morning Edition Programme on the subject of his public lecture: "The Once and Future Sun: The Sun's Impact on Climate and Life."
- Stephon Alexander (Department of Physics and Astronomy, Haverford College, USA) appeared on television to discuss his public lecture "Music and Cosmology."

25 teachers and teacher training students participated in the two-day teachers' workshop. The seminars were given by local lecturers and by M. Gerbaldi, E. Guinan and J.P. De Greve. 22 children took part in the morning children's workshop at the National Science Center. Interactive presentations were given by M. Gerbaldi, L. Edwards and J.P. De Greve. The topics covered were: the sky above Trinidad, color and brightness of stars, the solar system, our Milky Way and galaxies.

The ISYA academic sessions were complemented by an extensive cultural and social programme. On the last day, 18 December 2009, the students filled in a 4 page evaluation sheet. In the following closing ceremony, the students received their certificate witnessing their participation in the ISYA2009.

Excerpted from the report submitted by Jean-Pierre De Greve, Chairman PG ISYA

9.1.2 32nd ISYA in Byurakan, Armenia

12 September - 2 October, 2010

The 32nd ISYA is being organised jointly by the International Astronomical Union (IAU), the Byurakan Astrophysical Observatory (BAO), and the Armenian Astronomical Society (ArAS), with the support of NASL-KAVLI. It will be hosted by the Byurakan Observatory.

Upper-level University students and post-graduate students will participate in the school. In exceptional cases, some excellent B.Sc. students have also been accepted. The selection process is now over and 43 students from 19 countries are in the list of participants. English will be the official language of the school.

The participants will stay in the Byurakan Observatory hotel. The lecturers will stay in Yerevan at the Yerevan State University (YSU) hotel.

LOC members: A. Mickaelian (BAO, Chair), L. Sargsyan (BAO, Secretary) V. Adibekyan (BAO/YSU), M. Gevorgyan (BAO), K. Gigoyan (BAO), M. Gyulzadian (BAO), A. Hakobyan (BAO), G. Harutyunyan (YSU), H. Harutyunian (BAO), A. Hovhannisyan (YSU), N. Melikian (BAO), T. Movsessian (BAO), E. Nikoghossian (BAO), D. Sargsyan (BAO), P. Sinamyan (BAO).

contacts: Jean-Pierre De Greve <jpdgreve@vub.ac.be>
Areg Mickaelian <aregmick@aras.am>
URL: http://www.aras.am/SS2010/ss_index.htm

9.2 Worldwide Development of Astronomy - WWDA

9.2.1 Paraguay, August, 2009

Excerpted from a report by John Hearnshaw and Hugo Levato

John Hearnshaw and Hugo Levato visited the Republic of Paraguay over six days in mid-August (19-25 August) 2009 as part of the activities of the IAU Commission 46 Program Group for the World-wide Development of Astronomy (PGWWDA). The purpose was to assess the current situation in Paraguay concerning astronomical teaching and research and to make appropriate recommendations to the IAU on possible future development of astronomy in that country. The visit was hosted by two faculties of the Universidad Nacional de Asunción (UNA): the Facultad Politécnica (Engineering Technology Faculty) and by the Facultad de Ciencias Exactas y Naturales (FACEN, the Faculty of Exact and Natural Sciences).

UNA was founded in 1889 and has about 36,000 students and some 5500 teachers. The university is located on a large and spacious campus in the city of San Lorenzo, which is contiguous with Asunción. Astronomy is firmly established at UNA. The Observatorio Astronómico Prof. Alexis Troche Boggino, named after a former UNA astronomer, was installed in 2000 as a gift from the Japanese government. It houses a 45-cm GoTo Cassegrain reflector equipped with a 1.2-Mpixel CCD camera and a photoelectric photometer.

Two astronomers are employed at the observatory: Fredy Doncel and José Gómez. The mission of the observatory is to do research, to train students and to show the public the night sky through a public outreach program. Public nights are held every Tuesday and Friday evening for several hours, weather permitting. The telescope appeared to be in good working order. The mirror needs cleaning or realuminizing before much longer, but otherwise it appeared to be a very nice instrument with a sturdy equatorial mounting and closed tube configuration.

Doncel and Gómez also teach astronomy in the Department of Physics, which belongs to FACEN, the Faculty for Exact and Natural Sciences. The Licencia or bachelor's degree is a four-year programme, and astronomy is offered as an optional subject for one semester in the fourth year. It is a general descriptive course in introductory astrophysics. Typically about eight students might take this course in any year. The Department of Physics at FACEN, under Professor Miguel Vázquez, has about 30 staff members, two of them with PhD degrees and ten with MSc degrees in physics. Masters' and doctoral degrees are offered in physics, though in astronomy no PhD theses have yet been presented. In 2007, fifty-three research professors were appointed, with full-time teaching and research positions, and a higher salary level than other professors. However, just one was appointed in physics (in fact in medical physics) and none in astronomy. These full-time professors earn typically $US2500 per month, as compared to $US600 a month for a normal full professor at UNA. Most UNA academics are expected to take on a second job to supplement a relatively low income; the special research professors do not have to do this.

Inaugurated in 2008, the Observatorio Bicentario Buenventura Suárez (named after a regional Jesuit astronomer, 1679-1750) is a small facility in central Asunción supported by grants from the local city government and operated by members of the Asociación de Aficionados de la Astronomía, the amateur astronomical society, for the purpose of promoting astronomy to school students and to the public. The centre is run by Blas Servín and his helper, Samuel Hirschkorn, both amateur astronomers. It is housed in a building provided by the city, and comprising a library, a small planetarium, a meeting room and a flat roof where portable telescopes for public viewing can be mounted. An active programme of meetings and observing sessions is organised at the centre, and they are doing excellent work to promote IYA2009. The website of the Centro Astronómico Bicentario is <http://www.atropar.org>.

Astronomy in Paraguay is still in a relatively undeveloped state, but the telescope donation from Japan has obviously made a big impact in astronomy education and research at UNA. Astronomy is at present an optional subject in Paraguayan high schools. Nevertheless, at least six high schools in Asunción are teaching astronomy, and no doubt more throughout the country. At the Instituto Superior de Educación (ISE) in Paraguay, about thirty teachers are at present training to give courses in astronomy in Paraguay's high schools. To make further progress now, astronomy in Paraguay would benefit from IAU support.

John Hearnshaw and Hugo Levato have submitted the following recommendations:

- Fredy Doncel and José Gómez should be nominated for individual membership of the IAU from 2012.
- Paraguay could consider becoming a provisional member of the IAU in 2012.
- A school for high-school astronomy teachers should be organised under Commission 46's new programme group, NASE. A week-long workshop in Asunción would predictably attract several dozen participants. The possibility of such a course was discussed on several occasions to the astronomers at UNA and to the deans of the Politécnica and of FACEN at UNA. All agreed that a NASE school would be the best way of promoting astronomy in Paraguay in the near future. It is hoped that such a school can be organised for 2010 or 2011.

Contacts in Paraguay arising from the visit are:

- Fredy Doncel, UNA astronomer and director of the Observatorio Astronómico Alexis Troche Boggino, <fdoncel@pol.una.py>
- José María Gómez, UNA astronomer, <jhoseghomez@yahoo.es>
- Blas Servín, director of the Centro Astronómico Bicentario, <informes@astropar.org> <www.astropar.org>
- Miguel Angel Vázquez, head of the Department of Physics, FACEN, UNA, <fisica@facen.una.py>
- Nicolas Guefos, Dean of Science, FACEN, UNA, <decano@facen.una.py> <www.facen.una.py>
- Abel Bernal Castillo, Dean of the Facultad Politécnica, UNA, <abernal@pol.una.py> <www.pol.una.py>
- Miguel Volpe Borgognon, SPoC for IYA2009 in Paraguay, engineer at UNA, <mvolpe@cpia.org> <www.astronomia2009.org.py>

9.2.2 Senegal, Januar 2010

Katrien Kolenberg was invited by local contact Ahmadou Wague (Professor at the Institute of Applied Nuclear Physics – Institut de Technologie Nucleaire Appliquée, ITNA, UCAD) to attend a pan-African physics conference organised by the LAM Network (African Laser, Atomic, Molecular and Optical Sciences Network) from 11-16 January, 2010.

The Cheikh Anta Diop University (UCAD) in Dakar, Senegal, is the largest in the region, with over 50,000 students – many also from other (West-) African countries – of which about 1000 start studies in Physics every year. Until recently, there were no courses offered on astronomy topics.

During this historical meeting, the African Physical Society was founded. Important connections were made for future TAD and PGWWDA efforts in (West) Africa. The meeting had an entire session devoted to astronomy in Africa with, e.g., talks by Claude Carignan (on Astronomy in Burkina Faso and announcing IAUS277), Charles McGruder (on the bid to host the Square Kilometer Array, SKA, in Africa), and Katrien Kolenberg (on the IAU, PGWWDA, TAD and variable star research).

Following the conference, Katrien Kolenberg and John Bohannon travelled to the Sahel region (Fouta) in the north of the country. The goal of this project, "Galileo in Senegal," was to distribute Galileoscopes in remote villages and have conversations with the local population about the sky, its features and their significance to them (cultural exchange). The Japanese Galileoscope telescopes <http://www-irc.mtk.nao.ac.jp/~webadm/Galileo-E/> were kindly contributed by PGWWDA member Kaz Sekiguchi.

This adventure resulted in a Science article published in April 2010: <http://www.sciencemag.org/cgi/content/full/328/5976/296-b>.
Katrien Kolenberg also gave a Galileoscope workshop at the University of Dakar. This sparked further local outreach efforts.

In May 2010 Katrien Kolenberg returned to Dakar at her own expense to give a few further lectures at the University (doctoral program), the international school Ste. Marie de Hann (high school students), and the cultural center Maison de la Culture Douta Seck (public talk) in Dakar, resulting in a few articles in the local media.

Further TAD efforts in West Africa are planned later this year. Rector Abdou Salam Sall of the University of Dakar stongly endorses these efforts. Ahmadou Wague, who leads the doctoral programme in Physics, will be the main collaborator for TAD efforts to follow. Plans are to start a Masters/PhD programme in astronomy at the UCAD though collaborations worldwide over the course of the coming years, and to form the first West African PhDs in astronomy. In this respect, efforts such as AIMS (African Institute for Mathematical Science, <http://www.aims.ac.za/>, which will get a node in West Africa (Senegal) as of 2011, and the Next Einstein Initiative for scientific development in Africa <http://www.nexteinstein.org/> will play a complementary role.

There are plans to found the African Astronomical Society at the IAU S277 in Ouagadougou, December 2010.

Extracted from a report submitted by Katrien Kolenberg

9.2.3 Current and future PGWDDA activities

John Hearnshaw is currently visiting Tajikistan, hosted by Khursand Ibadinov, Director of the Institute of Astrophysics, Tajik Academy of Sciences, Dushanbe. Tajikistan is an IAU member with has 6 individual members of the IAU, three major astronomical observatories (Hisar, Sanglokh and Pamir observatories at superb high altitude sites), and several universities with an interest in astronomy. There is also a planetarium for public outreach in the northern city of Khujand. A report will be published in the *Information Bulletin 107*.

Other visits planned for 2010 are to Costa Rica and Panama, the Philippines, Angola, Ghana, Benin and Gabon.

9.3 Teaching Astronomy for Development - TAD

9.3.1 TAD Bolivia

June - July 2009, Observatorio Astronómico Nacional, Bolivia

A 12-day training programme on variable star observing techniques using CCD Image acquisition for high precision photometry and calibration to standard systems was held at the Observatorio Astronómico Nacional (Director: Rodolfo Zalles Barrera).

The programme was co-sponsored by the International Astronomical Union, the American Association of Variable Star Observers, Instituto Copérnico, Universidad Autónoma "Juan Misael Saracho" and Observatorio Astronómico Nacional. It was conducted by Jaime García of the Instituto Copérnico, Rama Caída, Mendoza, Argentina.

The objectives were to increase the technical capabilities of professional astronomers and the observatory and university staff, to contribute with the science of variable stars, using CCD techniques; specifically,

- to improve the knowledge of variable star astronomy
- to learn how to operate different types of CCD cameras and accessories
- to acquire the skills for image and data processing using the specific software.

The talks included topics on variable stars, photometry, standard photometric systems and "data mining" of catalogues and databases applied to variable star studies. The practical sessions included acquisition, calibration and reduction of scientific CCD images.

26 trainees from Tarija, La Paz, El Alto and Santa Cruz de la Sierra participated. Most were National Observatory and UAJSM staff members, professors and students of UMSA Physics Department and several amateur astronomers.

Excerpted from a report by John Beckman

9.3.2 Regional Astronomy Development Workshop for Eastern Africa

9-13 November, 2009, in Nairobi, Kenya

The workshop, a blend of lectures and hands-on laboratory exercises, was attended by 43 people including 29 Kenyans and 14 foreign participants and resource persons. The partipants were selected from various universities around Kenya and the neighbouring countries of Uganda, Rwanda, Ethiopia and Tanzania. Each country, except for Kenya, was represented by one lecturer and one student. The lecturers were invited to investigate the possibility of starting an astronomy programme or module at their university; the students were encouraged to establish a student club or societys to propagate the objectives of astronomy development. Selections were based on references, enthusiasm shown during IYA2009 and the potential of the person to promote development activities in his or her country.

The event was jointly sponsored by the International Astronomical Union (represented by Ed Guinan) and the International Science Programmes (ISP) of Uppsala University, Sweden (represented by Ernst van Groningen). Eight Kenyan universities sponsored at least participants each (one academic staff and a student). The speakers were:

- Ed Guinan, chair of the IAU's C46 TAD programme
- Petri Vaisenen, astronomer at the SAAO
- Hakeem Olyseyi, Dept. of Physicsand Space Sciences, Florida Institute of Technology
- Charles McGruder, American Society for Black Physicists/Western Kentucky University
- Kevin Govender, SAAO.

This pilot event was successful in that it succeeded in planting the seeds of astronomy in Eastern Africa. It introduced astronomy to various universties in the region that had not previously been exposed to the subject. Potential students of astronomy were identified, and a regional body for astronomy development, The Eastern Africa Astronomical Society, was established.

The plan is to hold a follow-up workshop organised by the team elected to head The Eastern Africa Astronomical Society. All aspects from concept to fund-raising to implementation are to be arranged locally, supported, where necessary, by the partners of first workshop.

Excerpted from a report by Kevin Govender

9.3.3 TAD activities in Gaza and the West Bank

In September 2009, TAD financed a telescope for the astronomer Suleiman Baraka in Gaza. He set it up in schoolyards and invited children to explore the skies. The story was written up in the *Jerusalem Post*. Posted online, the article also mentions the visit of IAU President Robert Williams and retired NASA astronaut Jeffrey Hoffman to the West Bank in January 2010. See:
<http://www.jpost.com/LandedPages/PrintArticle.aspx?id=171986>

9.3.4 CAP2010

5-19 March 2010 in Cape Town, South Africa

Communicating Astronomy with the Public CAP2010 received financial support from the IAU/TAD programme. The funds provided travel grants for six participants from India, Mauritius, Romania, Armenia, Mexico and Nepal. A number of African participants received grants from local sources. Most of the Powerpoint presentations are available at:
<http://www.communicatingastronomy.org/cap2010/programme.html>.

9.3.5 TAD – planned activities

Vietnam Astronomy/Astrophysics School
January 2011, Hue City and Hanoi

This IAU/TAD Astrophysics School was proposed and organised by Nguyen Quynh Lan (Hanoi National University of Education) as a follow-up programme of the successful Summer-2008 Hanoi Astrophysics School. The proposal was contingent upon Vietnam joining the IAU at the IAU GA in Rio (August 2009). The school will focus on upper level undergraduates, graduate students and recent PhDs from Vietnam. Several graduate students from nearby Cambodia are also expected to attend. Organising Committee: Nguyen Lan, M. Gerbaldi, E. Guinan, & L. Marschall.

IAU/TAD Aid for Palestine
Suleiman Baraka (Gaza, Palestine) in coordination with Kamal Rashid, Physics Dept., University of Nablus, Najah, Nablus, Palestine, has requested continued IAU/TAD support for Astronomy education in Gaza and the West Bank of Palestine. TAD has provided a small telescope for the education of children in Gaza and also will be providing astronomy text books, lab materials, and other educational materials that have been requested. The TAD is sponsoring visits from IAU astronomers to Gaza and the West Bank to give lectures and advice. Details are currently being worked out for educational and consultation visits during the late 2010 or early 2011.

IAU/TAD programme for Observational Astrophysics for Iran
Proposed by Yousef Sobouti, Director and President of the Institute for Advanced Studies in Basic Sciences (I.A.S.B.S.), this programme is now planned for the late 2010. The primary motivation is to promote and develop astronomy research and education in Iran. A secondary goal is to promote astronomy contacts with European and US astronomers. Two to three astronomers are planning to visit Iran and give lectures at several universities and research centers. A possible mini-workshop aimed at advanced undergraduates and graduate students is also tentatively planned at the Institute for Advanced Studies in Basic Sciences (IASBS), Zanjan, Iran.

TAD/ NASE-sponsored High School Science Teachers Workshop, Ouagadougou, Burkina Faso (West Africa).
This workshop coincides with IAU Symposium No 277: *Tracing the Ancestry of Galaxies*, held 13-17 December, 2010. About 30-40 (mostly) high school teachers from different provinces of Burkina Faso are expected to attend. The workshop is being organised by Claude Carignan (Université de Montréal), Michele Gerbaldi (IAP), Edward Guinan (IAU/TAD), and Rosa Maria Ros (IAU/NASE). Claude Carignan is also an organiser of the symposium.

IAU/TAD activies in Senegal
TAD plans to support a one week visit of Dr. Katrien Kolenberg (Univ. of Vienna / Harvard CfA) to Dakar during late 2010 or early 2011. Dr. Kollenberg will teach a one week intensive Introductory Astronomy course.

IAU/TAD Programme in the Democratic People's Republic of Korea
TAD will continue to send books and donated journals to Pyongyang Astronomical Observatory and maintain contacts with astronomers and students in the DPRK.

The deadline for proposing IAU/TAD programs for 2011 is October 2010. Proposals received by mid-October will be considered. Please contact TAD Program Co-Chairs: Edward Guinan <edward.guinan@villanova.edu> and Laurence Marschall <marschal@gettysburg.edu> for additional information.

9.4 Network for Astronomy Education - NASE

The NASE Programme Group is planning the following courses for 2010:

1. Quito, Ecuador, 29th June - 2nd July, 2010
2. Barranquilla, Colombia, 6th - 9th July, 2010
3. Managua, Nicaragua, 12th - 15th July, 2010
4. Lima, Perú, 17th - 20th July, 2010
5. Santa Fé, Argentina, 13th - 16th October, 2010

NASE is planning the following visits in order to prepare courses in Africa in 2011:

1. Tunisia, 26th - 27th May, 2010
2. Burkina Faso, 16th - 17th December, 2010

For more information and updates, see <http://www.iaucomm46.org/>.

10. IAU PUBLICATIONS

10.1 Highlights and Transactions

recently published:

Transactions of the International Astronomical Union Volume XXVIIB Proceedings of the Twenty Seventh General Assembly Rio De Janeiro 2009. Edited by Ian F. Corbett. (Cambridge: CUP) ISBN: 9780-521-76831-3

IAU Highlights of Astronomy 15 will be published by CUP in the second half of 2010.

Transactions XXVIIA will be published by CUP in 2012.

10.2 IAU Symposium Proceedings

Published to date in 2010:

IAUS 261 Relativity in Fundamental Astronomy
27 April - 1 May 2009, Virginia Beach, USA
Ed. S. Klioner, K. Seidelmann, M. Soffel
(Cambridge: CUP) ISBN: 9780-521-76481-0

IAUS 262 Stellar Populations – Planning for the Next Decade
3-7 August 2009, Rio de Janeiro, Brazil
Eds. G. Bruzual & S. Charlot
(Cambridge: CUP) ISBN: 9780-521-76484-1

IAUS 263 Icy Bodies in the Solar System
3-7 August 2009, Rio de Janeiro, Brazil
Eds: J. Fernandez, D. Lazzaro, D. Prialnik-Kovetz
(Cambridge: CUP) ISBN: 9780-521-76488-9

IAUS 264 Solar and Stellar Variability – Impact on Earth and Planets
3-7 August 2009, Rio de Janeiro, Brazil
Eds. A. Andrei, A. Kosovichev, J-P Rozelot
(Cambridge: CUP) ISBN: 9780-521-76492-6

IAUS 265 Chemical Abundances in the Universe – Connecting First Stars to Planets
10-14 August 2009, Rio de Janeiro, Brazil

Eds. K. Cunha, M. Spite, B. Barbuy
(Cambridge: CUP) ISBN: 9780-521-76495-7

IAUS 266 Star Clusters – Basic Galactic Building Blocks throughout Time and Space
10-14 August 2009, Rio de Janeiro, Brazil
Eds. R. de Grijs, J. R. D. Lépine
(Cambridge: CUP) ISBN: 9780-521-76499-5

IAUS 267 Co-evolution of Central Black Holes and Galaxies
10-14 August 2009, Rio de Janeiro, Brazil
Eds. B. Peterson, R. Somerville, T. Storchi-Bergmann
(Cambridge: CUP) ISBN: 9780-521-76502-2

IAUS 268 Light Elements in the Universe
9-13 November 2009, Geneva, Switzerland
Eds. C. Charbonnel, M. Tosi, F. Primas, C. Chiappini
(Cambridge: CUP) ISBN: 9780-521-76506-0

Still to be published:

IAUS 260 The Role of Astronomy in Society and Culture
19-23 January 2009, Paris, France
Eds. David Valls-Gabaud & A. Boksenberg
(Cambridge: CUP) ISBN: 9780-521-76477-3

To access the CUP IAUS Proceedings go to
<http://journals.cambridge.org/action/displayJournal?jid=IAU>

For a complete list of IAU Symposium and Colloquium Proceedings, see:
<http://www.iau.org/science/publications/iau/colloquium/list/>
<http://www.iau.org/science/publications/iau/symposium/list/>
<http://www.iau.org/science/publications/iau/symposium/list/>

11. Reports from other Organisations

11.1 COPUOS

Excerpts from the statement of the International Astronomical Union to the 47th Session of the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS) Scientific and Technical Subcommittee, Vienna, Austria, 8-19 February, 2010

By Karel A. van der Hucht, IAU representative to COPUOS, *SRON-Utrecht, the Netherlands, <k.a.van.der.hucht@sron.nl>*

The *International Astronomical Union* welcomes the continuing progress in the implementation of the recommendations of UNISPACE III. Several of these are

of great importance for the future of astronomy, and several require the support of the international scientific community. The *IAU* (which saw its 90th anniversary in 2009), representing the world's community of professional astronomers, is pleased to contribute to these issues together with interested delegations and other partners. A few of these issues will be discussed here.

I. The International Year of Astronomy 2009, and the *IAU*

The IAU XXV General Assembly, July 2003 in Sydney (Australia), voted unanimously in favour of a Resolution asking to proclaim the year 2009 as the *Year of Astronomy* by the United Nations. This in recognition of the significance of the introduction in 1609 of the astronomical telescope by the Italian mathematician and astronomer Galileo Galilei (1564-1642). With his telescopes he discovered craters on the Moon, moons around Jupiter, the phases of Venus and other astronomical phenomena, thus dramatically revising mankind's understanding of the Solar System. Of course, astronomy being the oldest science of mankind, pre-telescope astronomical records go back more than 5000 years.

The IYA2009 was, first and foremost, an activity of the inhabitants of planet Earth. It aimed to convey the excitement of personal discovery, the pleasure of sharing fundamental knowledge about the Universe and our place in it, and the cultural value of scientific research. The IYA2009 was one of the largest and most successful global astronomy outreach events in history, and will leave a lasting impression of inspiration and awe on millions of young minds of our place in the Universe.

II. Near Earth Objects (NEOs), and the *IAU*

The issue of forecasting and potentially mitigating future impacts of asteroids on Earth has been before this Subcommittee repeatedly in the past. In recent years, increasing evidence of the Near-Earth Objects (NEO) population has become available, thanks notably to the efforts of the USA. This justifies an increasing awareness among all governments of the hazards posed by NEOs to the Earth and its life forms.

NEOs are asteroids or comets in our planetary system whose variable orbits bring them into the Earth's neighbourhood. If an initial NEO orbit is well determined, its future behaviour can be calculated and an eventual close encounter or collision with Earth predicted. The initial goal of the US *Spaceguard* project, defined in 1994 and started in 1998, was to discover and obtain orbits of 90% of all NEOs larger than 1 km in diameter, *which could cause hazards on a global scale*, when impacting with Earth. Their estimated number is 940. Impressive progress has been made towards achieving this goal, with the current level of completeness being close to 85%.

Since 2005, additional attention has been given to the need to monitor also smaller NEOs, down to 140 metres in diameter, *whose impacts may have serious consequences on a regional scale*. Their estimated number is about 25,000, and the goal to detect and catalogue 90% of those objects may not be reached before the year 2028, provided that the necessary observational tools will become available. New astronomical telescopes dedicated to these large sky surveys are soon coming on-line in the USA, such as the Panoramic Survey Telescope And Rapid Response System (*Pan-STARRS*) and the Large Synoptic Survey Telescope (*LSST*), provided that US national, and hopefully also international funding, will be obtained.

To be of lasting value, the orbital data for all NEO discoveries are being verified, confirmed and catalogued. In this respect the *IAU* plays an active role by supporting the *Minor Planet Center (MPC)*, operated at the Harvard-Smithsonian Center for Astrophysics (MA, USA) and financed by NASA's Planetary Science Division. The *MPC* is responsible for collecting, validating and distributing all positional measurements made world-wide of minor planets and comets. The *MPC* acts as a gateway of these observations, including those of NEOs, performs identifications and orbital computations, and makes those public.

As NEOs are posted on the *MPC* NEO confirmation page, their orbits are checked for possible impact with the Earth. While such impacts are rare, in October 2008 an object of ~ 3 meter in diameter was discovered by the US Catalina Sky Survey to impact the Earth 19 hours later over the Nubian desert of Northern Sudan. The *MPC* software accepted the incoming e-mail, posted the object on the NEO confirmation page, secured additional follow-up observations, catalogued the object 2008 TC3, and predicted the impact. In this case, the system worked nearly flawlessly and the object was announced to the public as an impactor several hours before it broke up and burned up harmlessly in the Earth atmosphere. A systematic search in the Nubian desert located 280 asteroid fragments with a total mass of 3.9 kg.

The *IAU* will open a new web page with a chronology of milestones of NEO observations and research. Near Earth Objects are discussed further under item 16 of the agenda of this Subcommittee session and by Action Team 14.

III. Education and Capacity Building, and the *IAU*

Education and capacity building are of high priority for the *IAU,* and the *IAU* supports the work of Action Team 17, led by Japan, with enthusiasm.

The *IAU* is pleased to continue co-sponsoring the successful Capacity Building Workshops in Basic Space Science organised by *COSPAR*, in addition to its own range of educational activities. The 10th Capacity Building Workshop, on *Planetary Surface Science*, was held 6-19 September 2009 in Harbin (China) at the

Deep Space Exploration Research Center (DSRC), a department of the Harbin Institute of Technology (HIT), and supported by the Chinese Academy of Sciences (CAS). The next workshop in this series, on *Data Analysis of the Fermi Gamma-ray Space Telescope*, will be held in Bangalore (India), 8-19 February 2010.

The *IAU* is in the process of consolidating and expanding its educational programme. The IAU XXVII General Assembly, 3-14 August 2009 in Rio de Janeiro (Brazil), voted in favour of Resolutions asking for the implementation of the *IAU Strategic Plan 2010-2020*, dedicated to educating *Astronomy for the Developing World*. This ambitious blueprint for expanding astronomy development programs over the next decade has as key component the creation of an *IAU Global Astronomy for Development Office*, which will coordinate the many existing and foreseen IAU education activities, sustainable global development, and capacity building. This long term commitment of the *IAU* builds on the success of the *International Year of Astronomy 2009*. The *IAU* Executive Committee is currently in the process of selecting a host for this *Global Astronomy for Development Office*.

In conclusion,
the *IAU* is gratified to acknowledge the progress which is being made on several issues that have high priority for astronomers world-wide, and emphasizes its concern and efforts in the fields expressed above, both for the sake of our science and for that of the world in which we live and our descendants will live. This Subcommittee is substantially contributing to this progress. It will help us all, if Delegates would call the attention of their Governments to these important issues.

11.2 ICSU

ICSU Unions Meetings, 6-8 April 2010

The ICSU Scientific Unions met in Paris 7-8 April at the Institut Pasteur. This meeting was preceded by a meeting of the Geo-Unions cluster (of which IAU is a member) on 6 April.

Geo-Unions
This meeting serves to exchange information on current activities, share common concerns, especially about ICSU, and prepare for the general Unions' meeting the following days. As is usual, the discussions were largely focused on issues of interest to Earth scientists and apart from a short discussion of data bases and data access, there was little of direct interest to IAU.

I outlined the achievements of IYA2009, the intentions of our Strategic Plan and the establishment of the OAD. This was well received – education and capacity building are important topics for all unions.

The current priorities in the ICSU strategy – Health and Wellbeing, Sustainable Development, Ecological Change, Natural Hazards and Disasters – are all multi-disciplinary but of only peripheral professional interest to IAU. Nevertheless there are probably capabilities in the IAU community which could be brought to bear on these high profile areas of research.

There was general agreement that ICSU has improved its attitudes to the Unions in the past year or so, under its new President and Executive Director. The Geo-Unions were content with the way ICSU was performing and supportive of the way it was fostering the major programmes in its key areas. All agreed that ICSU was helpful to the Unions in the pursuit of their missions.

The discussion moved on to UNESCO – all the Geo-Unions have dealings with UNESCO, but a different sector to IAU. UNESCO sees ICSU as a privileged partner (the advantage of being non-governmental and so more free to speak its mind), and the UN also turns to ICSU for objective scientific advice to complement input from UNESCO (and others).

ICSU Unions meeting 7-8 April

This was a useful and constructive meeting of all the ICSU Scientific Unions with the ICSU Executive.

ICSU is preparing a new Strategic Plan to cover the period 2012-2017. This will concentrate on the areas seen as current priorities, namely Health and Well-being, Sustainable Development, Ecological Change, Natural Hazards and Disasters, and the Universality of Science. To assist in this process, ICSU is carrying out a comprehensive consultative 'foresight' analysis (see <http://foresight.icsu.org>). The emphasis in all these areas is international research collaboration, encouraged and facilitated by and through ICSU.

There was an interesting talk on "Visioning Sustainability Research", a new programme with a life span of 10 years and a 'sunset clause.' The goal is to select and work on key questions which are part of 'a holistic strategy for sustainability research' – see <http://www.icsu-visioning.org>. There is to be a UN Conference at Head of State/Government level in 2012 (20 years on from the famous Rio meeting) on "Sustainable Development." ICSU has been invited to provide scientific input, and will attend the meeting – the scientific unions will be essential in formulating this advice. There will be developments in this during 2010 and 2011.

The implementation of the earlier ICSU Strategic Plan (2006-2011) is proceeding on schedule, although there is still work to be done. One of the key areas in this Plan was Data Information and Management, to which IAU made several major contributions to policy development, and there are IAU nominees on the key committees and steering groups. This new structure is now functioning as

intended and moving towards a genuine World Data Centre of integrated data sets in which there is universal access to quality assured data in many fields.

ICSU finances are in good shape and dues are being paid on time. Note that the National Members contribute > 90% of the annual income of ~2m EUR, and the Unions only ~8%.

The ICSU web site is being redesigned to make it more modern and effective as a tool for communication to, with and from the members. The people responsible for the development have looked at all the Unions' web pages: they singled out the IYA2009 site for special praise.

The Committee of Freedom and Responsibility in Science (CFRS) is regarded as a great success. It now has an ambitious agenda of future tasks, and Switzerland has offered 0.5 FTE support to a CFRS bureau. There is to be a 2nd World Conference on Research Integrity in Singapore in July 2010 – see <https://www.wcri2010.org/index.asp>.

The International Union of Pure and Applied Chemistry (IUPAC) has a UN-endorsed International Year of Chemistry 2011. Their planning is heavily influenced by IYA2009 (which they happily admit), and the objectives are very similar. So is the role of UNESCO. See <http://www.chemistry2011.org>. They are looking for substantial industrial sponsorship.

Ian Corbett
IAU GS

11.3 KAVLI

The IAU was represented by Karel van der Hucht at the reception in the Norwegian Embassy in Brussels on the occasion of the meeting of the Kavli Prize Committee in Astrophysics to select the 2010 laureate.

The laureates (Roger Angel, Jerry Nelson and Ray Wilson) were officially announced on 3 June and will awarded their prizes in Oslo on 6-8 September.

11.4 SGAC

The Space Generation Advisory Council of the United Nations has published a Strategic Plan for 2010. This, the Annual Report for 2009 and other material is available on <http://www.spacegeneration.org>.

12. Deceased Members

The Union is saddened to learn that the following members and former members passed away, as has been reported to the IAU Secretariat:

Kurt **BIRKLE** (1939 - 2010), Germany, 1 January 2010
Sukumar **BISWAS** (1924 - 2010), India, 16 November 2009
Geoffrey Ronald **BURBIDGE** (1925 - 2010), United States, 26 January 2010
David **BURSTEIN** (1948 - 2009), United States, 26 December 2009
Julius H. **CAHN** (1919 - 2009), United States, 29 July 2009
Zdenek **CEPLECHA,** (1931 - 2009), Czech Republic, 4 December 2009
John **DAVIS** (1932 - 2010), Australia, 15 January 2010
John **DYSON** (1941 - 2010), United Kingdom, 3 February 2010
Sydney C.B. **GASCOIGNE** (1915 - 2010), Australia, 24 March 2010
Chushiro **HAYASHI** (1922 - 2010), Japan, 28 February 2010
Alfez Sh. **KHATISASHVILI** (1934 - 2008), Georgia, 2009
Tsiala S., **KHETSURIANI** (1931 - 2009), Georgia, 4 October 2009
R.I. **KILADZE** (1931 - 2009), Georgia, 22 February 2010
Mukul **KUNDU** (1930 - 2010), United States, 16 June, 2010
Martin F. **McCARTHY, S.J.** (1923 - 2010), USA, 13 February 2010
Christopher **MOSS**, (1946 - 2010), United Kingdom, 12 May 2010
S.E. **OKOYE** (1939 - 2009), Nigeria, 18 November 2009
Kenneth H. **OLSEN** (1930 - 2010)**,** United States, 15 February 2010
Evry Léon **SCHATZMAN** (1919 - 2010), France, 25 April 2010
Lothar **STANGE** (1926 - 2010), Germany, 16 January 2010
Klaus Guenter **STEINERT** (1928 - 2009), Germany, 4 November 2009
Douglas W. N. **STIBBS** (1919 - 2010), United Kingdom, 12 April 2010
Gérard **WLÉRIC** (1922 - 2010), France, 28 January 2010

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INTERNATIONAL ASTRONOMICAL UNION
UNION ASTRONOMIQUE INTERNATIONALE

The International Astronomical Union (IAU) was founded in 1919 to promote and safeguard the science of astronomy in all its aspects through international cooperation. Operating through its scientific bodies - 12 Divisions, 40 Commissions and some 75 Working and Program Groups, the IAU covers the whole spectrum of astronomy. The IAU currently has almost 10,000 individual members distributed over 87 countries. Of those, 63 countries are National Members. The IAU is member of the International Council for Science (ICSU).

The organization of scientific meetings is the IAU's key activity. Every year, the IAU sponsors nine international Symposia. The IAU Symposium Proceedings series is the flagship of the IAU publications. Every three years, the IAU holds its General Assembly. Six of the IAU Symposia of that year are incorporated in the scientific programme of the GA. Each General Assembly further offers some 25 Joint Discussions and Special Sessions, the proceedings of which are published in the Highlights of Astronomy series. The reports of the GA Business Meetings are published in the Transactions of the IAU - B series. All IAU proceedings are published by Cambridge University Press.

Among the other tasks of the IAU are the definition of fundamental astronomical and physical constants; unambiguous astronomical nomenclature; promotion of educational activities in astronomy; and early informal discussions on the possibilities for future international large-scale facilities. Furthermore, the IAU is the sole internationally recognized authority for assigning designations and names to celestial bodies and their surface features.

The IAU works to promote astronomical education and research in developing countries through its Program Groups on International Schools for Young Astronomers (ISYA), on Teaching for Astronomy Development (TAD), and on World Wide Development of Astronomy (WWDA), as well as through joint educational activities with COSPAR and UNESCO.

The IAU web site provides on-line information on the Union's activities and links to the web sites of the IAU Divisions, Commissions, Working Groups, and Program Groups. Contact with the IAU membership is maintained through this Information Bulletin, published twice per year, with a paper version as well as an e-version, available via the IAU web site.

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Cover picture:
Closing Ceremony of the International Year of Astronomy IYA2009, held 9-10 January, 2010, in the Aula Magna of the Unversity of Padua, where Galileo taught experimental physics and astronomy.
Photograph: Lee Pullen

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