IAU

INTERNATIONAL ASTRONOMICAL UNION

UNION ASTRONOMIQUE INTERNATIONALE

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Preface

We are now less than 6 weeks away from the start of the 28th General Assembly in Beijing, and so this IB is devoted almost entirely to the GA programme. And what a programme it is – 8 Symposia, 18 Special Sessions and 7 Joint Discussions, complemented by a wide range of special events, including those for Young Astronomers and Women in Astronomy. All the details can be found on the IAU or GA web sites. As I write there are over 3000 registered participants, and there has been unprecedented interest in the special events, which is quite a challenge for the organisers. The IAU has offered nearly 400 grants to attendees from all over the world with, as always, particular emphasis on young astronomers and those from less well developed countries.

In addition to the science sessions, there are the usual business meetings for the Divisions and Commissions, which take on a special importance this year because of the proposal to change the Divisional structure of the Union – details were given in IB109 and so are not repeated here. Then there are the two formal sessions of the General Assembly, where the National Members will vote on important changes to the Statutes and Bye-Laws as well as the budget for the next triennium. Finally, we are assured of a spectacular Inaugural Assembly which will display the talents and traditions of our host country. There is much to look forward to in Beijing in August!

Needless to say, the local organisers, the IAU secretariat, the session organisers and the Division and Commission presidents have been working round the clock to ensure that everything is ready on time and the event runs smoothly. I thank them for their continued efforts.

One of the key decisions at the last GA was the implementation of the "Strategic Plan" – astronomy for the developing world. The progress since then has been steady, and recently the three Task Forces foreseen in the Strategic Plan came into being – details can be found on www.iau.org/science/news/157/. With the core organisation now in place and a significantly increased budget proposed for the next triennium, we can be confident that this important activity will grow rapidly and should be able to meet the ambitious targets outlined in Rio.

This is my last Information Bulletin, as I will be stepping down at the end of the GA. More importantly, it is the last IB and the last GA for our Head of Administration, Vivien Reuter, who will be leaving us at the end of 2012. She has proved a veritable pillar of strength, taking over at a very difficult period following the death of Monique Orine and implementing a series of major changes in the way the Secretariat functions while at the same time earning the trust and respect of everyone who ever had any dealings with her or the IAU. She made my task as General Secretary so much easier and I will be eternally grateful to

her. A recruitment exercise is under way to find her successor. I am pleased to say that Jana Zilova will be remaining with us as 'master of the database,' and I thank her too for her contribution.

Of course, I must thank many more people than just Vivien. I particularly want to mention the President, Bob Williams, the Assistant General Secretary, Thierry Montmerle, my predecessor Karel van der Hucht, and all members of the Executive Committee. But in reality I must thank all members of the IAU, whose contribution and participation have made the task of General Secretary so rewarding. I look forward to seeing you in Beijing.

Ian Corbett
26 June 2012

EVENTS AND DEADLINES

2012

20 – 31 Aug	**IAU XXVIIIth General Assembly**, *Beijing, China* EC 91, part I Sunday 19 August EC 91, part II Thursday 23 August EC 91, part III Wednesday 29 August EC 92, Saturday 1 September	
1 Sep	Deadline for Letters of Intent for 2014 Symposia	
30 Nov	Due date for applications for the Gruber Foundation Fellowships 2013	
15 Dec	Deadline for submission of Proposals for 2014 Symposia	
15 Dec	Deadline for nominations for the Gruber Foundation Cosmology Prize 2013	

2013

7 – 11 Jan	**IAUS 296**	**Supernova environmental impacts Kolkata** *Calcutta, India*
20 – 24 May	**IAUS 297**	**The diffuse interstellar bands** *Haarlem, Netherlands*
20 – 24 May	**IAUS 298**	**The impact on galactic science from Gaia, LAMOST, and next generation surveys** *Lijiang, China*
2 – 7 Jun	**IAUS 299**	**Exploring the formation and evolution of planetary systems** *Victoria, Canada*
10 – 16 Jun	**IAUS 300**	**Nature of prominences and their role in space weather** *Paris, France*
19 – 23 Aug	**IAUS 301**	**Precision astroseismology** *Wroclaw, Poland*
25 – 30 Aug	**IAUS 302**	**Magnetic fields throughout stellar evolution** *Biarritz, France*
1 Sep	Deadline for Letters of Intent for 2015 Symposia (GA Year)	
30 Sep – 4 Oct	**IAUS 303**	**The galactic center: Feeding and feedback in a normal galactic nucleus** *Santa Fe, USA*
7 – 11 Oct	**IAUS 304**	**Multi-wavelength AGN surveys and studies** *Byurakan, Armenia*
30 Nov	Due date for applications for the Gruber Foundation Fellowships 2014	
15 Dec	Deadline for submission of Proposals for 2015 Symposia	
15 Dec	Deadline for nominations for the Gruber Foundation Cosmology Prize 2014	

2014

1 Sep	Deadline for Letters of Intent for 2016 Symposia
30 Nov	Due date for applications for the Gruber Foundation Fellowships 2015
15 Dec	Deadline for submission of Proposals for 2016 Symposia
15 Dec	Deadline for nominations for the Gruber Foundation Cosmology Prize 2015

2015

3 – 14 Aug	**IAU XXIXth General Assembly**, *Honolulu, Hawai'i, USA*

1. Executive Committee

1.1 Officers' Meeting, Paris, 23 – 25 January 2012

The principal items discussed were:

- Preparations for the XXVIII GA in Beijing
- The Divisional restructuring proposed by the EC Task Group
- The changes to the IAU Statutes and Bye-Laws to be put to the GA for approval
- The draft accounts for 2011
- The draft IAU budget for the triennium 2013-2015
- Progress in implementing the Strategic Development Plan and with the Office of Astronomy for Development
- The proposals received for scientific meetings in 2013
- Possible new categories of individual membership.

1.2 Executive Committee Meeting EC90, Paris, 18 – 20 April 2012

The principle items discussed were:

- The status of the Secretariat and the replacement of Vivien Reuter when she leaves at the end of 2012. Subsequently a Vacancy Notice for the post of "Head of Administration" was widely circulated and put on the IAU web site. An appointment should be made before the GA.
- The arrangements to maintain the IAU's website and database
- The proposed Divisional restructuring, how Commissions and Working groups might be re-organised in the new structure, and a timeline for its implementation if approved at the GA
- How the Strategic Plan and OAD activities might fit into the new structure
- Progress in implementing the Strategic Development Plan and with the Office of Astronomy for Development
- The changes to the IAU Statutes and Bye-Laws to be put to the GA for approval, and consequent changes required in the Working Rules
- The draft Resolutions received to be put to the GA
- Progress report from the GA LOC and IAU Secretariat on preparations for the GA
- The agenda and programme of the GA
- The proposals received for scientific meetings in 2013, the recommendations received from the Division Presidents, and the final programme for 2013
- The status of IAU publications and the report on 2010 and 2011 from CUP
- Proposals to host the XXX GA in 2018
- The draft accounts for 2011
- The draft IAU budget for the triennium 2013-2015
- Requests to become new National Members

- Possible new categories of individual membership
  The EC agreed that anyone working closely with an IAU Commission or Working Group but ineligible to become an Individual member should be entered in the IAU database as an "Associate." The EC decided not to have a new category of "Junior Member."

1.3 Upcoming EC Meetings

The next meeting of the Executive Committee will be in Beijing, on 19, 23 and 29 August (EC91). The new Executive Committee will meet on 1 September (EC92).

2. XXVIII General Assembly, Beijing, China, 20 – 31 August 2012

Full information on the GA can be found at www.astronomy2012.org

2.1 Message from the Local Organising Committee

From 20 to 31 August 2012, astronomers from around the world will gather in Beijing and exchange the latest reports on progress in all fields of astronomy and to discuss the future development of astronomy worldwide. Over 3000 international participants have already confirmed participation, making this one of the largest astronomical scientific meetings ever. The scientific programme will feature more topics and sessions than ever and a record-breaking number of abstracts will be presented, making this year's general assembly a meeting not to miss.

Registration is still open and we invite you to confirm participation by registering online through www.astronomy2012.org.

In the long history of Chinese Astronomy, and since the establishment of the Chinese Astronomical Society (CAS), it is the first time China will host such an important event. The meeting will have a profound impact on the development of Chinese astronomy, and promote and expand international exchange. Staging an excellent event is the top priority for the Chinese Astronomical Society and the entire astronomical community in China. The local organising committee has made enormous efforts in planning and preparing for the General Assembly and looks forward to warmly welcome the international community to Beijing in August. The spirit of IAU will definitely promote the development of astronomy in China as well as in the world, and strengthen the friendship of our IAU family.

For registered participants, the local organising committee is making a number of services available to facilitate travel and participation in the meeting, including:

- Discounted airfares through Air China and its Star Alliance partners
- Discounted rates and conditions at hotels around the venue of the General Assembly
- Optional tours to many sites in and around Beijing
- Relevant pre- and post-tours to famous tourism resort and astronomical sites in China

All details are available on www.astronomy2012.org

The General Assembly will feature a number of social events, including a special banquet celebrated on the special date of the Qixi Festival, 23 June, which falls on the seventh day of the seventh lunar month on the Chinese calendar. A number of tickets are still available, but it is advisable to book as soon as possible.

The capital of China, Beijing, is well known as a fast-growing, dynamic international metropolis with 3,000 years of history. It is one of the safest and most peaceful cities in the world. The long history leaves Beijing precious cultural treasures, among which no less than four sites have been designated as world cultural heritage by UNESCO: the Great Wall, the Summer Palace, the Forbidden City, and the Temple of Heaven.

The China National Convention Center will play an excellent host to the intensive scientific and social program. Great advance has been achieved in astronomical studies in China. We are now getting ready to present a memorable General Assembly for astronomers all over the world. With natural beauty, rich history and diverse culture, Beijing opens her arms to welcome your arrival in August of 2012!

2.2 Inaugural Ceremony

- "Women's Drum" opens the ceremony at 14:00

Opening Address by *R. Williams*, President of the IAU
Welcome addresses by invitees of Senior Government Officials

- Classic Dance of Qin Dynasty
- Ancient Traditional Musical Instrument Performance

Introduction of *Patricia Gruber* by *R. Williams*, and response
Introduction of 2012 Fellow *Anna-Lisa Varri*
Introduction of 2012 Prize awardee(s) and Acceptance speech(es).

Presentation by invited Chinese speaker
Presentation by *Jocelyn Bell-Burnell*

- "Acrobatics High Chair" – Winner of Gold Award in Chinese National Acrobatic Contest

- Tibet Dance
- Solo Female singer Yang Yuqi – Winner of CCTV singing contest
- "Acrobatics: Silk Act – Butterfly Love" – Winner of Italian Golden Circus Festival and China National Acrobatic Contest
- Performance about development of Chinese astronomy
- Demonstration of Peking Opera costumes and royal palace costumes of Qing and Tang Dynasty.

Ceremony concludes at 16.00 with closing address on behalf of the Chinese Astronomical Society.

2.3 Business Meetings for National Members

Monday 20th August
14:00 National Representatives meeting
15:00 Finance Committee meeting
16:00 Nominations Committee meeting

Tuesday 21st August
14:00 Opening Ceremony
16:30-18:00 First GA Session

Wednesday 29th August
14:00 National Representatives meeting
15:00 Finance Committee meeting
16:00 Nominations Committee meeting

Thursday 30th August
14-15:30 Second GA Session
16:00 Closing Ceremony

2.4 First and Second GA Sessions

Agenda 1st Session – Tuesday, 21 August, 16:30 – 18:00

1. Welcome by *R. Williams*, President
2. Listing of representatives of National Members
3. Adoption of Agenda
4. Reminder of voting rules
5. Appointment of Official Tellers
6. Admission of New National Members *(vote NM)*
7. Revisions to Statutes and Bye-Laws *(vote NM)*
8. Report of the Executive Committee
9. Report of the Special Nominating Committee
10. Presentation of Proposed Changes to Divisional Structure
11. Proposals to host XX General Assembly 2018
12. Close

This session will be followed by a short presentation on ICSU by *Professor Dov Jaron*, and then by a Welcome Reception in the CNCC lobby area, 3rd floor, 18:00-19:30. All are invited.

Draft Agenda 2nd Session – Thursday, 30 August, 14:00 – 16:00

1. Welcome by *R. Williams*, President
2. Individual Members admitted by Executive Committee
3. Deceased members
4. Tribute to *Franco Pacini*
5. Appointment of Official Tellers
6. Proposed Changes to Divisional Structure
7. Resolutions *(voting by Individual Members)*
   - 7.1 B1 on guidelines for the designations and specifications of optical and infrared astronomical photometric passbands
   - 7.2 B2 on the re-definition of the astronomical unit of length
   - 7.3 B3 on the establishment of an International NEO Early Warning System
   - 7.4 B4 on the restructuring of the IAU Divisions
8. Proposed Division Presidents and Vice-Presidents *(vote NM)*
9. Proposed Commission Presidents and Vice-Presidents *(vote NM)*
10. Financial Matters
    - 10.1 Report of Finance Sub-Committee on 2010-2012 Accounts
    - 10.2 Report of Finance Sub-Committee on 2013-2015 Budget
    - 10.3 Formal votes on Accounts and Budget *(vote NM)*
11. Election of Members of Finance and Membership Committees *(vote NM)*
12. Appointment of Resolutions Committee 2012-2015 *(vote NM)*
13. Appointment of the Special Nominating Committee 2012-2015 *(vote NM)*
14. Election of Executive Committee 2012-2015 *(vote NM)*
15. Dates and Place of XXX General Assembly 2018
16. AOB
17. Close of Business.

2.5 Closing Ceremony

2.6 Statutes and Bye-Laws

2.6.1 Proposed Modifications to Statutes

~~Rio de Janeiro, Brazil, 4 August 2009~~
Beijing, 21 August 2012

I. OBJECTIVE

1. The International Astronomical Union (hereinafter referred to as the Union) is an international non-governmental organisation. Its objecttive is to promote the science of astronomy in all its aspects.

II DOMICILE AND INTERNATIONAL RELATIONS

2. The legal domicile of the Union is Paris, France.

3. The Union adheres to, and co-operates with the body of international scientific organisations through the International Council for Science (ICSU). It supports and applies the policies on the Freedom, Responsibility, and Ethics in the Conduct of Science defined by ICSU.

III COMPOSITION OF THE UNION

4. The Union is composed of:

4.a National Members (adhering organisations)

4.b Individual Members (adhering persons)

IV NATIONAL MEMBERS

5. An organisation representing a national professional astronomical community, desiring to promote its participation in international astronomy and supporting the objective of the Union, may adhere to the Union as a National Member.

6. An organisation desiring to join the Union as a National Member while developing professional astronomy in the community it represents may do so:

6.a on an interim basis, on the same conditions as above, for a period of up to nine years. After that time, it must apply to become a National Member on a permanent basis or its membership in the Union will terminate;

6.b on a prospective basis for a period of up to six years if its community has less than six Individual Members. After that time it must apply to become a National Member on either an interim or permanent basis, or its membership in the Union will terminate.

7. A National Member is admitted to the Union on a permanent, interim, or prospective basis by the General Assembly. It may resign from the Union by so informing the General Secretary in writing.

8. A National Member may be either:

8.a the organisation by which scientists of the corresponding nation or territory adhere to ICSU, or:

8.b an appropriate National Society or Committee for Astronomy, or:

8.c an appropriate institution of higher learning.

9. The adherence of a National Member is automatically suspended if its annual contributions, as defined in Articles 23c and 23e below have not been paid for five years; it resumes, upon the approval of the Executive Committee, when the arrears in contributions have been paid in full. After five years of suspension of a National Member, the Executive Committee may recommend to the General Assembly to terminate the Membership.

10. A National Member is admitted to the Union in one of the categories specified in the Bye-Laws.

V INDIVIDUAL MEMBERS

11. A professional scientist who is active in some branch of astronomy may be admitted to the Union by the Executive Committee as an Individual Member. An Individual Member may resign from the Union by so informing the General Secretary in writing.

VI GOVERNANCE

12. The governing bodies of the Union are:

12.a The General Assembly;

12.b The Executive Committee; and

12.c The Officers.

VII GENERAL ASSEMBLY

13. The General Assembly consists of the National Members and of Individual Members. The General Assembly determines the overall policy of the Union.

13.a The General Assembly approves the Statutes of the Union, including any changes therein.

13.b The General Assembly approves Bye-Laws specifying the Rules of Procedure to be used in applying the Statutes.

13.c The General Assembly elects an Executive Committee to implement its decisions and to direct the affairs of the Union between successive ordinary meetings of the General Assembly. The Executive Committee reports to the General Assembly.

~~13.d The General Assembly appoints a Finance Committee, consisting of one representative of each National Member having the right to vote on budgetary matters according to §14.a., to advise it on the approval of the budget and accounts of the Union. The General Assembly also appoints a Finance Sub-Committee to advise the Executive Committee on its behalf on budgetary matters between General Assemblies.~~

13.d The General Assembly appoints a standing Finance Committee to advise the Executive Committee on its behalf on budgetary

matters between General Assemblies, and to advise the General Assembly on the approval of the budget and accounts of the Union. The Finance Committee consists of not more than 8 members of different national affiliations, including a Chairperson, proposed by the National Members, and remains in office until the end of the next General Assembly.

13.e The General Assembly appoints a Special Nominating Committee to prepare a suitable slate of candidates for election to the incoming Executive Committee.

~~13.f The General Assembly appoints a Nominating Committee to advise the Executive Committee on the admission of Individual Members.~~

13.f The General Assembly appoints a standing Membership Committee to advise the Executive Committee on its behalf on matters related to the admission of Individual Members. The Membership Committee consists of not more than 8 members of different national affiliations, including a Chairperson, proposed by the National Members, and remains in office until the end of the next General Assembly.

14. Voting at the General Assembly on issues of a primarily scientific nature, as determined by the Executive Committee, is by Individual Members. Voting on all other matters is by National Member. Each National Member authorises a representative to vote on its behalf.

14.a On questions involving the budget of the Union, the number of votes for each National Member is one greater than the number of its category, referred to in article 10. National Members with interim status, or which have not paid their dues for years preceding that of the General Assembly, may not participate in the voting.

14.b On questions concerning the administration of the Union, but not involving its budget, each National Member has one vote, under the same condition of payment of dues as in §14.a.

14.c National Members may vote by correspondence on questions concerning the agenda for the General Assembly.

14.d A vote is valid only if at least two thirds of the National Members having the right to vote by virtue of article §14.a. participate in it by either casting a vote or signalling an abstention. An abstention is not considered a vote cast.

15. The decisions of the General Assembly are taken by an absolute majority of the votes cast. However, a decision to change the Statutes requires the approval of at least two thirds of all National Members having the right to vote by virtue of article §14.a. Where there is an equal division of votes, the President determines the issue.

15.a To enable the widest possible participation of Individual Members the Executive Committee may decide that voting on certain issues of a primarily scientific nature, as determined by the Executive Committee, shall be open for electronic voting for not more than 31 days counting from the close of the General Assembly at which the issue was raised.

15.b The Executive Committee shall give Members not less than 3 months notice before the opening of the General Assembly of the intention to open certain issues to electronic voting after the General Assembly.

16. Changes in the Statutes or Bye-Laws can only be considered by the General Assembly if a specific proposal has been duly submitted to the National Members and placed on the Agenda of the General Assembly by the procedure and deadlines specified in the Bye-Laws.

VIII EXECUTIVE COMMITTEE

17. The Executive Committee consists of the President of the Union, the President-Elect, six Vice-Presidents, the General Secretary, and the Assistant General Secretary, elected by the General Assembly on the proposal of the Special Nominating Committee.

IX OFFICERS

18. The Officers of the Union are the President, the General Secretary, the President-Elect and the Assistant General Secretary. The Officers decide short-term policy issues within the general policies of the Union as decided by the General Assembly and interpreted by the Executive Committee.

X SCIENTIFIC DIVISIONS

19. As an effective means to promote progress in the main areas of astronomy, the scientific work of the Union is structured through its Scientific Divisions. Each Division covers a broad, well-defined area of astronomical science, or deals with international matters of an interdisciplinary nature. As far as practicable, Divisions should include comparable fractions of the Individual Members of the Union.

20. Divisions are created or terminated by the General Assembly on the recommendation of the Executive Committee. The activities of a Division are organised by an Organising Committee chaired by a Division President. The Division President and a Vice-President are elected by the General Assembly on the proposal of the

Executive Committee, and are ex officio members of the Organising Committee.

XI SCIENTIFIC COMMISSIONS

21. Within Divisions, the scientific activities in well-defined disciplines within the subject matter of the Division may be organised through scientific Commissions. In special cases, a Commission may cover a subject common to two or more Divisions and then becomes a Commission of all these Divisions.

22. Commissions are created or terminated by the Executive Committee upon the recommendation of the Organising Committee(s) of the Division(s) desiring to create or terminate them. The activities of a Commission are organised by an Organising Committee chaired by a Commission President. The Commission President and a Vice-President are appointed by the Organising Committee(s) of the corresponding Division(s) upon the proposal of the Organising Committee of the Commission.

XII BUDGET AND DUES

~~**23.** For each ordinary General Assembly the Executive Committee prepares a budget proposal covering the period to the next ordinary General Assembly, together with the accounts of the Union for the preceding period. It submits these, with the advice of the Finance Sub-Committee, to the Finance Committee for consideration before their submission to the vote of the General Assembly.~~

23. For each ordinary General Assembly the Executive Committee prepares a budget proposal covering the period to the next ordinary General Assembly, together with the accounts of the Union for the preceding period. It submits these to the Finance Committee for advice before presenting them to the vote of the General Assembly.

23.a The Finance Committee examines the accounts of the Union from the point of view of responsible expenditure within the intent of the previous General Assembly, as interpreted by the Executive Committee. It also considers whether the proposed budget is adequate to implement the policy of the General Assembly. It submits reports on these matters to the General Assembly before its decisions concerning the approval of the accounts and of the budget.

23.b The amount of the unit of contribution is decided by the General Assembly as part of the budget approval process.

23.c Each National Member pays annually a number of units of contribution corresponding to its category. The number of units

of contribution for each category shall be specified in the Bye-Laws.

23.d A vote on matters under article 23 is valid only if at least two thirds of the National Members having the right to vote by virtue of article §14.a. cast a vote. In all cases an abstention is not a vote, but a declaration that the Member declines to vote.

23.e National Members having interim status pay annually one half unit of contribution.

23.f National Members having prospective status pay no contribution.

23.g The payment of contributions is the responsibility of the National Members. The liability of each National Members in respect of the Union is limited to the amount of contributions due through the current year.

XIII EMERGENCY POWERS

24. If, through events outside the control of the Union, circumstances arise in which it is impracticable to comply fully with the provisions of the Statutes and Bye-Laws of the Union, the Executive Committee and Officers, in the order specified below, shall take such actions as they deem necessary for the continued operation of the Union. Such action shall be reported to all National Members as soon as this becomes practicable, until an ordinary or extraordinary General Assembly can be convened.

The following is the order of authority: The Executive Committee in meeting or by correspondence; the President of the Union; the General Secretary; or failing the practicability or availability of any of the above, one of the Vice-Presidents.

XIV DISSOLUTION OF THE UNION

25. A decision to dissolve the Union is only valid if taken by the General Assembly with the approval of three quarters of the National Members having the right to vote by virtue of article §14.a. Such a decision shall specify a procedure for settling any debts and disposing of any assets of the Union.

XV FINAL CLAUSES

26. These Statutes enter into force on ~~4 August 2009~~ 21 August 2012.

27. The present Statutes are published in French and English versions. For legal purposes, the French version is authoritative.

2.6.2 Proposed Modifications to Bye-Laws
~~**Rio de Janeiro, Brazil, 4 August 2009**~~
Beijing, China, 21 August 2012

I MEMBERSHIP

1. An application for admission to the Union as a National Member shall be submitted to the General Secretary by the proposing organisation at least eight months before the next ordinary General Assembly.

2. The Executive Committee shall examine the application and resolve any outstanding issues concerning the nature of the proposed National Member and the category of membership (§ VII.25). Subsequently, the Executive Committee shall forward the application to the General Assembly for decision, with its recommendation as to its approval or rejection.

3. The Executive Committee shall examine any proposal by a National Member to change its category of adherence to a more appropriate level. If the Executive Committee is unable to approve the request, either party may refer the matter to the next General Assembly.

~~**4.** Individual Members are admitted by the Executive Committee upon the nomination of a National Member or the President of a Division. The Executive Committee shall publish the criteria and procedures for membership, and shall consult the Nominating Committee before approving applications for admissions as Individual Members.~~

4. Individual Members are admitted by the Executive Committee upon the nomination of a National Member or the President of a Division. The Executive Committee shall publish the criteria and procedures for membership, and shall consult the Membership Committee before admitting new Individual Members.

II GENERAL ASSEMBLY

5. The ordinary General Assembly meets, as a rule, once every three years. Unless determined by the previous General Assembly, the place and date of the ordinary General Assembly shall be fixed by the Executive Committee and be communicated to the National Members at least one year in advance.

6. The President may summon an extraordinary General Assembly with the consent of the Executive Committee, and must do so at the request of at least one third of the National Members. The date, place, and agenda of business of an extraordinary General Assembly must be communicated to all National Members at least two months before the first day of the Assembly.

7. Matters to be decided upon by the General Assembly shall be submitted for consideration by those concerned as follows, counting from the first day of the General Assembly:

7.a A motion to amend the Statutes or Bye-Laws may be submitted by a National Member or by the Executive Committee. Any such motion shall be submitted to the General Secretary at least nine months in advance and be forwarded, with the recommendation of the Executive Committee as to its adoption or rejection, to the National Members at least six months in advance.

~~7.b The General Secretary shall distribute the budget prepared by the Executive Committee to the National Members at least eight months in advance. Any motion to modify this budget, or any other matters pertaining to it, shall be submitted to the General Secretary at least six months in advance. Any such motion shall be submitted, with the advice of the Executive Committee as to its adoption or rejection, to the National Members at least four months in advance.~~

7.b The General Secretary shall distribute the draft budget prepared by the Executive Committee to the National Members at least eight months in advance. Any motion to modify this budget, or any other matters pertaining to it, shall be submitted to the General Secretary at least six months in advance. The Executive Committee shall consider whether or not to adopt any such motion in a modified budget, which shall be distributed to the National Members at least four months in advance. Should the Executive Committee decide to reject the motion it shall also be submitted to the General Assembly with the reasons for its rejection.

7.c Any motion or proposal concerning the administration of the Union, and not affecting the budget, by a National Member, or by the Organising Committee of a Scientific Division of the Union, shall be placed on the Agenda of the General Assembly, provided it is submitted to the General Secretary, in specific terms, at least six months in advance.

7.d Any motion of a scientific character submitted by a National Member, a Scientific Division of the Union, or by an ICSU Scientific Committee or Program on which the Union is formally represented, shall be placed on the Agenda of the General Assembly, provided it is submitted to the General Secretary, in specific terms, at least six months in advance.

7.e The complete agenda, including all such motions or proposals, shall be prepared by the Executive Committee and submitted to the National Members at least four months in advance.

8. The President may invite representatives of other organisations, scientists in related fields, and young astronomers to participate in

the General Assembly. Subject to the agreement of the Executive Committee, the President may authorise the General Secretary to invite representatives of other organisations, and the National Members or other appropriate IAU bodies to invite scientists in related fields and young astronomers.

III SPECIAL NOMINATING COMMITTEE

~~9.~~ ~~The Special Nominating Committee consists of the President and past President of the Union, a member proposed by the retiring Executive Committee, and four members selected by the Nominating Committee from among twelve candidates proposed by Presidents of Divisions, with due regard to an appropriate distribution over the major branches of astronomy.~~

9. The Special Nominating Committee consists of the President and past President of the Union, a member proposed by the retiring Executive Committee, and four members selected by the representatives of the National Members from up to twelve candidates proposed by Presidents of Divisions, with due regard to an appropriate distribution over the major branches of astronomy.

9.a Except for the President and immediate past President, present and former members of the Executive Committee shall not serve on the Special Nominating Committee. No two members of the Special Nominating Committee shall belong to the same nation or National Member.

9.b The General Secretary and the Assistant General Secretary participate in the work of the Special Nominating Committee in an advisory capacity, and the President-Elect may participate as an observer.

10. The Special Nominating Committee is appointed by the General Assembly, to which it reports directly. It assumes its duties immediately after the end of the General Assembly and remains in office until the end of the ordinary General Assembly next following that of its appointment, and it may fill any vacancy occurring among its members.

IV OFFICERS AND EXECUTIVE COMMITTEE

11.

11.a The President of the Union remains in office until the end of the ordinary General Assembly next following that of election. The President-Elect succeeds the President at that moment.

11.b The General Secretary and the Assistant General Secretary remain in office until the end of the ordinary General Assembly next following that of their election. Normally the Assistant General Secretary succeeds the General Secretary, but both officers may be re-elected for another term.

11.c The Vice-Presidents remain in office until the end of the ordinary General Assembly following that of their election. They may be immediately re-elected once to the same office.

11.d The elections take place at the last session of the General Assembly, the names of the candidates proposed having been announced at a previous session.

12. The Executive Committee may fill any vacancy occurring among its members. Any person so appointed remains in office until the end of the next ordinary General Assembly.

13. The past President and General Secretary become advisers to the Executive Committee until the end of the next ordinary General Assembly. They participate in the work of the Executive Committee and attend its meetings without voting rights.

14. The Executive Committee shall formulate Working Rules to clarify the application of the Statutes and Bye-Laws. Such Working Rules shall include the criteria and procedures by which the Executive Committee will review applications for Individual Membership; standard Terms of Reference for the Scientific Commissions of the Union; rules for the administration of the Union's financial affairs by the General Secretary; and procedures by which the Executive Committee may conduct business by electronic or other means of correspondence. The Working Rules shall be published electronically and in the Transactions of the Union.

15. The Executive Committee appoints the Union's official representatives to other scientific organisations.

16. The Officers and members of the Executive Committee cannot be held individually or personally liable for any legal claims or charges that might be brought against the Union.

V SCIENTIFIC DIVISIONS

17. The Divisions of the Union shall pursue the scientific objects of the Union within their respective fields of astronomy. Activities by which they do so include the encouragement and organisation of collective investigations, and the discussion of questions relating to international agreements, cooperation, or standardisation. They shall report to each General Assembly on the work they have accomplished and such new initiatives as they are undertaking.

18. Each Scientific Division shall consist of:

18.a An Organising Committee, normally of 6-12 persons, including the Division President and Vice-President, and a Division Secretary appointed by the Organising Committee from among its members. The Committee is responsible for conducting the business of the Division.

18.b Members of the Union ~~appointed~~ accepted by the Organising Committee in recognition of their special experience and interests.

19. Normally, the Division President is succeeded by the Vice-President at the end of the General Assembly following their election, but both may be re-elected for a second term. Before each General Assembly, the Organising Committee shall organise an election from among the membership, by electronic or other means suited to its scientific structure, of a new Organising Committee to take office for the following term. Election procedures should, as far as possible, be similar among the Divisions and require the approval of the Executive Committee.

20. Each Scientific Division may structure its scientific activities by creating a number of Commissions. In order to monitor and further the progress of its field of astronomy, the Division shall consider, before each General Assembly, whether its Commission structure serves its purpose in an optimum manner. It shall subsequently present its proposals for the creation, continuation or discontinuation of Commissions to the Executive Committee for approval.

21. With the approval of the Executive Committee, a Division may ~~appoint~~ establish Working Groups to study well-defined scientific issues and report to the Division. Unless specifically re-appointed by the same procedure, such Working Groups cease to exist at the next following General Assembly.

VI SCIENTIFIC COMMISSIONS

22. A Scientific Commission shall consist of:

22.a A President and an Organising Committee consisting of 4-8 persons elected by the Commission membership, subject to the approval of the Organising Committee of the Division;

22.b Members of the Union, ~~appointed~~ accepted by the Organising Committee, in recognition of their special experience and interests, subject to confirmation by the Organising Committee of the Division.

23. A Commission is initially created for a period of six years. The parent Division may recommend its continuation for additional periods of three years at a time, if sufficient justification for its continued activity is presented to the Division and the Executive Committee. The activities of a Commission are governed by Terms of Reference, which are based on a standard model published by the Executive Committee and are approved by the Division.

24. With the approval of the Division, a Commission may ~~appoint~~ establish Working Groups to study well-defined scientific issues and report to the Commission. Unless specifically re-appointed by the same procedure, such Working Groups cease to exist at the next following General Assembly.

VII ADMINISTRATION AND FINANCES

25. Each National Member pays annually to the Union a number of units of contribution corresponding to its category as specified below. National Members with interim status pay annually one half unit of contribution, and those with prospective status pay no dues.

Categories as defined in article 10 of the Statutes

I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
1	2	4	6	10	14	20	27	35	45	60	80

number of units of contribution

26. The income of the Union is to be devoted to its objects, including:

26.a the promotion of scientific initiatives requiring international co-operation;

26.b the promotion of the education and development of astronomy world-wide;

26.c the costs of the publications and administration of the Union.

27. Funds derived from donations are reserved for use in accordance with the instructions of the donor(s). Such donations and associated conditions require the approval of the Executive Committee.

28. The General Secretary is the legal representative of the Union. The General Secretary is responsible to the Executive Committee for not incurring expenditure in excess of the amount specified in the budget as approved by the General Assembly.

~~**29.** The General Secretary shall consult with the Finance Sub-Committee (cf. Statutes § 13.d.) in preparing the accounts and budget proposals of the Union, and on any other matters of major importance for the financial health of the Union. The comments and advice of the Finance Sub-Committee shall be made available to the Officers and Executive Committee as specified in the Working Rules.~~

29. The General Secretary shall consult with the Finance Committee (cf. Statutes § 13.d.) in preparing the accounts and budget proposals of the Union, and on any other matters of major importance for the financial health of the Union. The comments and advice of the Finance Committee shall be made available to the Officers and Executive Committee as specified in the Working Rules.

30. An Administrative office, under the direction of the General Secretary, conducts the correspondence, administers the funds, and preserves the archives of the Union.

31. The Union has copyright to all materials printed in its publications, unless otherwise arranged.

VIII FINAL CLAUSES

32. These Bye-Laws enter into force on ~~4 August 2009~~ 21 August 2012.

33. The present Bye-Laws are published in French and English versions. For legal purposes, the French version is authoritative.

2.7 Draft Resolutions

RESOLUTION B1
on guidelines for the specifications and designations of optical and infrared astronomical photometric passbands

The XXVIII General Assembly of the International Astronomical Union,

noting

that considerable confusion has existed and continues to exist in the defining and naming of photometric passbands of all spectral widths in the visible and infrared regions of the electromagnetic spectrum,

considering

that minimizing such confusion has been a long-time goal of Commission 25

recommends

1. that any publication presenting new passbands should contain the following information, to aid in transformations and standardizations:
   a) a measure of central wavelength which is not flux-dependent, such as the pivot wavelength, or mean photon wavelength, as defined, for example, in Bessell & Murphy (2012), PASP, 124, 140-157;
   b) an indication of bandwidth, such as FWHM;
   c) the spectral profile of the passband, unless it is completely symmetrical, as in the case of a triangular passband, when its shape and domain (wavelength or wave number/frequency) are stipulated;
   d) a clear statement on whether the passband profile includes the spectral sensitivity curve of the detector or not, and, if so, the characteristics of the detector;
   e) the temperature at which these specifications apply;
   f) such other details (for example, roll-off, pinhole and leakage specifications) as may be needed to obtain a closely matching filter from manufacturers.

2. that proposers of new passband systems should check the IAU Commission 25 website and links therein, especially to http://ulisse.pd.astro.it/Astro/ADPS/ (extended version of the paper by Moro and Munari 2000, A&AS 147, 361), to ascertain what passband names have already been used, before creating designations for new passbands.*

3. that names for new passbands should avoid relatively well-known designations, such as UBVRIJHKLMNQ, and that the designations ZJHKLMNQ should be used henceforth to refer exclusively to the terrestrial atmospheric windows in the near and intermediate infrared (see Young et al. A&AS, 105, 259-279; Milone & Young (2005), PASP, 117, 485-502). #

* Well-known and accepted nomenclature also appears in the Drilling and Landolt chapter in Cox's "Allen's Astrophysical Quantities," 4th edition, 2000, page 386, Table 15.5, and other information on basic systems appears in V. Straizys' "Multicolor Stellar Photometry" volume, 1995 (second printing), (see http://www.itpa.lt/MulticolorStellarPhotometry), among other sources.

\# For example, "Y" and "iz" are designations that have been applied to passbands in the 1 micro-m (Z) atmospheric window.

RESOLUTION B2
on the Re-definition of the astronomical unit of length

Proposed by the IAU Division I WG Numerical Standards in Fundamental Astronomy
Supported by Division I

The XXVIII General Assembly of International Astronomical Union,

noting

1. that the International Astronomical Union (IAU) 1976 System of Astronomical Constants specifies the units for the dynamics of the solar system, including the day (D=86400 s), the mass of the Sun, MS, and the *astronomical unit of length* or simply *the astronomical unit* whose definition(*i)* is based on the value of the Gaussian gravitational constant,
2. that the intention of the IAU 1976 definition of the astronomical unit was to provide accurate relative distances in the solar system when absolute distances could not be estimated with high accuracy,
3. that, to calculate the heliocentric gravitation constant, GMS, in Système International (SI) units (ii),the Gaussian gravitational constant k, is used, along with an astronomical unit determined observationally,
4. that the IAU 2009 System of astronomical constants (IAU 2009 Resolution B2) retains the IAU 1976 definition of the astronomical unit, by

specifying k as an "auxiliary defining constant" with the numerical value given in the IAU 1976 System of Astronomical Constants,

5. that the value of the astronomical unit compatible with Barycentric Dynamical Time (TDB) in Table 1 of the IAU 2009 System (149 597 870 700 m 3 m), is an average (Pitjeva and Standish 2009) of recent estimates for the astronomical unit defined by k,
6. that the TDB-compatible value for *GM*S listed in Table 1 of the IAU 2009 System, derived by using the astronomical unit fit to the DE421 ephemerides (Folkner *et al.* 2008), is consistent with the value of the astronomical unit of Table 1 to within the errors of the estimate;

considering

1. the need for a self-consistent set of units and numerical standards for use in modern dynamical astronomy in the framework of General Relativity, *(iii)*
2. that the accuracy of modern range measurements makes the use of relative distances unnecessary,
3. that modern planetary ephemerides can provide *GM*S directly in SI units and that this quantity may vary with time,
4. the need for a unit of length approximating the Sun-Earth distance, and
5. that various symbols are presently in use for the astronomical unit,

recommends

1. that the astronomical unit be re-defined to be a conventional unit of length equal to 149 597 870 700 m exactly, as adopted in IAU 2009 Resolution B2,
2. that this definition of the astronomical unit be used with all time scales such as TCB, TDB, TCG, TT, *etc.*,
3. that the Gaussian gravitational constant k be deleted from the system of astronomical constants,
4. that the value of the heliocentric gravitation constant, *GM*S, be determined observationally in SI units, and
5. that the unique symbol "au" be used for the astronomical unit.

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Pitjeva, E.V. and Standish, E.M., 2009, Proposals for the masses of the three largest asteroids, the Moon-Earth mass ratio and the astronomical unit, Celest. Mech. Dyn. Astr., 103, 365, doi: 10.1007/s10569-009-9203-8

Standish, E.M., 2004, The Astronomical Unit now, in Transits of Venus, New views of the Solar System and Galaxy, Proceedings of the IAU Colloquium 196, D. W. Kurtz ed., 163

(i) The IAU 1976 definition is: "The astronomical unit of length is that length (*A*) for which the Gaussian gravitational constant (*k*) takes the value of 0.017 202 098 95 when the units of measurements are the astronomical unit of length, mass and time. The dimensions of *k*2 are those of the constant of gravitation (*G*), i.e., L3M-1T-2. The term 'unit distance' is also for the length *A*."

(ii) using the equation *A*3*k*2/*D*2=*GM*S where *A* is the astronomical unit and *D* the time interval of one day, and *k* the Gaussian gravitational constant

(iii) Relativistically a solar system ephemeris, for which the au is a useful unit, is a coordinate picture of solar system dynamics. SI units are induced into such a coordinate picture by using the relativistic equations for photons and massive bodies and by relating the coordinates of certain events with observable SI units.

RESOLUTION B3
on the establishment of an International NEO early warning system.

The XXVIII General Assembly of the International Astronomical Union,

recognising

-- that there is now ample evidence that the probability of catastrophic impacts of Near-Earth Objects (NEOs) onto the Earth, potentially highly destructive to life, and for humankind in particular, is not negligible and that appropriate actions are being developed to avoid such catastrophes;

-- that even the impact of small- to moderate-sized objects may represent a great threat to our civilizations and to the international community;

-- that our knowledge of the number, size, and orbital behaviour of smaller objects is still very limited, thus not allowing any reasonable anticipation on the likelihood of future impacts;

noting

that NEOs are a threat to all nations on Earth, and therefore that all nations should contribute to avert this threat;

recommends

that the IAU National Members work with the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS) and the International Council for Science (ICSU) to coordinate and collaborate on the establishment of an International NEO early warning system, whose main purpose is the reliable identification of potential NEO collisions with the Earth, and the communication of the relevant parameters to suitable decision makers of the nation(s) involved.

RESOLUTION B4
on the restructuring of the IAU Divisions

The XXVIII General Assembly of the International Astronomical Union,

noting

(a) that both the IAU and astronomy as a whole have evolved considerably since the current Divisions were introduced in 1994 and formally adopted in 1997, and that it is therefore appropriate to consider re-optimising the Divisional Structure,

(b) the report and recommendations of the Task Group established by the Executive Committee to examine the case for restructuring the Divisions, and the Executive Committee response to these recommendations,

(c) that the Commissions, Working Groups and other bodies under the Divisions may also require reform,

(d) that the implementation of the Strategic Plan through the Office of Astronomy for Development (OAD) and other associated programmes requires the Executive Committee to establish appropriate oversight and

governance provisions for all Astronomy for Development activities, including the Office of Astronomy for Development, ensuring a strong link between these activities, the Divisions, and the Executive Committee.

approves

the proposal of the Executive Committee to restructure the Divisions as follows:

Division A	**Space and Time Reference Systems**
Division B	**Facilities, Technologies, & Data Science**
Division C	**Education, Outreach, & Heritage**
Division D	**High Energies & Fundamental Physics**
Division E	**Sun & Heliosphere**
Division F	**Planetary Systems & Bioastronomy**
Division G	**Stars & Stellar Physics**
Division H	**Interstellar Matter & Local Universe**
Division J	**Galaxies & Cosmology**

and requests

the new Divisions, guided by the Executive Committee, to work together to produce initial plans for a revised structure for Commissions, Working Groups and other bodies to be approved, in accordance with the Statutes and Bye-Laws of the Union, by the Executive Committee at its meeting in Spring 2013.

2.8 Proposed timeline for Divisional restructuring

in the event that the proposal to change the Divisional structure is approved, otherwise the current procedure remains in place

The sequence of events is:

1. The EC agreed at EC90 on the revised Divisional Structure and agreed a draft Resolution to that effect to be put to the GA for approval. Notification was sent out to National Members on 20 April i.e. immediately after EC90, although the wording of the Resolution can be changed up to the GA.
2. The EC decided that implementing resolution will be by simply majority of IM present.
3. The EC agrees on an outline "Implementation Plan and Schedule," which can be revised up to EC91, and is then presented to the GA with the motion. This will have to be prepared by the Task Group in consultation with the DPs.
4. The current Divisions' OC are consulted on candidates for the DP and V-P of the old and new Divisions, which then have to be submitted to the GA for election (Statute 20). This consultation should be complete by 30 June 2012 and the outcomes communicated to the EC via the GS as soon as possible.

5. The EC agrees on the candidates for DP and V-P of the old and the new Divisions no later than EC91 first session (19th Aug), and proposes them to the GA after the restructuring motion is put to the 2nd Business Session.
6. The restructuring resolution is assumed to be approved at this session, as are the candidates for DP and V-DP as proposed by the EC.
7. Individual members must then elect to join a 'primary' Division by (say) end of November 2012.
8. The DP and V-P organise the election of a new Divisional Steering Committee (formerly OC), to be completed by February 2013.
9. The new DSCs examine their Commissions and Working Groups etc. and present initial plans for restructuring at EC92 in Spring 2013. If necessary further consultation with Commissions and Working Groups and others can take place after this.
10. The overall restructuring is reviewed, agreed and implemented at EC93 in Spring 2014.

2.9 Scientific Programme – Invited Discourses

2.9.1 Invited Discourses

ID1 "The Zoo of Galaxies"
Karen Masters, University of Portsmouth, UK
Monday, 20th August

"We live in a universe filled with galaxies with an amazing variety of sizes and shapes. One of the biggest challenges for astronomers working in this field is to understand how all these types relate to each other in the background of an expanding universe. Modern astronomical surveys (like the Sloan Digital Sky Survey) have revolutionized this field of astronomy, by providing vast numbers of galaxies to study. The sheer size of the these databases made traditional visual classification of the types galaxies impossible and in 2007 inspired the Galaxy Zoo project (www.galaxyzoo.org); starting the largest ever scientific collaboration by asking members of the public to help classify galaxies by type and shape. Galaxy Zoo has since shown itself, in a series of now almost 30 scientific papers, to be a fantastic database for the study of galaxy evolution."

ID2 "Type Ia Supernovae, the Accelerating Cosmos and Dark Energy"
Brian Schmidt, ANU, Australia
Wednesday, 22nd August

Type Ia supernovae remain one of Astronomy's most precise tools for measureing distances in the Universe. I will describe the cosmological application of these stellar explosions, and chronicle how they were used to discover an accele-

rating Universe in 1998 - an observation which is most simply explained if more than 70% of the Universe is made up of some previously undetected form of 'Dark Energy.' Over the intervening 13 years, a variety of experiments have been completed, and even more proposed to better constrain the source of the acceleration. I will review the range of experiments, describing the current state of our understanding of the observed acceleration, and speculate about future progress in understanding Dark Energy.

ID3 "The Herschel View of Star Formation"
Philippe André, CEA Saclay, France
Wednesday, 29th August

"Star formation is one of the most fundamental, most complex, and least understood processes in astrophysics. Recent studies of the nearest star-forming clouds of the Galaxy at submillimeter wavelengths with the Herschel Space Observatory have provided us with unprecedented images of the initial conditions and early phases of the star formation process. The Herschel images reveal an intricate network of filamentary structure in every interstellar cloud. These filaments all exhibit remarkably similar widths - about one third of a light year - but only the densest ones contain prestellar cores, the seeds of future stars. The Herschel results suggest favor a scenario in which interstellar filaments and prestellar cores represent two key steps in the star formation process: first turbulence stirs up the gas, giving rise to a universal web-like structure in the interstellar medium, then gravity takes over and controls the further fragmentation of filaments into prestellar cores and ultimately protostars. This scenario provides new insight into the inefficiency of star formation, the origin of stellar masses, and the global rate of star formation in galaxies. Despite an apparent complexity, global star formation may be governed by relatively simple universal laws from filament to galactic scales."

ID4 "Past, Present and Future of Chinese Astronomy"
Cheng Fang, Nanjing University, China
Thursday, 30th August

"In ancient history, Chinese astronomers had got tremendous achievement. Since the main purpose of the ancient Chinese astronomy was to study the correlation between man and the universe, all the Emperors made ancient Chinese astronomy the highly regarded science throughout the history. After brief introduction of the achievement of ancient Chinese astronomy, I describe the beginnings of modern astronomy research in China in the 20th century. Benefited from the fast development of Chinese economy, the research in astronomy in China has made remarkable progress in the recent years. The number of astronomer has doubled in the past ten years, and the number of graduated students has grown over 1500. The current budget for astronomy research is ten times larger than that ten years ago. The research

covers all fields in astronomy, from galaxy to the Sun. The recent progress in both the instruments, such as the ***L**arge Sky **A**rea **M**ulti-**O**bject Fiber **S**pectroscopic **T**elescope* (LAMOST), and the theoretical research will be briefly presented. The ongoing and the future projects on the space- and ground-based facilities will be described, including ***F**ive Hundred Meter **A**perture **S**pherical Radio **T**elescope* (FAST), *"Chang E"* project (Lunar mission), ***H**ard **X**-ray **M**odulate **T**elescope* (HXMT), ***D**eep Space **S**olar **O**bservatory* (DSO), ***C**hinese **A**ntarctic **O**bservatory* (CAO), and ***C**hinese **S**pectral **R**adio**h**eliogaph* (CSRH) etc."

2.9.2 Scientific Programme – Symposia and Plenary Lectures

IAUS 288 Astrophysics from Antarctica
20-24 August

Coordinating Division: IX - Optical & Infrared Techniques
Contact: Michael Burton m.burton@unsw.edu.au
URL: http://www.phys.unsw.edu.au/IAUS288

SOC Co-Chairs: Michael Burton (Australia), Xiangqun Cui (China Nanjing)

SOC Members: Leo Bronfman (Chile), Nicolas Epchtein (France), Peter Gorham (USA), Takashi Ichikawa (Japan), Doug Johnstone (Canada), John Kovac (USA), Silvia Masi (Italy), Young Minh (Korea, Rep of), Klaus Strassmeier (Germany), Ji Yang (China Nanjing), Zhaohui Shang (China Nanjing)

Editors of Proceedings: Michael Burton (Australia), Xiangqun Cui (China Nanjing), Nick Tothill (Australia)

Topics:

- Astrophysics from Antarctica (Plenary overview)
- Understanding the Antarctic Environment: the advantages & disadvantages
- Cosmic Microwave Background Radiation
- Neutrinos
- High Energy Astrophysics
- Sub-millimeter and Terahertz Astronomy
- Optical and Infrared Astronomy
- Antarctic Stations and their Observatories
- The Arctic Analogue
- Facilities for the Future

Plenary Talk: Monday, 20 August, 08:30
"Astrophysics from Antarctica," John Storey, University of New South Wales

IAUS 289 Advancing the physics of cosmic distances
27-31 August

Coordinating Division: VII - Galactic System
Contact: Richard de Grijs grijs@pku.edu.cn
URL: http://www.mporzio.astro.it/IAUS289

SOC Co-Chairs: Richard de Grijs (China Nanjing), Giuseppe Bono (Italy)

SOC Members:
Susan Cartwright (UK), Robin Ciardullo (USA), Andrei Dambis (Russian Federation), Michael Feast (South Africa), Wendy Freedman (USA), Wolfgang Gieren (Chile), Martin Groenewegen (Belgium), Jeremy Mould (Australia), Carme Jordi (Spain), Mark Reid (USA), Myung-Hyun Rhee (Korea, Rep of), Don VandenBerg (Canada), Rogier Windhorst (USA), Ye Xu (China Nanjing)

Editors of Proceedings: Richard de Grijs (China Nanjing), Giuseppe Bono (Italy)

Topics:

- The solar neighborhood (mostly direct methods, focus on physics in all cases)
- From the Milky Way to the Local Group (direct and indirect methods; calibration of distance tracers)
- Reaching Virgo cluster distances and beyond (more general methods applicable to galaxy systems)
- From nearby galaxies to cosmological distances (distance measurements beyond the reasonably robust regime)
- Common uncertainties and pitfalls; Exciting new developments and future prospects in the era of new technological developments

Plenary Talk: Monday, 27 August, 08:30
"The Cosmic Distance Scale: Past, Present and Future"
Wendy Freedman, Carnegie Institute

IAUS 290 Feeding compact objects: Accretion on all scales
20-24 August

Coordinating Division: XI - Space & High Energy Astrophysics
Contact: Chengmin ZHANG zhangcm@bao.ac.cn
URL: http://iaus290.bao.ac.cn/

SOC Co-Chairs: Tomaso Belloni (Italy), Mariano Méndez (Netherlands), Chengmin ZHANG (China Nanjing), Shuangnan ZHANG (China Nanjing)

SOC Members:
Roger Blandford (USA), Chryssa Kouveliotou (USA), Ramesh Narayan

(USA), Günther Hasinger (Germany), Brian Warner (South Africa), Donald Melrose (Australia), Rashid Sunyaev (Russian Federation), Gustavo Romero (Argentina), Jean-Pierre Lasota (France), Bozena Czerny (Poland), Chris Done (UK), Ken Ebisawa (Japan)

Editors of Proceedings: Tomaso Belloni (Italy), Mariano Méndez (Netherlands), Chengmin ZHANG (China Nanjing), Shuangnan ZHANG (China Nanjing)

Topics:

- Accretion phenomenon in AGN, X-ray binaries, CVs
- Probing General Relativity through accreting systems
- Multi-wavelength coverage from radio to gamma rays
- Magnetic environments around compact objects
- Large scale properties of accretion
- Accretion-ejection connection
- Jets & outflows
- Time variability across electromagnetic spectrum
- Scaling properties & unified models
- Instrumentation for next decade

Plenary talk: Wednesday, 22 August, 08:30
"Probing General Relativity using Accreting Black Holes"
Andrew Fabian, University of Cambridge

IAUS 291 Neutron stars and pulsars: Challenges and opportunities after 80 Years
20-24 August

Coordinating Division: XI - Space & High Energy Astrophysics
Contact: Richard Manchester dick.manchester@csiro.au
URL: http://www.pulsarastronomy.net/IAUS291/

SOC Co-Chairs: R. N. Manchester (Australia), Renxin Xu (China Nanjing)

SOC Members:
Sarah Buchner (South Africa), Yashwant Gupta (India), Jinlin Han (China Nanjing), Rick Jenet (USA), Vicky Kaspi (Canada), Michael Kramer (Germany), Maura McLaughlin (USA), Andreas Reisenegger (Chile), Roger Romani (USA), Shinpei Shibata (Japan), Marten van Kerkwijk (Canada), Joeri van Leeuwen (Netherlands), Nina Wang (China Nanjing), Silvia Zane (UK)

Editor of Proceedings: Joeri van Leeuwen (Netherlands)

Topics:

- Pulsar genesis and neutron-star structure
- X-ray and gamma-ray emission from pulsars, especially recent results

from Fermi
- Pulsar diversity – relationship of magnetars, INS, CCOs, RRATs to radio pulsars
- Pulsar astronomy with large radio telescopes – looking forward to FAST and the SKA
- Toward a census of Galactic neutron stars – Galactic distribution and evolution
- Magnetospheric structure – pair creation and currents, magnetic decay, pulsar braking
- Non-thermal emission physics – giant radio pulses, mode changing, high-energy emission
- Binary pulsars – eclipsing systems, post-Newtonian physics, stellar masses
- Pulsar Timing Arrays – detection of gravitational waves and a pulsar time standard
- Pulsars as probes of the interstellar medium

Plenary Talk: Thursday, 23 August, 08:30
"Pulsars are cool – seriously" Scott Ransom, NRAO, Charlottesville
"Magnetars: neutron stars with magnetic storms"
Nanda Rea, CSIC-IEEC, Barcelona
"Probing gravitation with pulsars"
Michael Kramer, Max-Planck-Institut für Radioastronomie, Bonn

IAUS 292 Molecular Gas, Dust, and Star Formation in Galaxies
20-24 August

Coordinating Division: VIII - Galaxies & the Universe
Contact: Martin Bureau bureau@astro.ox.ac.uk
URL: http://www.a.phys.nagoya-u.ac.jp/IAUS292/

SOC Co-Chairs: Martin Bureau (UK), Yasuo Fukui (Japan)

SOC Members:
Kate Brooks (Australia), Leonardo Bronfman (Chile), Daniela Calzetti (USA), Paola Caselli (UK), Françoise Combes (France), François Boulanger (France), Erwin de Blok (South Africa), Yu Gao (China Nanjing), Mark Krumholz (USA), Jürgen Ott (USA), Linda Tacconi (Germany), Enrique Vazquez-Semadeni (Mexico), Tony Wong (USA)

Editors of Proceedings: Tony Wong (USA), Jürgen Ott (USA)

Topics:
- (Giant) molecular clouds (distribution, structure, mass, kinematics, lifetime, formation/evolution) and star formation in the Milky Way

- ISM properties and diagnostics (physical conditions, excitation mechanisms, atomic-molecular transition, PDRs, XDRs, chemistry)
- Atomic and molecular gas in galaxies (Magellanic Clouds; nearby dwarfs, spirals, early-types; cooling flows; radio galaxies; high-redshift galaxies; epoch of reionisation)
- Dust (formation and evolution, PAHs, FIR/sub-mm lines)
- Comparison with other star formation tracers (X-ray, UV, optical/NIR emission lines, etc)
- Star Formation (star formation laws, efficiency, history)
- Gas accretion, feedback, outflows

Plenary Talk: Tuesday, 21 August, 08:30
"From Gas to Stars over Cosmic Time"
Mordecai-Mark Mac Low, American Museum of Natural History, New York

IAUS 293 Formation, detection, and characterization of extrasolar habitable planets
27-31 August

Coordinating Division: III - Planetary Systems Sciences
Contact: Nader Haghighipour nader@ifa.hawaii.edu
URL: www.ifa.hawaii.edu/iau293

SOC Co-Chairs: Nader Haghighipour (USA), Ji-Lin Zhou (China Nanjing)

SOC Members:
Alan Boss (USA), Rudolf Dvorak (Austria), Pascale Ehrenfreund (Netherlands), Sylvio Ferraz-Mello (Brazil), Muriel Gargaud (France), Krzysztof Gozdziewski (Poland), Caitlin Griffith (USA), Shigeru Ida (Japan), Doug Lin (USA), Rosemary Mardling (Australia), Frédéric Masset (Mexico), Karen Meech (USA), Stéphane Udry (Switzerland), Gang Zhao (China Nanjing)

Editors of Proceedings: Nader Haghighipour (USA), Ji-Lin Zhou (China Nanjing)

Topics:

- Formation of terrestrial/habitable planets
- Water on Earth and in other Solar System bodies
- Methods of detecting habitable planets (RV, Transit, TTV, Microlensing, Astrometry) and mass determination
- Processes affecting close-in planets (tides, tidal-locking, radiation)
- Habitability and habitable zone
- Interior dynamics of habitable planets
- Atmospheric models and habitability
- Planetary magnetic field and its connection to habitability
- Prospects of the detection of biosignatures of extrasolar habitable planets

- Habitability in extreme planetary systems (e.g., systems with: multiple planets, giant planets in close-in and/or eccentric orbits, binary star systems, Habitable moons, Trojan planets)

Plenary Talk: Tuesday, 28 August, 08:30
"The Kepler Mission: NASA's Exo-Earth Census," Natalie Batalha

IAUS 294 Solar and astrophysical dynamos and magnetic activity
27-31 August

Coordinating Division: II - Sun & Heliosphere
Contact: Alexander Kosovichev sasha@sun.stanford.edu
URL: http://sun.stanford.edu/IAUS294/

SOC Co-Chairs: Alexander Kosovichev (USA), Yihua Yan (China Nanjing), Lidia van Driel-Gesztelyi (France), Elisabete de Gouveia Dal Pino (Brazil)

SOC Members:
Rainer Beck (Germany), Axel Brandenburg (Sweden), Gianna Cauzzi (Italy), Arnab Rai Choudhuri (India), Louise Harra (UK), Maarit Korpi (Finland), Vladimir Kuznetsov (Russian Federation), Aimee Norton (Australia), Kristof Petrovay (Hungary), Nikolai Piskunov (Sweden), Takashi Sekii (Japan), Nataliya Shchukina (Ukraine)

Editors of Proceedings: Alexander Kosovichev (USA), Yihua Yan (China Nanjing), Lidia van Driel-Gesztelyi (France), Elisabete de Gouveia Dal (Brazil)

Topics:

- Solar dynamo and activity cycles: observations, theories and predictions
- Stellar dynamos and cycles
- Local dynamo: ubiquitous small-scale magnetic fields and "hidden magnetism"
- Role of magnetic dynamos in energizing the solar/stellar atmospheres and coronal activity
- Planetary dynamos
- Dynamos in accretion disks, galaxies, ISM, IGM
- Advances in dynamo theories, numerical simulations and experiments
- Critical physical ingredients for dynamos: turbulence and instabilities
- Current and future observing programs from the ground and space
- New frontiers in understanding of the origins of cosmic magnetism

Plenary talk: Wednesday, 29 August, 08:30
"The Origin and Evolution of Cosmic Magnetism"
Bryan Gaensler, University of Sydney

IAUS 295 The intriguing life of massive galaxies
27-31 August

Coordinating Division: VIII - Galaxies & the Universe
Contact: Daniel Thomas daniel.thomas@port.ac.uk
URL: http://www.icg.port.ac.uk/IAUS295

SOC Co-Chairs: Daniel Thomas (UK), Anna Pasquali (Germany), Ignacio Ferreras (UK)

SOC Members:
Roger Davies (UK), Avishai Dekel (Israel), Richard Ellis (USA), Yipeng Jing (China Nanjing), Xu Kong (China Nanjing), Shude Mao (UK), Eric Peng (China Nanjing), Alvio Renzini (Italy), Rachel Somerville (USA), Ian Smail (UK), Linda Tacconi (Germany), Christy Tremonti (USA), XianZhong Zheng (China Nanjing)

Editors of Proceedings: Daniel Thomas (UK), Anna Pasquali (Germany), Ignacio Ferreras (UK)

Topics:

- The first galaxies in the very early Universe
- Massive galaxies at high and intermediate z
- Luminous red galaxies at recent epochs
- Early-type galaxies in the local Universe
- Brightest cluster galaxies
- Stellar populations and chemical enrichment
- Dark matter and supermassive black holes
- The environment of massive galaxies
- Galaxy formation modelling and mass assembly
- Supernova and AGN feedback, cold accretion

Plenary talk: Thursday, 30 August, 08:30
"Black holes in galaxies," John Kormendy, University of Texas, Austin

2.9.3 Scientific Programme – Joint Discussions

JD1 The highest-energy gamma-ray universe observed with Cherenkov telescope arrays
20-21 August

Coordinating Division: XI - Space & High Energy Astrophysics
Contact: Diego F. Torres dtorres@ieec.uab.es
URL: http://www.ice.csic.es/research/JD-IAU

SOC Co-Chairs: Catherine Cesarsky (France), Stefan Wagner (Germany)

SOC Members:
Aya Bamba (Japan), Zhen Cao (China Nanjing), Dainis Dravins (Sweden), Brenda Dingus (USA), Tadayasu Dotani (Japan), Luke Drury (Ireland), Anne Green (Australia), Felix Mirabel (France), Helene Sol (France), Diego F. Torres (Spain), Meg Urry (USA), Shuang-Nan Zhang (China Nanjing)

Editors of Proceedings: Diego F. Torres (Spain), Catherine Cesarsky (France), Helene Sol (France), Stefan Wagner (Germany)

Topics:

- Space and High-energy astrophysics
- gamma-ray astronomy
- radio astronomy
- X-ray astronomy
- Galaxies and the Universe
- Galactic Systems
- Stars
- Interstellar medium
- Cosmic rays

JD2 Very massive stars in the local universe
20-22 August

Coordinating Division: IV - Stars
Contact: Jorick Vink jsv@arm.ac.uk
URL: http://www.arm.ac.uk/IAU

SOC Chair: Jorick S. Vink (UK)

SOC Members:
Artemio Herrero (Spain), Alexander Heger (USA), Dany Vanbeveren (Belgium), Anthony Moffat (Canada)

Editor of Proceedings: Jorick S. Vink (UK)

Topics:

- Weighing the most massive stars from their binary motions
- Stellar spectra of O and Wolf-Rayet stars
- Mass determinations from stellar spectroscopy and model atmosphere analysis
- Formation of the most massive stars
- Mass loss mechanisms, incl. eruptions of Luminous Blue Variables
- Stellar structure and evolution
- The fate of the most massive stars (over cosmological time)
- Mass and energy return to the interstellar medium (ISM)

JD3 3-D views of the cycling Sun in stellar context
20-22 August

Coordinating Division: II - Sun & Heliosphere
Contact: Lidia van Driel-Gesztelyi Lidia.vanDriel@obspm.fr
URL: http://www.mssl.ucl.ac.uk/iau_c10/iau28ga_jd03.html

SOC Co-Chairs: Lidia van Driel-Gesztelyi (France), Carolus J. Schrijver (USA), Gibor B. Basri (USA)

SOC Members:
Gianna Cauzzi (Italy), Peng-Fei Chen (China Nanjing), Katalin Olah (Hungary), Rachel Osten (USA)

Editor of Proceedings: Lidia van Driel-Gesztelyi (France)

Topics:

- Driving magnetic activity: differential rotation from seismology and patterns in surface activity – Observations and theory
- Magnetic activity from microflares to megaflares – Observations and theory
- 3-D views of the Sun and active stars – surfaces and interiors
- 3-D views of the Sun and active stars – atmospheres and astro-spheres
- Solar and stellar cycles

JD4 Ultraviolet emission in early-type galaxies
20-22 August

Coordinating Division: VIII - Galaxies & the Universe
Contact: Sugata Kaviraj s.kaviraj@imperial.ac.uk
http://astroweb1.physics.ox.ac.uk/~Kaviraj/IAU2012_JD4/home

SOC Co-Chairs: Sugata Kaviraj (UK), Sukyoung Yi (Republic of Korea), Martin Bureau (UK)

SOC Members: Beatriz Barbuy (Brazil), Joss Bland-Hawthorn (Australia), Daniela Calzetti (USA), Matthew Colless (Australia), J. Jesus Gonzalez (Mexico), Genevieve Graves (USA), Zhanwen Han (China Nanjing), Robert O'Connell (USA), C Megan Urry (USA)

Editors of Proceedings: Sugata Kaviraj (UK), Sukyoung Yi (Republic of Korea), Martin Bureau (UK)

Topics:

- Observational evidence for enhanced UV emission in early-type galaxies

- Extended horizontal branch, post-asymptotic giant branch, and binary stars
- Young stars and star formation
- Globular clusters and Helium enhancement
- Active galactic nuclei
- UV detectors and telescopes

JD5 From meteors and meteorites to their parent bodies: Current status and future developments
22-24 August

Coordinating Division: III - Planetary Systems Sciences
Contact: Jun-ichi Watanabe jun.watanabe@nao.ac.jp
URL: http://chiron.mtk.nao.ac.jp/IAUXXVIIIGA_JD5/

SOC Co-Chairs: Peter Jenniskens (USA), Jin Zhu (China Nanjing), Iwan Williams (UK)

SOC Members: Michael A'Hearn (USA), Peter Brown (Canada), Tadeusz Jopek (Poland), Karen Meech (USA), Sho Sasaki (Japan), Caroline Smith (UK), Mitsuru Soma (Japan), Pavel Spurny (Czech Republic), Jérémie Vaubaillon (France), Hitoshi Yamaoka (Japan), Makoto Yoshikawa (Japan), Hajime Yano (Japan), Masateru Ishiguro (Republic of Korea), Daisuke Kinoshita (China Taipei)

Editor of Proceedings: Peter Jenniskens (USA)

Topics:

- Source of meteorites, meteors, & IDPs
- Parent bodies & thier interrelations
- Historic records of comets, meteors & meteorite falls
- Meteoroid streams & NEOs
- Results from Hayabusa, EPOXI, DAWN etc.
- Meteorite types & asteroid classes
- Volatiles in the asteroid belt comets
- Future space mission and ground-based survey
- Recovery of meteorites of 2008TC8 etc.
- Role of CBAT & Outreach activities

JD6 The connection between radio properties and high-energy emission in AGNs
23-24 August

Coordinating Division: X - Radio Astronomy
Contact: Gabriele Giovannini ggiovann@ira.inaf.it
URL: http://www.ira.inaf.it/meetings/iau2012jd6/

SOC Co-Chairs: Gabriele Giovannini (Italy), Xiaoyu Hong (China Nanjing), Laura Maraschi (Italy)

SOC Members:
Teddy Cheung (USA), Ed Fomalont (USA), Luigi Foschini (Italy), Marcello Giroletti (Italy), Seiji Kameno (Japan), Matthias Kadler (Germany), Yuri Kovalev (Russian Federation), Thomas Krichbaum (Germany), Alan Marscher (USA), Raffaella Morganti (Netherlands), David Paneque (Germany), Maria Rioja (Australia), Eduardo Ros (Spain), Lukasz Stawarz (Japan), Meg Urry (USA), Anton Zensus (Germany)

Editors of Proceedings: Gabriele Giovannini (Italy), Teddy Cheung (USA), Marcello Giroletti (Italy), Laura Maraschi (Italy)

Topics:

- The AGN population as seen in the radio and gamma-ray bands
- High resolution core and jet properties
- Multi-wavelength correlations and variability
- Jet physics and the role of BH spin and BH accretion

JD7 Space-time reference systems for future research

27-29 August

Coordinating Division: I - Fundamental Astronomy
Contact: Dennis McCarthy dennis.mccarthy@usno.navy.mil
URL: http://www.referencesystems.info/iau-joint-discussion-7.html

SOC Co-Chairs: Nicole Capitaine (France), Sergei Klioner (Germany), Dennis McCarthy (USA)

SOC Members:
George H. Kaplan (USA), Zoran Knezevic (Republic of Serbia), Dafydd Wyn Evans (UK), Harald Schuh (Austria), Richard N. Manchester (Australia), Gérard Petit (France)

Editors of Proceedings: George Kaplan (USA), Dennis McCarthy (USA)

Topics:

- Space-time reference systems compatible with general relativity
- Accurate planetary ephemerides and time references for space missions and pulsar investigations
- Development of radio reference frames for space missions and astronomy
- Development of optical reference frames for exoplanet investigations

2.9.4 Scientific Programme – Special Sessions

SpS1 Origin and complexity of massive star clusters
20-24 August

Coordinating Division: VII - Galactic System
Contact: Giampaolo Piotto giampaolo.piotto@unipd.it
URL: http://www.physics.drexel.edu/~sps1_2012/

SOC Co-Chairs: Giampaolo Piotto (Italy), Enrico Vesperini (USA)

SOC Members:
Antonio Aparicio (Spain), Beatrice Barbuy (Brazil), Kenji Bekki (Australia), Torsten Boeker (Netherlands), Corinne Charbonnel (France), Cathie Clarke (UK), Francesca D'Antona (Italy), Licai Deng (China Nanjing), Bruce Elmegreen (USA), Raffaele Gratton (Italy), Young Wook (Republic of Korea), Steven Majewski (USA), Eline Tolstoy (Netherlands), Hans Zinnecker (USA)

Editors of Proceedings: Enrico Vesperini (USA), Giampaolo Piotto (Italy)

Topics:

- Multiple stellar populations in Galactic and extragalactic globular star clusters
- Multiple population star cluster formation and dynamical evolution
- Stellar evolution and the chemical evolution of star clusters
- Relation between globular clusters, dwarf galaxies, nuclear star clusters
- Relation between globular cluster stellar populations and Galactic halo, disk and bulge stars

SpS2 Cosmic evolution of groups and clusters of galaxies
20-24 August

Coordinating Division: XI - Space & High Energy Astrophysics
Contact: Jan Vrtilek jvrtilek@cfa.harvard.edu
URL: http://hea-www.cfa.harvard.edu/IAU/program.html

SOC Co-Chairs: Jan M. Vrtilek (USA), Laurence P. David (USA)

SOC Members:
Monique Arnaud (France), Paulo Lopes (Brazil), D. J. Saikia (India), Omar Lopez-Cruz (Mexico), Eugene Churazov (Russian Federation), Sabine Schindler (Austria), Diana Worrall (UK), Matthew Colless (Australia), Noam Soker (Israel), Manolis Plionis (Greece), Yipeng Jing (China Nanjing), Jeremy Lim (China Nanjing)

Editors of Proceedings: Jan Vrtilek (USA), Laurence David (USA)

Topics:

- Cluster Surveys
- Structure formation: Comparison between observations and simulations
- Cluster and group mass measurements (X-ray, optical, and lensing)
- Gas Mass Fraction and Missing Baryons
- Cooling and AGN Feedback
- Star Formation in the Central Dominant Galaxy in Clusters
- Chemical Enrichment over Cosmic Times
- Radio halos (mini, large-scale, relics)
- Impact of new radio observatories (LOFAR, ALMA, SKA)
- Clusters as laboratories for studying the effects of environment on galaxy evolution

SpS3 Galaxy evolution through secular processes
20-24 August

Coordinating Division: VIII - Galaxies & the Universe
Contact: Ron Buta rbuta@bama.ua.edu
URL: http://bama.ua.edu/~rbuta/iau-2012-sps3/

SOC Co-Chairs: Ronald J. Buta (USA), Daniel Pfenniger (Switzerland)

SOC Members:
John Kormendy (USA), Simon White (Germany), Kenneth C. Freeman (Australia), Xiaolei Zhang (USA), Robert C. Kennicutt (UK), Eija Laurikainen (Finland), Jerry Sellwood (USA), Juntai Shen (China Nanjing), Reynier Peletier (Netherlands), Lourdes Verdes-Montenegro (Spain), Johan Knapen (Spain), Lia Athanassoula (France), Bruce G. Elmegreen (USA), Françoise Combes (France)

Editors of Proceedings: Ronald J. Buta (USA), Daniel Pfenniger (Switzerland)

Topics:

- Observational evidence of secular evolution in Milky Way/other galaxies
- Influence of internal/external perturbations
- bulges/disks stellar populations
- Star formation, recycling, chem evol.
- Early vs late-type galaxies
- Theoretical mechanisms
- Lambda-CDM model vs secular evolution
- Role of collective effects
- Results of numerical simulations
- Implications new instruments/surveys

SpS4 New era for studying interstellar and intergalactic magnetic fields
20-23 August

Coordinating Division: X - Radio Astronomy
Contact: JinLin Han hjl@nao.cas.cn
URL: http://iau2012sps4.csp.escience.cn

SOC Co-Chairs: JinLin Han (China Nanjing), Marijke Haverkorn (Netherlands), Robert Braun (Australia)

SOC Members:
Rainer Beck (Germany), Robert Braun (Australia), Jo-Anne Brown (Canada), Elisabete de Gouveia Dal Pino (Brazil), Torsten Ensslin (Germany), Luigina Feretti (Italy), Bryan M. Gaensler (Australia), Tom Troland (USA), Alex Lazarian (USA), Giles Novak (USA), Eve Ostriker (USA), Dongsu Ryu Chungnam (Republic of Korea), Kandaswamy Subramanian (India)

Editors of Proceedings: Marijke Haverkorn (Netherlands), JinLin Han (China Nanjing)

Topics:

- Magnetic fields through new generation of instruments
- Magnetic fields in molecular clouds and star formation
- Magnetic fields and dynamics in interstellar medium
- Magnetic fields in the Galactic diffuse medium
- Magnetic fields in diverse nearby galaxies
- Magnetic fields in intra-cluster medium
- Magnetic fields in cosmic structure and early universe

SpS5 The IR view of massive stars: the main sequence and beyond
23-24 August

Coordinating Division: IV - Stars
Contact: Margaret Hanson hansonmm@ucmail.uc.edu
URL: http://www.gaphe.ulg.ac.be/IAU_XXVIII/index.html

SOC Chair: Yaël Nazé (Belgium)

SOC Members:
Jura Borrisova (Chile), Margaret Hanson (USA), Fabrice Martins (France), Paco Najarro (Spain), Barbara Whitney (USA)

Editor of Proceedings: Yaël Nazé (Belgium)

Topics:

- Obscured and distant clusters, with subtopics
- massive stars near the Galactic Centre
- newly discovered young clusters
- distant massive stars
- Stellar and wind parameters, with subtopics
- improvement in atomic data
- results from atmosphere modelling
- results from interferometry studies
- Matter ejection and feedback, with subtopics
- observed LBV and WR nebulae
- implications on the mass-loss evolution
- dust in SNe

SpS6 Science with large solar telescopes
22-24 August

Coordinating Division: II - Sun & Heliosphere
Contact: Gianna Cauzzi gcauzzi@arcetri.astro.it
URL: http://www.arcetri.astro.it/IAUSpS6/

SOC Co-Chairs: Gianna Cauzzi (Italy), Alexandra Tritschler (USA), Yuanyong Deng (China Nanjing)

SOC Members:
Tom Berger (USA), Manolo Collados (Spain), Phil Goode (USA), Siraj Hasan (India), Fernando Moreno Insertis (Spain), Jiong Qiu (USA), Goran Scharmer (Sweden), Wolfgang Schmidt (Germany), Manfred Schuessler (Germany), Steve Tomczyk (USA), Saku Tsuneta (Japan)

Editors of Proceedings: Gianna Cauzzi (Italy), Alexandra Tritschler (USA)

Topics:

- Key science problems for large solar telescopes.
- Connections to modeling and simulations.
- Advanced instrumentation and observing techniques for high-resolution observations of the solar atmosphere.
- Status and operation of existing and future large solar telescopes.
- Synergies and strategies for optimized scientific return from large facilities

SpS7 The impact hazard: current activities and future plans
29-31 August

Coordinating Division: III - Planetary Systems Sciences
Contact: G. Valsecchi giovanni@iasf-roma.inaf.it
URL: http://adams.dm.unipi.it/iausps7/

SOC Co-Chairs: G. Valsecchi (Italy), W. Huebner (USA), A. Milani (Italy)

SOC Members:
S. Chesley (USA), A. Harris (Germany), R. Jedicke (USA), D. Koschny (Netherlands), S. Larson (USA), A. Mainzer (USA), R. McMillan (USA), A. Milani (Italy), D. Morrison (USA), H. Rickman (Sweden), B. Shustov (Russian Federation), M. Yoshikawa (Japan)

Editor(s) of Proceedings: W. Huebner (USA), A. Milani (Italy), H. Rickman (Sweden), G. Valsecchi (Italy),

Topics:

- Current and Next Generation Surveys & enabled science
- Forecasting Impacts (orbit calculation and impact prediction)
- Non-gravitational forces and effect on impact prediction
- IAU Role in supporting the Minor Planet Centre
- Mitigating impacts
- The Operational Chain of NEO Hazards
- General Political Issues

SpS8 Calibration of star-formation rate measurements across the electromagnetic spectrum
27-30 August

Coordinating Division: XI - Space & High Energy Astrophysics
Contact: Andreas Zezas azezas@physics.uoc.gr
http://www.cfa.harvard.edu/events/2012/IAU_SpS8/index.html

SOC Co-Chairs: Andreas Zezas (Greece), Ann Hornschemeier (USA), Daniela Calzetti (USA)

SOC Members:
Almudena Alonso-Herrero (Spain), Matthew Ashby (USA), Eric Bell (USA), Alessandro Boselli (France), Véronique Buat (France), Roberto Cid Fernandes (Brazil), Michael Dopita (Australia), Lisa Kewley (USA), Xu Kong (China Nanjing), Robert Kennicutt (UK), Pavel Kroupa (Germany), Yanchun Liang(China Nanjing), Daniel Schaerer (Switzerland), Thaisa Storchi-Bergmann (Brazil), Vivienne Wild (UK)

Editors of Proceedings: Andreas Zezas (Greece), Ann Hornschemeier (USA), Daniela Calzetti (USA)

Topics:

- Update on the status of classical SFR indicators
- New SFR indicators
- Comparisons between SFR indicators calibrated on different spacial scales

- Results from new missions and expectations from future missions
- Physical biases, uncertainties and cross-calibration of the different tracers
- Definition of a "best use" framework
- SF tracers at high redshifts; cosmological applications

SpS9 Future Large Scale Facilities
27-28 August

To be organised by the Executive Committee Working Group:

R. Davies (Chair) - Oxford, UK
I. Corbett - General Secretary
R. Ekers - CSIRO, Australia
N. Gehrels - NASA/GSFC, USA
R. Green - NAOA, USA
M. Iye - NAOJ, Japan
L. Tacconi - MPE, Germany
M. Tarenghi - ESO, Germany
C. Wilson - McMaster, Canada
G. Zhao - NAOC, China Nanjing.

SpS10 Dynamics of the star-planet relations
27-30 August

Coordinating Division: II - Sun & Heliosphere
Contact: Jean-Louis Bougeret jean-louis.bougeret@obspm.fr
URL: http://www.lesia.obspm.fr/IAUSpS10/

SOC Co-Chairs: Jean-Louis Bougeret (France), Abraham C.-L. Chian (Brazil), Xueshang Feng (China Nanjing), Merav Opher (USA)

SOC Members:
Alan P. Boss (USA), Sandra C. Chapman (UK), Christopher J. Corbally (Vatican City State), Cheng Fang (China Nanjing), Nat Gopalswamy (USA), Zoran Knezevic (Republic of Serbia), Alexander Kosovichev (USA), Valentin Martinez Pillet (Spain), Karen J. Meech (USA), Heike Rauer (Germany), Kazunari Shibata (Japan), David F. Webb (USA)

Editors of Proceedings: Merav Opher (USA), Abraham C.-L. Chian (Brazil), Jean-Louis Bougeret (France), Xueshang Feng (China Nanjing)

Topics:

- Perspectives of the dynamics of the Sun-Earth and star-planet relations
- Fundamental physical processes in the stellar-planetary environment

- Stellar-solar variability
- Sun-Earth and star-planet interactions
- Stellar-solar winds: Physics of the asterospheres and the heliosphere
- Interactions of stellar-solar winds with the Local Interstellar Medium
- Prospects: Ground facilities and space missions, theory and simulations
- Star-Planet Relation and Public Outreach

Two Public Forums:

- Peking University, 27 Aug. 19:30-22:00
- Tsinghua University, 29 Aug. 19:30-22:00

WISER-IAU Advanced School

- Advanced School on space environment: 30 Aug. 10:30-18:00

SpS11 IAU Strategic Plan and the Global Office of Astronomy for Development
27-28 August

Contact person: Kevin Govender kg@astro4dev.org
URL: http://www.astro4dev.org/index.php/oadevents/iauga

SOC Chair: Kevin Govender (South Africa)

SOC Members:
George Miley (Netherlands), Khotso Mokhele (South Africa), Kaz Sekiguchi (Japan), Megan Donahue (USA), Claude Carignan (Canada), Patricia Whitelock (South Africa)

Editors of Proceedings; Kevin Govender (South Africa), George Miley (Netherlands)

Topics:

- IAU Strategic Plan "Astronomy for the Developing World"
- The IAU Global Office of Astronomy for Development
- Regional nodes for "Astronomy for Development" activities
- Sector Task Forces
- Volunteers and volunteer opportunities

SpS12 Modern views of the interstellar medium
27-30 August

Coordinating Division: VI - Interstellar Matter
Contact: You-Hua Chu yhchu@illinois.edu
URL: http://crescent.astro.illinois.edu/IAU_SpS12/

SOC Co-Chairs: You-Hua Chu (USA), Dieter Breitschwerdt (Germany)

SOC Members:
Michael Burton (Australia), Miguel de Avillez (Portugal), Erwin de Blok (South Africa), Elisabete de Gouveia Dal Pino (Brazil), Ralf-Jürgen Dettmar (Germany), Edith Falgarone (France), Tom Hartquist (UK), Bon-Chul Koo (Korea, Rep of), Naomi McClure-Griffiths (Australia), Eve Ostriker (USA), J. Xavier Prochaska (USA), Laszlo Viktor Toth (Hungary), Enrique Vazquez-Semadeni (Mexico), Keiichi Wada (Japan), Mark Wolfire (USA), Ji Yang (China Nanjing)

Editors of Proceedings: You-Hua Chu (USA), Dieter Breitschwerdt (Germany)

Topics:

- Physical Structure and phase distribution of the ISM in a galaxy
- Multi-wavelength observations of ISM in the Galaxy and nearby galaxies
- Recent theory/MHD simulation of ISM in a galaxy: magnetic field and turbulence
- Integrated picture of interstellar structure in a galaxy: relation among gas, dust, magnetic fields, cosmic rays, etc.
- The interstellar disk-halo connection in galaxies
- Interplay between stars and ISM: star formation and feedback
- Observations vs. Theory of the ISM
- How does the Galactic ISM help us understand the ISM in other galaxies?
- How does the nearby ISM help us understand the ISM in the distant past?

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

27-31 August

Contact: David Soderblom drs@stsci.edu
URL: http://www.stsci.edu/institute/conference/iausps13

SOC Co-Chairs: David Soderblom (USA), Andrea Dupree (USA)

SOC Members:
Conny Aerts (Belgium), Martin Asplund (Germany), Annie Baglin (France), Timothy Bedding (Australia), Jadwiga Daszynska-Daszkiewicz (Poland), LiCai Deng (China Nanjing), Fabio Favata (Italy), Jianning Fu (China Nanjing), Marc Pinsonneault (USA), Ignasi Ribas (Spain), Sylvie Vauclair (France), Werner Weiss (Austria), Suzanne Aigrain (UK)

Editors of Proceedings: Lucianne Walkopwicz (USA), David Soderblom (USA)

Topics:

- The current state of stellar models
- What physical parameters can be learned from high-precision photometry
- Properties of evolved stars
- Tests of the interior physics of solar-type stars
- Singular and unusual phenomena on stars
- New insights into pulsating stars
- Compact stars (including white dwarfs)
- Stellar interiors and magnetic fields, convection, and activity.

SpS14 Communicating astronomy with the public for scientists
29-31 August

Coordinating Division: XII - Union-Wide Activities
Contact: Dennis Crabtree Dennis.Crabtree@nrc-cnrc.gc.ca
www.communicatingastronomy.org/meetings/iauga2012-sps14/

SOC Co-Chairs: Dennis Crabtree (Canada), Lars Lindberg Christensen (Germany)

SOC Members:
Andrew Cohen (UK), Antonieta Garcia (Chile), Avivah Yamani (Indonesia), Carine Briand (France), Dirk Lorenzen (Germany), Doris Daou (USA), Hong-Kyu Moon (Republic of Korea), Ian Robson (UK), Kaz Sekiguchi (Japan), Pamela Gay (USA), Patricia Whitelock (South Africa), Pedro Russo (Netherlands), Rob Thacker (Canada), Wei-Hsin Sun (China Taipei)

Editors of Proceedings: Dennis Crabtree (Canada), Lars Lindberg Christensen (Germany), Pedro Russo (Netherlands)

Topics:

- Identifying public communication opportunities
- Knowing your audience
- Public presentations
- Telling a science story
- Using journalists
- How to access the media
- Choosing the right medium
- Writing a good press release
- Making the best of your images
- How to be interviewed
- Making the best of new media.

SpS15 Data intensive astronomy
28-31 August

Coordinating Division: XII - Union-Wide Activities
Contact: Masatoshi Ohishi masatoshi.ohishi@nao.ac.jp
URL: http://www.adc.nao.ac.jp/SpS15/index.html

SOC Chair: Masatoshi Ohishi (Japan)

SOC Members:
Kirk Borne (USA), Janet Drew (UK), Robert Hanisch (USA), Melaine Johnston-Hollitt (New Zealand), Nick Kaiser (USA), Ajit Kembhavi (India), Oleg Malkov (Russian Federation), Bob Mann (UK), Raffaella Morganti (Netherlands), Paolo Padovani (Germany), Hu Zhan (China Nanjing)

Editor of Proceedings: Masatoshi Ohishi (Japan)

Topics:

- Near- and far-future telescopes and survey projects that will produce large-scale data
- Scientific insights from large-scale observations in broad fields in astronomy
- Advanced data analyses, such as data mining, in deriving scientific knowledge from large-scale data
- Data management and data access with and beyond virtual observatories to ensure data-intensive astronomical research
- Synergy of data-intensive astronomy with other fields, such as mathematics/statistics and informatics
- Education, Public Outreach and Others

SpS16 Unexplained spectral phenomena in the interstellar medium
27-28 August

Coordinating Division: VI - Interstellar Matter
Contact: Sun Kwok sunkwok@hku.hk
URL: http://www.scifac.hku.hk/SpS16

SOC Chair: Sun Kwok (China Nanjing)

SOC Members:
Peter Bernath (UK), Walt Duley (Canada), Pascale Ehrenfreund (Netherlands), Thomas Henning (Germany), Christine Joblin (France), Aigen Li (USA), John P. Maier (Switzerland), Vito Mennella (Italy), Takashi Onaka (Japan), Peter Sarre (UK), Kris Sellgren (USA), Adolf Witt (USA)

Editor of Proceedings: Sun Kwok (China Nanjing)

Topics:

- Unidentified Infrared Emission features
- Extended Red Emission
- 217.5 nm extinction feature
- Diffuse interstellar bands
- 21 and 30 micron emission features

SpS17 Light Pollution: Protecting Astronomical Sites and Increasing Global Awareness through Education
29-31 August

Coordinating Division: XII - Union-Wide Activities
Contacts: Beatriz García beatrizgarciautn@gmail.com
Richard Green rgreen@lbto.org
URL: http://iau.iteda.org/

SOC Co-Chairs: Richard Green (USA), Beatriz García (Argentina), Constance Walker (USA), Xue Sui Jian (China Nanjing)

SOC Members:
Rosa Ros (Spain), WenJing Jin (China Nanjing), Stephen Pompea (USA), Elizabeth Alvarez del Castillo (USA), Russell Cannon (Australia), David Galadí-Enríquez (Spain), Brijesh Kumar (India), Malcolm Smith (Chile), Richard Wainscoat (USA), Jay Pasachoff (USA), Edward Guinan (USA), Mary Kay Hemenway (USA), Michèle Gerbaldi (France), Wim van Driel (France), Ramotholo Sefako (South Africa)

Editors of Proceedings: W. Scott Kardel (USA), Elizabeth Alvarez del Castillo (USA), Rosa Ros (Spain), Magda Stavinschi (Romania)

Topics:

- Media and Dark-Skies Images Worth 1000 Words
- Public Outreach on Light Pollution by Amateur Astronomers
- Role of Planetaria & Science Centers in Outreach on Light Pollution
- Light Pollution's Effects on Wildlife and Health Issues
- Light Pollution Education. The role of the School to change the social vision of this global problem
- Education through Global Star-Hunting & "Nights of Darkness" Campaigns
- Dark Skies Measurements for Education and Site Monitoring
- Dark Sky Places, Starlight Reserves and Astro-Tourism
- Light Pollution Education and Protecting Observatory Sites
- Progress and Action Plan for Implementing IAU Resolution 2009 B5
- Spectra of Artificial Blue-Rich Sources
- Observational Studies Most Impacted by Contamination below 500 nm
- Astronomical Input to Lighting Industry Development; Prospects for Success

SpS18 "Hot Topics" for each week: *24 August & 31 August*

Contact: Thierry Montmerle, AGS montmerl@iap.fr

2.10 Division, Commission & Working Group Business meetings

This schedule is provisional. The final schedule will be in the Programme Book for attendees and will be posted on the GA web site.

	Date	Time(s)
Division I	**29**	**14:00 – 15:30**
Comm 4	27	08:30 – 10:00
Comm 7	28	18:00 – 20:00
Comm 8	27	18:00 – 20:00
	29	16:00 – 20:00
Comm 19	30	08:30 – 12:30
Comm 31	28	18:00 – 20:00
Comm 52	28	08:30 – 10:00
	29	08:30 – 10:00
WG - Numerical Standards/SOFA	30	18:00 – 20:00
WG- Cartographic Coordinates/Div III	27	16:00 – 18:00
WG-Natural Satellites/Div III	28	14:00 – 15:30
WG -ST	28	08:30 – 10:00
Division II	**23**	**16:00 – 18:00**
Comm 10	23	14:00 – 16:00
Comm 12	22	14:00 – 15:30
Comm 49	23	14:00 – 15:30
WG-Int. Collab. On Space Weather	23	08:30 – 12:30
WG-Solar Minima	23	14:00 – 18:00
Division III	**24**	**16:00 – 18:00**
	30	**08:30 – 10:00**

Comm 15	29	14:00 – 18:00
Comm 16	27	08:30 – 10:00
Comm 20	24	14:00 – 15:30
Comm 22	24	14:00 – 15:30
Comm 51 business	27	18:30 – 20:00
Comm 51 science	29	08:30 – 10:00
Comm 53	28	18:00 – 20:00
WG-Small Bodies Nomenclature	28	14:00 – 15:30
WG-Planetary Systems Nomenclature	29	08:30 – 12:30
Div III WG NEO	31	16:00 – 18:00
Division IV (with Div V)	**24**	**14:00 – 15:30**
Comm 26	28	16:00 – 18:00
	29	08:30 – 10:00
Comm 29	24	08:30 – 10:00
Comm 35		
Comm 36	27	14:00 – 18:00
Comm 45	24	16:00 – 18:00
WG-Massive Stars	22	16:00 – 18:00
WG-Abundancies in Red Giants	24	10:30 – 12:30
WG-Active B-type Stars/Div IV	22	14:00 – 18:00
Wg-Ap and Related Stars/Div IV	23	14:00 – 18:00
Division V	**24**	**08:30 – 12:30**
Div IV-V joint meeting	**24**	**14:00 – 18:00**
Comm 27	24	08:30 – 12:30
Comm 42	24	08:30 – 12:30
Division VI		
Comm 34	29	12:30 – 14:00

WG-Astrochemistry		
WG-Planetary Nebula	30	10:30 – 12:30
Division VII	**24**	**16:00 – 18:00**
Comm 33	24	14:00 – 15:30
	28	16:00 – 18:00
Comm 37	24	10:30 – 12:30
	24	14:00 – 18:00
Division VIII	**23**	**12:30 – 14:00**
Comm 28	23	12:30 – 14:00
Comm 47	27	12:30 – 14:00
WG-Supernovae	22	14:00 – 18:00
	23	10:30 – 12:30
Division IX		
Comm 21		
Comm 25	28	14:00 – 18:00
Comm 25 WG-Infrare Astronomy	29	14:00 – 18:00
Comm 30	28	08:30 – 12:30
Comm 30 WG-Orbita Elements Binary		
Comm 54	24	10:30 – 12:30
WG-Astronomy from the Moon/ Div X, XI	22	16:00 – 18:00
Division X	**22**	**08:30 – 12:30**
WG-Global VLBI		
WG-Interference Mitigation	22	14:00 – 15:30
WG-Astro. Important Spectral Lines		
WG-Historic Radio Astronomy/Div XII	27	10:30 – 18:00
IUCAF	24	14:00 – 15:30

Evolutionary Map of Universe (EMU)	28	08:30 – 18:00
Division XI	**23**	**12:30 – 14:00**
WG-Particle Astrophysics		
Comm 5	23	08:30 – 12:30
Comm 5 WG-Astronomical Data	28	08:30 – 10:00
Comm 5 WG-Nomenclature	27	10:30 – 12:30
Comm 5 WG-Librarie	23	08:30 – 18:00
	24	08:30 – 18:00
Comm 5 WG-FITS Data Format	28	10:30 – 12:30
Comm 5 WG-Virtual Observatories	27	14:00 – 15:30
Comm 5 TF-Photographic Plates	28	16:00 – 18:00
Comm 6	24	08:30 – 12:30
CBAT		
Comm 14	24	14:00 – 18:00
Comm 41	22	14:00 – 18:00
	23	08:30 – 18:00
Comm 41 WG-Archives		
Comm 41 WG-Historical Instruments	28	10:30 – 18:00
Comm 41 WG-Transit of Venus		
Comm 41 WG-Astronomy & World Heritage	24	08:30 – 18:00
Comm 46	23	14:00 – 18:00
	28	14:00 – 18:00
Comm 50	27	16:00 – 18:00
Comm 50 WG-Controling Light Polution		
Comm 55	27	10:30 – 12:30

2.11 Lunchtime lectures and other events

"Ancient Chinese Astronomy," Xianchun Sun, *Tuesday 21 and Wednesday 29*

Young Astronomers Lunch – invitation only – *Thursday 23*
Women in Astronomy Lunch – invitation only – *Monday 27*

Reception – open to all – *after first session Tuesday 21*
Banquet – reservation necessary – *Thursday 23*

2.12 Women in Astronomy
Monday, 27 August 2012

The IAU XXVIII GA Women in Astronomy Meeting luncheon will be held on Monday, 27 August, from 12:30 to 2:00 pm in the foyer area outside Plenary Hall A on the 4th floor of the China National Convention Center. This area is marked "L4 lobby" in the CNCC maps.

Program
The keynote speech will be delivered by Professor Xiangqun Cui, President of the Chinese Astronomical Society and former Director of the Nanjing Institute of Astronomical Optics and Technology, who will give a summary of the current situation for women in astronomy in China. This will be followed by break out groups to discuss a range of issues over lunch, focusing on strategies that will improve the environment for all astronomers.

Registration for WAM luncheon
Thanks to the generous support of the U.S. National Academy of Sciences, there is no charge for WAM, but we do need an indication of numbers for catering purposes and there is a limit to the number of attendees. So please be sure to register to avoid disappointment!

WAM Organising Committee
Co-chairs: Sarah Maddison (Swinburne) & Francesca Primas (ESO)
Members: Yanchun Liang (NAO, China)
Conny Aerts (Katholieke University Leuven)
Geoffery Clayton (Louisiana State University)
Françoise Combes (Observatoire de Paris)
Gloria Dubner (University of Buenos Aires)
Luigina Feretti (INAF)
Anne Green (University of Sydney)
Elizabeth Griffin (Dominion Astrophysical Observatory)
Yuko Motizuki (Saitama University)
Birgitta Nordström (Copenhagen University)

2.13 Young Astronomers

A lunch for Young Astronomers will be held Thursday, 23 August, starting at 11.00. This event is sponsored by the U.S. National Academy of Sciences and the Norwegian National Academy of Science & Letters. Participants will be allocated to tables according to topics of interest. Senior astronomers will take part in the discussions. Attendance is by invitation only. A Young Astronomers Consulting Service will be offered throughout the GA and will be open to all.

2.14 Librarians

The Commission 5 Library Working Group has been making a special effort this year to foster discussion between librarians and astronomers in two days of sessions at the GA, on 23 and 24 August. A group of librarians will be attending the GA specifically to take part in these discussions. Further information is available from the Co-Chair of the WG, Marsha Bishop, mbishop@nrao.edu

2.15 Workshop for Journal Authors and Referees

Project outline submitted by Chris Biemesderfer, Director of Publishing, American Astronomical Society

The major astronomical journals in North America and Europe are co-sponsoring a workshop for journal authors and referees at the XXVIII General Assembly of the IAU. The workshop is aimed mainly at young astronomers and astronomers from Asian and developing countries. The topics that will be covered in the workshop include how to write a good paper, how to be an effecttive reviewer, and how the modern scholarly journal system works. The one-day workshop will be offered four different times during the General Assembly in Beijing, on 22, 24, 27 and 29 August. Persons who would like to participate in one of these workshops may indicate their interest in the Section "Special Events" on the General Assembly registration form. A separate registration for the workshop will be required.

2.16 IAU/UNAWE Workshop & Children's Day Camp

Pedro Russo, who was responsible for the organisation of IYA2009, now runs the UNAWE programme, with headquarters in Leiden, Netherlands. UNAWE is organising a Universe Awareness Workshop for the duration of the General Assembly.

Introduction

Following recommendations from IYA2009 "She is an astronomer" Cornerstone Project, the IAU, in collaboration with the educational programme Universe Awareness, is organising a day-camp for children of astronomers attending the IAU General Assembly. The idea behind the Day Camp is to combine

professsional childcare support for parents who would like to bring their family to the conference with a rich programme of educational astronomy activities for their children.

The organisers will also invite local children to attend the Day Camp. The benefit of this approach is twofold: to give something back to the local community in the GA's host city, and to offer the visiting children a unique opportunity to learn about Chinese culture and customs as they play and learn together.

The day-camp will offer a rich programme of science and cultural activities. The schedule will include hands-on science activities, games, social activities, 2-3 excursion per week (Planetarium, Ancient Observatory, Science Centre…), lunch and snack and a presentation of their activities on the last day of the IAU General Assembly. Monitors will be recruited among international students and multilingual staff; groups will be formed based on language and age.

Who can participate?

The day camp is addressed to the children of IAU GA attendants and those from the local community (Chinese and expats), aged 5-11 (date of birth between 20/8/2007 and 31/8/2001). Maximum number of participants each week is 25.

Where?

The day camp will take place in dedicated rooms in the conference venue. Weather permitting, the children can play in the park outside the rooms. The programme will include excursions to local sites for children.

Staff and monitors

The camp is organised by IAU in collaboration with Universe Awareness and Sterrenlab. All staff involved have previous experience with children and science education programmes.

Safety

The day camp will be run in a safe and healthy environment:

- the camp venue is safe and appropriate for children's activities
- monitors (>19 years old) and staff have previous experience with children
- parents will be asked to fill a form about health status (e.g. allergies) of their child(ren)
- contact with first aid at the conference and local hospital
- parents can contact the staff at any time of the day

Dates

week I: 20-25 August 2012

The camp opens 15 minutes before the first session and closes 30 minutes after the last one. Children **must** be collected by parent(s) before the camp closes.

Fee
The day-camp cost per child per week is 200 €. The fee includes:

- lunch, 2 snacks per day
- monitors (1 for every 10 children) and staff
- material for activities
- 2-3 excursions per week
- insurance

Withdrawal policy
No refunds can be made if a child is withdrawn after 5th August.

Rules
Upon submitting the pre-registration form, parents will receive the camp rules to be signed.

Information
Contact email address: info@unawe.org

3. SCIENTIFIC MEETINGS

3.1 Symposia in 2013

IAUS 296 **Supernova environmental impacts**
6-11 January 2013, Kolkata (Calcutta), India

Contact: Dick McCray dick@jila.colorado.edu
Event website: TBD
Coordinating Division: DXI – Space & High Energy Astrophysics

SOC Co-Chairs: Alak Ray (India), Dick McCray (USA), Roger Chevalier (USA)

SOC Members:
Evgeny Berezhko (Russia), Catherine Cesarsky (France), Claes Fransson (Sweden), Marianne Lemoine-Goumard (France), Fangjun Lu (China Nanjing), Virginia Trimble (USA), Massimo Turatto (Italy), Jacco Vink (Netherlands), Daniel Wang (USA), Chan Yang (China Nanjing)

Editors of Proceedings: Richard McCray (USA), Alak Ray (India)

Topics:

- Historical Supernovae and Supernova Remnants
- Core collapse supernovae: surveys, light curves, and progenitors
- Physics of core collapse supernova light curves and spectra
- Supernovae and star formation

- Particle acceleration in supernova shocks
- Radiation from supernova remnants – from radio to gamma rays
- SN1987A at 25 years

IAUS 297 The diffuse interstellar bands
20-24 May 2013, Haarlem (Netherlands)

Contact: Jan Cami, jcami@uwo.ca
Event website: TBD
Coordinating division**:** Division VI – Interstellar Matter

SOC Co-Chairs:
Jan Cami (Canada), Harold Linnartz (Netherlands), Nick Cox (Belgium)

SOC Members
Martin Cordiner (USA), Pascale Ehrenfreund (Netherlands), Gazinur Galatzutdinov (Chile), Cornelia Jager (Germany), Jacek Krelowski (Poland), Sun Kwok (China Nanjing), Farid Salama (USA), Peter Sarre (UK), Timothy Schmidt (Australia), Theodore Snow (USA), Paule Sonnentrucker (USA), Donald York (USA)

Editors of Proceedings: Jan Cami (Canada), Nick Cox (Belgium)

Topics:

- Astronomical surveys: overall properties and statistics of the Diffuse Interstellar Bands (DIBs) and their relation to known interstellar species and components (C, Si, atomic and molecular hydrogen, C2, dust, ...)
- DIB behaviour in different (and extreme) environments
- What can we learn from analyzing DIB line profiles and correlations?
- DIBs and the connection to other astronomical phenomena (Extended Red Emission, Unidentified InfraRed bands, UV extinction,...)
- Laboratory Astrophysics: current status and limitations of spectroscopy of potential DIB carriers
- Laboratory Astrophysics: what carriers can thrive & survive in DIB environments: stability & irradiation studies, hydrogenation, ...
- General properties of the most commonly suggested classes of DIB carriers: carbon chains, polycyclic aromatic hydrocarbon (PAH) molecules, fullerene compounds
- Theoretical and computational approaches & needs: quantum chemistry calculations (DFT, ...), chemical network models, astrophysical models
- How can recent and future observatories & instruments (HST/COS, SOFIA, ALMA, JWST, VLT, ELTs,...) contribute to help narrowing or eventually solving the DIB problem?
- What are the most promising avenues toward identifying the DIB carriers?

IAUS 298 **The impact on galactic science from Gaia, LAMOST, and next generation surveys**
20-24 May 2013, Lijiang (China Nanjing)

Contact: Sofia Feltzing sofia@astro.lu.se
Event website: TBD
Coordinating division**:** Division IV – Stars

SOC Co-Chairs:
Sofia Feltzing (Sweden), Gang Zhao (China Nanjing)

SOC Members:
Emilio Alfarro (Spain), Timothy Beers (USA), Masashi Chiba (Japan), Gaynadhi de Silva (Australia), Eva Grebel (Germany), Amina Helmi (Netherlands), Jacques Lépine (Brazil), François Mignard (France), Julio Navarro (Canada), Timo Prusti (Netherlands), Sofia Randich (Italy), Becham Reddy (India), Nicolas Walton (UK), Patricia Whitelock (South Africa), Manuela Zoccali (Chile)

Editors of Proceedings: Sofia Feltzing (Sweden), Nicolas Walton (UK), Patricia Whitelock (South Africa), Gang Zhao (China Nanjing)

Topics:

- The Milky Way as we know it
- Updates on on-going and upcoming Galactic surveys
- The state of the art of Milky Way modeling and how ongoing surveys and Gaia will inform these studies
- The role of Interstellar medium, variable stars, astrometry in large scale surveys of the Galaxy

IAUS 299 **Exploring the formation and evolution of planetary systems**
2-7 June 2013, Victoria (BC, Canada)
Contact: Brenda Matthews brenda.matthews@nrc-cnrc.gc.ca
Event web site: TBD
Coordinating division: Division III – Planetary Systems Sciences

SOC Co-Chairs
Brenda Matthews (Canada), James Graham (Canada)

SOC Members
France Allard (France), Antonio Heles (Chile), Paul Kalas (USA), Matthew Kenworthy (Netherlands), Anne-Marie Lagrange (France), Doug Lin (China Nanjing), Bruce Macintosh (USA), Sarah Maddison (Australia), Dimitri Mawet (Chile), Amaya Moro-Martín (Spain), Ruth Murray-Clay (USA), Don Pollacco (UK), Didier Queloz (Switzerland), Motohide Tamura (Japan), David Wilner (USA)

Editors of Proceedings: Brenda Matthews (Canada), James Graham (Canada)

Topics:

- Diversity and Evolution of Planetary Systems
- Protoplanetary discs: high resolution imaging, composition and structure
- Grains and Planetesimals
- Disc Chemistry
- Initial conditions of planet formation; planet formation pathways
- Signposts of planetary systems
- Dynamics in Planetary Systems: migration, multiplicity
- Exoplanet Atmospheres; composition, radiative transfer and circulation
- Interior Structure and Planetary Composition

IAUS 300 **Nature of prominences and their role in space weather**
10-16 June 2013, Paris, France

Contact: Brigitte Schmieder brigitte.schmieder@obspm.fr
Event web site: TBD
Coordinating division: Division II – Sun & Heliosphere

SOC Chair:
Brigitte Schmieder (France)

SOC Members:
Lydia van Driel-Gesztelyi (Hungary), Nat Gopalswamy (USA), Valentin Martinez Pillet (Spain), David Webb (USA), Sara Martin (USA), Nandita Srivastava (India), Petr Heinzel (Czech Republic), Holly Gilbert (USA), Ducan MacKay (UK), Sergio Dasso (Argentina), Jonchul Chae (Korea), Moira Jardine (UK)

Editor of Proceedings: Brigitte Schmieder (France)

Topics:

- Prominences : formation, dynamics
- Prominence plasma properties, including prominence seismology
- Magnetic field : measurements, topology, support
- Large-scale patterns and cyclic evolution
- Prominence destabilization, CMEs, reconstruction in 3D
- ICMEs in the heliosphere, magnetic clouds; their impact on the Earth environment
- Stellar quiescent and eruptive prominences and stellar CMEs
- Requirements for future instrumentation and prospects for future missions

IAUS 301 **Precision asteroseismology**
19-23 August 2013, Wroclaw, Poland

Contact: Jadwiga Daszynska-Daszkiewicz
daszynska@astro.uni.wroc.pl
Event web site: TBD
Coordinating division: Division V – Variable Stars

SOC Co-Chairs:
Jadwiga Daszynska-Daszkiewicz (Poland), Hiromoto Shibahashi (Japan)

SOC Members:
Annie Baglin (France), William Chaplin (UK), Jørgen Christensen-Dalsgaard (Denmark), Gilles Fontaine (Canada), Joyce Guzik (USA), Gerald Handler (Poland), Marcella Marconi (Italy), Margarida Cunha (Portugal), Andrzej Pigulski (Poland), Karen Pollard (NewZealand), Juan Carlos Suárez (Spain), Werner Weiss (Austria)

Editors of Proceedings: William Chaplin (UK), Joyce Guzik (USA), Gerald Handler (Poland), Andrzej Pigulski (Poland)

Topics:
- photometric and spectroscopic data,
- space observations, data analysis,
- stellar structure and evolution,
- pulsating stars, convection, rotation,
- mass loss, microphysics data, public outreach

IAUS 302 **Magnetic fields throughout stellar evolution**
25-30 August 2013, Biarritz, France

Contact: Pascal Petit ppetit@irap.omp.eu
Event web site: TBD
Coordinating division: Division IV – Stars

SOC Co-Chairs:
Pascal Petit (France), Moira Jardine (UK), Henk Spruit (Germany)

SOC Members:
Gibor Basri (USA), Matthew Browning (UK), Corinne Charbonnel (France), José-Dias do Nascimento (Brazil), Siraj Hasan (India), Oleg Khochukov (Sweden), Renada Konstantinova-Antova (Bulgaria), Hiroaki Isobe (Japan), Stephen Marsden (Australia), Sami Solanki (Germany), Henk Spruit (Germany), Klaus Strassmeier (Germany), Asif Ud-Doula (USA), Gregg Wade (Canada)

Editors of Proceedings: Pascal Petit (France), Moira Jardine (UK), Henk Spruit (Germany)

Topics:

- Stellar structure and evolution
- Magnetized accretion and outflows in young stellar objects
- Magnetic braking of PMS stars
- Solar and stellar activity in photospheres, chromospheres and coronae, and stellar cycles
- Magnetism in very low-mass stars and brown dwarfs
- Star-planet interaction
- Stellar dynamos across the HR diagram
- Magnetic field origin and stability in massive stars
- Magnetically-confined winds of massive stars
- Dynamo and mass-loss in giant and supergiant stars
- Final phases of stellar evolution : magnetism in compact objects

IAUS 303 **The galactic center: Feeding and feedback in a normal galactic nucleus**
30 September - 4 October 4 Oct., 2013, Santa Fe, NM, USA

Contact: Jürgen Ott jott@nrao.edu
Event web site: TBD
Coordinating division: Division VII – Galactic System

SOC Co-Chairs:
Jürgen Ott (USA), Cornelia Lang (USA), Michael Burton (Australia), Sera Markoff (Netherlands)

SOC Members:
Roland Crocker (Germany), Lorant Sjouwerman (USA), Masato Tsuboi (Japan), Sungsoo Kim (Korea), Paul Ho (China Taipei), Mark Morris (USA), Jesus Martín-Pintado (Spain)

Editors of Proceedings: Lorant Sjouwerman (USA), Jürgen Ott (USA), Cornelia Lang (USA)

Topics:

- Large-scale feeding/feedback:
  - The role of the Galactic bar in feeding the Galactic nucleus
  - The ISM and star formation in the Central Molecular Zone
  - The Galactic Center stellar population
  - 3-D large-scale structure of the Galactic nucleus and comparisons to other nuclear regions I
- Small-scale feeding/feedback:
  - Astrophysics of feeding and feedback near supermassive nuclear black holes like Sgr A*
  - Nuclear Feedback: Stellar, magnetic and high energy processes

IAUS 304 **Multiwavelength AGN surveys and studies**
7- 11 October 2013, Byurakan, Armenia

Contact: Areg Mickaelian aregmick@aras.am
Event web site: TBD
Coordinating division: Division VIII – Galaxies & the Universe

SOC Co-Chairs:
Areg Mickaelian (Armenia), Felix Aharonian (Germany), David Sanders (USA)

SOC Members:
Roger Blandford (USA), George Djorgovski (USA), Malcolm Longair (UK), Laura Maraschi (Italy), Enrico Massaro (Italy), Felix Mirabel (France), Ray Norris (Australia), Paolo Padovani (Germany), Bradley Peterson (USA), Elaine Sadler (Australia), Hélène Sol (France), Tadayuki Takahashi (Japan), Yervant Terzian (USA), Megan Urry (USA), Lutz Wisotzki (Germany)

Editors of Proceedings: Areg Mickaelian (Armenia), Felix Aharonian (Germany), David Sanders (USA)

Topics:

- Historical surveys: spectral and colorimetric surveys for AGN, surveys for UV-excess galaxies;
- AGN from IR/submm surveys: 2MASS, IRAS, ISO, AKARI, SCUBA, SST, WISE, Herschel;
- AGN from radio/mm surveys: NVSS, FIRST, ALMA, Planck, and others;
- AGN from X-ray/gamma-ray surveys: ROSAT, ASCA, BeppoSAX, Chandra, XMM, INTEGRAL, Fermi, HESS, MAGIC, VERITAS;
- Multiwavelength AGN surveys, AGN statistics and cross-correlation of multiwavelength surveys;
- Unification models of AGN, other AGN models, accretion modes;
- Understanding of the structure of nearby AGN from IFUs on VLT and other telescopes;
- Study of unique AGN and AGN variability;
- Future large projects;
- The Phenomena of Activity.

3.2 Post Meeting Reports

The 2011 reports are available at
www.iau.org/static/scientific_meetings/postmr11.pdf

2012 Symposia

IAUS 287 Cosmic Masers: from OH to H0
29 January - 3 February 2012, Stellenbosch, South Africa

Scientific highlights
Since their discovery in 1965, cosmic masers have proved to be a valuable tool in Astrophysics, Astrometry and, more recently, Cosmology despite remaining something of an enigma in terms of the complete comprehension of their excitation mechanism and the physics of the pump source. The papers of the opening theory session reminded us of this problem but presented some new clues. Furthermore, a review of recent polarization measurements (session 2) of the Zeeman splitting of the lines added valuable new data on the role of magnetic fields.

Of special interest were several papers on the polarization of masers associated with evolved stars, which appear to enhance the hypothesis that magnetic fields play a role in answering the puzzle posed by the formation of bipolar planetary nebulae from the circularly symmetric AGB stars. Session 3 on Masers associated with star formation began with a review of variability in (Class II) methanol masers. The quasi-sinusoidal temporal variability, first observed at the Hartebeesthoek Radio Astronomy Observatory in South Africa, remains difficult to explain but variability in either the pump source or the background continuum have been proposed. Other maser variability, intermittent and bursting was also discussed.

Nearly all the papers in the Star Formation session were on methanol class I or II. Class II methanol masers are known to be associated with young stellar objects (YSOs) and are tracers of high-mass star formation, along with OH and H2O masers, while Class I masers (eg at 36 and 44 GHz) are found in regions of both high- and low-mass star formation with pumping dominated by collisions (with molecular hydrogen). A review of new Australia Telescope Compact Array observations of class I methanol from all transitions from 9.9 to 104 GHz suggested that the shocks responsible for the class I masers could arise from a range of phenomena and not only the more established outflow scenario.

Progress in studies of circumstellar masers was the topic of the next session. Such emission arises from SiO and H2O in or near the stellar photosphere, or OH in the expanding envelope. An exciting development here is coordinated mid infrared VLTI observations with the SiO radio spectroscopic VLBI observations with the VLBA. SiO masers lie in the extended atmosphere, as seen by infrared interferometry, possibly located with Al2O3 dust. Near-IR interfero-

metry indicates a clumpy morphology, consistent with the erratic temporal structural changes found in VLBA observations of SiO.

There has been a lot interest in extragalactic masers in the past decade. Not only may strong water mega-masers be used to measure the Hubble constant, H0, as a function of red-shift, they also enable the determination of the central black-hole mass. The GBT and extremely wide band JVLA are becoming important instruments for the study of extra-galactic masers. Some of the new instruments under discussion, even construction, have deep HI surveys as prime science drivers (MeerKAT, ASKAP, SKA). The ability of OH maser emission to confuse HI fields is a recognized problem and we heard how progress is being made in investigations of the properties of red-shifted OH, in order to deal with such problems.

Finally, maser astrometry of the Galaxy is gaining new strengths with the new interferometers VLBA, the Japanese Vera network (and its extension with the new Korean multi-frequency array), and the EVN.

It seems clear that the through the work already done and that to come, maser astrometry will re-define the distance to the Galactic Centre and other established constants in astrometry.

Final comments
The fourth IAU Symposium on Astronomical masers, IAUS 287, entitled "Cosmic Masers- from OH to H0," was the second IAU symposium held in South Africa. The venue was the excellent Wallenberg Conference Centre in the beautiful old town of Stellenbosch nestling in the foothills of one of the country's foremost wine districts. The weather was perfect! Despite a strenuous programme with lively discussions, the participants found time to visit the Cape Town Water Front and take a boat trip to historical Robben Island, where the present political structure was formulated in the mid 90s. They also enjoyed an African evening at a local hospice, where they sampled truly African food, song and dance.

We look forward to the next maser meeting, in another exotic venue, in four years' time.

IAUS 279 Death of Massive Stars: Supernovae and Gamma-Ray Bursts

12-16 March 2012, Nikko, Japan

Overview
IAU Symposium 279 took place in Nikko, in the Tochigi Prefecture of Japan. The symposium was originally scheduled for the week of 18 April, 2011, but was postponed due to the catastrophic earthquake, the largest in Japanese history, that hit northern Japan on 11 March, 2011. The Tochigi Prefecture is located next to the Fukushima Prefecture, the same location as the Fukushima Daiichi

nuclear power plant. Due to the radiation, power grid, and other infrastructure uncertainties, it was decided to postpone the meeting until the following year (although no later than 31 March, 2012, in order to benefit from the generous funding provided by the Japanese government to support this meeting). The IAU Executive Committee graciously endorsed and supported the decision. When the meeting was finally held, a moment of silence was observed at the beginning of the meeting for the 20,000 individuals who lost their lives, either to the earthquake, tsunami, or the devastating aftermath.

The science motivation for holding IAU Symposium 279 centers around the death of stars that are larger than eight solar masses. These massive stars end their lives in a fiery explosion and are manifest as core collapse supernovae (CCSNe) or gamma-ray bursts (GRBs). In rare cases, a highly stripped massive star explodes and exhibits properties of both CCSNe and GRBs. In contrast, there are clear cases in which no bright supernova is found to be associated with a GRB, and vice versa. The quest in understanding supernovae (SNe) and GRBs, and the connection between them, has raised many questions. Since the elements synthesized in the explosion of massive stars are the building blocks for much of the visible Universe, it is important to understand the life cycle of these massive stars.

This symposium brought together international leaders, in both theory and observation, who study CCSNe and GRBs to discuss the range of activities in the field. These activities include: stellar evolution and explosion; progenitors, environments, and hosts; astroparticle physics; as well as multi-wavelength observations of these objects and their use as cosmological probes, particularly in the very early Universe.

The symposium was divided into eight sessions, 62 talks, and 82 posters. The 158 participants came from 25 countries with 28 invited and 34 contributed speakers, of which five and six were women, espectively. We had the privilege of having with us for the whole meeting, Thierry Montmerle, Assistant General Secretary of the IAU Executive Committee, who also delivered a talk on the future organisation of the IAU.

Scientific Highlights

Our understanding of the lives and death of stars with masses greater than eight solar masses are beginning to expand thanks to increasingly powerful diagnostic tools, models, and numerical simulations that have become available. These resources are helping identify the evolutionary channels and eventual fates of massive stars, as well as investigating how a fraction of them are able to produce high-energy emission and jets. The talks during the meeting focused on twelve primary themes:

- What are the differing models relating to the death of massive stars telling us
- X-ray and optical properties of all classes of SNe including superluminous SNe (sometimes referred to as "Quimbies")
- What we are learning from X-ray, optical and near-IR observations of the prompt and afterglow phases of GRBs
- What we are learning from X-ray, UV, and optical observations of SNe and their remnants
- The challenges associated with observing and constraining the progenitors of GRBs and SNe
- Current thoughts on CCSNe theory
- Gravitational waves and GRBs
- Host galaxies and the local environment, particularly the metallicities, of GRBs and CCSNe
- Current theories in early Universe star formation including Population III stars
- Using GRBs as probes of the early Universe
- Understanding the shock break out of SNe
- The possible connection between short GRBs and magnetars

The symposium was concluded by Shri Kulkarni, who summarized the content of the meeting as well as included some of his own thoughts about our current understanding in the field. One invited talk was not given: Chris Fryer had a last minute emergency that prevented him from giving his talk on Stellar Collapse and GRB Explosion Mechanisms.

3.3 Regional Meetings 2013 - 2015

LARIM 2013 **25 - 29 November 2013 in Florianopolis, SC, Brazil**
Coordinating division: D XII – Union-Wide Activities
to be confirmed

3.4 XXIX General Assembly, Honolulu, Hawai'i, August 2015

Status Report
Kevin B. Marvel, Executive Officer, American Astronomical Society

An MOU was signed between the IAU and the AAS on 12 May 2010.

Since then, significant progress has been made on the logistical details of the meeting, including securing contracts for a core block of hotel rooms and confirmation/reservation of dates for the convention center.

The AAS is in the process of preparing an invitational video to be shown at the XXVIII General Assembly in Beijing, where I will invite the gathered astronomers to Hawai'i.

A meeting website is already built including key information and details regarding the meeting including an email signup option for meeting updates, details on associated tours, room sharing service, hotel booking service and other activities. Additional information will be added as it becomes available. We will make the website live on 1 September, 2012.

Contacts have been made with the U.S. Department of State regarding the meeting and we will continue to work with the appropriate staff as the meeting approaches. Primarily, we want to make available to visitors to the US the details of the entry process and provide the correct information necessary for obtaining a visa. Secondarily, we will continue to urge the Department to maintain progress on shortening the length of time required to receive a visa, which they have substantially accomplished in just the past year or two. Finally, the Department is fully aware of the importance of the General Assembly to worldwide astronomy and has already entered it into their database of recognized scientific conferences, which will help attendees during their visa application process.

Plans to promote the meeting in Beijing are underway, with booth space and sufficient staffing already arranged.

Convention Center
A Letter of Confirmation was received from the Honolulu Convention Center on 1 September 2009. A contract will be finalized during late 2012 or early 2013 confirming pricing and logistical arrangements. The AAS has reserved the entire space of the convention center for the meeting after careful review of the programmatic information on the IAU website and review of recent past General Assembly programs. We anticipate that all sessions of the General Assembly can be held comfortably in the Convention Center. If the level of attendance or number of sessions exceeds expectation, we have arranged for additional space at some of the meeting hotels, so we are prepared for a meeting of record size.

Hotels and Lodging
Contracts have been signed with four hotels as detailed below. The total AAS commitment at this time exceeds 1500 rooms per night for the main portion of the meeting. We do not anticipate reserving further rooms until closer to the meeting and will do so after gauging attendance. The local Convention and Visitor's Bureau and our own contacts with other hotels indicate that many more rooms are potentially available if attendance should greatly exceed expectations. We are prepared to handle an attendance in excess of 4500 individuals.

Hotel Details

Hilton Hawaiian Village Beach Resort & Spa
- Confirmed rates for 2015: $253.00 and above
- US Government Rate Block secured
- Complimentary Internet in guest rooms

Sheraton Waikiki Hotel
- Confirmed 2015 rates: $205.00-$255.00

Sheraton Princess Kaiulani
- Student Block at confirmed rate: $125.00single/double/triple occupancy; Breakfast voucher per room per day

Hyatt Regency Waikiki
- Group Block at Confirmed 2015 rate: $215.00
- Ocean front rooms confirmed 2015 rate: $240.00

Other Logistical Details

The AAS uses a distributed, database driven speaker presentation system utilizing the latest Apple computer technologies to provide easy-to-use LCD projection systems for speakers. Speakers will deposit their talks prior to their speaking time in a central database. The talks are then pushed via an intranet to the podium computers. Support is provided in real-time by competent staff who can see all podium computer desktops in real time and take corrective action if necessary.

The AAS will organise an exhibition hall in which exhibitors will be able to have display booths, similar to recent past General Assemblies. However, as the AAS meetings typically draw many tens of additional exhibitors, we anticipate the General Assembly exhibit hall will be larger than typical GAs with at least fifty and perhaps many more exhibitors. We anticipate co-locating poster sessions within the exhibition hall, but we will not have exhibitors located in a secondary location. This also helps to ensure that meeting registration prices will match expectations.

Food & beverage details will be worked out once the initial registration deadlines arrive. We do not anticipate any challenges here due to the familiarity of the local vendors with meetings much larger than the anticipated GA attendance.

We anticipate using the AAS Abstract Submission system to facilitate the collection of abstracts, scheduling of scientific sessions and production of various program materials, including both online and electronic versions suitable for devices available at the time of the meeting. The AAS can deliver to the IAU abstracts in any format required. The system is integrated with our registration process.

The AAS is in regular communication with local astronomers and institutions relevant to astronomy. We have the full cooperation of the Institute for Astronomy, who are confirmed to provide a number of specific (but not critical) services to the meeting and the local observatories who will help arrange for tours before, during and after the GA.

4. IAU Publications

The Proceedings of IAU Symposia, Transactions and Highlights of Astronomy are published by Cambridge University Press. A full list, with access to recent electronic versions, is available at www.iau.org/science/publications/iau/

Latest publications

IAUS 285 **New Horizons in Time-Domain Astronomy**
Oxford, UK, 19-23 September 2011
Eds. Elizabeth Griffin, Robert Hanisch, Rob Seaman

IAUS 282 **From Interacting Binaries to Exoplanets: Essential Modeling Tools**
Tatranska Lomnica, Slovakia, 18-22 July 2011
Eds. Mercedes Richards, Ivan Hubeny

IAUS 280 **The Molecular Universe**
Toledo, Spain, 30 May - 3 June 2011
Eds. J. Cernicharo, R.Bachiller

IAUS 278 **Archaeoastronomy and Ethnoastronomy: Building Bridges between Cultures**
Lima, Peru, 5-14 January 2011
Ed. Clive Ruggles

IAUS 277 **Tracing the Ancestry of Galaxies: On the land of our ancestors**
Ouagadougou, Burkina Faso, 13-17 December 2010
Eds. Claude Carignan, Ken Freeman, Françoise Combes

IAUS 276 **The Astrophysics of Planetary Systems: Formation, Structure, and Dynamical Evolution**
Torino, Italy, 10-15 October 2010
Eds. A. Sozzetti, M.G. Lattanzi, A.P. Boss

IAUS 275 **Jets at All Scales**
Buenos Aires, Argentina, 13-17 September 2010
Eds.Gustavo Romero, Rashid Sunyaev, Tomaso Bellon

IAUS 274 **Advances in Plasma Astrophysics**
Giardini Naxos, Italy, 6-10 September 2010
Eds. A. Bonanno, A. Kosovichev

IAUS 273 **The Physics of Sun and Star Spots**
Los Angeles, USA, 22-26 August 2010
Eds. Debi Choudhary, Klaus Strassmeier

IAUS 272	**Active OB stars: structure, evolution, mass loss, and critical limits** *Paris, France, 19-23 July 2010* Eds. C. Neiner, G. Wade, G. Meynet, G. Peters
IAUS 271	**Astrophysical Dynamics: from Stars to Galaxies** *Nice, France, 21-25 June 2010* Eds. Nic Brummell, Allan Sacha Brun, Yannick Ponty, Mark S. Miesch
IAU Transactions 28A	**Proceedings of the International Astronomical Union Reports on Astronomy 2009-2011 – IAU Transactions 28A** Ed. Ian Corbett

5. Prizes & Awards

5.1 Gruber Foundation – Fellowship and Cosmology Prize

The Gruber Foundation Cosmology Prize "honors a leading cosmologist, astronomer, astrophysicist or scientific philosopher for theoretical, analytical, conceptual or observational discoveries leading to fundamental advances in our understanding of the universe." The IAU nominates 3 members to the Advisory Selection Board.

The Prize for 2012 will be awarded to Charles L. Bennett and the Wilkinson Microwave Anisotropy Probe (WMAP) team. Their observations and analyses of ancient light have provided the unprecedentedly rigorous measurements of the age, content, geometry, and origin of the universe that now comprise the Standard Cosmological Model. The Prize will be awarded during the first formal session of the Beijing General Assembly on Tuesday 21 August, and Charles Bennett will give the Gruber Prize Lecture on Wednesday 22 August at 12:45. The deadline for nominations for the 2013 Prize is 15 December 2012.

The Gruber Foundation Fellowship Award 2012 has been awarded to Anna Lisa Varri, who is a doctoral student in Astrophysics at the Universita' degli Studi di Milano (Italy). For her Master's thesis in Physics, she studied the construction of nonspherical stellar dynamical equilibrium models as an analytical perturbation problem. Her Ph.D. thesis is devoted to the study of the structure and dynamics of globular star clusters, by means of analytical models and numerical simulations. During her doctoral studies she constructed several families of self-consistent nonspherical models in which the effects of external tides, internal rotation, and anisotropy in the velocity space are fully taken into account. As a Fulbright Visiting Student Researcher, she also spent an extensive fraction of her doctoral program at Drexel University (Philadelphia, PA, U.S.A.) primarily

performing numerical simulations designed to investigate the dynamical stability and the long-term evolution of rotating dense stellar systems.

After the completion of her Ph.D. studies, she will take up the Gruber Foundation Fellowship at the Department of Astronomy at Indiana University (Bloomington, IN, U.S.A.), where the study of Galactic and Extragalactic star clusters is a long-standing and prominent research theme, both from the theoretical and observational point of view. The research project supported by the Gruber Foundation will be devoted to an extension of her studies of the dynamics of globular clusters, with the aim of providing a more realistic dynamical paradigm for this class of stellar systems. Within the new framework of analytical models developed in her Ph.D. thesis, supplemented by specifically designed numerical simulations, a number of fundamental questions will be addressed. Particular attention will be given to four open problems in the study of the formation and evolution of globular clusters, namely (a) the effects of angular momentum in the early formation stages; (b) the dynamical characterization of multiple stellar populations; (c) the role of internal rotation in the kinematics of the central regions; (d) the interplay between internal rotation and external tidal field.

5.2 Norwegian Academy of Science and Letters – The Kavli Prize in Astrophysics 2012

The Kavli Prize in Astrophysics is awarded for outstanding achievement in advancing our knowledge and understanding of the origin, evolution, and properties of the universe, including the fields of cosmology, astrophysics, astronomy, planetary science, solar physics, space science, astrobiology, astronomical and astrophysical instrumentation, and particle astrophysics.

The prize for 2012 has been awarded to David C. Jewitt, University of California, Los Angeles, Jane X. Luu, MIT Lincoln Laboratory, Lexington, and Michael E. Brown, California Institute of Technology, Pasadena "*for discovering and characterizing the Kuiper Belt and its largest members, work that led to a major advance in the understanding of the history of our planetary system.*"

The Kuiper Belt lies beyond the orbit of Neptune, a disk of more than 70,000 small bodies larger than 100 km in diameter made of rock and ices, orbiting the Sun. This year's Kavli Prize in Astrophysics honours two scientists who discovered the Kuiper Belt and a scientist who discovered many of its largest members. Their discoveries were each the result of cleverly designed observational campaigns aimed specifically at detecting new classes of distant objects in the Solar System. Their research required creative strategies, a great deal of persistence, and an open-minded approach to expect the unexpected.

The prize will be presented at a ceremony organised by the Norwegian Academy of Science and Letters in the Oslo Concert Hall on Tuesday 4th September. Further details may be found at: www.kavliprize.no/artikkel/vis.html?tid=54647

The IAU assists the Norwegian Academy of Science and Letters in the selection of the award committee members.

6. Educational Activities

6.1 Update on the IAU Office of Astronomy for Development

Background
The IAU Strategic Plan 2010 – 2020 "Astronomy for the Developing World – Building from IYA2009" was adopted at the Rio GA as a crucial part of the IAU's future mission. The Plan (SP) includes a vision, specific goals for the decade, a strategy for attaining them and a detailed blueprint for their implementation. Central to this SP is the establishment of the Office of Astronomy for Development (OAD) which has been reported on in the previous four Information Bulletins. This is an update on the activities of the OAD since the last Information Bulletin (IB109) in January 2012. Several more comprehensive documents on different aspects of the implementation are available on request from Kevin Govender (kg@astro4dev.org). IB109 reported on OAD activities up to the point of the OAD Stakeholders Workshop held in Cape Town from 12 to 14 December 2011, which was attended by 56 participants from 28 countries and which informed the trajectory of OAD activities.

Regional Nodes and Language Expertise Centres
In accordance with the "bottom-up" strategy outlined in the SP, an Announcement of Opportunity was issued in January 2011 for the establishment of Regional Nodes of the OAD (ROADs) and Language Expertise Centres for the OAD (LOADs). ROADs would be offices similar to the OAD established within host institutions and employing a full time coordinator, with a focus on activities in a specific geographic region. LOADs would have a similar structure but with a focus on a particular language or cultural region, which could sometimes stretch across the entire world. There was an excellent response with 31 Expressions of Interest and 14 full proposals received thus far. Evaluation of this first round of proposals was conducted by the Extended Development Oversight Committee (EDOC) which consists of the President and General Secretary of the IAU as well as the Director and full Steering Committee of the OAD. Several exchanges and negotiations are currently being conducted with proposers in order to finalise ROADs and LOADs globally.

Task Forces
In accordance with the strategy outlined in the SP and following the OAD Stakeholders Workshop in December 2011, three "Task Forces" have been

established to lead Astronomy for Development (AfD) activities. These are TF1 (Universities and Research), TF2 (Children and Schools) and TF3 (Public Outreach). The Chairs and Vice Chairs of the TFs have been appointed and approved by the EDOC to include a combination of veterans from the Commission 46 and 55 Organising Committees (OCs) and "new blood" from amongst the 400 volunteers that have registered on the OAD website, as well as names received from an open call for nominations. A Management Team (MT) was proposed for each Task Force by the TF Chairs and Vice Chairs in consultation with the OAD Director and submitted to the EDOC for approval. The MTs consist of relevant experts distributed over geographical regions and from different cultural backgrounds. The names of these individuals can be found on the OAD website (www.astro4dev.org/index.php/taskforces). An open call for proposals will be issued annually by the OAD for each task force, the first call in July of 2012. The proposals will be evaluated by the task forces and used as a basis for the development (together with the OAD) of implementation plans and budgets for the next calendar year, which will be submitted to the EDOC for approval.

Potential Volunteers

The number of volunteers who have registered with the OAD as potentially interested in participating in AfD activities exceeds 400, at least half of who are IAU members. It is expected that these volunteers would drive activities funded through the task force calls mentioned above, as well as several other grant opportunities. The OAD is currently developing a volunteer management system which is intended to be launched at the 2012 General Assembly.

Pilot Projects

Pilot projects such are used as "feelers" which the OAD uses to inform its global astronomy-for-development activities.

- *WorldWide Telescope Workshop:* The OAD partnered with Microsoft and the South African Astronomical Observatory (SAAO) to host a workshop on in April 2012, aimed at training attendees on using the WWT software for outreach and research. This was an opportunity to evaluate the usefulness of the software for development.
  www.astro4dev.org/index.php/oadprojects/wwtworkshop
- *Science Hack Day:* The OAD, along with several partners, hosted a Science Hack Day in Cape Town in January 2012, which was themed "Hacking Science for Development." This event was aimed at exploring the developmental benefits of the immense computing and instrumentation skills that comes with most astronomy careers.
  www.astro4dev.org/index.php/oadprojects/scihackday
- *Transit of Venus Consolidation of Experiences:* This global transit event on 5/6 June 2012 was enjoyed by millions of people around the world. The OAD, through its management of the large "Beyond IYA2009" email list, is currently coordinating a consolidation of experiences as a global record of the event. Reports are still coming in and can be sent to

tov2012@astro4dev.org. More information and the latest reports can be viewed on www.astro4dev.org/index.php/oadprojects/tov2012.

- *Sutherland Youth Day Computer Programming Workshop:* The OAD participated as co-organiser of this pilot project in June 2012 in the rural town of Sutherland (located 18km from the South African Astronomical Observatory SAAO which is home to the Southern African Large Telescope SALT. The novelty of the initiative was that rural South African youth who had little to no experience with a computer were taught the basics of computer programming, to the point where they could generate either an animation or html5 application that was immediately published and viewed on the internet – an important statement which demonstrated the immensely empowering nature of computing skills which astronomers and engineers often take for granted.

Funding by external partners

Agreements have been concluded with 3 external partners to provide funding for some of the OAD-coordinated AfD activities. These are:

- OAD-RAS (Royal Astronomical Society) programme for visits to developing countries by UK-based experts (Initially minimum of £5000)
- OAD-NWO (The Netherlands Organisation for Scientific Research) programme for visits to developing countries by Dutch-based experts (Initially maximum of €6000).
- OAD-ICTP (International Centre for Theoretical Physics, Trieste) programme which will cover several different aspects of AfD including schools, networking and travel grants. Implementation details are currently being finalized.

OAD at the IAU General Assembly

There will be a Special Session (SpS11) at the 2012 General Assembly entitled "IAU Strategic Plan and the Global Office of Astronomy for Development." Talks will range across the three Task Force areas (universities and research, children and schools, and public outreach) as well as talks regarding development in different regions of the world. SpS11 will take place from 27 to 28 August 2012. More information and the draft programme are available at www.astro4dev.org/index.php/oadevents/iauga. The OAD will also have a booth in the exhibition area which will be used to inform GA delegates about the OAD and its activities. Importantly this exhibition booth will also be used as a central coordination point for development activities such as recruiting of volunteers, "state-of-astronomy" surveys in delegates' home countries and a meeting place for an evolution of the programme traditionally known as the Consulting Service (where young/developing astronomers link up with senior/-more experienced astronomers in their field). Watch that space for other interesting activities during the GA.

OAD Staffing
The full OAD staff will consist of a Director, a Project Officer and an Administration Officer. However, the OAD Project Officer has not yet been appointed. An international search was conducted in order to fill the position, but none of the candidates were selected. This has led to challenges in terms of growth of activities and has placed an extra load on the 2 current staff members of the OAD. The appointment process has been restarted and the position has been re-advertised until 31 July 2012. Recommendations from IAU membership are welcome – you may send them to kg@astro4dev.org. In the meantime the OAD has launched an internship programme both to handle the extra workload and to offer experience to individuals interested in the field. The first two interns have been appointed and the opportunity remains open for others. Details of the Project Officer position and the Internship Opportunity can be found at www.astro4dev.org/index.php/vacancies.

Future Outlook
Once the Task Forces, Regional Nodes and Language Expertise Centres have been set up and a credible, functional, global organisational structure can be demonstrated, the OAD will be in a position to raise substantial external sources of funding for the AfD activities. The proposals received through the Task Force calls, together with the needs of the Regional Nodes and Language Expertise Centres, will inform the OAD's fundraising strategy. The organisation of an effective fund-raising campaign in support of AfD activities will be an important task for the OAD during the triennium 2012 – 2015.

6.2 Other educational activities

6.2.1 International School for Young Astronomers (ISYA)

Triennial report 2010 - 2012 by Jean-Pierre De Greve

Introduction
Three editions of the School took place during this triennium: in Armenia, in China, and in South Africa. They were all organised with the much appreciated support of the Norwegian Academy of Sciences and Letters.

ISYA 2010
The 32nd ISYA was held at Byurakan Observatory, Armenia. There were many applicants (more than 100) from a large number of countries in the region. Because of the close connections between the observatory and research groups in France and Germany, and the fact that for students of those countries grants were available outside the ISYA funding, a few students from these countries were also accepted, to enhance the international character of the student body. In all, 48 students from 21 countries participated, including several from out of the region (France, Germany, India). The gender distribution was 56% female, 44% male. There were 18 lecturers from 11 countries.

Thanks to the Faulkes Foundation, ISYA had access to the 2 meter robotic Faulkes telescopes on Maoui, Hawai (FTN) and in Australia (FTS), (with special thanks to the support of Paul Roche). Additionally, students could carry out observations at night, using the spectrograph on the 0.5 m telescope of the observatory (27 hrs, thanks to Arthur Amirkhanian, Head of small telescopes), and in the last week, students also used the 2.6 m telescope. A special event was the first Ambartsunian Prize ceremony. A special guest lecture was given by Gennady Bisnovaty-Kogan, one of the members of the international jury of the Ambartsunian Prize, while one of the three winners, Garik Israelian, gave a series of lectures on the detection of extra solar planets. Another jury member, IAU president Robert Williams, also served as ISYA lecturer.

In the evaluation, the students suggested some possible improvements in the practical organisation. The vast majority strongly agreed that the ISYA helped them to acquire a broader view of astronomical research.

ISYA 2011

The 33rd ISYA was held in China at the Yunnan Astronomical Observatory (YNAO). The school ran from 31 March - 20 April 20. It was hosted by the YNAO and co-organised by the Lijiang Teacher's College (LTC). This ISYA had two special features:

- It partly coincided with the Pacific Rim Conference. This provided a unique opportunity for several of the students to attend a professional international content. Some students presented a paper, and several of them participated in the discussion after each presentation.
- The choice of country enabled the school to attract participants from North Korea. With the assistance of the host, Qian Shengbang, we managed to have 4 high level students from the DPR Korea. They participated actively to the School.

22 of 48 candidates were selected. In the end, 19 candidates from outside China showed up (including the 4 from the DPR Korea). The number was complemented by 18 Chinese students. Altogether students from 10 countries participated. The gender distribution was 24% female, 76% male. There were 9 lecturers scheduled from 8 countries. Due to unforeseen circumstances, Garik Israelian (Spain) could not make it.

The observational part was restricted to visits to the Yunnan Observatory telescopes, with demonstrations by observatory residents. The students preferred hands-on experience, and more time, to carry out group projects. Students participating at the PRCSA Conference found some of the presentations fine, but others were at a too high level.

Students acknowledged that they developed a network as a result of this ISYA. The School gave them a better insight into their research interests. They acquired a broader view on the research done in astronomy and found that they benefitted significantly from attending this ISYA.

ISYA 2012

Introduction

The 34th ISYA was held at the South African Astronomical Observatory (SAAO). The school ran from 5 - 26 February. It was hosted by the SAAO and co-organised by the University of Cape Town (UCT).

The sponsors were: IAU, NRF-SAAO, UCT, SALT and the Norwegian Academy of Science & Letters (NASL). The organisers were: Petri Vaisanen (SAAO/SALT), Patrick Woudt (UCT), Patricia Whitelock (SAAO/UCT), Jean-Pierre De Greve (VUB), Michèle Gerbaldi (IAP), Nuhaah Solomon (OAD)

The IAU covered travel expenses of the participants and lecturers (visa, insurance, air fare, local transport and cultural trips), as well as some unforeseen accommodation and software costs. The airfares were minimised as all tickets were bought directly from South Africa, thanks to the help of the OAD secretariat. All other expenses including room and board were covered by the South African hosts, in large part through a grant from the National Research Foundation (NRF).

Location and theme

The SAAO, home of the 11-m Southern African Large Telescope (SALT), is the premier optical and infrared astronomy facility in Africa and plays a leading role in the promotion of astronomy in the continent.

The school was hosted at the prestigious UCT and at SAAO, and conducted partly at the SAAO/SALT observatory site at Sutherland, 400km from Cape Town, in the Karoo semi-desert. Lecturers from UCT, SAAO and abroad were invited to speak on a range of topics in active astronomical fields.

The theme of the school was "Observational astronomy in the optical and infrared," involving both lectures and observational work in teams. The goal was to give students ideas of modern research projects and show them which technical expertise is needed to plan, propose for, obtain, reduce and analyse modern astronomical data.

Students

32 of 83 candidates were selected for participation. The final number of was 31, including 18 students from 6 other African countries (Ethiopia, Kenya, Nigeria, Tanzania, Uganda and Zambia). 2 students from Namibia and France were

presently studying in South African universities, and 11 were South African. The gender distribution was 29% female, 71% male.

Opening ceremony
The Opening Ceremony was held at UCT on Monday, 6 February, at 9 am. The participants were welcomed by Anton Le Roex, Dean of Science of UCT, and by Patricia Whitelock, Director SAAO. Michèle Gerbaldi addressed the participants on behalf of the ISYA.

Programme
The topics by the lectures covered were:

- Solar system science
- Galactic astronomy: physical characterization of the stars, emission line stars, binary systems, evolution of close binary systems
- Origin and evolution of galaxies
- Cosmology
- Modern telescopes, instrumentation and observing techniques

There were 16 lecturers scheduled from 5 countries.

Several slots were reserved for both individual student presentations as well as group presentations of the observational project and the obtained result. The lecturers agreed that the presentations were well prepared and of high quality.

Students received lectures on both theoretical and practical aspects of telescopic observations as well as background to prepare the observational projects. The observational projects were assigned by the lecturers. The observations were conducted by tutors, PhD students and post-docs at SAAO and UCT, and astronomers.

In the week 15 - 21 February, the students could observe each night from 8:00 pm till 4:00 am on one of the four telescopes, depending on the chosen project: 1.9m (Radcliffe) Telescope, 1.0 m (Elizabeth) Telescope, 0.75 m Telescope and the IRSF (Infrared Survey Facility) – a joint Japanese/South African project. These telescopes were equipped with instruments for photometry and spectroscopy.

Lecturer Michel Dennefeld obtained observations confirming that the possible supernova PSN J23255963-8154333 is indeed a supernova and hence can be designated as SN 2012ah. His confirmation was possible thanks to assisting observations from several SAAO observers and 13 ISYA students. Cf. the resulting IAU circular 3028.

Data reductions were done using IRAF package under the guidance of the tutors. During the first week at SAAO, basic instruction on this package had been given to the students, as well as on Linux system, when necessary. A laptop computer was made available for each pair of students by the SAAO IT department.

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

- Career development (Kartik Sheth, NRAO, USA)
- How to write and publish a research paper, and Applying for a position and writing projects (J.P. De Greve, Brussels, Belgium)

Closing

At the end of the ISYA, students completed a 2-page evaluation sheet. A DVD was prepared and distributed: one DVD per university represented by the students, containing a virtual Linux Ubuntu machine with all the software used during the school, as well as other astronomical software, resources, lectures, etc. The evaluation of the ISYA 2012 was overwhelmingly positive.

Conclusions

ISYA 2012 focused on observations and data reduction. To this end, telescope time was given to the ISYA by the SAAO on different telescopes and detectors. The approach required a large amount of preparatory work: computers with IRAF, Linux, finding tutors, and preparing them for the guidance to the students, two different sites (Cape Town and Sutherland), etc. The infrastructure and IT environment was excellent, the accommodation and meals were certainly up to the ISYA standards (there is always room for improvement), and the daily organisation was smooth.

The organisers, lecturers, and tutors had to deal with a large spectrum of participants, ranging from students well acquainted with observing and data reduction to total novices. The students gave useful feedback which will be taken into account in the organisation of the future ISYAs.

Taking all the above into account, I consider ISYA 2012 an excellent event, and I thank all those who contributed to its success.

Jean-Pierre De Greve
23 March 2012

Conclusions

The three consecutive ISYAs offered a broad spectrum of astrophysical subjects as well as observational experience to 117 students from 40 different countries. Some 38 lecturers from 18 countries contributed to the Schools. For each of them, some improvements were suggested by the students, but at the same time, strong praise was expressed for the international experience that the ISYA offered, and for the broadening of the views on what astronomy has to offer.

6.2.2 Report on the World-wide Development of Astronomy 2011 to the present. By John Hearnshaw, PGWWDA chair

Introduction

In 2011 PGWWDA had another very successful year, with visits to 8 developing countries. In 2012 our activities will be somewhat reduced, with just 3 visits to 4 countries confirmed so far. 2012 will be the last year of operations, and we can look back on nearly a decade of very successful contributions to the IAU development programme, since I took over as chair of the Program Group in 2003.

Summary of PGWWDA visits in 2011- 2012

- Beatriz García, Nicaragua and Guatemala, 13-19 July 2011
- Boonrucksar Soonthornthum and Hakim Malasan, Brunei, 16-19 July 2011
- Kaz Sekiguchi, Kazakhstan, 16-23 August 2011
- Hugo Levato, Bolivia and Colombia, 10-26 October 2011
- John Hearnshaw, Fiji, 16-23 October 2011
- Jin Zhu, Nepal, 14-19 December 2011
- Athem Alsabti, Tunisia and Algeria, planned for 25 April - 5 May 2012
- Boonrucksar Soonthornthum and Hakim Malasan, Myanmar/Burma, dates to be announced, but probably October 2012
- Katrien Kolenberg, Jamaica, December 2012
- Thijs Kouwenhoven may go to Suriname and Guyana in late 2012, subject to a fuller application for IAU support and time constraits.

Concluding remarks

This brief overview update is also a final report on a most successful Program Group of Commission 46, whose functions will be taken over by the new Office for Astronomical Development. I would like to thank the IAU Executive Committee for the fantastic opportunity working for C46 has given me personally. Since 2003, I have visited many interesting places I would probably not otherwise have had the chance to go to, and I have made many wonderful friends in developing countries around the world. Another highlight of the last nine years was organising the Special Session SpS5 on Astronomy for the Developing World at the Prague General Assembly in 2006.

It has been a great privilege to be able to serve the IAU in this way, and there is a clear sense that the numerous visits made to countries all over the world by members of PGWWDA have made a real difference on the ground to astronomical development in the developing countries that we visited.

6.2.3 Summary of the main NASE activities during 2010 - 2011

By Beatriz García and Rosa M. Ros
NASE Vice-president, Argentina, and NASE President, Spain

NASE PG is a programme for post-graduates. Its main objective is to educate new generations of teachers and re-educate the current ones. We work with university professors in order to train future teachers, and we cooperate with the departments of education in order to train experienced primary and secondary school teachers. NASE created a basic course for training teachers aiming at:

1) teaching astronomy to teachers
2) teaching teachers how to teach astronomy

At the same time, NASE works with university professors to introduce them to new methods of teaching astronomy.

The topics of "the basic NASE course" are as follows: position astronomy, solar system, exoplanets, spectrography, photometry, spectroscopy, determination of absolute magnitudes, potency of stars, nucleosynthesis, star evolution and cosmology.

Yet NASE is not only about visiting a country once and leaving the scene. The main goal is to set up in each country a local group of NASE members who can carry on teaching "the basic NASE course" every year and create new courses by using NASE materials. Some of these NASE Groups organise monographic courses themselves (Argentina, Nicaragua or Honduras) or create small planetariums (Colombia).

Since 2010, NASE has been active in Center and South America. In total, 13 basic courses were organised, including a total of 609 direct participants and involving about 160 000 students who received materials and tuition (on average we consider that each teacher has 200 students per year). Seven NASE Groups were created in seven different countries. It is not possible to estimate the number of teachers and students that receive information by means of activities other than the basic course.

NASE also produced a 280-page book that includes all the materials for the basic course and a CD with the contents in color and all the power points for the course. Both are written in Spanish and English. NASE has also created a repository website for astronomy materials for teachers, which include activities, animations, articles, photos, games, simulations, interactive programs and videos.

6.2.4 Public Outreach Coordinator

The IAU has established an Office for Public Outreach in collaboration with the National Astronomical Observatory of Japan (NAOJ). The Office is led by the Public Outreach Coordinator (POC) and coordinates worldwide efforts to promote public awareness, appreciation and education of astronomy and related sciences. The IAU OPO will be located within an existing Public Relations Center of the NAOJ and is under the daily supervision by the head of the NAOJ PR

group. The IAU OPO will act as the central global "communication point," as a facilitator for best practices, providing guidance and delivering weekly information about ongoing and activities in astronomy and astronomy communication. In addition, the IAU OPO will support the NAOJ Public Relations Center's international activities.

After a competitive selection process, IAU and NAOJ have appointed Sarah Reed. Sarah has a background in Theoretical Physics and varied experience in science communication. She will start at NAOJ in time to attend the General Assembly and work on the GA Newspaper amongst other things. She will also take over as Editor of the Communicating Astronomy to the Public (CAP) journal.

7. Reports by representatives to other organisations

7.1 United Nations Committee on the Peaceful Uses of Outer Space

7.1.1 Statement of the IAU presented to COPUOS at the 49th session of the Scientific and Technical Subcommittee, *Vienna, Austria, 6-17 February 2012. By Karel A. van der Hucht, IAU representative to COPUOS, SRON-Utrecht, the Netherlands*

Mister Chairperson, distinguished delegates and representatives,

Introduction

The *International Astronomical Union (IAU)* welcomes the continuing progress in the implementation of the recommendations of UNISPACE III. Several of these are of great importance for the future of astronomy and the well-being of our planet; and several require the support of the international scientific community and the international community at large. The *IAU*, representing the world's community of professional astronomers, is pleased to contribute to these issues together with interested delegations and other partners. While all these issues are of equal importance, I will report here in particular on the issue of Near Earth Object detections.

Near Earth Objects (NEOs) and the IAU

The issue of forecasting, and potentially mitigating, future impacts of Near Earth Objects (NEOs; comets: NECs; asteroids: NEAs) on Earth has been before this Subcommittee repeatedly in the past. In recent years, increasing evidence of the extent of the NEO population is building up, thanks to surveys by dedicated astronomical observatories, notably in the U.S.A. The evidence of this extent justifies an increasing awareness among all governments of the world of the hazards posed by NEOs to individual countries and to the Earth as a whole. Near Earth Objects are asteroids (NEAs) and comets NECs) in our planetary system whose variable orbits bring them into the Earth's neighbourhood. If a

NEO orbit is well determined, its future behaviour can be calculated and an eventual close encounter or collision with the Earth predicted with high accuracy in time (within a few seconds) and place (within a few kilometres). The international *Spaceguard* project started in 1989. The initial goal of the U.S. *Spaceguard* project, defined in 1994 and started in 1998, was to discover and determine the orbits of 90% of all NEOs with sizes $D > 1$ km, *which could cause hazards on a global scale* when impacting with the Earth. Their estimated number is presently 966 ± 45. Impressive progress has been made toward achieving this goal of finding objects with $D > 1$ km, with the current level of completeness being 87 ± 4%.

Since 2005, additional attention has been given to the need to monitor also smaller NEOs, in the size range $D = 140$ - 1000 meter, *whose impacts may have serious consequences on a regional scale*. Their estimated number is about 14,000, and the goal to detect, characterize and catalogue 90% of those objects may be reached before the year 2030, provided that the necessary observational tools will become available. New astronomical telescopes dedicated to comprehensive NEO sky surveys are foreseen, such as the Large Synoptic Survey Telescope (*LSST*), hopefully operational in 2016 and available for NEO surveys in 2019. Also space observatories dedicated to NEO surveys are being considered.

To be of lasting value, all NEO observations are being verified, confirmed and catalogued. In this respect the *IAU* plays an active role by supporting the *Minor Planet Center* (MPC), operated at the Harvard-Smithsonian Center for Astrophysics (MA, U.S.A.) and financed by NASA's Planetary Science Division. The MPC is responsible for collecting, validating and distributing all positional measurements made world-wide of asteroids and comets. The MPC acts as a gateway and clearinghouse of these observations, performs identifications and orbital computations, and makes those public. As NEOs are posted on the MPC NEO Confirmation Page, their orbits are calculated automatically by the JPL SENTRY software and the University of Pisa NEODyS software, and checked for possible impact with the Earth. While such impacts are rare, in October 2008 an object with a size $D \approx 4$ meter was discovered by the U.S. Catalina Sky Survey to impact the Earth 19 hours later over the Nubian desert of Northern Sudan. The MPC software accepted the incoming e-mail, posted the object on the NEO Confirmation Page, secured additional follow-up observations and catalogued the object 2008 TC3. The JPL SENTRY software as well as the University of Pisa NEODyS software system verified the impact time and place. In this case, the system worked nearly flawlessly and the object was announced to the public as an impactor several hours before it broke up and burned up partly and harmlessly in the Earth atmosphere. A systematic search in the Nubian desert located some 280 asteroid fragments with a total mass of 3.9 kg.

The Director of the *IAU* Minor Planet Center, Dr. Timothy B. Spahr, reported on 30 September 2011 and on 14 January 2012:

"The discovery rate of NEOs is higher than in the past. Roughly 1000-1200 NEOs are found annually. This is due largely to the increase in discoveries from the Pan-STARRS project operated by a consortium of institutions, led by the University of Hawaii. The main discovery team of NEOs is still the Catalina program that uses two telescopes in Arizona, finding approximately 600-800 NEOs, but the Pan-STARRS team will find approximately 250-300 of the expected 1000-1200 NEOs discovered this year. The teams are collaborating well, sharing their sky coverage to allow more efficient use of telescope time to cover areas not seen by other surveys. A 9-meter-sized asteroid, 2011 MD, passed just 12,000 km from the Earth surface on 27 June 2011. This object was picked up a full two days before the closest approach, and identified as a near-miss object by the MPC computers soon after discovery. This illustrates how well both the surveys and the MPC are handling the increase in near-miss objects!

"There is a good amount of cooperation among worldwide follow-up observers in targeting NEOs that need orbital improvement. The MPC now has a blog that allows observers to post in real time their follow-up efforts, allowing for better distribution of resources on-the-fly. The amount of cooperation among the worldwide cadre of NEO observers is impressive. Follow-up facilities in Europe are improving their capabilities and cooperation, and providing critical longitudinal coverage. In particular, European observers often target NEOs discovered the previous night from the South-Western US. As a whole, we discover more NEOs each year, and the NEO population is studied more closely each year as well. The orbit quality of the MPC database has never been better. The two main producers now, Pan-STARRS and the Catalina Mt. Lemmon Survey, produce astrometry good to 0.1" and 0.3" respectively. There are nearly 700,000 objects with orbits in the database."

NEO impacts are the only natural catastrophes which can be predicted. In recent years it has been realized that also NEAs with sizes D = 140 - 40 m can be potentially hazardous and *impacts of those may have serious consequences on a local scale*. Their estimated number is about 300,000, of which about 2% is presently known. Impacts of 40-m sized NEOs may happen once every 200 years. The most recent one, in 1908, happened above Tunguska (Siberia, Russia) and flattened 2000 km^2 of forest. An increase of NEO survey activities by astronomical observatories around the world, ground-based and space-based, is necessary to determine the orbits and physical parameters of all those about 300,000 NEAs with sizes D > 40 meter, in order to reveal the full extent of the permanent hazards posed by those NEAs. Governments are urged to provide the necessary funds for this.

Since March 2010, the *IAU* maintains a web page www.iau.org/public/nea/ presenting a chronology of milestones of Near Earth Asteroid observations and research, serving to increase awareness of NEA facts and consequences. Also in

2010, the *IAU* established in its Division III on Planetary Systems Sciences a new *Working Group on Near Earth Objects:*

www.iau.org/science/scientific_bodies/working_groups/171/

This IAU WG-NEO is charged to determine the requirements for a permanent international NEO Early Warning System. It will report to the IAU XXVIII General Assembly in August 2012 in Beijing (China), with a Resolution to be addressed to all 67 IAU Member States, asking them to increase their support for NEO surveys, in their own interest and that of our planet.

NEOs are the only astronomical objects, apart from the Sun, which are directly relevant to all human beings and other life forms on planet Earth. NEOs constitute a clear and present danger. If the governments of our planet do not want to be bothered by NEOs, then they have to do something about them, starting by increasing their support for the necessary NEO surveys.

In conclusion

The IAU is gratified to acknowledge the progress which is being made on several UNISPACE III issues, notably that of Near Earth Objects, that has high priority for astronomers world-wide. The IAU emphasizes its concern and efforts in the field expressed above, both for the sake of our science and for the sake of the world in which we live, and in which our descendants will live. This Subcommittee is substantially contributing to this progress. It will help us all, if Delegates would call the attention of their Governments to this important issue.

Mister Chairperson, I thank you for the opportunity to share these views with you and the distinguished delegates and representatives.

7.1.2 Report on the activities of the UN-COPUOS Scientific and Technical SubCommittee (STSC) Action Team 14 (AT-14) on Near-Earth Objects

Excerpted from a report by Karel A. van der Hucht

Introduction

In recent years a number of space agencies, foundations and associations have combined efforts under the umbrella of UN-COPUOS to phrase international procedures dealing with the impact threat of potentially hazardous Near Earth Objects (NEOs). Leading roles are carried by

- NASA Near Earth Object Program neo.jpl.nasa.gov/
- Association of Space Explorers
  www.space-explorers.org/committees/NEO/neo.html
- Secure World Foundation www.secureworldfoundation.org/
- ESA Space Situational Awareness Program www.esa.int/ssa/neo

The IAU has Observer Status with UN-COPUOS and its Scientific and Technical Sub-Committee (STSC). The IAU representative is a member of STSC

Action Team 14 on *Near Earth Objects*. UN-COPUOS/STSC considers the topic of NEOs twice per year in Vienna (Austria). AT-14 will present its final report to UN-COPUOS/STSC in June 2013.

This report focuses on the *Draft recommendations of the Action Team on Near-Earth Objects for an international response to the near-Earth object impact threat*. The full report is available at www.unoosa.org/pdf/limited/c1/AC105_C1_L317E.pdf

Of the NEOs, we discuss here notably the Near Earth Asteroids (NEAs), because NEAs are ~100 times more numerous than Near Earth Comets (NECs).

An asteroid is coined a *Near Earth Asteroid* (NEA) when its trajectory brings it within 1.3 AU from the Sun and hence within 0.3 AU of the Earth's orbit. The largest NEA known is 1036 Ganymed (D = 31.7 km, P_o = 4.34 yr). A NEA is said to be a *Potentially Hazardous Asteroid* (PHA) when its orbit comes to within 0.05 AU of the Earth orbit and has a diameter D > 140 m. The largest known PHA is 4179 Toutatis (D = 4.6×2.4×1.9 km, P_o = 4.03 yr).

Since 1947, the IAU Minor Planet Center (MPC, SAO, Cambridge, MA, USA, www.cfa.harvard.edu/iau/mpc.html) is the clearing-house for discovery and orbit determination of comets and asteroids. MPC-determined orbits are verified instantaneously by SENTRY (JPL, USA, neo.jpl.nasa.gov/risk/) and by NEODys (University of Pisa, Italy, newton.dm.unipi.it/neodys/). To date, over 95% of all NEO detections have been made by surveys in the USA.

Since 2008, it is realised that the 1908 Tunguska explosion, which flattened ~2000 km^2 of forest in Siberia, may have been caused by a NEA with a diameter of only 40 ± 10 m (Boslough & Crawford 2008; Steel 2008). This makes NEA surveys for objects down to 40 m mandatory.

As of 15 March 2011, the NEA census is (see: <neo.jpl.nasa.gov/stats/>): 8800 NEOs, including 8710 NEAs, including 1293 PHAs. Some 900 new NEAs were discovered in 2011. The estimated number of NEAs with D > 1 km is 966 ± 45; the observed number is 840 (87 %), including 152 PHAs. The estimated number of NEAs with D > 140 m is ~15,000; the observed number is 5120 (~ 34 %). The estimated number of NEAs with D > 40 m is ~300,000; the observed number is 7363 (~ 2 %). Estimates from Harris, 2011:

targetneo.jhuapl.edu/pdfs/sessions/TargetNEO-Session2-Harris.pdf

In 2011, some 33 NEAs with dimensions ranging from 1 to 325 meter have been spotted to pass the Earth within 1 Lunar Distance. It is estimated that this actually happens every day.

In the past eight years, 9 NEAs with dimensions ranging from 1 to 20 meter have been spotted to pass between 6.7 and 0.9 Earth radii from the Earth surface, i.e., well within the orbits of geo-stationary satellites. On 6 October 2008,

the 4-m-sized NEA 2008 TC3 was spotted 19 hours before impact in northern Sudan.

In the coming decades, the NEAs Apophis, 2011 AG5 and 2007 VK184 deserve extra attention, because current knowledge of their orbital parameters does not exclude possible imminent impacts with Earth. New observations to reduce the uncertainties in their orbital parameters are likely to reduce their risk factors. Overall, the MPC, the JPL SENTRY and the Pisa NEODys do agree that the presently *known* NEA population does not give reason for exceptional concern in the coming two centuries.

Thus, do NEAs present a clear and present danger? To answer the question we note that to date, as mentioned above, of the NEAs with dimensions $D > 1000$ m *some 13 % is unknown*; that of the NEAs with dimensions $D > 140$ m *some 66 % is unknown*; and that of the objects with dimensions $D > 40$ m *some 98 % is unknown*. Therefore, the subtitle of this article could read: *Unknown Near Earth Asteroids – a clear and present danger.*

ASE Report "Astreroid Threats: A Call for Global Response

In 2007, the Association of Space Explorers (ASE) convened a panel on asteroid threat mitigation, consisting of non-governmental, multidisciplinary experts in science, diplomacy, law and disaster management from around the world. On 25 September 2008, the ASE submitted a report to AT-14 at UN-COPUOS in Vienna, entitled *"Asteroid Threats: a Call for Global Response"* www.space-explorers.org/committees/NEO/docs/ATACGR.pdf. This report formed the basis of the further deliberations in AT-14.

Excerpted from the report:

Proposed Program for Action
Because NEO impacts represent a global, long-term threat to the collective welfare of humanity, an international program and set of preparatory measures for action should be established. Once in place, these measures should enable the global community to identify a specific impact threat and decide on effective prevention or disaster responses. A global, coordinated response by the United Nations to the NEO impact hazard should ensure that three logical, necessary functions are performed:

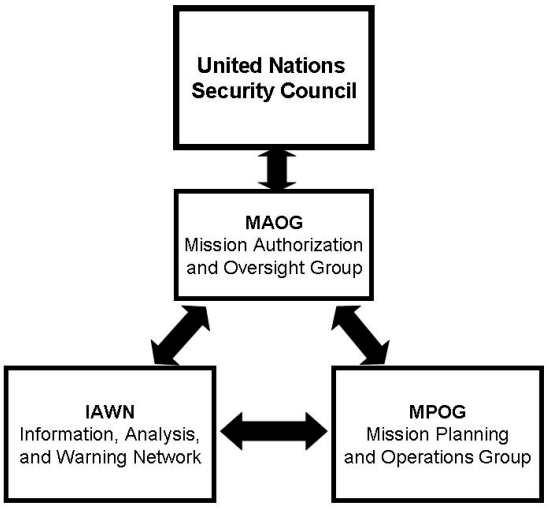

Figure: NEO decision-making functions

Information, Analysis, and Warning
An Information, Analysis, and Warning Network should be established. This network would operate a global system of ground- and/or space-based telescopes to detect and track potentially hazardous NEOs. The network, using existing or new research institutions, should analyse NEO orbits to identify potential impacts. The network should also establish criteria for issuing NEO impact warnings.

Mission Planning and Operations
A Mission Planning and Operations Group, drawing on the expertise of the spacefaring nations, should be established and mandated to outline the most likely options for NEO deflection missions. This group should assess the current, global capacity to deflect a hazardous NEO by gathering necessary NEO information, identifying required technologies, and surveying the NEO-related capabilities of interested space agencies. In response to a specific warning, the group should use these mission plans to prepare for a deflection campaign to prevent the threatened impact.

Mission Authorisation and Oversight
The United Nations should exercise oversight of the above functions through an intergovernmental Mission Authorization and Oversight "Group." This group would develop the policies and guidelines that represent the international will to respond to the global impact hazard. The Mission Authorization and Oversight Group should establish impact risk thresholds and criteria to deter-

mine when to execute a NEO deflection campaign. The Mission Authorization and Oversight Group would submit recommendations to the United Nations Security Council for appropriate action.

On the basis of the discussions held during its meetings and through correspondence afterwards, AT-14 prepared the following updated version of the draft recommendations for an international response to the near-Earth object impact threat, for further consideration by the UN-COPUOS Scientific and Technical Subcommittee.

Draft Recommendations of the Action Team on NEOs for an International Response to the NEO Impact Threat

The Action Team on Near-Earth Objects (Action Team 14) was given a mandate to review the content, structure and organisation of ongoing efforts in the field of NEOs; to identify any gaps in the ongoing work where additional coordination is required and/or where other countries or organisations could make contributions; and to propose steps for the improvement of international coordination in collaboration with specialized organisations. Its recommendations are online at www.unoosa.org/pdf/limited/c1/AC105_C1_L317E.pdf

The Action team concludes with the following recommendations (Section III):

Near-Earth Object threat mitigation functions
There are three primary components of threat mitigation: discovery of threatening asteroids and comets and identifying those objects that pose a threat requireing action (action may include the initiation of civil defence measures); planning a mitigation campaign that includes both deflection or disruption and civil defence activities; and, if the threat warrants, authorizing the initiation of a mitigation campaign.

The nature and consequences of the threat posed by asteroids and comets are international, and it is likely that any mitigation effort will require action by and coordination of efforts among many nations. The following steps are recommended to ensure that all nations are aware of potential threats and to assure the design and coordination of mitigation activities, including civil defence activities, among those nations that are threatened by a possible impact and that might play a direct role in any eventual asteroid or comet deflection or disruption campaign.

An Information, Analysis and Warning Network (IAWN) should be established by linking together the institutions that are already performing many of the proposed IAWN functions, including the following, and adding capabilities as needed:

(a) To discover and monitor the potentially hazardous NEO population using optical and radar facilities and other assets based in both the northern and southern hemispheres and in space;

(b) To provide an internationally recognized clearing-house function for the receipt, acknowledgment and processing of all NEO observations;

(c) To act as a global portal, serving as the international focal point for accurate and validated information on the NEO population;

(d) To coordinate campaigns for the observation of potentially hazardous objects;

(e) To recommend policies regarding criteria and thresholds for notification of an emerging impact threat;

(f) To assess hazard analysis results and communicate them to entities identified by Member States as being responsible for the receipt of notification of an impact threat in accordance with established policies;

(g) To assist Governments in the analysis of impact consequences and in the planning of mitigation responses.

Several institutions are currently engaged in NEO detection, tracking, catalogueing, impact prediction and notification of threats exceeding established risk thresholds. These include the Near-Earth Object Observations Program of the National Aeronautics and Space Administration (NASA), the NASA-supported Minor Planet Center of the International Astronomical Union and Sentry computational centre at the NASA Jet Propulsion Laboratory. Ongoing NEO programmes also include the computational centre at the Near-Earth Objects Dynamic Site (NEODyS) at the University of Pisa, Italy, as well as the NEO survey and follow-up elements of the space situational awareness programme of the European Space Agency. Additional expert centres contributing to the objectives of IAWN should be encouraged.

IAWN should develop a communications strategy using well-defined communication plans and protocols, grounded in the science of risk communications and psychology. News and information should be distributed using words that are easily understood by the public and policymakers and should be accurate, timely and aimed at responding promptly and directly to misinformation and media errors.

IAWN should investigate the communication channels and contacts used by other disaster warning networks to communicate with the disaster management community. IAWN could benefit from the large body of knowledge about the human response to other natural disasters and should therefore include among its members risk analysis experts familiar with the behavioural and psychological elements of disaster management. It should also draw on the lessons learned from other disaster response and risk management organisations.

In order to inform the public about the risk of NEOs, IAWN should develop an education plan that identifies the major NEO risk factors. IAWN should coordinate an NEO outreach plan using entities such as the International Astrono-

mical Union, the American Geophysical Union, space agencies and amateur astronomical observer organisations.

Continued research will be essential to the efficient functioning of IAWN. IAWN should therefore identify and call for necessary NEO-related research in order to address gaps in knowledge of impact prediction, impact effects or other areas necessary for the IAWN mission.

IAWN should emphasize the value of finding hazardous NEOs as soon as possible in order to obtain precision tracking data, thus averting the considerable costs of unnecessary NEO threat mitigation missions. This strategy requires upgraded NEO search and tracking capabilities:

(a) Rapid enhancements to current detection and tracking systems are a wise investment. Assessment of the impact hazard requires a thorough survey of the NEO population in order to detect the hundreds of thousands of small near-Earth asteroids (and comets) that can cause ground damage. Early execution of this survey, at a relatively modest cost, will enable repeat observations and precise orbit determination that will eliminate many spurious NEO impact scenarios and the associated deflection planning and operational costs;

(b) Priority NEO research should include an analysis of the value of spacebased detection and tracking in order to accelerate identification of potentially hazardous NEOs and enable precise orbit determination.

A steering group, composed of IAWN members, should be created to propose and assist the long-term development of IAWN. Such a group would then be in an ideal position to integrate IAWN with the functions to be carried out by a mission planning and operations group and a mission authorization and oversight group. The steering group should consider the many issues related to the establishment of IAWN, such as resources, structure, institutional model, and legal and liaison issues.

Member States should ensure that IAWN-related facilities are supported at an appropriate level to enable them to perform their critical functions. Further, as appropriate, Member States should establish the capacities and procedures needed to facilitate the following actions for impact warning response at the national and regional levels:

(a) Receiving notification of an impact threat that meets established notification policies;

(b) Taking appropriate action in response to an impact threat notification.

Mission campaign planning and operations

Uncertainties are associated with the discovery and tracking of any asteroid or comet, and these uncertainties will make it difficult to predict an Earth impact

with certainty until additional tracking data are available. As a result, it is possible, and even likely, that efforts to mitigate a threat must begin before it is certain that a particular object will actually impact. The international nature of an asteroid or comet threat necessitates coordination among entities involved in mitigation and civil defence as the threat evolves; at the same time, it must be recognised that, in many cases, the threat may vanish once additional data are available.

Two activities are essential in order to prepare the foundation for an effective response to a threat of asteroid or comet impact. The first is to lay out the framework, timeline and options for initiating and executing response activities; the second is to inform the civil defence community of the nature of impact disasters and incorporate that community into the overall mitigation planning process.

An inter-agency body whose functions would be similar to those identified for the mission planning and operations group, as proposed in the report prepared by the Panel on Asteroid Threat Mitigation, should be established by space agencies. The Action Team could assist in that process. The group should be composed of representatives of spacefaring nations and other relevant entities and, once established, it should be sanctioned by the United Nations on behalf of the international community. Its responsibilities should include:

(a) Recommendation and promotion of key research required for planetary defence. Such research can take the form of NEO observations, computer simulations, laboratory research and deep space missions;

(b) Identification of research opportunities for international collaboration on technologies and techniques for NEO deflection. This will help avoid costly duplication of effort and speed the development of an effective deflection capability;

(c) Development and adoption of a set of reference missions addressing a variety of potential NEO impact scenarios and deflection and disruption possibilities. These reference missions will facilitate accurate technical planning and provide a basis for mitigation campaign cost estimates;

(d) Development of decision and event timelines for a variety of potential Earth impactors and trajectories identified for mitigation campaign analysis;

(e) Evaluation of technical maturity and consequences of deflection techniques;

(f) Recommendations to the appropriate authorities, in collaboration with IAWN, on criteria and thresholds for action (e.g. notification of a significant impact risk, initiation of an observation and/or mitigation campaign);

(g) Recommendation of a minimum acceptable Earth-miss distance and other criteria for deflection targeting;

(h) Recommendation of operational responsibilities for a mitigation campaign;

(i) Preparation to coordinate with the relevant actors involved in the implementation of the threat response;

(j) Identification for a detailed review of any legal issues (e.g. liabilities) that may arise in undertaking NEO mitigation actions or selecting any likely mitigation option;

(k) Communication of its activities to the international community;

(l) Provision of a yearly briefing to the Committee on the Peaceful Uses of Outer Space on the status of these activities.

The mission planning and operations group could be organised and function in a manner similar to the Inter-Agency Space Debris Coordination Committee, with the position of Chair rotating among representatives of spacefaring nations and activities supporting the terms of reference of the group being undertaken by institutions of each member State.

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8. AstroConcepts Tool – A Novel Semantic Software for Astronomical Concepts

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Abstract
We have created a new semantic tool called AstroConcepts, providing definitions of astronomical concepts present on Web pages. This tool is a Google Chrome plug-in that interrogates the *Etymological Dictionary of Astronomy and Astrophysics*, developed at Paris Observatory. Thanks to this tool, if one selects an astronomical concept on a web page, a pop-up window will display the definition of the available English or French terms. Another expected use of this facility could be its implementation in Virtual Observatory services.

Introduction
There is a need for a reliable and comprehensive reference source providing the definitions of all the concepts, from the oldest to the newest, used in astronomy and astrophysics. Valuable efforts have so far been made to gather a large number of astronomical concepts; for example the four-volume work by Klecze & Kleczkova (1990), which also gives the equivalents in six European languages, but does not provide the definitions of concepts. We can also mention the four-volume set *Encyclopedia of Astronomy and Astrophysics* (Murdin, 2001), which deals with many topics with ample explanations in articles aimed at astronomers. There are also numerous astronomical dictionaries intended for amateur astronomers and a larger public (among the most recent ones, one can mention, e.g., Riadpath, 2012 and Daintith & Gould 2009. Despite their valuable utility, these references, however, do not meet the requirements of completeness and up-to-dateness apart from other considerations, including the fact that they are not interdisciplinary oriented, nor freely accessible.

An exhaustive concept base would make life easier, because instead of searching definitions through sparse subset references, one could have access to all the available definitions at one go. Besides practical use, it would be interesting to collect in a single source all the astronomical concepts that have ever been created. It would be even more helpful to be able to access such a source freely online as a database that would get enriched on a daily basis through the inclusion of new concepts created in current research work. This aspect contrasts with usual dictionaries which are updated at best after several-year intervals.

Such a concept source is being developed at Paris Observatory in the form of an interactive database (MySql/Php) called *An Etymological Dictionary of Astronomy and Astrophysics* (Heydari-Malayeri, 2012). Currently, it contains the definitions of about 10,000 English entries, with their French and Persian equivalents. Each definition is checked by specialist astronomers at Paris Observatory or others in international research institutes. In this sense it is a collaborative international endeavor that should serve various research, educational, and development goals, as those defined by the International Astronomical Union, in particular its Commission 46, which seeks to promote the development and improvement of astronomical education at all levels through the world (Jones, 2012). More detailed information about various aspects of the dictionary is given elsewhere (Heydari-Malayeri, 2009). Hence in the "Features" Section, below, we only highlight some of the distinctive marks of this work.

A Browser Embedded Astrophysical Dictionary

We developed a Google Chrome extension, called AstroConcepts, giving access to definitions of the *Etymological Dictionary of Astronomy and Astrophysics* from any web page. AstroConcepts, created by one of the authors, Nicolas Moreau (2012), interrogates a SKOS (Simple Knowledge Organisation System (Isaac & Summers, 2009) version of the *Etymological Dictionary of Astronomy and Astrophysics*. This formal language is recommended by the International Virtual Observatory Alliance (IVOA, Derriere et al., 2009) to create Knowledge Organisation System information in a Semantic Web compatible form. SKOS is a common data model for expressing the basic structure and content of concept schemes, such as thesauri, classification schemes, taxonomies, subject heading systems, and other similar types of controlled vocabularies. SKOS is also meant to develop and re-use standard tools (concept-based search engines, browsers) for the exploitation of the Knowledge Organisation Systems published on the Semantic Web. Moreover it hides the complexity of Web Ontology Language (OWL), which is a more expressive language for defining the syntax and semantics of vocabularies.

- *What is lurking behind a Web page word?*
  An immediate application of the AstroConcepts tool is to have access to the definition of any astronomical term, or that in a related field of knowledge, on any Web page. Its installation is a very simple operation requiring just a couple of clicks, the instructions for which are presented by Moreau (2012).

Once installed and activated, readers can underline a concept on a Web page to get access to its definition as provided by the *Etymological Dictionary of Astronomy and Astrophysics*. Selected words can be either in French or English, while the definitions, appearing in a pop-up window, are in English. Put metaphorically, the tool offers a sort of radioscopy of the page words to the user.

- *Virtual Observatory*
  Virtual Observatory is an international initiative by the astronomical community to allow global electronic access to the available astronomical data archives of space and ground-based observatories. It also aims to enable data analysis techniques through a coordinating entity that provides common standards, wide-network bandwidth, and state-of-the-art analysis tools. The Virtual Observatory is also intended for re-using data for scientific objectives different from the original ones, in order to optimize the science return of astronomical observations. The Virtual Observatory's capabilities are enabled through the use of standard protocols for registering the existence and location of data and for requesting data that satisfies the user's interests. These standards are developed on an international basis through the IVOA. The cornerstone of the Virtual Observatory is interoperability (Egret & Genova, 2001). Interoperability is the ability of different types of computers, networks, operating systems, and software applications to work together by exchanging and sharing information in a standardized, accurate, and effective manner. AstroConcepts is an initiative in line with the requirements of interoperability.

  The AstroConcepts tool has been developed thanks to the experience of VO-Paris Data Center staff in Semantic Web. Indeed, several IVOA efforts rely on a Web semantic layer. The Semantic Working Group at the IVOA as well as the VO-Theory Interest Group develop several SKOS vocabularies to define concepts. One of the aims of these efforts is to help users to discover astronomical data thanks to commonly used concepts. In term, the SKOS vocabulary on which AstroConcepts rely could be used in VO-Tools and astronomical services to provide definitions of astronomical concepts as well as refine the interoperability between services.

Some features of the dictionary

The AstroConcepts tool also allows the interested reader to have direct access, through a click, to the *Etymological Dictionary of Astronomy and Astrophysics* for additional information. In fact the dictionary is intended for professional and amateur astronomers, university students in astrophysics, as well as terminologists and linguists, especially those interested in the etymology of Indo-European languages. Some of the particularities of this work are specified below.

- *Word filiation*
  Indeed, the origin, history, and the way in which a term is composed provide the reader with an additional dimension of the concept. The etymology sec-

tion is in fact the interface between physical and human sciences. The *Etymological Dictionary of Astronomy and Astrophysics* is indeed the first fully fledged etymological dictionary in this field. In particular much effort has been made on the etymology of Persian words dealing also with dialects and other languages of the Iranian branch. The dictionary is careful about the linguistic and terminological aspects of the terms, their morphological structure, and, in a broader scope, the mechanisms that govern a scientific language. The terminological and linguistic analysis of astronomical concepts will be addressed in a separate work.

- *Multidisciplinarity*
  Astronomy is tightly related to other branches of knowledge. It even includes other sciences in subfields such as astrobiology, astrochemistry, astrogeology, planetary meteorology, and so on. The dictionary therefore contains a large number of terms in physics, mathematics, geology, meteorology, including philosophy. The hypertext ability enables the reader to move on from a given concept to related ones. Moreover, the dictionary also guides the reader to families of associated concepts in astronomy as well as other fields of knowledge. Owing to new informatics tools resulting from technological advances, we are now able to transcend the partial scope of disciplenary worldviews. Innovative integrated approaches involving synergy from different backgrounds are indispensable for the production and diffusion of knowledge. Initiatives are underway to expand the multidisciplinary aspects of this work. Although more and more specialization for scientific progress is inevitable, inter-, multi-, and transdisciplinary initiatives are necessary to overcome the compartmentalizing of knowledge (see the dictionary for the definitions of these terms).

- *Educational and cultural vocations*
  The dictionary is intent on providing the most recent concepts in astrophysics. It is at the same time careful to explain the previous concepts upon which the new ones are based. This chain of reasoning enables the dictionnary to contain the most basic concepts and be self-sufficient. Moreover, such didactic method should make the outcome user-friendly. A new culture based on information is changing the way people learn, work, interact, and live. Education is a key for development. In this new context a great research effort is being made to find technological tools to support the new demands of education. The AstroConcepts semantic tool we have presented in this paper will help the *Etymological Dictionary of Astronomy and Astrophysics* to participate more in this effort.

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9. Deceased Members

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

Vadim A. **ANTONOV** (1934 – 2010), Russian Federation, 8 July 2010
David **AXON** (1951 – 2012), United Kingdom, 5 April 2012
Roger **BELL** (1935 – 2012), United States, 1 July 2012
Yolanda Gómez **CASTELLANOS** (1962 – 2012), Mexico, 16 February 2012
David Sutphin **HEESCHEN** (1926 – 2012), United States, 13 April 2012
Peter D. **HINGLEY** (1951 – 2012), United Kingdom, 22 June 2012
Roman **JUSZKIEWICZ** (1954 – 2012), Poland, 28 January 2012
Koh-ichiro **MORITA** (1954 – 2012), Japan, 7 May 2012
Pavel G. **PAPUSHEV** (1949 – 2012), Russian Federation, 31 January 2012
John H. **PARKINSON** (1947 – 2012), United Kingdom, 9 March 2012
John Peter **PHILLIPS** (1941 – 2012), Mexico, 29 April 2011
Vagharshak **SANAMIAN (**1918 – 2010), Armenia, 29 June 2010
Natalja S. **SOBOLEVA** (1933 – 2012), Russian Federation, 1 January 2012
Kazuo **SUDA** (1927 – 2012), Japan, 20 February 2012
Gábor **SZÉCSÉNYI-NAGY** (1948 – 2012), Hungary, 7 July, 2012
Mine **TAKEUCHI** (1933 – 2012), Japan, 18 February 2012
Hans G. **WALTER** (1928 – 2012), Germany, 5 March 2012
Volker **WEIDEMANN** (1924 – 2012), Germany, 14 March 2012
Bernhard **WOLF** (1935 – 2012), Germany, 23 March 2012
Helmut **ZIMMERMANN** (1926 – 2011), Germany, 18 December 2011
Harold **ZIRIN** (1929 – 2012), United States, 3 January 2012

10. Tribute to Franco Pacini (10 May 1939 – 26 January 2012)

The IAU was greatly saddened to hear of the death of Franco Pacini, professor of astrophysics at the University of Florence, Italy, who died on 26 January, 2012 due to complications from Parkinson's disease. Franco was an outstanding astronomer who made an enormous contribution to Italian and European astronomy in his highly productive career, based at the Arcetri Astrophysical Observatory overlooking Florence, the city he loved and so strongly associated with Galileo Galilei. Arcetri developed into one of the leading astrophysical institutes in Europe under his determined leadership. He was a strong advocate of the need for Italy to become a Member State of ESO, which came about in 1982. Franco himself served for many years as Italian scientific delegate in the ESO Council, and was President of Council in the years 1991-93. His contribution to astronomy, in particular in the field of pulsar research, was widely recognised with many honours, and the asteroid 25601 Francopacini, discovered by astronomers from the Pistoia Mountains Astronomical Observatory in 2000, was named in his honour.

Franco was strongly involved in the IAU over many years. He became a member in 1970, was active in Commissions 44 and 51, served as a member of the Special Nominating Committee 1985-1988, and elected to two terms as a Vice-President 1991-1997 before being elected President-Elect in 1997 and then President in 2000. Perhaps his major contribution to the IAU came at the IAU General Assembly in Sydney (2003), at the end of his term as President. Franco suggested that 2009 be declared the International Year of Astronomy (IYA) to commemorate the 400th anniversary of the first revolutionary discoveries of Galileo Galilei. The corresponding resolution was unanimously approved by the GA, later endorsed by UNESCO, and the IYA2009 finally proclaimed by the United Nations on 20 December 2007. The IYA met with great worldwide success which led to the IAU Strategic Development Plan, the Office of Astronomy for Development and a major shift in the priorities of the IAU. Franco thoroughly approved of these developments: he was very popular as a science communicator, but his greatest attention and efforts were devoted to children because he strongly believed that astronomy is particularly suited for introducing the scientific method. We should be grateful to Franco for his foresight – an outstanding astrophysicist with a long-lasting world-wide impact on the development of astronomical research and culture.

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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), though 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:

The Shanghai 65m radio telescope, currently under construction.
Photographed on 28 May 2012. Prospective completion by the end of the year.
Illustration provided courtesy of the Shanghai Astronomical Observatory.

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