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 差出人 maeda@serc.kyushu-u.ac.jp

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*           I S W I = International Space Weather Initiative      *
*                   (www.iswi-secretariat.org)                    *
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Attachment(s):

(1) "IAU Report IB 108", 1.8 MB pdf, 93 pages.

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:                               Re:
:                               IAU Report
:                               with a reference to ISWI
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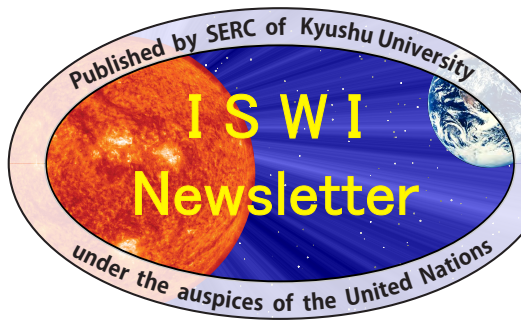
Dear ISWI Participant:

I attach for your reference an IAU report that has just come out.  
 There is a short report on ISWI in it (pages 77 and 78).

For more info on the activities of IAU Commission 46 see  
 <<http://www.iaucomm46.org/content/united-nations-basic-space-science-initiative-unbssi-1991-2012>>

Eternally faithfully yours,

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:      George Maeda
:      The Editor
:      ISWI Newsletter
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Volume 3, Number 71,  
on 18 July 2011.

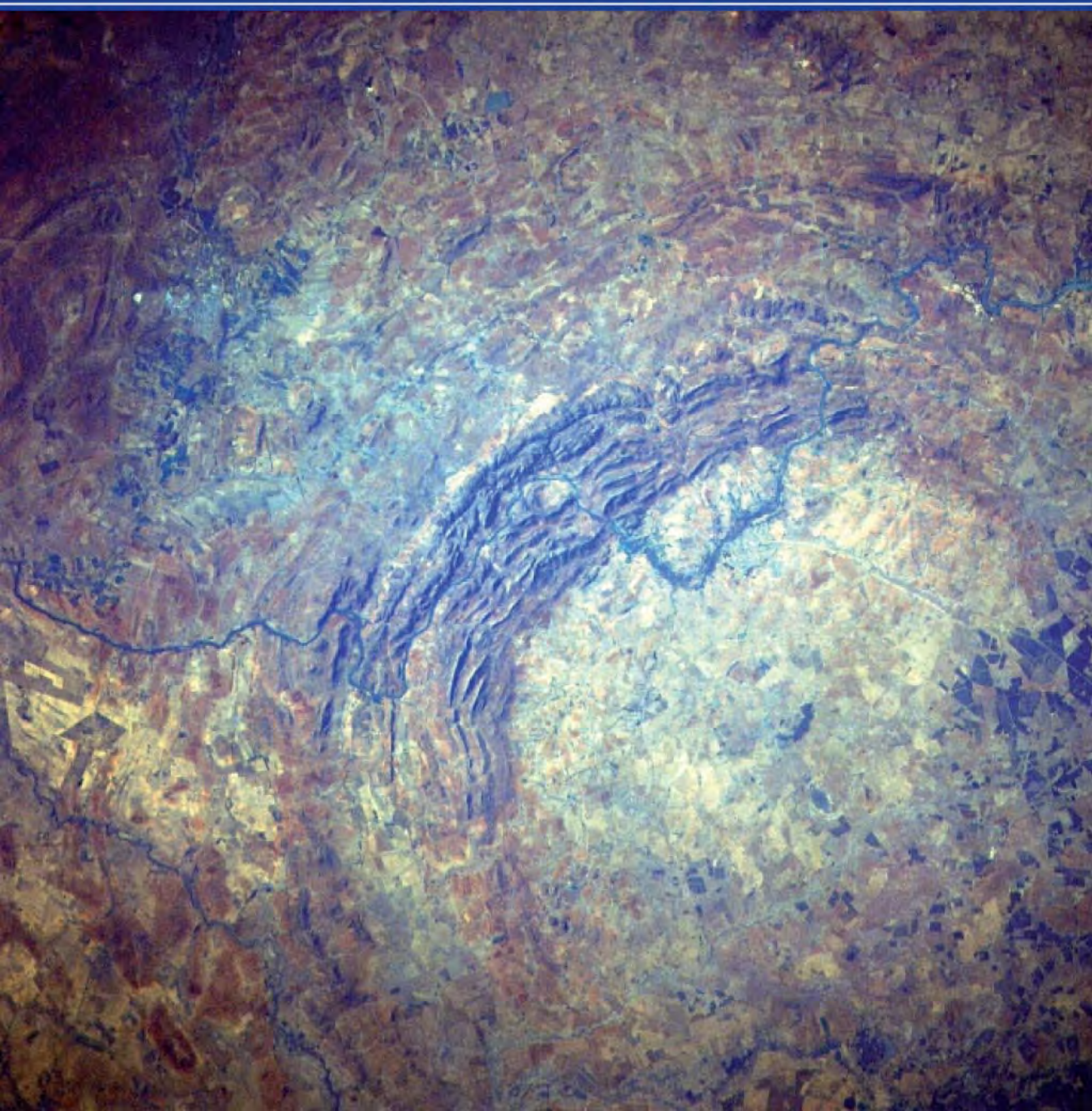
THIS IS A COVER SHEET FOR THE ATTACHED DOCUMENT  
(has numbered pages from i to 82)

Please see pages 77 and 78  
for a report on ISWI  
by Dr. David Webb.

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INFORMATION BULLETIN JULY 2011





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## Preface

A great deal has happened since the last IAU Information Bulletin, in the world at large as in the world of astronomy. Developments in astronomy are reflected in our IAU Symposia, and once again we have an exciting scientific programme for the 2012 General Assembly, to be held in Beijing from 20<sup>th</sup> to 31<sup>st</sup> August in the spectacular Chinese National Convention Center (CNCC).

It was quite a challenge for the Executive Committee, with the active assistance of the Division Presidents, to select the final programme from the 57 proposals we received. After very detailed discussion we decided that, quite exceptionally, we should increase the number of Symposia at the General Assembly to 8, to reflect the quality of the proposals we received. These will be complemented by a total of 18 Special Sessions and 7 Joint Discussions. These are all listed in this Bulletin, and full details will shortly be posted on both the IAU and General Assembly web sites, and will be included in the next Bulletin, IB 109, which will appear in January 2012. This extensive GA programme is only possible because of the exceptional facilities offered by the CNCC in Beijing.

As a direct consequence of the selection of 8 Symposia for the GA, only one 2012 IAU Symposium will take place outside the GA – that will be in South Africa at the end of January. However, IAUS 279, scheduled for April 2011, will now take place in March 2012, understandably postponed in the aftermath of the dreadful tsunami of March 2011.

Our Chinese colleagues have planning for the GA itself well in hand, with a new web site nearing completion and registrations starting on 1 September. Determined efforts have been made to keep the registration fee as low as possible and, as usual, early registrations will benefit from a significant reduction. Beijing and the nearby region are replete with well known tourist attractions, and we hope that attendees and accompanying persons will be able to make the most of this unique opportunity.

The other major development was the official inauguration on 16<sup>th</sup> April of the new Global Office of Astronomy for Development (OAD) in Cape Town by the South African Minister of Science and Technology. In a very supportive speech she said that people “*share the vision that astronomy will play a significant role in the development of society*,” exactly the theme of the IAU Strategic Plan. Under its new Director the OAD is moving rapidly to establish its programme and will be holding a workshop for stakeholders in December 2011.

The present Divisional structure has served us well since it was established in 1994, but nothing stands still and astronomy has changed substantially in the intervening years. We have therefore been looking at a possible reorganisation of our Divisional structure, and a Task Group has been set up to consult widely

and report on options well before the deadlines for submission of a Resolution to the General Assembly.

Finally, I offer my sincere apologies to everyone who has been waiting patiently for the Proceedings of IAUS 260, "The Role of Astronomy in Society and Culture," and particularly to those who contributed their manuscripts. This symposium took place in January 2009, at the start of IYA 2009, and the Proceedings have only just appeared, nearly 2 years late. This extraordinary delay was caused by a series of editorial issues the like of which I have never seen before and which required several direct interventions by the IAU to resolve. I would like to express my thanks to everyone whose hard work made final publication possible, and I would particularly thank Neil Hammond and colleagues at Cambridge University Press for their patience and tenacity, without which this volume might never have seen the light of day.

Once again it is my pleasure to thank my colleagues on the Executive Committee, the Division Presidents, 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 2011*



## EVENTS AND DEADLINES

**2011**

4-8 July	<b>IAU S281</b>	<b><i>Binary Paths to the Explosions of type Ia Supernovae</i></b> , Padova, Italy
18-22 July	<b>IAU S282</b>	<b><i>From Interacting Binaries to Exoplanets: Essential Modeling Tools</i></b> <i>Tatranska Lomnica, Slovak Republic</i>
25-29 July	<b>IAU S283</b>	<b><i>Planetary Nebulae: an Eye to the Future</i></b> <i>Puerto de la Cruz, Tenerife, Spain</i>
26-29 July	<b>XI Asian-Pacific Regional IAU Meeting (APRIM 2011)</b> <i>Chiang Mai, Thailand</i>	
5-9 Sept	<b>IAU S284</b>	<b><i>The spectral energy distribution of galaxies (SED2011)</i></b> , Preston, UK
15 Sept	Deadline for Letters of Intent for Symposia in 2013	
19-23 Sept	<b>IAU S285</b>	<b><i>New Horizons in Time Domain Astronomy</i></b> <i>Oxford, UK</i>
3-7 Oct	<b>IAU S286</b>	<b><i>Comparative magnetic minima: characterizing quiet times in the Sun and stars</i></b> <i>Mendoza, Argentina</i>
1 Nov	Deadline for submitting Letter of Intent to host the XXX <sup>th</sup> GA in 2018	
1 Nov	Deadline for items for consideration at OM 2012	
1 Nov	Deadline for contributions to IB 109	
26 Nov	Deadline for submitting financial Resolution or motions to amend Statutes or Bye-Laws to General Secretary	
30 Nov	Due date for applications for the Gruber Foundation Fellowships 2012	
1 Dec	Deadline for Proposals for Symposia in 2013	
15 Dec	Deadline for nominations for the Gruber Foundation Cosmology Prize 2012	

**2012**

21 Jan – 3 Feb	<b>IAUS 287</b>	<b><i>Cosmic masers - from OH to Ho</i></b> <i>Stellenbosch, South Africa</i>
23-25 Jan	Officer's Meeting (OM2012) in Paris	
19 Feb	Deadline for motions to change Statutes and Bye-Laws at GA2012	
28 Feb	Deadline for motions with administrative implications for GA2012	

12-16 March	<b>IAU S279</b>	<b><i>Death of Massive Stars: Supernovae and Gamma-Ray Bursts, Nikko, Japan</i></b> <i>(Postponed from 18-22 April, 2011, because of the tsunami)</i>
1 April		Deadline for Proposals to host the XXX <sup>th</sup> GA in 2018
17-19 April		Executive Committee Meeting EC 90 in Paris
28 May		Deadline for submission of Resolutions with no financial implications for GA2012
20-31 Aug	<b>IAU XXVIII<sup>th</sup> General Assembly</b>	<i>Beijing, China</i>
1 Sept		Deadline for Letters of Intent for 2014 Symposia
1 Dec		Deadline for submission of proposals for 2014 Symposia
<b>2015</b>		
3-14 Aug	<b>IAU XXIX<sup>th</sup> General Assembly</b>	<i>Honolulu, Hawai'i, USA</i>

## 1. Global Office of Astronomy for Development

### 1.1 Inauguration of the Global Office

The South African Minister of Science & Technology, Mrs Naledi Pandor, launched the IAU Global Office of Astronomy for Development at the headquarters of the South African Astronomical Observatory on 16 April 2011.

The Global Office of Astronomy for Development (OAD) is a partnership between the IAU and the South African National Research Foundation to coordinate a wide range of worldwide activities designed to use astronomy as a tool for education and development. This is part of the realisation of a visionary decadal plan by the IAU entitled "Astronomy for the Developing World." This plan aims to use astronomy to stimulate development at all levels including primary, secondary and tertiary education, science research and the public understanding of science, building on the success of the International Year of Astronomy 2009. In a strong partnership between the IAU and the South African government, the OAD began its work on 1<sup>st</sup> March 2011.

According to Minister Pandor, *"In South Africa, people in the astronomy field, from those working on the ground to the highest levels of government, share the vision that astronomy will play a significant role in the development of society."*

The President of the IAU, Professor Robert Williams, who also spoke at the launch, said: *"Astronomy has incredible potential to impact on the developmental aspirations of Africa and the rest of the world. It is appropriate that this global coordinating office be situated in Sub-Saharan Africa as this is a focus region for the IAU's strategic plan."*

This event took place immediately following the second IAU regional meeting for the Middle East and Africa (MEARIM II), which brought together astronomers and astronomy students from this vast region. Many of these conference participants were present at the launch.

Pheneas Nkundabakura, a young astronomer from Rwanda, said: *"This is a very important occasion for all of Africa, as it represents a project where the continent will take on a leadership role in coordinating a global development activity. South Africa has demonstrated its capacity to host this office on behalf of Africa, through the training of astronomers like myself and in supporting astronomy development across the continent."*

Kevin Govender, the first Director of the OAD, expanded on this: *"Although Africa will remain a region of strong focus, which is in accordance with the IAU strategic plan, the OAD actually has a global role to play, and lessons from*

*developments in Africa and other parts of the world will be used to impact on every part of the world. I look forward to interacting with the broader astronomy community, both amateur and professional, to see how we can together realise the incredible potential of astronomy for development.”*

The OAD will mobilise talented professional and amateur astronomers, engineers and teachers around the world in the service of developing countries. The wide range of activities that will be coordinated by the OAD include the education of young disadvantaged children, science education at all levels, the training of school teachers and building up research capacity in university departments throughout the developing world.

## **1.2 First Meeting of the Steering Committee, 16<sup>th</sup> - 17<sup>th</sup> April 2011 at the SAAO, Cape Town**

The IAU EC and the South African NRF appointed a Steering Committee (SC) to provide oversight of the OAD. This SC presently consists of Megan Donoghue, George Miley (*Chair*) and Kaz Sekiguchi (IAU), and Claude Carignan, Khotso Mokhele (*Vice Chair*) and Patricia Whitelock (NRF).

All members of the Steering Committee except Megan Donahoe were present, and Phil Charles (Director SAAO), Ian Corbett and Kevin Govender (Director OAD) were invited as advisers.

The name of the office was originally Global Astronomy for Development Office (GADO) in the IAU Strategic Plan, but after input from several parties it is now, and into the future, to be referred to as the Global Office of Astronomy for Development (OAD).

The Director reported on general progress in setting up the Office and plans for staff recruitment, which were well received. The OAD will have its own domain names:

<[www.astro4dev.org](http://www.astro4dev.org)> and <[www.astronomyfordevelopment.org](http://www.astronomyfordevelopment.org)>

It was agreed that it was important to hold a 'stakeholder' workshop in 2011, and that the OAD should consider having such a workshop every year, perhaps in parallel with other international meetings.

The aim of the workshop would be to seek input into the OAD planning, to obtain assistance with implementation strategy (regional nodes and task forces), and to form partnerships with stakeholders. It was agreed that attendance should be by invitation only.



There would be a strong OAD presence at the 2012 General Assembly, with a Special Session in the programme and a permanent display in an area where all attendees would see it.

The next SC meeting will be held at the stakeholder workshop in December 2011.

### **1.3 Message from the Director**

*by Kevin Govender*

#### ***Overview of activities***

The OAD officially began its work on 1<sup>st</sup> March 2011 when I assumed the position of Director. The official launch took place in Cape Town on 16<sup>th</sup> April 2011 and was attended by several dignitaries including the South African Minister of Science and Technology Mrs Naledi Pandor. The first three months of the OAD have been dominated by logistics regarding the premises; reviewing the history of IAU activities; drawing up an implementation strategy and budget for the OAD; communicating with and meeting several potential partners and stakeholders; the launch of the OAD and steering committee meeting; developing the OAD website; and appointing other OAD staff. After an intensive selection process, Nuhaah Solomon was appointed in early June as the second staff member of the OAD. At the time of writing this, the search is still underway for the third full time staff member. We also have an open call for volunteers, as well as a call for expressions of interest to host regional nodes, on the OAD website.

#### ***Appeal for partners***

The OAD represents a significant milestone in the history of the IAU. It is a point of recognition and acknowledgement of the significant impact that the astronomy field can, should, and does have on society as a whole. The IAU has chosen to take this action of establishing the OAD to realise the tangible benefits of our field to humankind and the developing world in particular – the essence of its decadal strategic plan.

The vision of the OAD is simple: Astronomy for a better world! I appeal to every individual in the astronomy and related communities to partner with us in order to realise this vision and make the world a better place. We will target three areas for development: (i) university education and research; (ii) young children and school education; and (iii) public outreach. Why these areas? Education is probably the most sustainable form of development; and in the current state of the planet, the development of the human mind is at the root of ensuring a better world for all. Astronomy provides the fertile soil upon which to grow scientific method and rational thought. Its presence and influence in just about every culture

around the world places it in a unique position to be used as a tool for positive impact on the development of our world.

Our most important, immediate tasks at the OAD are twofold: (i) to set up regional nodes – organisations and individuals who will champion efforts in their regions; and (ii) to set up sector task forces which will operate globally in each of the three targeted areas of development. Such structures are essential as we recognise that one central office cannot possibly have the reach or the expertise required to achieve the vision. We need the people on board who know the local situations. We need the skills on board to deliver the astronomical content in a meaningful way. The OAD will facilitate and coordinate activities, striving to find the funding and resources that will feed these skills and realise the vision.

The process of setting up these structures is currently underway and we encourage you to visit the OAD website to register your interest in becoming a partner, either as an individual or an organisation. We also encourage you to join the OAD mailing list to stay informed and, if you are able, volunteer some of your skills towards the activities of the OAD. Everything you need to become involved is on the OAD website <[www.astronomyfordevelopment.org](http://www.astronomyfordevelopment.org)>.

I would also like to invite your input and suggestions at any time. The OAD will be shaped by a spirit that keeps it dynamic, transparent and humble – always welcoming input from its stakeholders. If you have an idea that uses astronomy for development, the OAD is here to help you make it happen!

## **2. IAU EXECUTIVE COMMITTEE**

### **2.1 Officers' Meeting 2011 – Paris, 24<sup>th</sup> – 26<sup>th</sup> January 2011**

The meeting took place in the IAU Secretariat in Paris. All the Officers were present. The main items discussed were:

- progress in re-establishing the Executive Committee Working Group on Future Large Scale Facilities, which Roger Davies (Oxford) has agreed to chair;
- the evolving situation with the Minor Planet Center and the Central Bureau for Astronomical Telegrams, which has migrated from the Smithsonian to Harvard/EPH <[www.cbat.eps.harvard.edu/index.html](http://www.cbat.eps.harvard.edu/index.html)>;
- the possible implementation and use of electronic voting;
- progress in establishing the Cape Town OAD and appointing the Director;

- the Commission 46 programme and funding for 2011, and its relationship with the OAD;
- the current Division and Commission structure;
- IAU scientific meetings and publications;
- the financial situation and the IAU investment strategy;
- membership issues;
- preparations for GA 2012 in Beijing (including a telecon with the local organisers).

Most of these items were discussed in preparation for the Executive Committee meeting EC 89, Prague, 24-26 May 2011, where they were discussed at greater length, as reported in the account of EC89.

## 2.2 Report on EC89

The meeting took place in Prague, 24-26 May 2011, at the invitation of Vice-President Jan Palouš. The Executive Committee was joined by the Division Presidents, or their representatives, for much of the business.

The principal items for discussion were the scientific programme for 2012, and specifically the programme for the 28<sup>th</sup> General Assembly in Beijing, preparations for the General Assembly, and a possible revision to the Division structure of the IAU.

The scientific programme for 2012 is covered elsewhere in this Bulletin. The EC is grateful to the Division Presidents for their hard work in selecting interesting and wide ranging sessions for the General Assembly from an abundance of excellent proposals. Note that, quite exceptionally, there will be 8 IAU Symposia at the GA as well as the usual programme of Joint Discussions, Special Sessions and Invited Discourse. This is possible because of the magnificent venue, the Chinese National Convention Centre <[www.cniecchina.com](http://www.cniecchina.com)>, selected by the Chinese Astronomical Society.

A videoconference with the Local Organising Committee confirmed that preparations are well advanced, with a web site now up and running at <[www.astronomy2012.org](http://www.astronomy2012.org)>. Early registration will open on 1 September 2011. Further details will be publicised on the IAU web site as they become available.

There was an extended discussion of possible revision of the Divisions and, following that, of the Commissions and Working Groups. It was decided to set up a "Task Group" comprising Thierry Montmerle (Chair), Martha Haynes, Norio Kaifu, and Giancarlo Setti from the EC, with Division Presidents Chris Corbally – D IV, Russ Taylor – D X, Christine Jones – D XI, and Françoise Genova – D XII. This group will report

before the end of the year; extensive consultation will take place through the existing structure. If changes are recommended, they will be publicised in February 2012 and put to the 2012 General Assembly for approval.

The EC were given an online demonstration of a proprietary electronic voting system. The Division Presidents agreed that it could be very useful to both Divisions and Commissions, but the EC did not reach a consensus on how it might be used at or for General Assemblies and agreed to study the issues further.

Vice-President George Miley gave a report on progress with the OAD, now established at the South African Astronomical Observatory under its Director Kevin Govender. The EC confirmed the membership and Terms of Reference of the recently re-established EC Working Group on Future Large Scale Facilities, which will, amongst other tasks, organise a Special Session at the Beijing GA.

See <[www.iau.org/science/scientific\\_bodies/working\\_groups/120/](http://www.iau.org/science/scientific_bodies/working_groups/120/)>

While most of the meeting was given over to these major topics, the EC approved the accounts for 2010 and the outline budget for 2011. It reviewed the situation of the National Members' dues and the suggestions made by the Nominating Sub-Committee to modify the Nominating and Finance Committee procedures (these will be put to the National Members), collaboration with UNESCO, and dealt with other matters of routine business.

### 2.3 EC90

EC 90 is scheduled for 17-19 April, 2012 at the IAU Secretariat in Paris, France.

## 3. IAU GENERAL ASSEMBLIES

### 3.1 XXVIII<sup>th</sup> IAU GA, 20-31 August 2012, Beijing, China

*Progress Report from the LOC*

In August of 2006 at the 26<sup>th</sup> IAU General Assembly, the Chinese Astronomical Society won the bid for China to host its first IAU General Assembly. From 20 to 31 August 2012, over 3,000 astronomers from around the world are expected to gather in Beijing, to exchange the latest reports on progress in all fields of astronomy and to discuss the future development of astronomy worldwide. This is a major event in the history of Chinese astronomy, and it is the first time to host such an important event since the establishment of the Chinese Astronomical Society. It will have a profound impact on the development of Chinese astronomy, and promote and expand the international exchanges. Within the



five intervening years, from winning the bid to staging the event, this will be with top priority for the Chinese Astronomical Society and the whole astronomical community in China.

Till now, the local organising committee has made enormous efforts in planning and preparing for the General Assembly. This report will outline all important progress as of June 2011.

### ***Communication and collaboration with the IAU***

In April of 2005, an IAU EC delegation visited Beijing for investigation and to hold thorough consultations with the Chinese Astronomical Society concerning details about the 2012 IAU GA. The two sides formally signed the agreement to hold the 28<sup>th</sup> General Assembly in Beijing in 2012.

In April 2009, IAU General Secretary Ian Corbett visited Beijing and attended the Commemoration Assembly for the International Year of Astronomy 2009 jointly hosted by China Association for Science and Technology (CAST) and the Chinese Academy of Sciences (CAS), and gave a plenary speech at the assembly. After the assembly, Dr. Corbett investigated the conference venue for the 2012 IAU GA: the China National Convention Center (CNCC).

In October 2009, the IAU EC delegation visited the CNCC, investigated in detail, and discussed with the Chinese Astronomical Society and the National Astronomical Observatories about the progresses and plans of preparations for the General Assembly.

In May of 2011, a video meeting was held between the IAU EC and the LOC during the IAU EC 89 meeting. Based on the LOC presentation about the preparation of the 2012 IAU GA, detailed discussions have been carried out for a number of key issues as well as next steps for future planning.

### ***Advising and organising teams***

In 2010, the National Organising Committee and the Local Organising Committee were officially formed, and the Professional Conference Organiser was selected.

#### ***National Organising Committee (NOC):***

CHEN, Li (Beijing Normal University); CUI, Xiangqun (Co-Chair, Nanjing Institute of Astronomical Optics and Technology, NAOC); DAI, Zigao (Nanjing University); DING, Mingde (Nanjing University); DONG, Guoxuan (National Natural Science Foundation of China); FAN, Junhui (Guangzhou University); HAN, Jinlin (National Astronomical Observatories, Chinese Academy of Sciences); HAN, Zhanwen (Yunnan Astronomical Observatory, NAOC); HAO, Jinxin (NAOC - National Astronomical Observatories, Chinese Academy of Sciences); HONG, Xiaoyu (Shanghai Observatory, Chinese Academy of Sciences).

ces ); GAN, Weiqun (Purple Mountain Observatory, Chinese Academy of Sciences); GUO, Ji (National Time Service Center, NAOC); JI, Peiwen (National Natural Science Foundation of China); LI, Xiangdong (Nanjing University); LI, Yan (Yunnan Astronomical Observatory, NAOC); LIAO, Xinhao (Shanghai Observatory, Chinese Academy of Sciences); LU, Chunlin (Purple Mountain Observatory, Chinese Academy of Sciences); LU, Jufu (Xiamen University); SUN, Xiaochun (The Institute of the History of Natural Science, Chinese Academy of Sciences); WANG, Na (Urumqi Observatory, NAOC); WU, Xuebing (Peking University); YAN, Jun (NAOC); YAN, Yihua (NAOC); YANG, Ji (Purple Mountain Observatory, Chinese Academy of Sciences); YUAN, Yefei (University of Science and Technology of China); ZHANG, Shuangnan (Institute of High Energy Physics, Chinese Academy of Sciences); ZHAO, Gang (Co-Chair, NAOC); ZHAO, Yongheng (NAOC); ZHENG, Xiaonian (NAOC); ZHU, Jin (Beijing Planetarium); ZHU, Yongtian (Nanjing Institute of Astronomical Optics and Technology, NAOC); ZHU, Zonghong (Beijing Normal University)

*Local Organising Committee (LOC):*

YAN, Jun (Co-Chair); ZHAO, Gang (Co-Chair); CUI, Chenzhou; GAO, Frankie; HEI, Qili; LI, Haining; LIANG, Yanchun; LIU, Nancy; LIU, Yujuan; LU, Ye; PODT, Michael; RHEINDORF, Richard; WAN, Haoyi; WANG, Junjie; XU, Ang; XUE, Suijian; YANG, Deteng; YUN, Xiaoshan; ZHANG, Isabella; ZHAO, Bing; ZHU, Jin

*Professional Conference Organiser (PCO):*

After competitive bidding and negotiation, in January of 2010, the MCI Group was finally selected as the PCO for the 2012 IAU GA. More details of MCI can be found at <[www.mci-group.com/](http://www.mci-group.com/)>.

***Venue and CNCC***

One of the major challenging experienced in the last months, has been the negotiation with the CNCC, venue of the General Assembly in 2012.

While an official memorandum of understanding had been signed, the venue had launched negotiations with different scientific organisation, i.e., the 23<sup>rd</sup> International Congress of Theoretical and Applied Mechanics (ICTAM) for identical dates. The Organising Committee has put much effort into meeting and with all parties involved. While the matter is not fully closed and firm contracts need to be signed as soon as possible, the organising committee has now received an official proposal from the CNCC and is advancing in negotiating final costs and conditions.

Early 2011, the IAU EC provided the LOC a letter indicating our attitude towards altering the date and venue of 2012 IAU GA to the local organiser of

ICTAM, the Chinese Society of the Theoretical and Applied Mechanics, insisting that the 2012 IAU GA shall not be affected by other conferences.

Both MCI and LOC have spent a lot of time and spirit on settling the venue and negotiations with the CNCC. With confirmation of conference room quotes from the IAU, the LOC has officially signed the contract with CNCC in June 2011.

### ***Registration***

The registration system for the 2012 IAU GA will officially open on 1 September 2011, with the early registration to be closed by 31 January 2012.

Based on the LOC budget and the charge for a copy of the Proceedings of one Symposium or Highlights, the early registration fee will be 4220 CNY (3800 registration plus 420 Proceedings); while the normal registration fee will be 4556 CNY (4000 registration plus 556 Proceedings).

Early registrants can optionally buy additional copies of the Proceedings of a Symposium at the concessionary price of 315 CNY and normal registrants at 420 CNY if they order at time of registration.

The registration fee for students and seniors does not include a copy of the Proceedings, but they will have the option to purchase a copy at either 420 or 556 CNY, depending on the time of registration.

### ***Webpage and publicity***

After several rounds of evaluation and revisions, the official website for the 2012 IAU GA is now open to the public at <[www.astronomy2012.org/](http://www.astronomy2012.org/)>.

In August 2009, at the 27<sup>th</sup> IAU General Assembly in Rio de Janeiro, through plenary talks at the assembly, posters, video, detailed explanations, souvenirs and many other forms of publicity, the Chinese Astronomical Society set up a special booth, introducing Chinese astronomy, traffic, accommodation and catering in Beijing, and informing the international astronomical community about the progress of preparations for the 2012 IAU GA. President of the Chinese Astronomical Society, Prof. Gang Zhao gave a speech at the closing ceremony, forwarding the sincere invitation to welcome astronomers from all the world to join the 28<sup>th</sup> IAU GA at Beijing in 2012.

A news release conference will be held on 18 July 2011 at CNCC, officially announcing the 2012 IAU GA to the media and the public.

### ***Other matters***

A project plan is being established with finalisation of deadlines and details, with all important dates indicated on the homepage.

Official letters requesting financial support have been submitted to the China Association for Science and Technology, Chinese Academy of Sciences and related funding agencies, and the LOC will try their best to make sure of the success of the 2012 IAU GA.

### 3.2 XXIX<sup>th</sup> IAU General Assembly, 2015

The IAU XXIX<sup>th</sup> GA will be held in *Honolulu*, Hawai'i, USA,  
2-14 August, 2015.

The AAS has reserved a website at <<http://astronomy2015.org>>

### 3.3 XXX<sup>th</sup> IAU General Assembly, 2018

Proposals to host the XXX<sup>th</sup> GA in 2018 must be submitted by  
1 April 2012.

## 4. IAU Divisions, Commissions, Working Groups, Committees & Services

### 4.1 Updates

IAU Bye-laws 21/24 stipulate: *“With the approval of the Executive Committee, a Division/Commission may appoint Working Groups to study well-defined scientific issues and report to the Division/Commission. Unless specifically re-appointed by the same procedure, such Working Groups cease to exist at the next following General Assembly.”*

EC89 has reviewed the IAU Working Groups and resolved that the following Working Groups are to be continued:

#### Commission Working Groups

<i>Name</i>	<i>Chair(s)</i>	<i>C</i>
TG on Asteroid Magnitudes	R.A. Gil-Hutton	C 15
TG on Asteroid Polarimetric Albedo Calibration	R.A. Gil-Hutton	C 15
TG on Cometary Magnitudes	Gonzalo Tancredi	C 15
TG on Preservation & Digitization of Photographic Plates	Elizabeth R. Griffin	C 5
Archives	Ileana Chinnici	C 41
Astronomical Data	Raymond P. Norris	C 5
Astronomy and World Heritage	Clive L.N. Ruggles	C 41
Atomic Data	Gillian Nave	C 14
Binary & Multiple System Nomenclature	William I. Hartkopf	C 26
CAP Conferences	Ian E. Robson	C 55
Catalog of Orbital Elements of Spectroscopic Binary Systems	Dimitri Pourbaix	C 30



Collision Processes	Milan S. Dimitrijevic	C 14
Communicating Astronomy Journal	Pedro Russo	C 55
Controlling Light Pollution	Richard J. Wainscoat	C 50
Densification of the Optical Reference Frame	Norbert Zacharias	C 8
Designations	Marion Schmitz	C 5
FITS	William D. Pence	C 5
Historic Radio Astronomy	K. I. Kellermann	C 41
Historical Instruments	Sara Jane Schechner	C 41
Infrared Astronomy	Eugene F. Milone	C 25
Johannes Kepler	Terence J. Mahoney	C 41
Libraries	Martha Bishop/ Robert J. Hanish	C 5
Molecular Data	Steven R. Federman	C 14
Physical Studies of Comets	Daniel Craig Boice	C 15
Physical Studies of Minor Planets	R.A. Gil-Hutton	C 15
Professional-Amateur Cooperation in Meteors	Galina O. Ryabova	C 22
Radial-Velocity Standard Stars	Stephane Udry	C 30
Solids & Their Surfaces	Gianfranco Vidali	C 14
Stellar Radial Velocity Bibliography	O. Hugo Levato	C 30
Transits of Venus	Hilmar W. Duerbeck	C 41
Virtual Observatories, Data Centers & Networks	Robert J. Hanisch	C 5
Washington Charter	Dennis Crabtree	C 55

### Division Working Groups

<i>Name</i>	<i>Chair(s)</i>	<i>D</i>
Abundances in Red Giants	John C Lattanzio	D IV
Astrochemistry	E. F. van Dishoeck	D VI
Astrometry by Small Ground-Based Telescopes	William Thuillot	D I
Astrophysically Important Spectral Lines	Masatoshi Ohishi	D X
Communicating Heliophysics	Carine Briand	D II
Comparative Solar Minima	Sarah Gibson	D II
Galactic Center	Joseph Lazio	D VII
Infrared Astronomy	Eugene F. Milone	D IX
Interference Mitigation	Willem A. Baan	D X
International Collaboration on Space Weather	David F. Webb	D II
International Solar Data Access	Robert D. Bentley	D II
Large Telescope Projects	( <i>vacant</i> )	D IX
Massive Stars	Joachim Puls	D IV
Near Earth Objects	Alan William Harris	D III
Numerical Standards in Fundamental Astronomy	Brian J. Luzum	D I

Planetary Nebulae	Arturo T. Manchado	D VI
Planetary System Nomenclature (WGPSN)	Rita M. Schulz	D III
Second Realization of International Celestial Reference Frame	Chopo Ma	D I
Site Testing Instruments	Andrei A. Tokovinin	D IX
Sky Surveys	Quentin A. Parker	D IX
Small Bodies Nomenclature (SBN)	Jana Tichá	D III
Solar Eclipses	Jay M. Pasachoff	D II
Supernovae	Avishay Gal-Yam	D VIII

### Inter-Division Working Groups

<i>Name</i>	<i>Chair(s)</i>	<i>Ds</i>
Active B Stars	Geraldine J. Peters	D IV, D V
Ap & Related Stars	Gautier Mathys	D IV, D V
Astronomy from the Moon	Heino D. Falcke	D IX, D X, D XI
Cartographic Coordinates & Rotational Elements	P. Kenneth Seidelmann	D I, D III
Encouraging the International Deve- lopment of Antarctic Astronomy	Michael G. Burton	D IX, D X
Historic Radio Astronomy	Kenneth I. Kellermann	D X, D XII
Natural Satellites	Jean-Eudes Arlot	D I, D III

### Executive Committee Working Groups

Future Large Scale Facilities	Roger L. Davies
IAU General Assemblies	Daniela Lazzaro
Women in Astronomy	Sarah T. Maddison

The following Working Groups are to be considered for renewal subject to further review:

- Adaptive Optics
- Particle Astrophysics
- New Media / Virtual Astronomy Multimedia Project

Two Working Groups will be terminated:

- Small Telescope Projects
- Global VLBI

## 4.2 Future Large Scale Facilities WG – FLSF

Some 10 years ago, the IAU Executive Committee created a Working Group on Future Large Scale Facilities, but its activities have fallen somewhat into abeyance in the last few years. It has been decided to revive the group, and Roger Davies (Oxford) has agreed to chair it. The membership is:

R. Davies (Chair) – Oxford University, UK  
 I. Corbett – IAU General Secretary, France/UK  
 R. Ekers – CSIRO, Australia  
 N. Gehrels – NASA/GSFC, USA  
 R. Green – NAOA, USA  
 M. Iye – NAOJ, Japan  
 R. Kraan-Korteweg – University of Cape Town, South Africa  
 M. T. Ruiz – University of Chile, Chile  
 L. Tacconi – MPE, Germany  
 M. Tarenghi – ESO, Chile/Germany  
 C. Wilson – McMaster University, Canada  
 G. Zhao – NAOC, China Nanjing.

The revised Terms of Reference agreed at EC89 are:

- To review the status of current planned or proposed large scale ground based and space projects in astronomy;
- In doing so, to encourage contacts and cooperation between projects.
- To report on progress against 1. above to the Executive Committee meeting EC90 in April 2012;
- To organise a Special Session at the 2012 IAU GA to hear presentations on selected projects and to develop a strategic overview of planned and required investment in large scale facilities;
- To consider what further work might be undertaken by the Working Group, and present a proposal to the meeting of the new Executive Committee at the 2012 General Assembly.

## 4.3 Reports from Divisions

### Report from Division I - Fundamental Astronomy

*Submitted by Dennis D. McCarthy, President*

#### **Introduction**

Division I is composed of Commissions 4 (Ephemerides), 7 (Celestial Mechanics & Dynamical Astronomy), 8 (Astrometry), 19 (Rotation of the Earth), 31 (Time), 52 (Relativity in Fundamental Astronomy) along with Working Groups

on Numerical Standards in Fundamental Astronomy, Astrometry by Small Ground-Based Telescopes, Cartographic Coordinates & Rotational Elements, and Natural Satellites. The latter two working groups are joint efforts with Division III. The Standards of Fundamental Astronomy (SOFA) service is managed by an international panel, the SOFA Board, also appointed through IAU Division I. The goal of the Division is to address scientific issues related to fundamental astronomy. These were categorized at the 2009 IAU General Assembly in Rio de Janeiro as follows:

- Astronomical constants
  - Gaussian gravitational constant, Astronomical Unit,  $GM_{\text{Sun}}$ , geodesic precession-nutation
- Astronomical software
- Solar System Ephemerides
  - Pulsar research
  - Comparison of dynamical reference frames
- Future Optical Reference Frame
- Future Radio Reference Frame
- Exoplanets
  - Detection
  - Dynamics
- Predictions of Earth orientation
- "Units of measurements" for astronomical quantities in relativistic context
- "Astronomical units" in the relativistic framework
- Time-dependent ecliptic in the GCRS
- Asteroid masses
- Review of space missions
- Detection of gravitational waves
- VLBI on the Moon
- Real time electronic access to UT1-UTC

In pursuit of these goals, Division I members have made significant scientific and organisational progress.

### ***Science***

The *Journées 2010* meeting (<http://syrtte.obspm.fr/journees2010/>), organised by the Paris Observatory and co-sponsored by the IAU was held in September, 2010. Among the topics was new information on the latest fundamental solar system ephemerides from JPL (Pasadena), IMCCE (Paris), and IAA (St. Petersburg). Links to all three ephemerides can be found at the Commission 4 web site.

Commission 7 has proposed to organise a Symposium on the Three-Body Problem in 2012. It supports the AstDyS (The Asteroids Dynamics Site) web site which is proposed as a potential IAU Permanent Service should the organisation

nal proposal of Division I be accepted (see below). This web site provides data on numbered and multi-opposition asteroids, including orbital elements, ephemerides, and uncertainties. The orbits and other information are periodically recomputed if new observations are available, with the OrbFit free software.

The Proceedings of IAU Symposium 276, *The Astrophysics of Planetary Systems: Formation, Structure, and Dynamical Evolution* held in Torino, 11-15 October 2010, will be published by Cambridge University Press. Colleagues also participated in the Astronomical Data Analysis Software and Systems (ADASS) conference in Boston, 7-11 November 2010 which provided a forum for scientists and developers concerned with algorithms, software and software systems employed in the acquisition, reduction, analysis, and dissemination of astronomical data. The Joint GGOS/IAU Science Workshop "Observing and Understanding Earth Rotation" was organised in Shanghai, 25–28 October 2010, with about 60 international participants and Commission 19 is co-organising a special issue on Earth rotation in *Journal of Geodynamics*.

The proposal to eliminate "leap seconds" from Coordinated Universal Time (UTC) continues under discussion. Commission 31 members contributed to the discussion by the International Telecommunications Union Radiocommunications Section (ITU-R). Working Party 7A (Time Signals and Frequency Standard Emissions) of ITU-R met in Geneva, 5-11 October, 2010. During this meeting the possible revision of ITU-R Recommendation TF 460-6 to abolish leap seconds was discussed. Prior to this meeting, the IAU was requested to report on whether or not it supported this proposal. A poll of Commission 31 members especially requesting input from those opposed to the recommendation resulted in three opposing responses. Responses supporting the recommendation were also received. Based on this and other input from IAU members, the IAU submitted a document to the ITU-R supporting the proposed change. The proposed revision of Recommendation ITU-R.460-6 is to be sent to the Radio Assembly which will meet in Geneva in January 2012. A vote will take place during that meeting, and at least 70% of the votes are required for the approval. The IAU is a recognized international organisation in the ITU and is not a Member State. Only Member States have the right to vote.

The Standards of Fundamental Astronomy (SOFA) Center made available its 8<sup>th</sup> release of software. It includes 18 new routines in the Time Scales section of the Astronomy Library and three new routines in the Operations on Angles section of the Vector Matrix Library for both the Fortran 77 and ANSI C releases. A new cookbook, *Time Scale and Calendar Tools*, has also been made available in separate versions for Fortran and C users, with common text and appropriately tailored examples. Over 500 people have registered for e-mail updates. An article about SOFA, may be found at [www.scholarpedia.org/article/Standards\\_of\\_Fundamental\\_Astronomy](http://www.scholarpedia.org/article/Standards_of_Fundamental_Astronomy).

The Working Group (WG) on Numerical Standards for Fundamental Astronomy has expanded its web pages to document their ongoing efforts. A report on that work has been accepted for publication in *Celestial Mechanics and Dynamical Astronomy*. Members are drafting procedures for adopting new Current Best Estimates.

The WG on Natural Planetary Satellites continues to gather current as well as old observations not yet published for its data base. Ephemerides of planetary satellites are available at [www.imcce.fr/sat](http://www.imcce.fr/sat) (IMCCE) and [www.sai.msu.ru/neb/nss/index.htm](http://www.sai.msu.ru/neb/nss/index.htm) (SAI).

The WG on Astrometry by Small Ground Based Telescopes, which maintains a web site at [www.imcce.fr/astrom/astrom.html](http://www.imcce.fr/astrom/astrom.html), continues to update and maintain information on astrometric programmes and activities carried out by small telescopes and to facilitate the coordination of activities from ground-based telescopes. It is supporting the organisation of the Astrometry School and workshop "Astrometry now and in the future" September 5-9, 2011 in Antalya (Turkey) and several WG members will be lecturers. The meeting is also supported by TÜbitak National Observatory, Akdeniz University, TÜBITAK, Antalya Tecknokent, IMCCE-Paris Observatory, Nikolaev Astronomical Observatory, OPTICON programme, and Shanghai Astronomical Observatory. For further information, see: [www.tug.tubitak.gov.tr/aass/](http://www.tug.tubitak.gov.tr/aass/). The workshop will follow the school on September 12-13.

The WG on Cartographic Coordinates and Rotational Elements defines the rotational elements of the planets, satellites, dwarf planets, asteroids, and comets of the solar system on a systematic basis relating their cartographic coordinates rigorously to the rotational elements and body shapes. The WG's 2009 report was published in *Celestial Mechanics and Dynamical Astronomy* (CMDA) (Archinal *et al.*, **109**, 101 (2011), doi:10.1007/s10569-010-9320-4). The report and the WG's activities are also summarized in Archinal, LPS XLII, abstract 2362 (2011). The WG will submit errata for the 2006 and 2009 reports to CMDA, due to conversion errors in longitude definition made when changing to current standards for the bodies (243) Ida, Pluto, and Charon. It is also beginning preparation of the 2012 report.

The International Academy of Astronautics will hold its second conference on protecting the Earth from impacts by asteroids and comets from 9 to 12 May 2011 in Bucharest, Romania. The 1st IAA Planetary Defense Conference: Protecting Earth from Asteroids, co-sponsored by the European Space Agency and The Aerospace Corporation, is the follow-on to three previous planetary defense conferences held in 2004 in Los Angeles and 2007 in Washington, D.C., and in 2009 in Granada, Spain.

*Journées 2011: "Earth rotation, reference systems and celestial mechanics: Synergies of geodesy and astronomy"*, will be held September 19-21, 2011, in Vienna, Austria. Session titles are: Fundamental astronomy, time and relativity; Towards the next generation of space-time reference systems; Modeling, observation and prediction of Earth rotation and global geodynamics; Celestial mechanics of solar system bodies; and Space observations and dedicated missions for geodesy and astronomy. Commission 19 is proposing a Special Session on Earth Rotation for the IAU General Assembly in Beijing.

A joint meeting of the European Planetary Science Congress (EPSC) and the American Astronomical Society Division for Planetary Sciences – DPS will take place in Nantes, France, 3-7 October 2011.

Division I will organise a Joint Discussion on "Space-Time Reference Systems for Future Research" at the 2012 IAU General Assembly.

### ***Organisation***

All Division I Commissions have reviewed and updated their terms of reference and web sites.

A Working Group on Standardizing Access to Ephemerides was established within Commission 4. Its goal is to facilitate the use of ephemerides produced by various institutions. Its terms of reference are: to evaluate various ephemeris formats; to define a standard format; to recommend software to read the standard format; and to make a recommendation on whether the software might come within the purview of SOFA (if the SOFA Board also agrees). The discussions within the working group have already converged toward the SPICE format developed at JPL. Commission 4 also officially supported a group organised under the auspices of the International Space Science Institute (ISSI, at <[www.issibern.ch/](http://www.issibern.ch/)>) to look into the issue of obtaining spacecraft navigation data for use in ephemeris computations on a more timely basis.

Commission 19 updated its membership rolls, removing retired and inactive members and identifying candidates active in the field who might be interested in participating in commission activities, particularly young colleagues at the post-doctoral level.

The Division Organising Committee strongly supports the proposed co-affiliation of Commission 7 with the current IAU Division III or its possible successor Division.

The subcommittee on Division I structure discussed the possible creation of Working Groups on Extrasolar Planets and Near-Earth Objects. As there is a proposal currently in circulation regarding possible changes in divisional structure that includes the formation of a Commission on Extrasolar Planets and

since it appears that this will be discussed at length in the near future the sub-committee made no recommendations pending the outcome of the IAU Executive Committee meeting. Potential changes in the names of commissions 19, 31 and 52 were also discussed but no action was recommended by the subcommittee.

IAU Division I is proposing that the IAU consider modifying existing statutes, bye-laws and working rules to allow Divisions to create two new organisational elements within the current Divisional structure. These would be designated "Services" and "Standing Committees." A Service would be a quasi-permanent organisation created to provide well-defined products, such as data or software, to the astronomical community. A Standing Committee would be organised to provide specific specialized information, such as adopted values of astronomical quantities, to the astronomical community. It would be composed of a limited number of subject-matter experts and instituted by the Division Organising Committee. Specifically, IAU Division I proposes that the IAU Executive Committee create a committee to draft the appropriate changes to the existing IAU statutes, bye-laws and working rules to permit the existence of these organisational elements within Divisions for consideration at the next General Assembly. If the proposal to change the IAU rules is not accepted by the IAU Executive Committee, the Division would propose to change the name of Commission 4 to "Ephemerides and Astronomical Constants" and to organise the WG on Numerical Standards within that commission.

### **Report from Division II - Sun and Heliosphere**

*Submitted by V. Martínez Pillet, President*

A division-wide email address, <iaudivii@iac.es>, moderated by the Division's President and Vice-President, has been put into use to allow contacting all the members of the Division with issues related to the IAU. While this e-mail was presented some time ago, its first practical use was made with the announcement of the deadline for proposals for the General Assembly in Beijing in 2012. As a result of this announcement, a large number of proposals were submitted by Division II members: 3 Symposium proposals, 5 Joint Discussions proposals and 3 Special Sessions proposals. They involve all the relevant science topics of the three Commissions included in Div. II and show a clear interdisciplinary character with links to magnetic fields in the interstellar medium or their role in planetary formation. It is clear that the use of such e-mail based mechanism as a reminder can boost the response of a community that is potentially interested in actively making proposals, but that would otherwise not receive a clear notification of the opportunity that has been issued. While it is clear that IAU's web services have improved considerably over the past years, no notification system is available to the various scientific bodies. In some cases, individual Division, Commissions or Working Groups can temporarily create such systems. How-



ever, a discussion must be promoted to see if permanent communication channels with IAU members can be put into place. With the present explosion of social web-based services, this seems readily possible (can I follow IAU announcements on Twitter?).

One of the activities undertaken by our Division was related to questions posed to our Organising Committee, from non-IAU scientific bodies, about the relation between Global Warming and Solar variability. Division II Organising Committee was contacted twice last year about IAU's position on the role of the Sun in Global Warming. We were being asked about alleged claims that appeared in the media, and promoted by interested parties, about IAU supporting the idea that solar variability is responsible for the observed warming effect. Scientists from the University of St. Tomas (Minnesota, USA) and from the University of Western Australia (Crawley, Australia) contacted the Division II OC members asking if, indeed, IAU was backing such position. They were being referred in public talks stating that IAU's official view, as issued in 2004, was that "most climate change results from solar changes and that global warming will end soon." Similarly, we were specifically asked if "IAU believes that our Earth will soon begin cooling because of solar activities." IAU was being cited to support these views. The contacts to our Division happened as a consequence of a world-wide tour made by specific activists in the field. While some of this confusion might have been raised in the media, and originated by the recent unusually deep solar minimum (for which an IAU Symposium is dedicated this year in Mendoza), it was clear that some formal answer to these claims was needed. The scientists contacting Division II all received the following paragraph that they were allowed to quote in public:

"There is not such a formal position endorsed by the IAU. Let alone any claim from IAU that suggests that global warming (defined as the heating trend observed on Earth during the last mid 20th century) can be explained by solar variability."

While it is clear that the Sun does have an impact on Earth's climate and that changes (over the past few centuries) have been tentatively ascribed to solar irradiance changes, there is a common consensus by the solar community that the recently observed warming trend cannot be related to changes on the Sun. As a consequence of these contacts, the OC of Division II has decided to create a group of experts from Commissions 10 and 12 to issue a brief, strictly scientific, report on the status of our understanding of solar influences on Earth's climate, with specific focus on the changes observed in the past century, where the consensus is clear. Once a formal resolution is received from this group of experts and discussed in the Division II OC, it will be elevated to the IAU Executive for their evaluation.

### **Report from Division III – Planetary Systems Science**

*Submitted by Karen J. Meech, President*

#### *Commission 15 – Physical Study of Comets and Minor Planets*

Commission 15 activities have proceeded as usual for what concerns the support to scientific activity in the field of studies of the physical properties of the minor bodies in our Solar System. The list of members of the Working Group on Physical Properties of Minor Planets has been updated. This WG should be soon renamed "Physical Properties of Asteroids" to avoid using the expression "minor planets" which is now obsolete. The web page of C15 has been thoroughly re-written and updated, and it includes now also a Forum that can be used by C15 members as a new tool to strengthen collaborations and updating colleagues about results of new investigations. The commission plans to invite C15 members, who are still not used to have such a tool at their disposal, to become more familiar with it.

#### *Commission 16 – Physical Study of Planets and Satellites*

Commission 16 had a face to face meeting of seven members during the American Astronomical Society's Division for Planetary Sciences conference in Pasadena, California in October 2010. At this meeting plans were made to update the Commission 16 web site for easier access to historical archives and ongoing Commission activities. Plans were also made to hold a Town Hall meeting to encourage new membership at the joint European Planetary Science and Division for Planetary Science Conference in October 2011 in Nantes, France. The Commission helped develop and sponsor several proposals for Symposia and Joint Discussions for the 2012 General Assembly in 2012.

#### *Commission 20 – Positions & Motions of Minor Planets, Comets & Satellites*

#### *Commission 22 – Meteors, Meteorites & Interplanetary Dust*

After the GA in 2009, the president of Commission 22, Meteors, Meteorites & Interplanetary Dust, J. Watanabe, started "Newsletter" to inform members about the activity of the commission business timely via e-mail. Since the first one issued on Sept. 24 2009, nine newsletters have been released until March 29, 2011. New members were assigned to the Working Group on Meteor Shower Nomenclature, which is a new WG changed from the task group at the last GA. New members have also been assigned to the WG on Professional-Amateur Cooperation in Meteors. All the members have been announced in the newsletter on the commission web site at <[www.iau-c22.org/](http://www.iau-c22.org/)>. The Meteoroids 2010 was successfully held May 24-28, 2010 in Colorado U.S.A. The business meeting of the organising committee was held during the meeting. The next meeting will be held in Pozan, Poland in 2013. The detailed information will be released at the following website <[www.astro.amu.edu.pl/Meteoroids2013/](http://www.astro.amu.edu.pl/Meteoroids2013/)>.

#### *Commission 51 – Bioastronomy*

The primary activity of C51 is the Triennial meeting. This year for the first time Commission 51 will hold a joint meeting with ISSOL, The International Astrobiology Society. The conference, which is called Origins 2011 (see website at <[www.origins2011.univ-montp2.fr/](http://www.origins2011.univ-montp2.fr/)>), will take place July 3-8 in Montpellier, France. The programme as it stands at present is attached. Thanks to an outstanding effort by the Scientific Organising Committee, it has been possible to retain the traditional C51 approach of all plenary sessions, so that all participants can take part fully in all aspects of Bioastronomy. Note that the SOC has both nationality and gender balance, and a very exciting programme has been arranged. The SOC includes: Alan Boss (USA), Andre Brack (France), Jose Cernicharo (Spain), Pascale Ehrenfreund (The Netherlands), Natalia Gontareva (Russia), Nils Holm (Sweden), Gerda Horneck (Germany), William Irvine (USA), Kensei Kobayashi (Japan), Ramanarayanan Krishnamurthy (USA), Antonio Lazcano (Mexico), Anny-Chantal Levasseur-Regourd (France), Claudio Maccone (Italy), Francois Raulin (France), Alan Schwartz (The Netherlands), Janet Siefert (USA). During the conference there will be a meeting of the Organising Committee of C51 and corresponding committees of ISSOL, the Astrobiology Society and the NASA Astrobiology Institute to discuss the possibility of future joint meetings. It appears likely that there will be invitations to host such future meetings from Australia, Japan, Korea and Cuba.

#### *Commission 53 – Extrasolar Planets*

C53 has discussed and debated at some length several issues regarding the nomenclature for newly discovered extrasolar planets. The first issue arose as a result of a detailed paper written by W. Lyra proposing a scheme for naming exoplanets by using a number of names from the classical (Greek, Latin) literature, rather than the mundane, but functional current system of the star's name (e.g. 51 Peg) followed by a lower case letter, in order of discovery, e.g., 51 Peg b, c, d. C53 decided against changing the current system of naming exoplanets, which is geared toward the clarity of astronomical databases of stars and exoplanets. The second issue dealt with the preferred means for naming exoplanets in systems of binary stars, e.g., Alpha Cen AB, where the planets could orbit either binary star or could orbit both stars. C53 members discussed and voted upon several specific schemes for handling all possible combinations of binary and multiple star systems, but C53 was unable to arrive at a consensus recommendation. Hence, no recommendation was made, and journal articles about exoplanets in binary systems are now published with nomenclatures agreed upon by the authors and journal editors involved.

#### *WG – Near Earth Objects*

Following its meeting during May 2010, the IAU EC requested that a WG on NEOs be formed to carry out 3 activities: (i) investigate and formulate requirements for an international NEO survey, to detect, track and characterize (optical/IR, radar) 90% of all NEOs with  $D > 40$  m and to establish as such a per-

manent International NEO Early Warning System; *(ii)* to assemble a SOC in order to write and submit a proposal for a GA IAU Symposium or a GA Special Session, to be held during the IAU XXVIII General Assembly on theoretical and observational aspects of NEO research in general, and on requirements and other aspects of a permanent International NEO Early Warning System; and *(iii)* to prepare a Resolution for consideration by the IAU XXVIII General Assembly in Beijing, August 2012, asking for international action and support to establish an International NEO Early Warning System. The new WG has been formed consisting of 22 members from 9 countries, chaired by A. W. Harris. Task *(ii)* has been completed, and task *(iii)* has not yet begun. The WG requests further input from the EC for task *(i)* because it appears to be beyond reasonable or cost-effective capability from either ground or space.

#### *WG – Small Bodies Nomenclature (SBN)*

The WG of the SBN (CSBN) has been carrying out its usual duties - collecting, judging, and approving of name proposals for minor planets as well as naming of comets. The WG SBN works in close connection to the Minor Planet Center (both minor planets and comets) and the CBAT (comet names). Since the 2009 IAU GA 1092 minor planets were named. In November 2010 the long-time Secretary of the WG SBN Brian G. Marsden unfortunately passed away. This was a very great loss to the small solar system body nomenclature work, of a wealth of his excellent knowledge, experience and insight. Gareth V. Williams is now serving as the new Secretary of the CSBN. Several members have been working on the preparation of the web-based system for minor planet name proposals and the CSBN voting all now goes through the website, again in close cooperation with the MPC, making the work will become much more efficient.

#### *WG – Planetary System Nomenclature (WGPSN)*

The WGPSN has been very productive. From Aug. 2009 to the present, 258 new names have been assigned for planetary surfaces (Mercury: 11, Venus: 14, the Moon: 3, Mars: 29, Dione: 17, Enceladus: 27, Rhea: 95, Titan: 26, Lutetia: 36). During this same time period the following additional actions have been taken:

- New satellite name: Herse (Jupiter I)
- For Titan: Introduced the descriptor terms labyrinthus, lacuna and mons and their themes
- For Venus: Changes Metis Regio to Metis Mons, Ningal Undae to Ningal Lineae, Szel-anya Dorsa to Szel-anya Lineae, Texan Dorsa to Texan Lineae, and dropped: Mnemosyne Regio, Lorelei, Labe Patera.
- For Vesta: Approved the first themes for this body, although these are still being refined, and have approved a list of names for the encounter. These are now in review
- For Mimas: Changed Tintagil Chasma to Tintagil Catena
- For Rhea: two changes – Kun Lun Chasma → Kunlun Linea and Pu Chou Chasma → Puchou Catanae

- For Lutetia: Approved the first themes
- For Mercury: Approved names for 6 map quadrangles.

#### *Minor Planet Center*

The Minor Planet Center continues to operate at the Smithsonian Astrophysical Observatory, much as it has in the past. A physical move within the Observatory caused some minor disruption. Another recent change involved moving the Center's extensive web presence onto its own servers, with a consequent increase in the response of and capacity of its web services. This change also allowed the introduction of web-based database search tools. Observations continue to be received at ever-increasing rates, currently about 13 million per year, and this rate looks to increase substantially with the ramping-up of the Pan-STARRS programme. Observations and orbits of minor planets, comets and certain natural satellites are distributed via the referenceable daily *Minor Planet Electronic Circulars*, the weekly *Minor Planet Observation Supplement* and the monthly *Minor Planet Circulars*, along with associated machine-readable data files.

#### **Report from Division IV – Stars**

*none submitted*

#### **Report from Division V – Variable Stars**

*Submitted by Steven Kawaler, President*

Division V deals with all aspects of stellar variability, either intrinsic or due to eclipses by its companion in a binary system. In the case of intrinsic stellar variability the analysis of pulsating stars, surface inhomogeneities, stellar activity and oscillations are considered. For close binaries, classical detached eclipsing binaries are studied as well as more interacting systems, like contact and semi-detached binaries, or those with compact components, like cataclysmic variables and X-ray binaries, including the physics of accretion processes.

Division V consists of Commission 27, also called Variable Stars, and Commission 42 – Close Binaries. Thus the former deals with stars whose variations are intrinsic, whereas in the latter the variations are caused by the interactions between the components in the binary.

With the explosion of available time-series photometry (from CoRoT and now Kepler), it is clear that the study of stellar variability has entered the space age. In addition to revolutionizing the study of classical variables, spacecraft have revealed variations at the millimagnitude to micromagnitude levels. These are fundamentally new 'types' of variable stars: solar-like main sequence variables, red giants showing solar like oscillations, and non-radial pulsations revealed in classical radial pulsators are some examples.

In addition, with such data, new binaries are being uncovered that show small photometric variations across the orbital phase – often, at the millimagnitude level – caused by reflection of light from a bright primary by a dim secondary, or by ellipsoidal variations through tidal effects that are much smaller than could be observed previously.

Indeed, there are now many cases where objects show both intrinsic pulsations as well as evidence of binary-related variations (ellipsoidal variations, reflection effect, and/or eclipses). The working group structure of the Kepler Astero-seismic Science Consortium (KASC) recognizes this, and collaborative research by members of both Commissions is commonplace.

Kepler was launched on 6 March, 2009, and data were made available to KASC members at the end of the calendar year. Papers describing the results of the initial survey of stellar variability began to appear during the start of calendar 2010, with a flood of papers appearing throughout the year and into 2011. The report of the Division for the triennium 2009-2012 will document more fully the activities of Division and Commission members in traditional ground-based observations, in addition to describing the new and exciting results from Kepler and CoRoT.

### **Report from Division VI – Interstellar Matter**

*Submitted by You-Hua Chu, President*

Division VI consisted of one commission, C34 (Interstellar Matter), and three Working Groups: Astrochemistry, Planetary Nebulae, and Star Formation in 2009. While the field of star formation has been active and many conferences have been held, the Star Formation Working Group (SFWG) has been dormant for a number of years and nobody from the SFWG expressed any wish to renew its Working Group status. Therefore, the Star Formation Working Group was discontinued in 2010.

The Astrochemistry Working Group submitted a request on March 27, 2011 to change their status from a Working Group to a Commission. Astrochemistry, or molecular astrophysics, governs the cool components of the interstellar matter. The Astrochemistry Working Group has been very active in organising IAU Symposia every 5-6 years. The attendance at their meetings has increased over the years to 440, limited by logistics, at its recent IAU Symposium 280, held in Toledo, Spain in May 2011. Based on the growth of the field and sustained activity for over 20 years, the Astrochemistry Working Group proposes to elevate their status to a Commission in order to provide services to researchers in the field, disseminate knowledge, molecular database, observations obtained with new-generation telescopes, and promote interdisciplinary activities.

The Planetary Nebulae Working Group has also requested to change their status from a Working Group to a Commission. This Working Group has been active over the past 44 years and organised eight IAU Symposia on planetary nebulae. The upcoming IAU Symposium on planetary nebulae will be held in Tenerife, Spain on July 25-29, 2011. Planetary nebulae consist of material ejected by intermediate and low mass stars. The formation process is very similar to that of circumstellar bubbles blown by evolving massive stars, such as luminous blue variables (LBVs) and Wolf-Rayet (WR) stars. These nebulae associated with stars with a wide range of masses can be studied with similar methods, and researchers can learn from one another. Therefore, the Planetary Nebulae Working Group has proposed to form a Commission of "Circumstellar Nebulae" to include nebula formed by stars regardless of their masses.

The C34, Interstellar matter, remains the same. The Organising Committee members of C34 have been drawn mostly from researchers on diffuse interstellar medium and star formation. When C34 was the only Commission under Division VI, one Organising Committee serves both the Division and the Commission. With the addition of Astrochemistry and Circumstellar Nebulae Commissions, if approved, Division VI and C34 should have separate Organising Committees that are each smaller than the current, common Organising Committee.

### **Report from Division VII – Galactic System**

*Submitted by Despina Hatzidimitriou, President*

#### ***Introduction***

Division VII provides a forum for astronomers studying the Milky Way as a galactic system, and its constituents. It acts as an umbrella for two commissions, C33 and C37.

C33 focuses on the structure and dynamics of the Galactic System, providing a paradigm for the processes involved in the formation and evolution of the stellar and gaseous components of spiral galaxies in general.

C37 studies star clusters and associations, as test particles for deciphering the formation and evolution of the galactic system as a whole, but also as important astrophysical objects in their own right. For example, it has now become apparent that the presence of multiple stellar generations is a widespread phenomenon among star clusters, subverting the long lasting paradigm that these objects are simple stellar populations.

***The current status of Major Milky Way Surveys (on-going and near-future)***

There has been a great revival of Milky Way research with several large surveys and experiments, in different wavelengths, either recently completed, or in progress, or planned for the near future. For example:

- The Sloan Extension for Galactic Understanding and Exploration 2 (SEGUE-2): spectroscopic observations of around 120,000 stars, focusing on the stellar halo of the Galaxy, from distances of 10 to 60 kpc.  
<[www.sdss3.org/surveys/segue2.php#GettingStarted](http://www.sdss3.org/surveys/segue2.php#GettingStarted)>
- The RAdial Velocity Experiment (RAVE) is a multi-fiber spectroscopic astronomical survey of stars in the Milky Way using the 1.2-m UKST covering 20,000 square degrees of the sky, with the primary aim of deriving the radial velocities. It is expected to run to the end of 2012.  
<[www.rave-survey.aip.de/rave/pages/project/index.jsp](http://www.rave-survey.aip.de/rave/pages/project/index.jsp)>
- The SkyMapper survey is a five year photometric survey of the entire southern sky (using a 1.35-m telescope), in six different filters and providing 6 epochs per filter. <[www.mso.anu.edu.au/skymapper/](http://www.mso.anu.edu.au/skymapper/)>
- The Apache Point Observatory Galactic Evolution Experiment (APOGEE) will (starting in Spring 2012) use high-resolution, high signal-to-noise infrared spectroscopy to penetrate the dust that obscures the inner Galaxy. APOGEE will survey 100,000 red giant stars across the full range of the Galactic bulge, bar, disk, and halo.  
<[www.sdss3.org/surveys/apogee.php](http://www.sdss3.org/surveys/apogee.php)>
- The HERMES Galactic archaeology survey (start of science observations expected late 2012), using the new, multi-object high resolution spectrometer for the 3.9-m AAT HERMES. The primary goal of the survey is to unravel the history of the Galaxy from detailed elemental abundances for about 1.2 million individual stars (in the 5000 to 8000 Å window, at a resolving power of 30,000).  
<[www.aao.gov.au/HERMES/](http://www.aao.gov.au/HERMES/)>
- The LAMOST Experiment for Galactic Understanding and Evolution (LEGUE) will use the 4-m Large Sky Area Multi-Object Fiber Spectroscopic Telescope of the Chinese Academy of Science. It is expected to provide about 2 million spectra per year, at a resolution of  $R \sim 1000/2000$ , down to a magnitude limit of 20.5mag.  
<[www.lamost.org/website/en](http://www.lamost.org/website/en)>
- GAIA is an ESA mission (expected launch date 2013) with the aim of providing a three-dimensional map of the Galaxy, with unprecedented positional and radial velocity measurements with the accuracies needed to produce a stereoscopic and kinematic census of about one billion stars in our Galaxy and throughout the Local Group.  
<[www.esa.int/export/esaSC/120377\\_index\\_0\\_m.html](http://www.esa.int/export/esaSC/120377_index_0_m.html)>
- There are several on-going surveys of the galactic plane in the infrared, the sub-mm and radio regimes:



- The Spitzer and Herschel guaranteed time projects aimed at mapping nearly all of the molecular clouds within 500 pc of the Sun will be available by the end of 2012.
- The JCMT Legacy Survey (galactic plane survey) aims to achieve a full census of star formation activity in the plane of the Galaxy using SCUBA-2 at 450  $\mu\text{m}$  and 850  $\mu\text{m}$ , and is also expected by the end of 2012.  
<[www.jach.hawaii.edu/JCMT/surveys/JPS\\_Abstract.html](http://www.jach.hawaii.edu/JCMT/surveys/JPS_Abstract.html)>
- the Caltech Submillimeter Observatory BGPS Bolocam 1.1 mm survey  
<[www.cso.caltech.edu/outreach/kiosk/news2009/BGPS/index.html](http://www.cso.caltech.edu/outreach/kiosk/news2009/BGPS/index.html)>
- the APEX telescope ATLASGAL 870 micron survey  
<[www.mpifr-bonn.mpg.de/div/atlasgal/](http://www.mpifr-bonn.mpg.de/div/atlasgal/)>
- the Herschel Hi-GAL survey (between 70 and 500 microns), e.g.  
<<http://adsabs.harvard.edu/abs/2010PASP..122..314M>>
- the Spitzer GLIMPSE 360 mid-IR survey  
<[www.astro.wisc.edu/sirtf/](http://www.astro.wisc.edu/sirtf/)>
- the UKIRT Widefield Infrared Survey for  $\text{H}_2$  (UWISH2-Froebrich et al. 2011, MNRAS, 413, 480)
- the International Galactic Plane Survey which combines many radio telescope surveys from around the world to map the interstellar gas and dust in the MW <[www.ras.ucalgary.ca/IGPS/](http://www.ras.ucalgary.ca/IGPS/)>
- Multi-epoch/variability surveys
  - Young stellar object variability (YSOVAR) with Spitzer  
<<http://ysovar.ipac.caltech.edu/>>
  - The VISTA Variables in The Via Lactea (VVV) public survey will perform wide FOV multi-epoch observations of the Galaxy's bulge and part of the disk, in the near IR, yielding a high resolution 3-D map of the bulge  
<[http://mwm.astro.puc.cl/mw/index.php/Main\\_Page](http://mwm.astro.puc.cl/mw/index.php/Main_Page)>
  - UKIDSS <[www.ukidss.org/surveys/surveys.html](http://www.ukidss.org/surveys/surveys.html)> galactic plane survey (3-epoch) and galactic clusters survey, in J,H,K filters

### ***Conferences in 2010***

During the reporting period, several international conferences, workshops and meetings related directly or indirectly to the Galaxy and to star clusters and associations have taken place:

- Summer school and workshop on "Computational Gravitational Dynamics," 3-13 May 2010, Leiden, The Netherlands
- The Sixth Harvard-Smithsonian Conference on Theoretical Astrophysics "Dynamics from the Galactic Center to the Milky Way Halo," 10-13 May 2010, Cambridge, MA

- "The Chemical Enrichment of the Milky Way Galaxy," 10-14 May 2010, in Ringberg Castle, Germany
- IAU Symposium 270 on "Computational Star Formation," Barcelona, Spain, 31 May - 4 June 2010
- "Gaia: at the frontiers of astrometry," the closing conference of the European Marie Curie Research Training Network "ELSA," 7-11 June 2010, in Sèvres, France
- ESO workshop on "Central Massive Objects: The Stellar Nuclei - Black Hole Connection," Garching, Germany, 22 - 25 June 2010
- International Conference on "Binary Star Evolution: Mass Loss, Accretion and Mergers," Mykonos, Greece, 22-25 June 2010 (with special session on "Binaries in Clusters")
- LAMOST summer school and workshop on "Galactic Studies with the LAMOST Surveys," 19-23 July 2010, in Beijing, China
- MODEST-10: "Encounters and interactions in dense stellar systems: modeling, computing, and observations," 30 August - 3 September 2010, Beijing, China
- The "VVV Survey conference," 8-10 December 2010, Vina del Mar, Chile

### ***News and publications***

During 2010, there have been about 150 refereed papers on the Milky Way system (including galactic center papers) and another 450 refereed papers referring to star clusters. There have been several interesting reviews published in the proceedings of the various meetings mentioned in the previous paragraph. One should also mention the review on "Young Massive Clusters" by Zwart et al., which appeared in the 2010 volume of the Annual Review of Astronomy and Astrophysics. In addition, there has been a special edition of the Philosophical Transactions of the Royal Society reviewing various aspects of star cluster research, entitled "Star clusters as tracers of galactic star-formation histories," compiled and edited by Richard de Grijs (February 2010).

A new version (version 3.1) of the "New catalogue of optically visible open clusters and candidates" was released in November 2010.

<<http://www.astro.iag.usp.br/~wilton/>>

A new discussion group about star cluster research has been announced in the SCYON newsletter <[www.citeulike.org/group/6906](http://www.citeulike.org/group/6906)>.

Finally, it should be noted that the Galactic Center newsletter has ceased to publish abstracts of papers, as of December 2010.

<[www.aoc.nrao.edu/~gcnews/gcflash/gcflash\\_Vol.29\\_No.21](http://www.aoc.nrao.edu/~gcnews/gcflash/gcflash_Vol.29_No.21)>

## **Report from Division VIII – Galaxies and the Universe**

*Submitted by Elaine Sadler, President*

Division VIII covers all aspects of the structure, dynamics and evolution of galaxies, cosmology, and the overall structure of the Universe. It covers two commissions (C28: Galaxies and C47: Cosmology) and one working group (WG on Supernovae).

D VIII is by far the largest IAU Division, with 1760 members. The large scope of the Division is seen as valuable because of the strong (and growing) astrophysical links between the fields it covers, and there is no wish to change the structure of this Division in any substantial way.

The field continued to be very active in 2010, with many international workshops and symposia taking place. These included IAUS 277 "Tracing the ancestry of galaxies" in Burkina Faso, Africa.

Scientific highlights in 2010 included many papers presenting the first results and source catalogues from new facilities such as Herschel, Planck and Fermi. In cosmology, new constraints on fundamental parameters continue to come from large surveys using a variety of techniques including baryon acoustic oscillation (BAO) measurements and distant Type Ia supernovae.

The D VIII Organising Committee has discussed the proposed new Divisional Structure. While we are happy with the proposed structure for the new Division J, we wish to argue strongly that the current name of "Galaxies and the Universe" should be retained on scientific grounds, rather than adopting the potentially confusing title of "Distant Universe and Cosmology." We would also like to see discussion and clarification of the name for the proposed new Division H.

## **Report from Division IX – Optical and Infrared Techniques**

*none submitted*

## **Report from Division X – Radio Astronomy**

*Submitted by A. Russ Taylor, President*

### ***Science highlights***

Since the previous IAU GA, radio astronomical observations have been an integral component of substantive advances in several aspects of astronomy.

- The Fermi mission has been able to classify a significant fraction of their detected sources either as radio pulsars or radio-loud active galactic nuclei (Abdo et al. 2010a, b). Surprisingly, many of the Fermi-identified radio pulsars are millisecond pulsars and may be important

additions to radio pulsar timing arrays aimed at detecting low-frequency gravitational waves.

- The mass of the neutron star PSR J1614-2230 was measured to be approximately 2 solar masses (Demorest et al. 2010), which places severe constraints on certain equations of state of nuclear matter.
- The Planck mission was launched (Tauber et al. 2010), and began acquiring high precision cosmic microwave background (CMB) observations.
- Molecular line observations of star-forming galaxies over a significant redshift range are beginning to reveal how galaxies convert their molecular gas to stars (e.g., Genzel et al. 2010, Daddi, E. et al. 2010). Once ALMA becomes fully operational, an even larger fraction of the galaxy luminosity function should be sampled.
- Multi-wavelength observations of sub-millimeter galaxies (SMGs) are confirming that they are gas-rich systems at intermediate redshifts with high star formation rate efficiency, likely the result of major mergers (e.g., Ivison et al. 2010, Riechers, D. et al. 2010), and are likely to form the progenitors of massive stellar systems in the local Universe.
- High precision astrometric observations obtained by very long baseline interferometric (VLBI) techniques are revealing the distances to a host of objects (e.g., Miller-Jones et al. 2009; Dzib et al. 2010).
- A radio afterglow, similar to those detected following gamma-ray bursts (GRBs), was detected at the location of SN 2009bb (Soderberg et al. 2010). However, no gamma-ray burst was detected, raising the possibility that this object may be the first GRB "orphan," i.e., a GRB detected by means of its non-gamma ray properties.

### ***Radio Astronomy from the Moon***

There has been considerable international activity related to robotic missions for radio astronomy on the Moon, with active participation by DX members of the IAU WG on Astronomy from the Moon.

**Europe:** Several initiatives on ultra-long wavelength space-borne radio astronomy facilities have been pursued over the last several years, primarily under the auspices of ESA. These include the freeflying Space-based Ultra-long-wavelength Radio Observatory (SURO), a formation of satellites equipped with antennas and receivers covering the frequency range 0.1–30 MHz; a Lunar Far-side Explorer, which would carry a two-element, ultra-long wavelength interferometer for the frequency range 0.016–40 MHz; a lander, the payload of which would contain radio antennas designed to assess site characteristics for a future larger radio telescope. A collaboration has also been established to develop an ultra-long wavelength antenna for a future Russian lander.

**India:** Work is progressing on fabricating prototypes for a low-noise, high-sensitivity front end (0.3–16 MHz) and FPGA-based, 6-channel data acquisition (32 MHz sampling) and processing back end for future payloads on a lunar- or free-flying mission. After prototyping, these will be taken up for constructing an engineering model in conjunction with ISRO.

**United States:** The Lunar University Network for Astrophysics Research (LUNAR) is one of seven teams funded by the NASA Lunar Science Institute (NLSI). It has three key projects: *low frequency cosmology & astrophysics*, which is developing the science and technology for a future radio telescope to study the 21-cm emission from the Dark Ages; radio heliophysics, which is developing the science and technology for a future solar radio telescope; and *gravitational studies via lunar laser ranging*, which is developing the technology for the next generation of laser retro-reflectors. A major activity of LUNAR has been the development of the Dark Ages Radio Explorer (DARE) mission, which proposes to place a radio antenna on a lunar orbiter to make the first astronomical measurements exploiting the radio quiet zone behind the Moon.

### ***Spectrum Management***

The frequency range, 275-1000 GHz, is used for radio astronomy observations of important spectral lines and continuum bands used in studies to understand the Universe. New receiver technology and new instruments (both ground-based and space based) being used in the 275-1000 GHz region are helping to refine the results of radio astronomy observations in this spectrum range, while similar developments in the 1000-3000 GHz range are leading to a better understanding of specific spectral lines and atmospheric windows that are of interest to radio astronomers. Significant infrastructure investments are being made under international collaboration for the use of these bands between 275 and 3000 GHz.

Frequency allocations for the use of this frequency range are not available, but the radio astronomy community is requested to identify a list of specific bands of interest between 275 and 3000 GHz towards World Radio Communication Conference 2012 held by the International Telecommunication Union. A new ITU-R Recommendation RA.1860 (Preferred frequency bands for radio astronomical measurements in the range 1-3 THz) was published on February 2010, by including a list of astrophysically most important spectral lines in the frequency range between 275 and 3000 GHz that was established by the IAU Working Group on Important Spectral Lines.

### ***Update on Global Radio Astronomy Mega-projects***

#### *The Atacama Large Millimetre Array*

ALMA is making rapid progress towards its goal of providing dramatic improvements in sensitivity and resolution for astronomy at millimeter and sub-millimeter wavelengths. The first call for proposals ("Cycle 0") has recently gone out and it is expected that observations with 16 antennas, 4 receiver bands and baselines of up to 400m will start later this year. With such an advanced and complex system there are naturally a large number of technical problems and hitches that are holding up progress and a great deal of effort is going into solving those. No real show-stoppers have however been found and the initial commissioning results have already confirmed that the accuracy, sensitivity and stability of the key components are close to the very ambitious goals set for them. Commissioning tests have also demonstrated high-quality images. The first observations for the Scientific Verification programme - aimed at producing data that can be compared directly with observations made with other submillimeter arrays - are presently being made and the goal is to release those results in June.

At the time of writing, ten antennas are in operation at the 5000m-altitude site and a further seven antennas, with full complements of receivers, are being tested at the 2900m-altitude operations support facility (OSF). The first of the 12m antennas from the European consortium has recently been accepted conditionally and a 7m-diameter antenna for the ALMA Compact Array from the Japanese contractor is also in the final stages of acceptance. This means that, very shortly, examples of all four of the different types of antenna planned for ALMA will have been accepted. Seventeen more antennas are at different stages of assembly and testing in the facilities of the three manufacturers at the OSF and a further four are in transit across the Atacama desert, which means that a total of forty antennas are now in Chile.

Final versions of the local oscillator system, the two large correlators and all the other electronics and control and monitor systems are in place, and the infrastructure (roads, power and communications) is expected to be ready to support the configurations planned for early science within a month. An enormous amount of software, covering both the real-time and off-line needs, has been developed for ALMA and is being deployed and tested through regular releases. The version currently being used covers all the requirements for the Cycle 0 observations. ALMA's capabilities will continue to grow during 2012 and there will be further calls for proposals from the user community to exploit these. It remains the target to have the full system with sixty-six antennas and baselines of up to 16km in operation during 2013.

#### *The Square Kilometre Array*

Crucial steps for the SKA project were taken in the last week of March this year. A "Founding Board" was created with the aim of establishing a legal entity for

the project by early July, as well as agreeing the resourcing of the Project Execution Plan for the Pre-construction Phase from 2012 to 2015. Nine countries signed the Letter of Intent for the Founding Board – Australia, China, France, Germany, Italy, New Zealand, South Africa, The Netherlands, and the UK. A number of additional countries are expected to join the Board in the next month or so. Each country is represented by an agency or government official, and by a scientist. At its first meeting on 2 April, the Founding Board decided that the location of the SKA Project Office (SPO) during the preconstruction phase will be at the Jodrell Bank Observatory near Manchester in the UK.

The engineering side of the project passed an important milestone in February with a successful System Conceptual Design Review. Sub-system CoDRs are now underway, and the first two subsystems – signal processing, and aperture arrays – passed their reviews in April. The remaining subsystems will all have undergone this level of review by October. The overall system will reach Preliminary Design Review stage at the end of 2012; construction is currently planned to commence in 2016.

The site characterization for the SKA location is in full swing. A request for information has been issued to the candidate sites, Australia and southern Africa, and measurements of the radio frequency interference environment and tropospheric phase turbulence are in progress. The decision on the SKA site is expected in early 2012.

### **Report from Division XI - Space and High-Energy Astrophysics**

*Submitted by Christine Jones, President*

#### ***Organisational:***

Originally, the Division covered only high-energy astrophysics (UV, X-ray and gamma rays), to which was later added the domain of low-energy astrophysics where observations are generally performed from space (infrared, submillimeter and parts of the radio spectrum). The Division also includes, in principle, ground-based gamma ray and cosmic ray experiments, gravitational wave, and Moon-based astronomical observations. The individual expertise of the present OC reflects primarily the UV and higher energy domains. We propose that, following the restructuring of the Divisional structure and renewal of the OC, new members will be recruited to broaden the spectral range of topics covered by the Division.

Division XI comprises a single Commission (44, having the same name as the Division and the same OC) that has the same OC as the Division, and two Working Groups ("Astronomy from the Moon", which is an inter-divisional WG together with Divisions IX and X, and "Particle Astrophysics"). Both WGs do not seem to be active and each has only one registered member. Given this

state, we propose to abolish both existing WGs and initiate an organisational effort to invigorate them by forming new WG, if there would be divisional interest.

Given the proposed restructuring of the Divisional structure of the IAU, within which the domain of astroparticle physics would come under new division D that would succeed the present Division XI, we propose to initiate a strong recruiting effort among high-energy physicists to join the Division and initiate cross-fertilization between particle physics and astrophysics. It is possible that, if the IAU Commissions will be retained after the IAU restructuring effort, it might be beneficial to create a number of commissions within the Division to deal with, e.g., Space Astronomy (including astronomy from the Moon), High-Energy Astrophysics (both from space and from the ground), and possibly in Non-Photon (particle) Astrophysics.

The Division now has a total membership slightly above 1000, which does not reflect the potential of interested Union members whose research includes using space-based instrumentation, or which touches the high-energy physics domain. Obviously, more efforts by the OC to enlarge the Division roster are in order.

#### ***Scientific Activities:***

These contain the continuing observational activity of GALEX, Swift, AGILE, Chandra, Suzaku (except for the calorimeter), XMM-Newton, RXTE and Integral at the energy range higher than that of the optical, of HST in the UV-optical-near IR domain, of WISE (operations terminated in February 2011), and of Herschel in the IR. The Akari mission, launched in 2006, is continuing despite the boil-off of its liquid Helium coolant, by using active cooling to only 40K and restricting the long-wave IR observations.

We note delays in the deployment of the ASTROSAT mission, planned to cover the spectral domain from hard X-rays to the UV, and the effective termination of the TAUVEVX UV telescope following its dis-assembly from the GSAT4 satellite (subsequently lost on launch in May 2010). We also note continued efforts during 2010 to prepare the World Space Observatory-UV as a spectroscopic and imaging instrument for an eventual launch in 2013-2014 and the Spektr-RG (Rongen-Gamma) satellite for X-rays planned to launch in the first quarter of 2013.

The WMAP mission, which collected invaluable data on the cosmic microwave background for nine years at the L2 location, was terminated on 28 October 2010. Fortunately, the Planck satellite also at L2 took over the CMB measurements from WMAP starting on July 2009, with enhanced sensitivity and angular resolution. The space radio interferometry mission RadioAstron (Spekr-R) is scheduled to launch in June 2011.



The COROT satellite, studying transiting exoplanets and stellar asteroseismology, has been operating normally in this period, and so has the MOST satellite of the Canadian Space Agency. The Kepler mission, with similar goals to these of MOST and COROT but having significantly enhanced sensitivity, has been in operation since 2009 and announced by now more than 1000 exoplanet candidates.

The GAIA mission, to follow-up and enhance the Hipparcos mission, is being readied for a 2012 launch.

In the domain of ground-based HE observatories we note the successful operation of the southern Auger observatory in Argentina, but also the decision by the US not to host the northern part of the observatory.

### ***Scientific meetings:***

During 2010 we mention the following scientific meetings that had components of Space or High-energy Astrophysics, arranged by months:

*January:* UCF Winter School 2010: Exoplanets for Planetary Scientists

*February:* The Future of Neutrino Mass Measurements: Terrestrial, Astrophysical, and Cosmological Measurements in the Next Decade, 11<sup>th</sup> COSPAR Capacity-Building Workshop on Data Analysis of the Fermi Gamma-ray Space Telescope, Infrared Emission, Interstellar Medium and Star Formation

*March:* High Energy Astrophysics Division (HEAD) Meeting of the American Astronomical Society, Saas-Fee Course 2010: Astrophysics at Very-High Energies, 8<sup>th</sup> International Conference on High Energy Laboratory Astrophysics (HEDLA-2010), Science with the William Herschel Telescope 2010-2020, The View from 5 AU: Measuring the Diffuse Sky Brightness from the Outer Solar System

*April:* High Energy Emission from Pulsars and Their Systems, JWST and the ELTs: An Ideal Combination, 7<sup>th</sup> IBWS: INTEGRAL/BART Workshop, Deciphering the Ancient Universe with Gamma-Ray Bursts, International X-Ray Observatory Science Meeting

*May:* Herschel First Results Symposium, International school: Exploring the Dawn of the Universe with Gamma-Ray Bursts, Ultra-Luminous X-ray sources and Middle Weight Black Holes, Ultraviolet Universe – 2010

*June:* Herschel Open Time Cycle 1 Observation Planning Workshop, The First Galaxies, Quasars & Gamma-Ray Bursts, Gaia: At the Frontiers of Astrometry, Fermi meets Jansky - AGN in radio and gamma-rays, The Cosmic Enigma - Cosmology & Particle Astrophysics, GONG 2010/SoHO 24: A New Era of Seismology of the Sun and Solar-like Stars

*July:* Exploring the Extreme Universe: A Symposium Celebrating 50 years of Space Science at Leicester, The Multi-Wavelength View of Hot, Massive Stars (39<sup>th</sup> Liège International Astrophysical Colloquium), PPC 2010: IV International

Workshop on the Interconnection between Particle Physics and Cosmology, The Infrared/X-ray Connection in Galaxy Evolution, Accretion Processes in X-rays: from White Dwarfs to Quasars, Physics and Astrophysics of Neutron Stars and Black Holes, 38th Scientific Assembly of the Committee on Space Research (COSPAR) with associated symposia, TeV Particle Astrophysics 2010, 2010 HST Calibration Workshop, Galaxy clusters: observations, physics, and cosmology

*August:* 10<sup>th</sup> Ramaty High Energy Solar Spectroscopic Imager (RHESSI) Workshop, Astrophysics of Neutron Stars 2010, 17th European White Dwarf Workshop,

*September:* X<sup>th</sup> Hvar Astrophysical Colloquium - The Active Sun, New Results in X-ray Astronomy 2010, Herschel and the Formation of Stars and Planetary Systems, JENAM 2010, SciNeGHE 2010 – 8<sup>th</sup> Workshop on Science with the New Generation of High Energy Gamma-ray Experiments. Gamma-ray Astrophysics in the Multimessenger context, UniverseNet2010: Frontiers of Particle Cosmology, IAU Symposium 275: Jets at all Scales, CRIS 2010-Cosmic Ray International Seminar : One Hundred Years of Cosmic Ray Physics: From Pioneering Experiments to Physics in Space, Evolution of Galaxies, their Central Black Holes and their Large-scale Environment, Multiwavelength Variability of Blazars, ISAPP 2010-International School on Astroparticle Physics, Early Universe and Gravitational Waves, Challenges in Infrared Extragalactic Astrophysics II, 8<sup>th</sup> INTEGRAL Workshop: The Restless universe

*October:* High Energy View of Accreting Objects: AGN and X-ray Binaries, Robotic Science From the Moon: Gravitational Physics, Heliophysics and Cosmology, 4<sup>th</sup> Hinode Science Meeting, Accretion and Outflow in Black Hole Systems, Science with the Hubble Space Telescope – III, School of Astrophysics Francesco Lucchin: GAIA: Science with one billion stars - The Infrared Universe: the Herschel and Alma eras

*November:* Gamma Ray Bursts 2010, Stormy Cosmos: The Evolving ISM from Spitzer to Herschel and Beyond, Synchrotron Radiation in Earth, Space & Planetary Science - Exploiting the UK's newest facility, XXII Canary Islands Winter School of Astrophysics on Asteroseismology, Exploring Physics with Neutron Stars, First Year of MAXI: Monitoring Variable X-ray Sources

*December:* 25<sup>th</sup> Texas Symposium on Relativistic Astrophysics

### ***Conclusion:***

The field of Space and High-Energy Astrophysics is very active and generates unique science. This has not yet generated corresponding organisational activities on the part of the Divisional structure, which are definitely in order.

### **Report from Division XII – Union-Wide Activities**

*none submitted*

## 5. PRIZES & AWARDS

### 5.1 The Gruber Cosmology Prize 2011

Four astronomers who found a way to model the growth of the Universe are the recipients of the 2011 Cosmology Prize from The Peter and Patricia Gruber Foundation, now known more simply as the Gruber Foundation. Marc Davis, a professor in the Departments of Astronomy and Physics at the University of California at Berkeley (USA); George Efstathiou, the director of the Kavli Institute for Cosmology in Cambridge (UK); Carlos Frenk, the director of the Institute for Computational Cosmology at Durham University (UK); and Simon White, a director of the Max-Planck Institute for Astrophysics in Garching (Germany) will share the \$500 000 award.

For more information, see <[www.iau.org/public\\_press/news/detail/iau1103/](http://www.iau.org/public_press/news/detail/iau1103/)>.

### 5.2 The Gruber Foundation Fellowship Award 2011 & 2012

The 2011 Gruber Foundation Fellowship has been awarded to Dr. Jaime E. Forero-Romero, Postdoctoral Researcher in the Cosmology Group at the Astrophysikalisches Institut Potsdam, Germany. He will take up the Fellowship to work at UC Berkeley. He says: “*My main research subject is galaxy formation in an explicit cosmological context. I make use of massive numerical simulations to study the evolution of galaxy populations through cosmic history. Using this approach, I have mostly focused on two central lines: 1) to describe the assembly of dark matter halos and 2) to model galactic spectral properties in the UV, and the Lyman-alpha emission line. At UC Berkeley I will use this approach to investigate the observational properties of young galaxy populations during the epoch of reionization.*” More on Dr. Forero-Romero can be found on his webpage: <<http://www.aip.de/People/jforero/>>

Applications for the Gruber Foundation Fellowship Award 2012 should be submitted by 30 November 2011. For information on the application procedure, see <[www.iau.org/grants\\_prizes/gruber\\_foundation/fellowships/procedure/](http://www.iau.org/grants_prizes/gruber_foundation/fellowships/procedure/)>

## 6. IAU SCIENTIFIC MEETINGS

### 6.1 Post-Meeting Reports 2010

*Excerpts. The full post-meeting IAU reports for 2010 will be posted at <[www.iau.org/static/scientific\\_meetings/postmr10.pdf](http://www.iau.org/static/scientific_meetings/postmr10.pdf)>.*

<b>IAU S269</b>	<b>Galileo's Medicean Moons: their Impact on 400 Years of Discovery</b>
Date and place	6 - 9 January, 2010, in Padova, Italy
Chairs of SOC	Cesare Barbieri (Italy), Angioletta Coradini (Italy), Michael Mendillo (USA), Toby Owen (USA)

*Summary and Highlights of the Conference*

The main aim of Symposium 269 was the celebration of 400<sup>th</sup> anniversary of the discovery of the Galilean Moons, in the very same place and dates of that great moment, and the elucidation of its impact on subsequent Science.

The speakers were by invitation only, all of them distinguished historians of science or scientists personally involved in the exploration of Jupiter and its Moons and of the solar system in general, from space and from ground.

The conference was opened to young scholars, who had the opportunity to submit and briefly illustrate poster contributions.

Therefore, it is essentially impossible for me to single specific talks out of such an impressive complement of contributions of the highest level. However, I regard the final conclusions drawn by Roger Bonnet as a beautiful conclusion of the Symposium. Roger was able to convey to the audience not only the beauty of research, but also the need to defend seemingly heretic ideas against popular belief or prejudice which may be present even in scientific and cultural circles. And finally, he expressed the gratitude of all scientists to a man who silently sat in the audience for the entire conference, and who was in the back of most NASA missions to Solar System, namely John Casani, chief engineer at JPL for many years. In particular, he was of fundamental importance for the success of the NASA GALILEO mission to Jupiter and its moons. The results of GALILEO and its legacy to future missions as JUNO had been masterly illustrated by Torrence Johnson, the chief scientist of the mission.

In conclusion, this is the highlight of the conference, that space missions and ground telescopes will bring to light many more fascinating aspects of our Solar System, and of other planets and earths that populate the Universe around us.

I'm sure that the many young researchers and students attending the conference have received an unforgettable inspiration for their future activities.

<b>IAU S270</b>	<b>Computational Star Formation: Playing by the Numbers?</b>
Date and Place	31 May - 4 June 2010, in Barcelona, Spain
Chairs of SOC	J. Alves (Spain), B. Elmegreen (USA), V. Trimble (USA)

IAU Symposium 270 had its origins at the Autumn 2008 JENAM meeting in Vienna, where three of the four present editors participated in a session on star formation that proved too short to clarify either all of the problems or what progress was being made on them. We decided that a larger meeting would be useful, particularly one with an emphasis on numerical simulations and comparisons with observations. Fortunately, the IAU Executive Committee agreed.

The conference has achieved the goals with a significant participation of astronomers from around the world (219 from 30 countries). Among the participants, we have a large group of internationally renowned astronomers, as well as many young talents. There were a total of about 80 talks and 130 posters. The talks were selected in order to cover most of the main topics of Star Formation, from individual star formation at disk scales to star formation at cosmological scales. A special emphasis was done to better understand the similarities and differences between computational techniques, as well as the recognition of the successes and shortcomings in matching the simulation results to detailed observations of star formation. The meeting was organised in the following sessions:

- Historical introduction
- Individual Star Formation: Observations
- Individual Star Formation: Theory
- Formation of Clusters: Observations
- Cluster Formation: Theory
- Numerical Methods: MHD
- Numerical Methods: Radiative Dynamics
- Local Star Formation Processes
- Star Formation Feedback
- Star Formation on Galactic Scales
- Novel technologies: Special purpose hardware
- Computational Methods
- Synthetic observations: Radiation diagnostics of star formation
- Large Scale Star Formation
- Cosmological Star Formation
- Computational Star Formation

Star formation is complex, involving unknown initial conditions and poorly understood physical processes, such as supersonic turbulence, magnetic diffusion and reconnection, radiation transfer of background and young stellar light, and cooling by collisional excitation and decay of transient molecules and dust particles, all operating in a medium with rapidly changing substructures spanning 20 orders of magnitude in density. It is a violent storm of collapse into filaments, clumps, disks, and protostars, with equally violent energy release in the form of jets, winds, and heat, plus ionization when the most massive stars appear. Yet viewed at various embedded stages through infrared, mm, and radio telescopes, the result of this activity is a fairly regular assortment of young stars and protostars, with a power law distribution of separations and a power law distribution of masses, both extending from the largest scales and masses down to minimum values where the motions become subsonic. By the time these stars are visible to the eye in the night sky, the process is mostly over, the dense gas has dispersed, the jets have calmed, and the dense young clusters have started to disperse.

What lies between the dispersed gas before star formation and the dispersed gas after star formation, minus the few percent that has turned into stars, is the concern of theoreticians and observers at this conference. After 50 years of exponential growth in the speed, storage, and capacity of computers, we are at a stage where many of the formerly unimaginable processes involved with star formation can be studied with some realism. These processes include cloud formation in galaxies, cloud turbulence and collapse, disk and binary star formation, pre-stellar jets and winds, the effects of ionization, and star cluster evolution. Remarkably, simulators get about the same results as observers: power law structures and mass functions are reproduced in computers, filaments, clumps and disks are all present, the timescale for star formation comes out about right, and the overall efficiency of turning gas into stars is also right.

Still there are many details that need to be evaluated. In fact, the first two decades of simulations look almost too good in retrospect. When realistic heating and windy feedback are included, the stellar mass function sometimes changes in seemingly unacceptable ways. The full complexity of magnetic processes is not yet modeled either. Different magnetic field configurations could affect the binary fraction and disk sizes. Processes such as ion-molecule radiation chemistry that determine the ionization fraction and rate of diffusion are not in computer codes, nor is magnetic reconnection. Radiative transfer through complex gas structures has barely begun. There is still a lot to do

<b>IAUS 271</b>	<b>Astrophysical Dynamics: from Stars to Galaxies</b>
Date and Place	21 - 25 June 2010, in Nice, France
Chairs of SOC	Nic Brummell (USA), Allan Sacha Brun (France)

We live in a dynamic Universe. Wherever we point our ground-based or space-born telescopes, we see clear evidence of intricate, multi-scale, time-dependent phenomena. The Sun exhibits intense convective and magnetic activity that impacts the entire heliosphere, including our own planet Earth. Other stars, whether they are being formed, live on the main sequence or are on the verge of dying, likewise show intense activity, and the most massive ones die in tremendous energetic events. Their host galaxies are equally active and dynamic. Throughout their formation and subsequent evolution they may undergo dramatic mergers, create and destroy bars, accrete from surrounding cosmological filaments or emit powerful jets detectable as radio lobes. These phenomena and many others occurring in the cosmos undeniably demonstrate that in order to understand our Universe, astronomers in the 21st century must face the complexity of nonlinear dynamical systems head-on with multiwavelength, multi-scale observations, sophisticated theoretical models, and high-resolution numerical simulations on modern high-performance computing platforms.

This is a very challenging task, but thanks to the universality of the laws of physics and to common fundamental physical processes at work in most astronomical objects, such as gravity, turbulence, mixing, magnetism, dynamo action and dynamical instabilities, progress can be made by appealing to a comprehensive theoretical framework.

Astrophysical dynamics, which encompasses astrophysical fluid dynamics, clearly constitutes such a framework and has already led to substantial progress in modern astronomy. To list just a few notable achievements, we are now able to model the convective layers of stars and their large-scale differential rotation, to describe aspects of the formation of stars and the dynamics of accretion disks and jets, to study the formation of bars and density waves in galaxies, and to simulate galactic mergers. Still, many fundamental challenges remain, such as elucidating the ultimate origins of the 22-year solar activity cycle, the stellar initial mass function, and the bi-modal galaxy color distribution. How do subtle nonlinear interactions among gravitation, magnetism, and inertia give rise to such a diversity of observed phenomena?

In this final report of the IAU Symposium on “*Astrophysical Dynamics: From Stars to Galaxies*” we are pleased to say that we were able to bridge the gap between stars and galaxies, emphasizing commonalities in physical processes, observational techniques and modelling strategies. All the leading experts in solar and stellar physics, galaxy structure and evolution, astrophysical fluid dynamics, and dynamical systems theory, have made a tremendous effort to improve our understanding of complex astrophysical systems and in particular, to educate and inspire young scientists, preparing them for the challenges that lie ahead. The technical issues were addressed in all fields from dynamo to galaxy mergers. In this symposium researchers have interacted directly and compared their methods and approaches since in many cases they are solving the same equations. Thanks to many discussion sessions (twice a day + questions time at the end of each talk), dedicated poster sessions and coffee break near the poster room and a common lunchroom on the 7th floor of the Grand Aston Hotel, ample time has been allocated to such interdisciplinary exchanges in order to promote cross-fertilization.

<b>IAU S272</b>	<b>Active OB stars: structure, evolution, mass loss, and critical limits</b>
Date and Place	19 - 23 July 2010, in Paris, France
Chair of SOC	Coralie Neiner (France)

The IAU Symposium 272 was a great success thanks to the participation of many researchers from 26 different countries and various fields of research in the domain of active OB stars. The programme including both complete long reviews by experts and shorter talks on very new results often presented by

young researchers has been very much appreciated. Discussions held at the end of each thematic session have been active and fruitful. Among the many highlights of the symposium, one could mention the following examples:

- The observation of magnetic fields in massive stars is a recent domain of research that already provided important results, in particular thanks to the MiMeS project. The magnetic fields of OB stars are rare, internally strong, organised and show no correlation with stellar properties. Only a few percents of massive stars show magnetic fields with intensity at the surface larger than 300 G.
- Important progress has also been made on the theoretical and numerical side in the field of magnetism. For example, a parameter which describes the magnetic confinement of the wind has been introduced and allows one to classify magnetospheres. On the analytical side, the first stable configuration of fossile magnetic field has been determined.
- Mass loss estimates depend on density or density squared, depending on the type of determinations used (e.g. radio and H $\alpha$  estimates depend on density, while UV determinations depend on density squared). Indeed, the presence of clumping leads to large overestimates when based on radio and H $\alpha$  data. Only X-ray spectroscopy makes it possible to determine mass-loss rates without being affected by clumping.
- There is a strong dependence of most properties of OB stars on the metallicity of their environment. For example, the lower the metallicity, (1) the lower the mass-loss rate, (2) the larger the projected rotational velocities, and (3) the more Be stars there are.
- From the new LBV discovered, in particular in external galaxies, one can derive that the LBV phenomenon is not restricted to high metallicities. Moreover, the lifetime of the LBV phase is much longer ( $2\text{--}5 \cdot 10^5$  years) than previously assumed. Thus the LBV phase may be the phase when most of the mass loss necessary to form WR stars occurs, solving the problem of WR star formation.
- The advent of interferometry allows to study and model circumstellar discs in detail, for example around Be stars. Most disc properties are consistent with a viscous decretion disc (the size at various wavelengths, the thin opening angle, the small deviations from a Keplerian disc, the long term variations in the integral light and colors, etc), unless the disc is confined by a magnetic field.
- The occurrence and strength of magnetic fields detected in Herbig Ae/Be stars is compatible with the fraction and properties of magnetic fields observed in Ap/Bp stars assuming flux conservation. Thus magnetic Herbig stars are probably the progenitors of Ap/Bp stars.
- The launch of high-precision photometric space missions, such as MOST, CoRoT and Kepler, allows asteroseismic studies and bring



many new facts concerning the interior of massive stars, in particular about overshooting, semi-convection and rotational mixing.

- The observation of a Be outburst by CoRoT showed the coincidence between the outburst and pulsation mode-enhancement. This correlation allows a giant step forward in the understanding of the Be phenomenon.
- Recent IR spectro-interferometry allowed a better understanding of the geometrical structure of the environment of Herbig Ae/Be stars, as well as the origin of their winds.

### **IAU S273**

### **Physics of Sun and Star Spots**

Date and Place    23 - 26 August, 2010, in Los Angeles, California, USA

Chairs of SOC    Debi Prasad Choudhary (USA), Klaus G. Strassmeier (Germany)

The goal of IAU Symposium 273 was to bring the solar and stellar astronomers together to discuss the developments in the field of sunspots and star spots. This collaboration would give an opportunity to extend the knowledge of sunspots to understand the unresolved observations of star spots. There were about half participants from both solar and stellar field. There was a vigorous interaction between these two communities leading to exchanges and new collaborations. There were three PhD thesis presentations. The following are few highlights of the scientific results presented in the symposium:

- The magnetoconvection models show that the convective processes responsible for the complicated magnetic structure of the penumbra and the mechanisms leading to the driving of strong horizontal outflows in the penumbra (Evershed effect) as well as large scale outflows in the periphery of sunspots (moat flows). Strong horizontal outflows in the sunspot penumbra can be explained through a redistribution of kinetic energy preferring flows along the filaments.
- The sunspot 1 minute cadence line of sight magnetogram observations show prominent changes of magnetic flux contained in the flaring spot region. Except in one case, the observed limbward flux increases while diskward flux decreases rapidly and irreversibly after flares. This observational evidence provides strong support, either directly or indirectly, the photospheric magnetic fields must respond to coronal field restructuring and turn to a more horizontal state near the Polarity Inversion Layer after eruptions.
- The observations of stars in wide range of wavelength provide valuable information on stellar magnetic field. At the shortest wavelengths, Xrays arise from magnetically heated coronal plasma, and study of transient heating events provides constraints on coronal length scales and magnetic field strengths required to confine the coronal plasma.

X-ray line diagnostics provide newly used constraints on spatial scales, with a bias towards compact coronal loops. At the opposite end of the electromagnetic spectrum, radio observations diagnose the presence and action of accelerated particles in stellar atmospheres. The persistent nature of nonthermal stellar radio emission, in addition to transient events, points to both the global and localized nature of magnetic fields in stellar atmospheres.

- The recent study of the late B-type star HD 11753 with HgMn peculiarity revealed a fast dynamical evolution of chemical surface spots. This result implies a hitherto unknown process operating in late B-type stars with radiative envelopes.
- The long-term sunspot observations in near IR wavelengths show a lot of scatter but at a barely significant level we see that smaller, brighter and magnetically weaker spots have appeared more frequently as time passes.
- The Ca II H imaging observations by the Hinode Solar Optical Telescope (SOT) have revealed that the chromosphere is extremely dynamic, especially around sunspots. Chromospheric ejections and jets are well observed in most regions around sunspots. X-ray observations show frequent occurrence of microflaring activities around sunspots; small emerging flux or some type of moving magnetic features can be identified on the footpoints for half of microflares studied, but no clear magnetic activities are observed at footpoints even with SOT high spatial magnetograms.
- Active region studies show that both tether cutting and breakout model result in CMEs in different time scales.

#### **IAU S274**

Date and Place  
Chairs of SOC

#### **Advances in Plasma Astrophysics**

6 - 10 September, 2010, in Catania, Italy  
A. Bonanno (Italy), E. de Gouveia dal Pino (Brazil),  
R. Rosner (USA), A. Kosovichev (USA)

#### *Scientific Summary*

The symposium was an important occasion to in order to discuss 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 in astrophysical systems (the dynamo problem), the origin of x-ray emitting coronas and the role of magnetic reconnection, acceleration of charged particles and cosmic rays, winds and jets from highly-evolved stars and supernova remnants, plasma radiation processes, turbulence of the magnetized plasma in astrophysical objects, in the interstellar and intergalactic media and the solar wind, quantum plasmas under

extreme conditions in planetary interiors and in exotic stars, and other key problems in modern plasma astrophysics.

*Scientific content and discussion at the meeting:*

More than 99% of the baryonic matter in the universe is in the plasma state, and many similar plasma phenomena occur in astrophysical systems on scales different by many orders of magnitudes. For example, magnetic fields are continuously generated by turbulent motions in planets, stars and galaxies; mass ejections and shocks are observed on the Sun, protostellar systems, gamma-ray bursts, neutron stars and black holes; impulsive magnetic energy release occurs in solar and stellar coronae, X-ray binaries and active galactic nuclei; shocks and particle acceleration exist in solar flares, supernova remnants, gamma-ray bursts, clusters of galaxies, etc. Recent multi-wavelength observations from ground and space provide a very important and timely question about plasma phenomena in the Universe. In addition, substantial progress has been made in theoretical modelling, computer simulations and laboratory experiments. Moreover, there has been a significant effort to incorporate the fundamental concepts of plasma physics in the interpretation of astronomical observations. The field of plasma physics, with strong impetus from fusion, laboratory and space plasma science has grown to significant maturity. In recent years, it has become increasingly clear that this mature body of knowledge is likely to have a significant impact in the eventual resolution of some of the outstanding questions in astrophysics, such as the origin and dynamics of magnetic fields in astrophysical systems ("the dynamo problem"), the mysteries of x-ray emitting coronas and the role of magnetic reconnection, the acceleration of charged particles and cosmic rays, the ejection of winds and jets from highly-evolved stars and supernova remnants, the turbulence of the magnetized plasma in the interstellar medium and the solar wind, and more generally, the problem of magnetic self-organisation which is at the heart of the key question of the angular momentum transfer in astrophysical (and laboratory) plasma. The most important goal of the symposium was therefore to bring together experts from plasma physics community, MHD community, laboratory experiments community and numerical simulation experts.

In fact, plasma astrophysicists have always been a fairly small group, often distinct from the main astrophysical community, holding their own workshops and special sessions at plasma physics conferences. Despite the identification of a rich class of physical problems of mutual interest, the plasma physics and astrophysics communities remain, for the most part, quite detached, with different societies and memberships, conferences and journals. Thus, the primary goal of the this Symposium was to promote links and cooperation between these communities, to discuss the recent advances in understanding the fundamental plasma physics processes and their application to interpretation and understanding phenomena observed in astrophysical plasmas at various scales. Despite the wide range of temporal and spatial scales and conditions the basic physics of

these phenomena is often very similar. Therefore, it was a unique occasion to discuss these issues together. The most important scientific outcomes of the conferences were the followings: *Study of physics of magnetic reconnection in a laboratory plasma* (M. Yamada) where for the first time was shown the occurrence of magnetic reconnection in a laboratory experiment, and *Galaxy dynamo by supernovae-driven interstellar turbulence*, where for the first time it was shown that dynamo action in galaxies can be generated by the supernovae explosion driven turbulence.

*Assessment of the results and impact of the even in future direction of the field:*

Undoubtedly, such discussions and exchange of ideas from different fields will lead to a better understanding of the basic mechanisms of many observational phenomena, their origin, structure and dynamics, and will guide future astrophysical observing programmes, as well as theoretical and numerical modeling and laboratory experiments in plasma astrophysics.

Such interdisciplinary and cross-discipline discussions become increasingly important as they provide a unique opportunity to get a broader view of the field and new ideas about new methodologies and approaches. This aspect is particularly crucial for younger researchers because the learning curves in various sub-disciplines become steeper and steeper. For this reason, in addition to traditional review and contributed talks covering outstanding observational and theoretical problems of astrophysical plasmas planned to devote some time to discussions at the end of each day sessions. In fact the organisers proposed to schedule sessions on the recent progress in computer simulations, laboratory experiments and observational programmes from space and ground-based observatories. It is important to stress that the last day it was decided that this type of meetings should occur on yearly or biyearly base, so that it was informally announced the meeting

**Magnetic Fields in the Universe: from laboratory and stars  
to primordial Structures III (MFU III)**

August 21 - 27, 2011, Tatra Mountains, Poland

which is intended to be a natural follow-up of the IAU274 symposium.

**IAU S275      Jets at All Scales**

Date and Place    13 - 17 September, 2010, in Buenos Aires, Argentina

Chair of SOC      Gustavo E. Romero (Argentina)

The IAU Symposium No. 275 on Jets at all Scales was held in Buenos Aires city, Argentina, in September 2010. Out of 187 registered participants, more than 130 from 26 countries met at the Novotel, in the traditional Calle Corrientes of Buenos Aires, to discuss the latest results on astrophysical jets and outflows.

The first ideas for this Symposium appeared at discussions among participants of the 7th Microquasar Workshop, entitled "Microquasars and Beyond," held in Foca, Izmir, Turkey, in September, 2008. The series of Microquasar Workshops had by then extended over more than a decade and started to attract participants from far beyond the relatively small community of researchers on galactic binary systems. Comparisons between the jets of microquasars and those presented by other astrophysical objects like gamma-ray bursts, active galactic nuclei, and young stellar objects were becoming more and more common in these meetings. The time seemed to have arrived for a much larger meeting that could gather outstanding researchers from all these different fields to discuss at length the similarities and differences among all types of jets, as well as the underlying physics.

The opportunity came in 2009 with the endorsement and sponsoring by IAU Commissions and Divisions and subsequent approval by the IAU Executive Committee. The final result reflects, I think, a good balance of different topics related to the production, collimation, propagation, interaction, and radiative properties of jets on all scales. Both new theoretical and observational results of high impact were presented at the Symposium, including the first detection of polarized synchrotron emission from the jet of a young stellar object (discovery published subsequently in *Science*).

The discussions were highly motivating and constructive. Many of them occurred during extensive coffee breaks, posters sessions, and in the nearby cafés of Buenos Aires. Their effect, I am sure, will appear in many forthcoming publications and can be already appreciated in the volume edited by G.E. Romero, R. Sunyaev, and T. Belloni, and published by CUP.

The meeting was also an occasion to celebrate Félix Mirabel's 65th birthday and pay tribute to his outstanding contributions to our current knowledge of jets. Félix has been a source of inspiration for all of us that have worked with him. His permanent action fostering high-energy astrophysics in South America deserves a particular mention.

It has past a while since the last IAU Symposium was held in Argentina. This new occasion helped to promote a research field that is growing very fast in several South American countries. It was also a good opportunity to show how strong the female astrophysical community is in Argentina: 17 out of 25 Argentinians that attended the Symposium were women (2/3 of the total number of women in the meeting). I doubt that such a rate can be matched in any other country.

<b>IAU S276</b>	<b>The Astrophysics of Planetary Systems: Formation, Structure and Dynamical Evolution</b>
Date and Place	10 - 15 October, 2010, in Torino, Italy
Chair of SOC	Alessandro Sozzetti (Italy)

More than 500 planets are now known to orbit main-sequence stars in the neighbourhood of our Sun, discovered and characterized using a variety of techniques, both from the ground and in space. On the one hand, the observational data on extrasolar planets show striking properties indeed, likely evidence of the complexity of the process of planet formation and evolution. On the other hand, the large flow of empirical information gathered on extrasolar planets in the Solar neighbourhood is such that in-depth studies are now possible, which allow us to reach a deeper understanding of the mechanisms regulating their formation processes, their internal structure and atmospheres, and their long-term dynamical evolution. Next-generation observatories (both from the ground and in space) and new methods of data analysis have reached a degree of ripeness that the discovery of planets similar to our Earth, for which it might be possible to establish the degree of habitability, appears to be behind the corner. Fifteen years after the first announcement of a Jupiter-mass companion orbiting a normal star other than the Sun, the formation and evolution of planetary systems is now emerging as a new, quickly expanding interdisciplinary research field.

When the vast breadth of exoplanets research is taken as a whole, one then realizes how we're now witnessing the beginning of a new era of comparative planetology, in which our Solar System can finally be put in the broader context of the astrophysics of planetary systems. To this end, help from future data obtained with a variety of techniques will prove invaluable. Planet search surveys, initially focused solely on planet discovery, are now being designed to put the emerging properties of planetary systems on firm statistical grounds and thus thoroughly test the theoretical explanations put forth to explain their existence. Furthermore, both NASA and ESA are now formulating strategies to establish a logical sequence of missions and telescope construction to optimize the pace of exoplanet discoveries (with both direct and indirect techniques) and address key questions on the physical characterization and architecture of planetary systems.

The 276<sup>th</sup> IAU Symposium, held in Torino, Italy, during the week of October 10-15, 2010, focused on addressing two main questions: Where do we stand? What's next? At the time of definition of the final scientific programme, the broad range of issues in the astrophysics of planetary systems selected to provide answers to these questions was divided into four main topical sessions:

*Planet Formation, Internal Structure and Atmospheres, Interactions, and The Next Decade.* The first three sessions allowed for vibrant confrontations between theory and observations. Datasets of the highest quality, state-of-the-art numerical tools,

and increasingly sophisticated theoretical models showed the impressive progress being made in our understanding of planet formation and evolution. The last session provided a forward look into strategic planning exercises of both community and agencies and into ongoing preparations and developments of future ground-based and space-borne observatories devoted to exoplanetary sciences.

One major objective achieved during the Symposium was indeed that of connecting scientific results obtained by ground-based and space-borne research programmes for the detection and characterization of extrasolar planets with the grand projects that will contribute to move forward the frontier of research in the field during the next decade. The most recent, exciting discoveries of transiting rocky planets ('Super Earths') by the Kepler and CoRoT space telescopes were discussed in parallel to unprecedented results obtained with large ground-based facilities, such as the VLT and the Keck Observatories, regarding the characterization of the chemical composition of the atmospheres of nearby exoplanets. From the ground, ambitious project to search for Earth analogs around the nearest stars with the HARPS spectrograph were discussed in the context of the science potential of next generation instruments that will come online during the next decade, such as ESPRESSO on the VLT, or CODEX on the 42-m E-ELT. From space, the heritage of the great results obtained by the Hubble and Spitzer space telescopes (at visible and infrared wavelengths) on the characterisation of the structural and atmospheric properties of extrasolar gas giants was shown to form the basis for the design of new challenging exoplanet characterisation programmes with the next generation of space observatories, such as NASA's JWST and ESA's Gaia.

The community answered even more enthusiastically than we could hope for. The great interest in the Symposium can be easily quantified in terms of its sheer numbers: 12 invited review, 27 invited talks, 39 oral contributions, and some 120 posters, whose authors had the opportunity to illustrate with 1-minute presentations within five dedicated daily poster popups sessions. Overall, the Symposium entertained 218 astronomers from 27 countries. The enthusiasm and professionalism of the participants crucially helped in making IAUS 276 an overwhelming success.

<b>IAU S277</b>	<b>Tracing the Ancestry of Galaxies (on the land of our ancestors)</b>
Date and Place	13 - 17 December, 2010, in Ouagadougou, Burkina Faso
Chairs of SOC	Claude Carignan (Canada), Ken C. Freeman (Australia)

This Symposium was the opportunity to examine the possible links between nearby, mature galaxies and the distant objects that our deepest extragalactic surveys now routinely uncover. Major open questions pertaining to the evolu-

tion of these objects into the galaxies we see today were addressed and confronted to theoretical models of galaxy formation and evolution. In recent years, the multi-wavelength mapping of galaxies has enabled a new vision of their structure and composition that may, or may not, be compatible with theoretical precepts.

We are living the golden era of multi-wavelength observations with COSMOS, GOODS, MUSYC, AEGIS and several other surveys probing deep areas of the sky. In the Local Universe, multi-wavelength observations have also reached the survey era with SDSS, SINGS, SINGG and NGVS, among others. Sophisticated instrumentation are allowing the comparison of spatially resolved measurements of the dynamics and chemical composition of galaxies at high redshifts with high-resolution kinematical and abundance maps of local galaxy, possibly yielding new insights into the mass assembly and the integrated star formation history of galaxies.

There is emerging evidence that the properties of  $z > \sim 2$  galaxies are quite drastically different from those of the galaxies in the local universe. Disks appear to be more turbulent and gas-rich, early-types appear to be much smaller for a given mass than their local counterparts and morphologies do not fit in the Hubble sequence of present-day galaxies. Moreover,  $z \sim 1$  seems to be the epoch of transition where galaxies start to resemble more the present-day population and where star formation starts to decrease.

One legitimate question the participants tried to answer was: can we really apply the knowledge gained from low- $z$  studies to the high- $z$  galaxy populations, in view of the strong apparent differences in observed properties? Or do we still have to rely heavily on models/simulations, often based on simplified and likely inadequate recipes for the complex and poorly constrained physical processes involved to interpret high- $z$  observations? With the next generation of facilities coming on line worldwide or in final design stage (e.g. Atacama Large Millimeter Array, Extremely Large Telescopes, James Webb Space Telescope, Large Synoptic Survey Telescope, Square Kilometer Array, etc.) that will allow us to probe galaxies at redshifts  $z=1$  or beyond with similar precision as in the local Universe, the time was right at the end of 2010 to assess the current status of the field.

This Symposium brought together theorists and observers in an attempt to reach a common understanding of the puzzles that our research has recently unfolded, largely through the study of galaxy dynamics and their stellar populations at low and high redshifts. With Meerkat (Karoo Array Telescope) and Salt (South African Large Telescope) in operation in South Africa and Astrophysics being developed in Burkina Faso, it seemed timely to hold such a meeting in Africa,



especially following the IYA and the resolution of the 2009 IAU General Assembly asking to support the development of Astronomy in emerging countries.

The education side was not left out, with a discussion of the IAU Strategic Plan: Astronomy for the Developing World and different tools presented for astronomy teaching (e.g. IAU/TAD) and research (e.g. virtual observatory). In parallel with the science symposium, there was also a very successful 2 days IAU/TAD workshop to form 50 (1 per province and 5 from Ouagadougou) Burkinabè secondary school teachers. The programme of the workshop was prepared by Michèle Gerbaldi (IAP) and the formation was given by Ed Guinan (Villanova: president IAU/TAD), Rosa Maria Ros (Catalunya: president of IAU Commission 46), Jean-Pierre de Greve (Brussels) and Katrien Kolenberg (Wien).

Also, in parallel with the scientific symposium, there was another 2 days workshop to define the basis of what will become the African Astronomical Society (AfAS), which should be launched, in the coming year. African from 12 different African countries participated to the AfAS workshop.

Finally, outreach activities were not left out. During the meeting, Symposium's participants gave 3 public lectures at the Centre Culturel Français and 7 participants gave talks in Ouagadougou's schools.

We can say that this first IAU Symposium in Sub Saharan Africa (outside South Africa) was a great success. This gave a big boost to the new Astrophysics programme at the University de Ouagadougou and to the rebuilding of the Marly Telescope in the northeastern part of the country.

*Scientific and Education Sessions:*

- 1) Large Photometric (UV, optical, IR) Surveys
- 2) Large HI & CO Surveys
- 3) Large 3D Kinematical Surveys - low  $z$
- 4) Large 3D Kinematical Surveys - high  $z$
- 5) Stellar Populations in the Local Universe and at high  $Z$  and Galaxy Evolution
- 6a) Teaching Aids for Astronomy (High School & Undergraduate):  
Open to Local Teachers
- 6b) The Virtual Observatory (VO): A Wealth of Data for Astronomical Research in Africa and Worldwide
- 7) Confronting Cosmological Simulations and Galaxy Evolution Models with Galaxy Samples
- 8) Mass assembly
- 9) Unsolved problems
- 10) Panel Discussion & Conference Summary

## 6.2 IAU Meetings, July – December, 2011

### 6.2.1 Symposia

#### 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](mailto:orio@astro.wisc.edu)>

URL: <<http://www.pd.astro.it/oapd/IAU281/IAU281.html>>

#### 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>

URL: <<http://www.astro.sk/IB2E/>>

### **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), Romano Corradi (Spain),

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 Schoenberger (Germany), Albert Zijlstra (United Kingdom)

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 Schoenberger (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>

URL: <[www.iac.es/congreso/iaus283/](http://www.iac.es/congreso/iaus283/)>

### **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>

URL: <<http://www.mpi-hd.mpg.de/sed2011/>>

### **IAUS 285 New Horizons in Time Domain Astronomy**

Date and Place: 19 - 23 September, 2011, in Oxford, UK

Coordinating Division: XII - Union-Wide Activities

Chairs of SOC: Elizabeth Griffin (Canada), Robert Hanisch (USA)

Members of SOC: Conny Aerts (Belgium), Dipankar Bhattacharya (India), Jianning Fu (China Nanjing), Arne Henden (USA), Keith Horne (United Kingdom), Aris Karastergiou (United Kingdom), Katrien Kolenberg (Austria), 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: Vanessa Ferraro-Wood, Sarah Blake, Tom Evans,  
Ian Heywood, Kate Maguire, Amy McQuillan,  
Yen-Chen Pan, Kimon Zagkouris (United Kingdom)

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-ihc.nrc-cnrc.gc.ca>  
URL: <<http://www.physics.ox.ac.uk/IAUS285/>>

### **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)

Members 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](mailto:sgibson@ucar.edu)>

URL: <<http://iaus286.iafe.uba.ar/>>

## 6.2.2 Regional Meetings, July – December, 2011

### **APRIM 2011: XI Asia-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 (Thailand),  
Busaba Hutawarakorn Kramer (Thailand/Germany)

Members of SOC: Matthew Bailes (Australia), Leonardo Bronfman (Chile), Wen-Ping Chen (Taiwan), Kwong Sang Cheng (Hong Kong), Neil Gehrels (USA), John B. Hearnshaw (New Zealand), Norio Kaifu (Japan), Young-Woon Kang (South Korea), Ken Kellermann (USA), Ajit K. Kembhavi (India), Hideiyuki Kobayashi (Japan), Yuri Y. Kovalev (Russia), Sun Kwok (Hong Kong), Hakim L. Malasan (Indonesia), Premana W. Premadi (Indonesia), Sheng-Bang Qian (China), David Ruffolo (Thailand), Ingrid Stairs (Canada), Lister Staveley-Smith (Australia), Russ Taylor (Canada), Stan Whitcomb (USA), Gang Zhao (China Nanjing)

Chair of LOC: Saran Poshychinda (Thailand)

Members of LOC: Patarawat Arj-ong, Suparerk Aukkaravittayapun, Pimwan Chaikamwang, Siriporn Chaisri, Pratchaya Chatuphian, Wichan Insiri, Praphond Issariyakul, Jullada Kaosa-ard, Siramas Komonjinda, Wichean Kraiwattanawong, Watcharawuth Krittainathan, Apichat Leckngam, Patcharintorn Leckngam, Julin Likasiri, Chalida Niparak, Warin Pattanayota, Saran Poshychinda, Chanpen Silawongsawas, Korakamon Sriboonrueng, Kritsada Srisuk, Thana Thancharoenporn, Kanlaya Thapiang, Sodchuen Wiboolsake

**Topics:** All areas in Astronomy and Astrophysics

Contact: Busaba Kramer <busaba@narit.or.th> or <kbusaba@gmail.com>  
 URL: <<http://conference.narit.or.th/aprim2011/index.php/aprim2011/2011>>

### 6.2.3 Co-sponsored Meetings in 2011

#### 2011 IAA Planetary Defense Conference

9 - 12 May 2011, in Bucharest, Romania  
 URL: <[www.pdc2011.org](http://www.pdc2011.org)>

#### 14<sup>th</sup> COSPAR Capacity Building Workshop on Data Analysis of the XMM-Newton, Chandra and Suzaku X-ray Missions

25 July - 5 August 2011, in San Juan, Argentina  
 Contact: <cospar-sj-2011-ws@sciops.esa.int>  
 URL: <<http://hea-www.harvard.edu/~gluna/cospar/index.ht>>

## 6.3 Meetings in 2012

### 6.3.1 Symposia outside the General Assembly

#### IAUS 287 Cosmic masers - from OH to Ho

Date and place: 29 Jan. - 3 Feb. 2012, Stellenbosch, South Africa  
 Coordinating Division: X - Radio Astronomy  
 Chairs of SOC: R Booth (South Africa) <rbooth@ska.ac.za>  
 E. Humphreys (Chile), V. Vlemmings (Germany)

Members of SOC: A. Bartkiewicz (Poland), V. Bujarrabal (Spain),  
 J.M. Chapman (Australia), S. Ellingsen (Australia), M. Elitzur (USA),  
 Y. Gomez (Mexico), M.D. Gray (UK), M. Honma (Japan), A.J. Kemball (USA),  
 K.-T. Kim (S. Korea), H.J. van Langevelde (Netherlands), J.M. Moran (USA)

Chairs of LOC: R. Booth, S. Goedhart (South Africa)  
 Members of LOC: K. de Boer, M. Gaylard, J. van der Waalt,  
 P. Whitelock, (South Africa)

Editors of Proceedings: V. Vlemmings (Germany), E. Humphreys (Chile),  
 R. Booth (South Africa)

#### **Topics**

- Advances in MASER theory
- Polarisation and Magnetic Fields



- Masers and Star Formation
- Stellar Masers
- Maser Surveys
- Cosmology and the Hubble Constant
- Astrometry with Masers
- AGN and Mega Masers
- New Masers and Maser Physics
- Observations of masers with the new facilities

**IAU S279 Death of Massive Stars: Supernovae and Gamma-Ray Bursts**

Date and Place: 12 - 16 March 2012, in Nikko, Japan

***Postponed from 18-22 April, 2011 because of tsunami***

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>

### 6.3.2 General Assembly Scientific Programme

#### *GA Symposia*

**IAUS 288 Astrophysics from Antarctica**

Contact: Michael Burton (Australia) <m.burton@unsw.edu.au>

**IAUS 289 Advancing the physics of cosmic distances**

Contact: Richard de Grijs (China) <grijs@kiaa.pku.edu.cn>

**IAUS 290 Feeding compact objects: Accretion on all scales**

Contact: Zhang Chengmin (China) <zhangcm@bao.ac.cn>

**IAUS 291 Neutron stars and pulsars: Challenges and opportunities after 80 Years**

Contact: Richard Manchester (Australia) <dick.manchester@csiro.au>

**IAUS 292 Molecular Gas, Dust, and Star Formation in Galaxies**

Contact: Martin Bureau (UK) <bureau@astro.ox.ac.uk>

**IAUS 293 Formation, detection, and characterization of extrasolar habitable planets**

Contact: Nader Haghighipour (USA) <nader@ifa.hawaii.edu>

**IAU S294 Solar and astrophysical dynamos and magnetic activity**

Contact: Alexander Kosovichev (USA) <sasha@sun.stanford.edu>

**IAU S295 The intriguing life of massive galaxies**

Contact: Daniel Thomas (UK) <daniel.thomas@port.ac.uk>

#### *Special Sessions at the General Assembly*

**SpS1 Origin and complexity of massive star clusters**

Contact: Giampaolo Piotto (Italy) <giampaolo.piotto@unipd.it>

**SpS2 Cosmic evolution of groups and clusters of galaxies**

Contact: Jan Vrtilik (USA) <jvrtilik@cfa.harvard.edu>

**SpS3 Galaxy evolution through secular processes**

Contact: Ron Buta (USA) <rbuta@bama.ua.edu>

**SpS4 New era for studying interstellar and intergalactic magnetic fields**

Contact: Han JinLin (China) <hjl@nao.cas.cn>

**SpS5 The IR view of massive stars: the main sequence and beyond**

Contact: Margaret Hanson (USA) <hansonmm@ucmail.uc.edu>

**SpS6 Science with large solar telescopes**

Contact: Gianna Cauzzi (Italy) <gcauzzi@arcetri.astro.it>

**SpS7 The impact hazard: current activities and future plans**

Contact: Alan Harris (USA) <harrisaw@att.net>

**SpS8 Calibration of star-formation rate measurements across the electromagnetic spectrum**

Contact: Andreas Zezas (Greece) <azezas@physics.uoc.gr>

**SpS9 Future Large Scale Facilities**

Contact: Roger Davies (UK) <rld@astro.ox.ac.uk>

**SpS10 Dynamics of the star-planet relations**

Contact: Jean-Louis Bougeret (France)  
<jean-louis.bougeret@obspm.fr>

**SpS11 IAU Strategic Plan and the Global Office of Astronomy for Development**

Contacts: George Miley (Netherlands), Kevin Govender (South Africa)  
<miley@strw.LeidenUniv.nl> and <kg@astro4dev.org>

**SpS12 Modern views of the interstellar medium**

Contact: You-Hua Chu (USA) <yhchu@illinois.edu>

**SpS13 High-precision tests of stellar physics from high-precision photometry**

Contact: Dave Soderblom (USA) <drs@stsci.edu>

**SpS14 Communicating astronomy with the public for scientists**

Contact: Dennis Crabtree (Canada)  
<Dennis.Crabtree@nrc-cnrc.gc.ca>

**SpS15 Data intensive astronomy**

Contact: Masatoshi Ohishi (Japan) <masatoshi.ohishi@nao.ac.jp>

**SpS16 Unexplained spectral phenomena in the interstellar medium**

Contact: Sun Kwok (China) <sunkwok@hku.hk>

**SpS17 Common Special Session: Strategies & approaches for increasing light pollution awareness & education around the globe**

Contact: Beatriz García (Argentina) <beatrigarciautn@gmail.com>

and: **Astronomical site protection and the menace of blue-rich lighting**

Contact: Richard Green (USA) <rgreen@lbto.org>

**SpS18 “Hot Topics” for each week**

Contact: Thierry Montmerle (France) <montmerle@iap.fr>

### *Joint Discussions at the General Assembly*

**JD1 The highest-energy gamma-ray universe observed with Cherenkov telescope arrays**

Contact: Diego Torres (Spain) <dtorres@ieec.uab.es>

**JD2 Very massive stars in the local universe**

Contact: Jorick Vink (UK) <jsv@arm.ac.uk>

**JD3 3-D views of the cycling Sun in stellar context**

Contact: Lidia van Driel-Gesztelyi (France)  
<Lidia.vanDriel@obspm.fr>

**JD4 Ultraviolet emission in early-type galaxies**

Contact: Sugata Kaviraj (UK) <s.kaviraj@imperial.ac.uk>

**JD5 From meteors and meteorites to their parent bodies: Current status and future developments**

Contact: Junichi Watanabe (Japan) <jun.watanabe@nao.ac.jp>

**JD6 The connection between radio properties and high-energy emission in AGNs**

Contact: Gabriele Giovannini (Italy) <ggiovann@ira.inaf.it>

**JD7 Space-time reference systems for future research**

Contact: Dennis McCarthy (USA) <dennis.mccarthy@usno.navy.mil>

Full details of the Scientific Programme of the 2012 General Assembly will be given on the web site <www.astronomy2012.org> and will be published in IB109, January 2012.

### **6.3.3 Regional Meetings 2012**

No Regional Meetings are held in General Assembly years.

### **6.3.4 Co-sponsored Meetings 2012**

#### **10<sup>th</sup> Arab Conference on Astronomy and Space Sciences**

5 - 8 February, 2012, in Oman

Organised by the Arab Union of Astronomy & Space Science (AUASS)

Contact: Hamid M.K.Al-Naimiy, University of Sharjah  
<alnaimiy@sharjah.ac.ae>

#### **COSPAR 39<sup>th</sup> Scientific Assembly and Associated Events**

14 - 22 July, 2012, in Mysore, India

Scientific Programme Chair: U.R. Rao, Department of Space, India

URL: <www.cospas-assembly.org>

### **6.4 Other meetings of astrophysical Interest**

#### **"The Extreme and Variable High Energy Sky"**

##### **Workshop celebrating 9 years of INTEGRAL success in Space**

19-23 September 2011, Centro Congressi Chia Laguna, Sardegna

Chairs of SOC: L. Bassani, A. Bazzano

URL <www.iasf-roma.inaf.it/extremesky\_chia2011/index.htm>

## **7. IAU Educational Meetings and Activities**

### **7.1 International Schools for Young Astronomers – ISYA**

#### **Report of the 33<sup>rd</sup> ISYA 2011, Lijiang, China, 31 March - 21 April 2011**

*Jean-Pierre De Greve, Chairman PG ISYA*

The 33<sup>rd</sup> ISYA 2011 was held in China, hosted by the Yunnan Observatory (YNAO) and co-organised by the Lijiang Teacher's College (LTC).

The following organisations sponsored the ISYA programme:

The KAVLI Foundation and the Norwegian Academy of Science and Letters (NASL), the International Astronomical Union (IAU), the Chinese Academy of Sciences (CAS), Chinese Natural Science Foundation (CNSF), Yunnan Astronomical Observatory (YNAO), Lijiang Teachers College (LTC).

KAVLI and the IAU covered travel expenses of the participants (visas, insurance, and air fare, local transport, and cultural trips), as well as some extra costs of the weekend trips.

#### *Location*

Yunnan Astronomical Observatory, founded in 1938, is a ground-based observatory for practical astrophysics in southern China. The main research areas include active galactic nuclei, stellar evolution, variable and binary systems, physics of solar active regions, astrometry, and the applications of new technologies and methods in astronomy. The Chinese Academy of Sciences has designated the Observatory as a Key Laboratory for the Structure and Evolution of Celles-

tial Objects. There are several ground-based optical and radio telescopes in YNAO, such as 60-cm, 1-m, 1.2-m and 2.4-m optical telescopes, 10-m and 40-m radio telescopes. In addition, a new 1-m solar spectropolarimetry infrared telescope and 1.8-m adaptive optical telescope have been put into operation.

The student and lecturer accommodation was in the Linjiang Lijun Hotel, a 4-star hotel with national character located in the intersection of Lijiang ancient town and New city. It is only 30 km away from the airport and 0.5 km away from the bus station. There are 114 rooms with air conditioning. All meals were provided in the hotel restaurant, except during the PCRSA Conference when lunch was served in the conference hotel. The hotel has a well equipped conference room which was used for the lectures in the first two weeks.

#### *Students*

Out of 48 candidates, 22 were selected for participation. Three of these withdrew, and two additional candidates were selected. Finally, 19 candidates from outside China showed up. There were four students from the DPR Korea. The number was further complemented by 18 Chinese students. In total there were students from 10 countries participating. The gender distribution was 24% female, 76% male.

#### *Arrivals and departures*

The students were met at the airport, and transported in groups in small buses, while taxis were arranged to bring the lecturers to the Lijiang Lijun Hotel. After the ISYA, the majority of students travelled as a group by train from Lijiang to the airport of Kunming.

#### *Opening ceremony*

The Opening Ceremony was held on April 1, 2011, at 9 pm. The participants were welcomed by the Vice Mayor of Lijiang government, Zhang Renbin, and by Michele Gerbaldi and Kam-Ching Leung on behalf of the organisers. In the evening, a welcome dinner was organised.

#### *Programme*

In total, there were 9 lecturers scheduled from 8 countries. Due to unforeseen circumstances, Dr. Garik Israelian (Spain) was unable to attend. Lectures started at 9:00 am and finished at 5:30 pm. 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 till 14:00.

#### *Lectures:*

- |                  |   |
|------------------|---|
| Michel Dennefeld | ▪ <i>Observing Techniques</i> (series of 3 lectures)      |
| Michele Gerbaldi | ▪ <i>Fundamental Stellar Properties from Observations</i> |

	(series of 4 lectures)
Ed Guinan	▪ (4 lectures)
Thijs Kouwenhoven	▪ <i>Dynamics of Star Clusters &amp; Multiple Systems</i>
Kam-Ching Leung	▪ <i>Astrophysics of Emission-Line Stars</i> (series of 4 lectures)
Shengbang Qian	▪ <i>Astronomy in China and Yunnan</i>
	▪ <i>Close Binary Systems</i> (series of 3 lectures)
ZHU Liying	▪ <i>IRAF, Photometry</i> (series of 3 lectures)

Nine slots were reserved for student presentations of 15-30 minutes each. The lecturers agreed that the presentations were well prepared and of high quality:

Supachai Awiphan (Thailand)	<i>Variations in orbital periods of contact binaries</i>
Samanta Acharya (Nepal)	<i>Astronomical opportunities in Nepal</i>
Johan Muhamad (Indonesia)	<i>Solar radio research in Indonesia</i>
Dr Kai Li (China)	<i>Variable stars in the globular clusters</i>
Sirinapa Arjyotha (Thailand)	<i>Photometric observations of 2 new long periods CVs</i>
Jujia Zhang (China)	<i>Integral Field Unit for the 2.4 telescope</i>
Putri Siti Rahma (Indonesia)	<i>Photometric studies of field stars in the region of M6 and M7 open cluster</i>
Dr Jia Zhang (China)	<i>Algol type binaries</i>
Chutipong Suwannajak (Thailand)	<i>Star formation activity in nearby galaxies</i>
Dr Lijiang Li (China)	<i>The long term period changes in two delta scuti type stars : DY Peg and AN Lyn</i>
Rishi Ram Paudel (Nepal)	<i>Spatial orientation of angular momentum in three merging clusters</i>
Sonam Arora (India)	<i>Indian astronomical observatory HCT – Supernova 2007rw (photometric observations)</i>
Dr Ergang Zhao (China)	<i>Period search of massive binary stars</i>
Jingjing Wang (China)	<i>G-type solar like contact binary</i>
Linqiao Jiang (China)	<i>An introduction of M star</i>
Anh Tuan Pham (Vietnam)	<i>Radio detection of the Sun</i>
Xu Yonghua (China)	<i>Helioseismology, solar site survey, solar telescope in China</i>
Lam Duc Hoan (Vietnam)	<i>A photometric exercise to understand stellar evolution</i>
Erika Valdueza (Philippines)	<i>Astronomy in the Philippines</i>
Wen Xiao (China)	<i>Helioseismology, solar site survey, solar telescopes in China</i>
Janette Suherli (Indonesia)	<i>Brief introduction to astronomy study at Bandung Institute of Research &amp; at Bosscha Observatory</i>
Janette Suherli (Indonesia)	<i>Photometric study of V899 Her</i>
Kim Kyong Chol (DPR Korea)	<i>BC 3000 ~200 star maps Korean dolmen</i>

Students got both theoretical aspects of observing as well as tutorials to analyse the practical aspects. On several evenings, groups of students visited the telescopes of the Yunnan Observatory, where they got demonstrations from residents of the observatory.

*practical training sessions:*

- |                            |  |
|----------------------------|--|
| Jia Zhang                  | • preparation for observations (introduce 2.4-m telescope and CCD camera) :                            |
| Zhu Liying                 | • preparation for observations (selected objects for photometry); introduction to IRAF                 |
| Michel Dennefeld           | • preparation for observations (Selected objects for spectroscopic observations)                       |
|                            | • introduction to spectroscopic data reduction   |
|                            | • CCDs   |
| <i>practical exercises</i> | • IRAF photometric data reduction (seven sessions)   |
| <i>evening visits:</i>     | • visits to the observatory and introduction to photometry, with observations done by the technicians. |
|                            | • introduction to the Echelle Spectrograph, with observations done by technicians                      |

A special seminar was given on 2 topics related to the scientific career:

- |               |   |
|---------------|---|
| J.P. De Greve | • How to write and publish a research paper |
|               | • Applying for a position                   |

In the last week, the Summer School coincided with the PRCSA. For the ISYA participants, this represented a unique opportunity to attend a professional international conference. Some students presented a paper, and several of them participated in the discussion after each presentation. During the coffee break they engaged in lively discussions with other participants on the research presented in the posters.

### ***Evaluation***

At the end of the ISYA, students filled in a 4-page evaluation sheet. The feedback was overwhelmingly positive, with some suggestions for improvement:

Comments on observation training:

- More was expected from the observation training. They learned to handle the telescope in groups, but found the groups too large and the time too short. Small. Moreover, the training was a demonstration by a technician. The students preferred hand-on experience, and more time, to perform group projects.

Comments on the PRCSA Conference:

- Some of the presentations were fine, some others were at a too high level. Moreover, some speakers were talking quite fast and sometimes



mumbling. The abstracts in the programme book were not in order, which made it difficult to use the programme book.

Comments on accommodation:

- The meals were mostly very good, and well arranged, though some students found the breakfast monotonous and with food sometimes badly prepared.
- Students noted a difference between the services announced in the programme guide and the reality. This was specifically the case for the available computers and the wireless internet connection.

Comments on cultural tours and leisure:

- The cultural part was very much appreciated. One improvement could be the availability of sports facilities.

Overall comments:

- The ISYA was very well organised. The LOC made large efforts to make the stay comfortable. Students appreciated the assistance of the local students. It was recommended to organise some after dinner activities during the first days, so the students would get better acquainted with each other.

The next ISYA will be held in South Africa in February 2012, hosted by the South African Astronomical Observatory (SAAO).

## 7.2 TAD

### **TAD programme in Nicaragua**

*Report by Jaime García*

#### *Introduction*

The only University department completely devoted to Astronomy in Nicaragua is the Observatorio Astronómico de la Universidad Nacional Autónoma de Nicaragua-Managua. Established in the capital city, the Observatory was founded by the University in 2007. Three Nicaraguan astronomers (Humberto García Montano, Ligia Aréas Zavala and Marcel Chow Martínez) went to Argentina and México to complete their degrees and have returned to Nicaragua and are on the Observatory's staff. The Coordinator of the Observatory, Dr. Gámez Rodríguez, is a PhD in Mathematics from the University of Moscow, with no background in Astronomy.

The equipment of the Observatory is a small 8" SCT alt-azimuth with a ST237 and a DSI-Pro monochrome CCD camera, with a set of BVRI

filters that are presently out-of-order. They are covered by fungi and the coating is completely destroyed.

Astronomy is not a university degree option in Nicaragua. The Universidad Nacional Autónoma de Nicaragua-Managua offers a regular degree in Physics, but there are no professional astronomers capable of supervising a graduate degree (as MS or PhD) in Astronomy or even of supporting the preparation of a thesis. At present, students preparing a thesis for a degree need to have an advisor from abroad.

Some students of Physics are very interested in Astronomy and one of them will be advised for his thesis by Dr. Jaime García.

There are only two groups of amateur astronomers in Nicaragua. Both of them are based in Managua but have members in Masaya and Granada. The amateurs are very interested not only in popularising Astronomy, but also in observing, studying and making real contributions to science.

#### **Training course on variable star observing techniques using CCD Image acquisition for high precision photometry and calibration to standard systems**

Jaime García (IAU/TAD) conducted this course in January, 2011. The following institutions were involved:

- Observatorio Astronómico de la UNAN-Managua (OAUNAN-Managua), Área de Astrofísica, Depto. de Física – Facultad de Ciencias e Ingeniería  
Coordinator: Dr. Luis Gámez Rodríguez
- Asociación Nicaragüense de Astrónomos Aficionados (ANASA)  
Dr. Jaime Inser Barquero, President  
Ing. Julio C. Vannini, Secretary
- Asociación Científica de Astronomos y Astrofisicos Nicaragüenses (ASTRONIC)  
Ing. David Castillo Pacheco, President  
Aynhe A. Castillo Anderson, Secretary

#### *Objective*

The objective of the training was to increase the technical capabilities of professional astronomers, students and amateurs to contribute with the science of variable stars, using CCD techniques and data mining techniques. In detail:

- 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;
- to learn how to mine into catalogues and databases about variable stars.

*Activities:*

- The training lasted 8 days, with some activity during the afternoon (including talks and software training) and observing sessions, during the night.
- 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.

*Trainees:*

- 22 people completed this training.
- They came from Managua, Masaya and Granada.
- They were professional astronomers and students from OAUNAN-Managua, and amateur astronomers from ANASA and ASTRONIC

*Trainer:*

Dr. Jaime García  
Instituto Copérnico, Rama Caída, Mendoza, Argentina

*Sponsors:*

International Astronomical Union – IAU  
American Association of Variable Star Observers  
Instituto Copérnico  
Universidad Autónoma de Nicaragua - Managua

*Conclusions:*

There are several things that could be done in order to promote Astronomy in Nicaragua:

- continue to support training such as that conducted in January 2011;
- help the Observatory to acquire adequate research equipment;
- provide grants for students of Physics to acquire Masters or PhD degrees abroad, e.g. in Argentina and Mexico;
- provide grants for supporting research in Astronomy supervised by astronomers from abroad;
- help to organise an International School for Young Astronomers for Nicaraguan and other Central American graduate or undergraduate students, in order to encourage interest in Astronomy;
- support the development of programmes like NASE.

### **Regional East Africa Astronomy workshop**

21 - 25 February, 2011, in Addis Ababa, Ethiopia

Hosted by the Addis Ababa University, College of Natural Science,  
School of Earth and Planetary Science

*Report prepared by Petri Vaisanen <petri@sao.ac.za> and Solomon Belay  
<solomobe@yahoo.com>*

#### ***Brief summary***

A total of 85 people, of which 71 Ethiopians, participated in the Second Regional East Africa Astronomy Workshop in Addis Ababa. The programme consisted of basic astronomy lectures, contributed talks by participants, lectures on telescopes and detectors, computer labs on both educational and professional astronomy software, as well as outreach training. There was a dual purpose of teaching basic astronomy while at the same time emphasising modern observational astronomy.

We were honored by the presence in several sessions by his excellency Ato Tefera Waluwa, the Chairman of the ESSS Board of Directors, and a high-ranking government official. The ongoing Entoto 1-m class telescope project was thoroughly discussed between the hosts and the SAAO experts.

#### ***Background***

This astronomy workshop originated from two separate previous events. In November 2009 there was a first regional astronomy workshop held in Nairobi, Kenya, with major sponsorship from IAU/TAD and IYA/DAG, and the present workshop can be seen as its direct continuation. On the other hand, there was a partially PGWWD-sponsored trip to Ethiopia in December 2008 by Peter Martinez and Petri Vaisanen, during which the idea of a future astronomy workshop was discussed with the local hosts, the Ethiopian Space Science Society (ESSS), as well as universities.

The success of the Nairobi workshop led to the wish of the astronomical community in East Africa to hold similar events in the region, hopefully annually, rotating from country to country, and because of the previous discussions in Ethiopia it was a natural choice for the next event. Moreover, the evident keenness of the ESSS to host, organise and sponsor the event, when the possibilities were discussed in early 2010, made the decision of the location easy. We note, finally, that for some time in 2010 there was an idea to combine the workshop with similar workshop plans of Charles McGruder from the Western Kentucky University. This, however, fell through due to lack of WKU funding.

#### ***Format of the Workshop(s)***

The format of these East Africa Regional Astronomy Workshops is still developing, of course, but the basic idea seems to be very fruitful. Most of the parti-

cipants come from the universities of the host country. They are advanced undergraduate or graduate students and/or lecturers, typically from physics departments around the country. In addition, there are 2-4 foreign lecturers and a dozen or so participants are sponsored to come from the neighbouring countries. The latter are partially students, but mostly established and new professional members of the East African astronomical community (or Society, see below), who have also helped to assemble the programme and give talks at the Workshop. This group is crucial in developing educational and research networks with in the region and also to take ownership of the continuation of the workshops.

With the Addis workshop, in particular, we wanted to have two tracks for part of the duration. The first three days mainly consisted of a presentation of Ethiopian astronomy, a series of introductory astronomy lectures (Petri Vaisanen a compacted version of the NASSP summer school taught in 20-hours every year at the SAAO), lectures on telescopes and instrumentation by David Buckley, talks by participants themselves, and time for open discussion about the present and future of astronomy in East Africa, on the constitution of the East African Astronomical Society, and curriculum development. In addition, there was a half-day excursion the ESSS-driven Entoto Telescope site outside of Addis Ababa.

For the last 2 days of the week we separated the workshop into *two simultaneous tracks*. One track concentrated to a CLEA workshop, led by Abiy Tekola, with the primary objectives of giving participants a feeling of observational astronomy and introducing CLEA as a very useful teaching tool for lecturers interested in developing their astronomy classes. The other track, led by Petri Vaisanen, on the other hand, concentrated on giving (mainly) graduate students basic skills and understanding of astronomical data formats and data reduction using professional software; IRAF, ds9, and SExtractor were used.

### ***Local organisation***

ESSS is a non-governmental organisation established in 2004 by a group of astronomy enthusiasts from a diverse range of backgrounds. In addition to hundreds of amateur astronomers and students it includes science professionals and many influential individuals from the government and universities, and has managed to raise substantial funds from private sources to drive their telescope project and other astronomy initiatives.

The full responsibility for all local organisation, including financial responsibility of venue, local participants, conference dinner, lecture room material, etc. etc., was very kindly provided by the ESSS and by the funds they had raised for the workshop. The Addis Ababa University (AAU) provided the meeting venue as well as the two computer labs needed. ESSS organised the registration of all Ethiopian participants from around the country – their travel and accommodation costs were subsidized by their respective universities and the LOC's fund

raising efforts, based on an agreement made between ESSS and Ethiopian Universities.

#### ***Local Organising Committee***

- Solomon Belay, ESSS and Kotebe College of Teacher Education  
- Chair
- Lemi Demeyou, Physics Department, Addis Ababa University
- Gizaw Mengistu, Institute of Geophysics, Space Science & Astronomy, Addis Ababa University
- Tolu Biressa, ESSS and Jimma University
- Getinet Feleke, ESSS and Kotebe College of Teacher Education
- Alemiye Mammo, ESSS and Hawassa University
- Gezahegn Yirgu, ESSS and Addis Ababa University

#### ***International SOC***

- Petri Vaisanen, SAAO, SA - Chair
- David Buckley, SAAO, SA
- Kevin Govender, SAAO, SA
- Gezahegn Yirgu, ESSS and Addis Ababa University
- Solomon Belay, ESSS and Kotebe College
- Paul Baki, Nairobi University, Kenya
- Edward Jurua, Mbarara University of Science of Technology, Uganda
- Pheneas Nkundabakura, Kigali Institute of Education, Rwanda
- Abiy Tekola, SAAO, UCT, SA

#### ***Lecturers***

- Paul Baki, Astrophysicist at Nairobi University, Kenya
- Solomon Belay, Astrophysicist at ESSS and Kotebe College, Ethiopia
- Tolu Biressa, Lecturer at Jimma University, Ethiopia
- Abiot Biressaw, Lecturer at Bahir Dar University, Ethiopia
- David Buckley, Director of SALT Operations, South Africa
- Kevin Govender, Head of SALT Collateral Benefits Program and new Director of the International Office for Astronomy Development of the IAU, South Africa
- Nadir Hashim, Astroparticle physicist, lecturer at Kenyatta University, Kenya
- Edward Jurua, Astrophysicist, Mbarara University of Science and Technology, Uganda
- Tsegaye Kassa, Lecturer at Bahir Dar University, Ethiopia
- Simon Anguma Katrini, Lecturer, Mbarara University of Science and Technology, Uganda
- Melessaw Nigussie, Lecturer at Bahir Dar University, Ethiopia
- Pheneas Nkundabakura, Astrophysicist, UFS, South Africa, and Kigali Institute of Education, Rwanda
- Pierre Nzohabonayo, Lecturer at University of Burundi

- Tahani Shatir, Lecturer at the University of Khartoum, Sudan
- Abiy Tekola, Finishing PhD student at UCT/SAAO, South Africa
- Petri Vaisanen, Astronomer at SAAO and SALT, South Africa
- Gezahegn Yirgu, Chairman of ESSS, Dean of the School of Earth & Planetary Science

### ***Participants***

Including the speakers above, there were a total of 85 registered participants in the workshop – 30 more than anticipated, highlighting the interest generated amongst the universities in Ethiopia. A total of 14 of the participants came from outside the country, including 4 from South Africa (SAAO) and the rest from neighbouring countries.

As a sign of professional development of astronomy in Ethiopia, the LOC chair Solomon Belay obtained a PhD in astrophysics last year, and another one, Tolu Biressa, is expected to get his this year. In addition, one of the participants from SAAO, Abiy Tekola, is in fact an Ethiopian who has submitted his PhD thesis to University of Cape Town earlier this year.

### ***Computer workshops***

The CLEA software workshop was again a big success. The professional astronomy software workshop (IRAF etc.) was very useful for many participants. However, we were hampered first by very slow internet connection which delayed the installation of some packages, and especially later by non-existent unix/linux skills of many of the participants of this workshop. Clearly, in the future, this part of the programme should be given only to those with some level of linux skills, unless there is time to give a separate linux crashcourse.

### ***The Entoto Telescope Project***

ESSS has a very ambitious plan to develop observational astronomy in Ethiopia and the whole region. They have been donated a mountain ridge site approx. 15 km north-east of Addis Ababa at ~3200 m altitude for an observatory that is intended for both education/outreach purposes as well as scientific use. The infrastructure at the site including conference and hostel facilities is already in the latter stages of construction. Some initial advice on the project was given by Peter Martinez and Petri Vaisanen in December 2008. David Buckley visited in December 2009, followed by much more detailed advice. During this workshop, the SAAO delegation, led by David Buckley's expertise again met with the ESSS board members to finalise their plans to purchase 1-m telescopes for the site, as well as to discuss plans for further site-testing at a better and more remote astronomical site near Lalibela. It is understood that the project, when up-and-running, will benefit the whole East African community. SAAO will continue to provide consultation help.

***Discussions on the future of astronomy in the region and the East African Astronomical Society***

There were several opportunities to discuss the situation of astronomy in Ethiopia and in East Africa. These sessions led by Kevin Govender were very useful and informative. The following declaration was signed by all participants.

**The Addis Ababa Declaration:**

*The Second East African Astronomy Development Workshop, held in Addis Ababa in February, 2011, and attended by representatives from Ethiopia, Uganda, Sudan, Rwanda, Kenya and Burundi, hereby declares that:*

- 1. We consider this workshop a sufficiently representative gathering for the development of astronomy in East Africa and as such, after discussion, we hereby acknowledge previous efforts and declare our wish to establish the East African Astronomical Society.*
- 2. We have established a representative "East African Astronomical Society working group," and we task them to lead efforts towards the establishment of the East African Astronomical Society.*
- 3. As an organised regional group we wish to have our collective voice heard in international discussions concerning astronomy in Africa. As such we task the East African Astronomical Society working group to engage immediately with the African Astronomical Society to ensure that our region is appropriately represented at every stage.*
- 4. We acknowledge and commend the efforts in Ethiopia towards the establishment of an astronomical observatory in Entoto, which would strongly stimulate the development of astronomy in East Africa, and we commit to work together as a region in realising maximum benefit from this facility.*

*This document was signed on 25<sup>th</sup> February 2011 in Addis Ababa by those present.*

***The big picture***

Why do we think this workshop, and similar ones in the future are important in developing astronomy in Africa?

- There is very little astronomy taught in sub-Saharan Africa (outside South Africa). However, there clearly is interest in developing astronomy here – this is evident from a growing network of physical sciences students and lecturers in universities and other educational institutions throughout the region wanting to see astronomy growing as a science, career choice, as well as a public outreach vehicle. The interest can also be seen in the rapid increase in the number of students from around the continent applying to the Cape Town-based National Astrophysics and Space Sciences programme.

However, there is not enough capacity in that one programme to meet the wide interest. It is crucial to start developing teaching elsewhere, in the longer term goal of establishing similar programmes of astronomy in other regions of Africa,



to make use of the observational facilities in Africa (especially SALT and Meer-KAT) and elsewhere.

Thus, the driving purpose of the workshops is the development of a regional astronomy research and teaching hub in East Africa. The workshops give a compact lecture series covering basic astronomy to help participants teach and develop undergraduate astronomy courses, or to start/continue with further astrophysics studies themselves. The workshops address the astronomy research aspect by introducing modern astronomical observational techniques, data reduction and analysis skills, as well as introducing tools to plan observing programmes.

In order to build the public image of astronomy and to promote it as a field of study, the workshop will also include training on basic astronomy education and outreach which could be performed by Physics students and lecturers amongst the schools and public in the region. This method of using students and lecturers to engage in outreach activities has shown to be a powerful way of generating enthusiasm towards the subject at all levels. Finally, the workshops are used for networking and developing future plans for astronomy in Africa.

## 8. IAU PUBLICATIONS

### 8.1 IAU *Highlights of Astronomy* and Transactions

*Transactions XXVIII*A will be published by CUP in 2012.

### 8.2 IAU *Symposium Proceedings* published in 2011

*just appeared:*

#### **IAUS 260 The Role of Astronomy in Society and Culture**

19-23 January 2009, Paris, France

Eds. David Valls-Gabaud & A. Boksenberg

Cambridge University Press, ISBN: 9780-521-76477-3

*2010 Symposia Proceedings published to date:*

#### **IAUS 270 Computational Star Formation**

3 - 7 May, 2010, Barcelona, Spain

Eds: J. Alves, B. Elmegreen, V. Trimble

Cambridge University Press, ISBN 9780-521-76643-2

26 April 2011

**IAUS 274 Advances in Plasma Astrophysics**

6 – 10 September 2010, Catania, Italy

Eds: A. Bonanno, A. Kosovichev

Cambridge University Press, ISBN 9780-521-19741-0

16 June 2011

**IAUS 275 Jets at All Scales**

13 – 17 September 2010, Buenos Aires, Argentina

Eds: Gustavo Romero, Rashid Sunyaev, Tomaso Bellon

Cambridge University Press, ISBN: 9780-521-76607-4

24 February 2011

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<<http://www.iau.org/science/publications/iau/symposium/list/>><<http://www.iau.org/science/publications/iau/colloquium/list/>>**9. Reports from other Organisations****9.1 CIPM Consultative Committee for Units (CCU)***Nicole Capitaine, IAU Representative in the CCU, 23 May 2011**Observatoire de Paris, France, <[nicole.capitaine@obspm.fr](mailto:nicole.capitaine@obspm.fr)>*

Activities of the Consultative Committee for Units (CCU) of the *Comité international des poids et mesures* (CIPM) concern matters related to the development of the International System of Units (SI), preparation of successive editions of the SI brochure, and advice to the CIPM on matters concerning units of measurement. The CCU is currently chaired by Ian Mills (Dept. of Chemistry, University of Reading, UK); it is formed of delegates and experts from a number of national institutes of metrology and international scientific unions, including the IAU (see the CCU web page at: <[www.bipm.org/en/committees/cc/ccu/](http://www.bipm.org/en/committees/cc/ccu/)>).

The main activity of the CCU in 2009 and 2010 was to continue to advance in the revision of the definitions of some of the base units (cf. « News from the CCU », IAU IB 102, July 2008, p 78), for preparing a « new SI ». The intention is to redefine four of the SI base units, namely the kilogram, the ampere, the kelvin and the mole, in terms of invariants of nature; the new definitions would be based on fixed numerical values of the Planck constant ( $h$ ), the elementary

charge ( $e$ ), the Boltzmann constant ( $k$ ), and the Avogadro constant ( $N_A$ ), respectively. The definitions of all seven base units of the SI would also be uniformly expressed using the explicit-constant formulation, and specific *mises en pratique* would be drawn up to explain the realization of the definitions of each of the base units in a practical way. It is important to recall that of the seven base units of the SI, only the kilogram is still defined in terms of a material artefact, namely the international prototype kept at the BIPM. The major disadvantage of that current definition is that it refers to the mass of the artefact, which, by its very nature, we know cannot be absolutely stable. By basing the definition of the kilogram on an invariant of nature instead of a material artefact, it will be possible to realize the SI unit of mass at any place, at any time and by anyone. The uncertainties of the values of many other important fundamental constants and energy conversion factors would be eliminated or greatly reduced if  $h$ ,  $e$ ,  $k$  and  $N_A$  had exact numerical values when expressed in SI units.

Progress towards the new SI has been reviewed and discussed during the 19<sup>th</sup> and 20<sup>th</sup> CCU meetings that were held on 26-28 May 2009 and 14-16 September 2010, respectively, at the *Bureau international des poids et mesures* (BIPM) in Sèvres (France). A draft Chapter 2 for the SI Brochure has been prepared, providing a draft specification for the SI, which would follow from the proposed redefinition of the kilogram, ampere, kelvin and mole. The changes described include changes in the words used to present the definitions of the units, in addition to the fundamental changes proposed for the four base units described above. When these changes have been adopted this draft may become the basis of a new edition of the SI Brochure. However, while remarkable progress has been made over the last few years, the conditions for adopting the redefinition, as set by the *Conférence générale des poids et mesures* (CGPM) in 2007, have not yet been fully met. Communication, awareness and debate on the possible revision of the SI are encouraged. In this purpose, two key documents can be consulted on the BIPM web site at <[www.bipm.org/en/si/new\\_si](http://www.bipm.org/en/si/new_si)>: Draft Resolution A, "On the possible future revision of the International System of Units, the SI," extract of the Convocation of the CGPM (24<sup>th</sup> meeting, Oct. 2011), and Draft Chapter 2 of the 9th SI brochure (dated 29 Sept. 2010), as produced by the CCU at its 20th meeting (2010) and to be further amended in the coming years.

## 9.2 The International Space Weather Initiative (ISWI)

*Report by David Webb, IAU Representative for the ISWI*

The first international ISWI workshop was held in Helwan, Egypt, November 6-10, 2010 and is for the Western Asia region. About 200 registered scientists participated from 30 countries. The focus was on instrument planning and training workshops. Future Workshops are planned for Nigeria in 2011 and Ecuador in 2012.

Six Space Science Schools were organised during the IHY. The first ISWI Space Science School was held in Bahir Dar University in Ethiopia, November 2010. A total of 56 delegates representing 16 different African countries attended the school in Ethiopia. These included 14 instructors from six different countries. A full report on this school is at:

<[www.stil.bas.bg/ISWI/Outreach/ISWI2010-School-Report.pdf](http://www.stil.bas.bg/ISWI/Outreach/ISWI2010-School-Report.pdf)>.

This year ISWI-sponsored schools are being held in Slovakia, Kinshasa, RD Congo, Rabat, Morocco, Lagos, Nigeria, Abuja, Nigeria, and Mumbai, India.

The next steps for ISWI include: 1) Identifying appropriate sites for new instrument deployments, 2) Identifying additional instruments for deployment, 3) Adding additional experiments to the current list of 14, and 4) Utilizing these new instrument data sets in modeling and predictions. Additional information on ISWI can be found at <<http://iswi-secretariat.org>> and on Twitter: ISWINews.

### **9.3 Scientific Committee on Solar-Terrestrial Physics (SCOSTEP)**

*Nat Gopalswamy, LAU Representative to SCOSTEP*

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The SCOSTEP Secretariat Office is now located (as of June 2010) at the Centre for Research in Earth and Space Science (CRESS) at York University in Toronto, Canada and is supported by the Canadian Space Agency and York University. The move followed the appointment of Marianna Shepherd as the Scientific Secretary of SCOSTEP. COSPAR has appointed Takuji Nakamura of the National Polar Research Institute in Tokyo as a replacement for Ryo Fujii whose term ended in 2010. The list of scientific discipline representatives (SDRs) is being updated by a subcommittee consisting of Nat Gopalswamy, Christian Hanuise and Brigitte Schmieder. The recommendation of the subcommittee will be considered in the upcoming Bureau meeting, which will take place on July 2, 2011 during the IUGG General Assembly in Melbourne, Australia. The General Council meeting will take place on July 3, 2011 in the same venue, when the election process for the new SCOSTEP President will be completed.

#### *The SCOSTEP Scientific Program*

The current scientific programme of SCOSTEP is "Climate And Weather of the Sun-Earth System (CAWSES 2009-2013)." The CAWSES programme helps coordinate international activities in observations, modeling, and applications aimed at a better understanding of the effects of the Sun on life on Earth. CAWSES also promotes capacity building and educational activities throughout the world. The CAWSES programme promotes system science, treating the entire solar-terrestrial domain as one system. CAWSES-I covered the descending phase of the solar cycle from 2004 to 2008, whereas CAWSES-II covers the

rising phase of the solar cycle. Four task groups coordinate the scientific activities. Following is a brief description of each of the task groups.

*Task Group 1: What is the solar influence on climate?*

Task Group 1 is concerned with the effect of transient solar events on the middle and lower atmosphere quantifying the direct and indirect solar effects upon climate over time scales ranging from minutes to millennia. This group is involved in several study projects at the International Space Science Institute (ISSI) in Switzerland.

*Task Group 2: How will Geospace Respond to a Changing Climate?*

This group studies the complex physical and chemical processes of the upper atmosphere in response to processes such as rising greenhouse gas concentrations and cooling in the middle atmosphere and the related consequences in the ionosphere and magnetosphere. This group has undertaken several projects that will help understand the geospace response to the changing climate.

*Task Group 3: How does short-term solar variability affect the geospace environment?*

This group deals with the science of space weather, involving the mass and electromagnetic emissions from the Sun on short time scales. Electromagnetic radiations (flares, irradiance) drive the ionosphere, while the mass emissions (coronal mass ejections, solar wind, solar energetic particles) impact the magnetosphere and lower layers all the way to the surface of Earth. Adverse space weather can be detrimental to human technology in space and on Earth, so understanding space weather effects is important in developing techniques to forecast them.

*Task Group 4: What is the geospace response to variable inputs from the lower atmosphere?*

This group strives for an understanding of the cause-and-effect chain that connects atmospheric variability with geospace processes. In particular, the group is involved in assessing the extent to which the effects of the quiescent atmospheric variability are transmitted to the magnetosphere: Persistent tropical rainstorms drive atmospheric waves that modulate ionospheric densities in the equatorial region. Lightning strokes generate radio waves that interact with radiation belt particles in the magnetosphere. Hurricanes and typhoons generate gravity waves that seed plasma bubbles in the low-latitude ionosphere. Task Group 4 actively encourages interactions between atmospheric scientists and plasma scientists by bringing out a Newsletter once every 3-4 months.

More details on the task group activities are periodically updated in the web site: <<http://www.cawses.org/wiki/index.php>>

*Next SCOSTEP programme*

SCOSTEP is charged by ICSU with organising and running international research programmes in the Solar-Terrestrial environment, of which CAWSES-II

is the latest programme. SCOSTEP activities during CAWSES-II will be reported by Robert Vincent (SCOSTEP President) on at the upcoming 30th General Assembly of ICSU to be held in Rome in September 2011. The SCOSTEP Bureau has tasked Nat Gopalswamy with the compilation of information on the next major scientific programme to be undertaken by SCOSTEP after CAWSES-II ends in 2013. The discussion will be initiated during the Bureau meeting in Melbourne, Australia.

*Solar-Terrestrial Physics Symposium:*

The Solar-Terrestrial Physics (STP) Symposia are held on an approximately quadrennial basis. The twelfth STP Symposium (STP-12) was organised by SCOSTEP during July 12 – 16, 2010 in Berlin. STP-12 provided an excellent opportunity to discuss the scientific accomplishments and outcomes of the CAWSES-I & II programmes. The symposium consisted of tutorial lectures/-keynote talks in the morning followed by specific scientific sessions in the afternoon. The presentations were under the following categories:

1. Solar influences on climate: a. Solar physics, variability, heliosphere; b. solar influences on Earth's climate; c. The role of mesospheric clouds in climate research
2. Space weather: science and impacts: a. CME-ICME connection; b. Shock formation in the solar atmosphere; c. Solar wind and magnetosphere interface; d. Substorm variability
3. Atmospheric coupling processes; a. Geospace response to variable inputs from the lower atmosphere; b. Coupling by transport of photochemically active species; c. The role of dynamic waves for coupling
4. Space climatology: a. Geospace to an altered climate; b. Effect of short-term solar variability on the geospace environment?

STP-12 symposium presentations (oral and poster) can be downloaded from the website: <[www.iap-kborn.de/SCOSTEP2010/material.php](http://www.iap-kborn.de/SCOSTEP2010/material.php)>. STP-12 was co-sponsored by a number of international scientific organisations: IAGA, URSI, IAMAS, SCAR, as well as organisations in Germany: German Science Foundation, Deutsche Meteorologische Gesellschaft, German Aerospace Center, German Research Centre for Geosciences, Leibniz Institute of Atmospheric Physics (Kühlungsborn), Max-Planck Institute for Solar System Research (Lindau).

*SCOSTEP Capacity Building*

SCOSTEP continues the comics books programme to raise the awareness of general public on selected scientific topics. In addition, SCOSTEP has supported several summer schools relevant to Solar-Terrestrial Physics, including the schools organised by the International Space Weather Initiative (ISWI).

## 9.4 Other Reports

### Inauguration of Panama's first observatory (28 - 30 April, 2011)

T. Montmerle (AGS) was invited by the Universidad Tecnológica de Panamá (UTP) to attend the inauguration of the first astronomical observatory of the Republic of Panamá, along with several astronomers from France, Mexico, and Chile. This observatory is situated near the city of Penonomé, Coclé province, about 140 km west of Panama City, on the southern (Pacific) side of the country. This location was chosen because it hosts one of the UTP regional centers and, while at sea level, is relatively dry. The observatory's first Director, Dr. R. Delgado Serrano, holds a PhD from Paris Observatory.

The telescope is a Meade 14" LX200GPS Schmidt-Cassegrain donated by France, installed in a full-fledged building featuring an astronomical dome and several rooms, funded by UTP. It is now equipped with cutting-edge focal-plane devices (CCD detector, autoguide, adaptive optics, filters, etc.). The new telescope will be the "spearhead" of many technological developments and will be used by the UTP for educational, research, and astrotourism projects.

The history of the observatory project dates back to 1998, when members of the "Uranoscope de France" association (a French association aspiring to promote communication among professional and amateur astronomers worldwide) went to Panamá on the occasion of the solar eclipse. A collaborative project was set up, with the goal of installing a telescope in Panamá. Eventually, following an initiative of the "Uranoscope de France," the telescope was donated to Panamá by the French Ministry of Foreign Affairs. The donation took place in 2004 on the occasion the 2<sup>nd</sup> French-Panamanian scientific meeting, sponsored by the local Alliance Française. The construction of the building by the UTP started in 2008.

## 10. 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:

Zenta **ALKSNE** (1928 – 2011), Latvia, 6 March 2011  
 Donald E. **BLACKWELL** (1921 – 2011), United Kingdom, 21 March 2011  
 Victor M. **BLANCO** (1918 – 2011), United States, 8 March 2011  
 Jens Viggo **CLAUSEN** (1946 – 2011), Denmark, 5 June 2011  
 Shinzo **ENOME** (1940 – 2011), Japan, 24 March 2011  
 Alan D. **FIALA** (1948 – 2010), United States, 26 May 2010  
 Darrel B. **HOFF** (1933 – 2010), United States, 2 November 2010  
 Christopher **HUNTER** (1934 – 2008), United States, 2 March 2008  
 George A. **KRASKINSKY** (1939 – 2011), Russia, 17 March 2011  
 Sigfrido **LESCHIUTTA** (1933 – 2011), Italy, 12 May 2011  
 Jelena **MILOGRADOV-TURIN** (1937 – 2011), Serbia, 3 February 2011  
 Alan **MOORWOOD** (1945 – 2011) ESO, Germany, 18 June 2011  
 Alberto **ORTE** (1919 – 2011), Spain, 3 April 2011  
 Malina Dimitrova **POPOVA** (... – 2011), Bulgaria, 14 March 2011  
 V. **RADHAKRISHNAN** (1930 – 2011), India, 3 March 2011  
 Alain **SEGONDS** (1942 – 2011, France, 2 May 2011  
 Walter R. **STEIGER** (1929 – 2011), United States, 6 February 2011  
 Marij A. **SVECHNIKOV** (1933 – 2011), Russia, 19 June 2011  
 Françoise **TRAN-MINH** (1937 – 2011), France, 2 May 2011  
 Ilkka V. **TUOMINEN** (1939 – 2011), Finland, 19 March 2011  
 Magda **VARGHA** (1931 – 2010), Hungary, 8 August 2010

You will have noticed that from time to time we publish brief obituaries of deceased individuals in the Information Bulletin. We normally only publish obituaries of past Presidents and General Secretaries, but very occasionally we may include members who have made outstanding individual contributions to the work of the IAU.



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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 Programme Groups, the IAU covers the whole spectrum of astronomy. The IAU currently has over 10,000 individual members distributed over 91 countries, of which 68 are National Members. The IAU is member of the International Council for Science (ICSU).

The organisation 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 recognised 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 "Office for Astronomy Development" (OAD), through its Programme Groups "International Schools for Young Astronomers" (ISYA), "Network for Astronomy School Education" (NASE), "Teaching for Astronomy Development" (TAD), and "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 Programme 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: Asteroid Impact Crater

Amongst the many impact craters on Earth, the Vredefort Crater in South Africa is probably the largest and the second-oldest. Its age is estimated at more than 2 billion years. The estimated diameter of the impacting asteroid is 5-10 km while the crater has a diameter of 250-300 km. In 2005, the Vredefort Dome at the centre of the crater was added to the list of UNESCO World Heritage Sites.

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