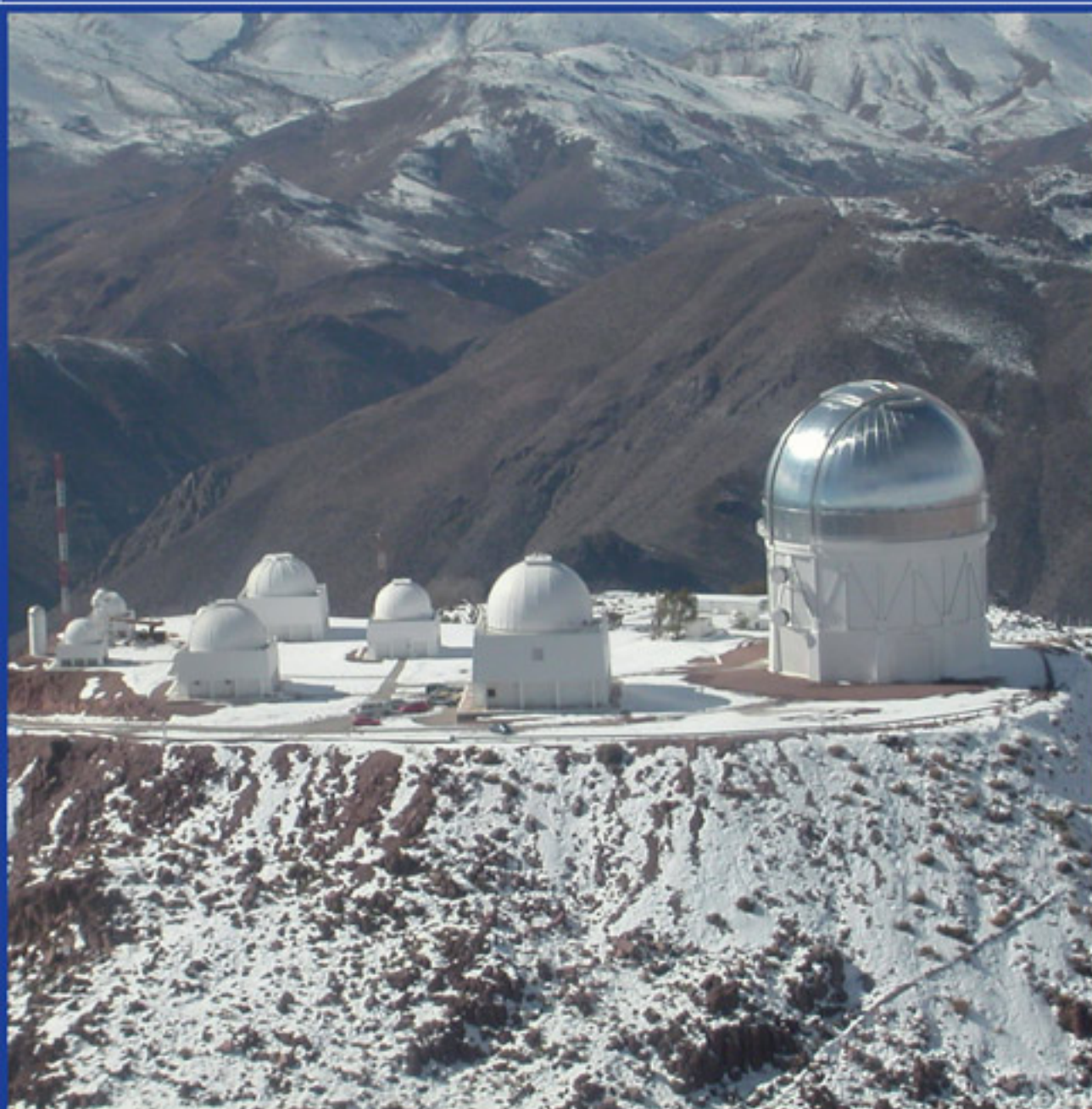

INTERNATIONAL
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UNION
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INTERNATIONALE

INFORMATION BULLETIN JANUARY 2011



107

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Preface

In the last Information Bulletin, we looked back on the success of IYA2009 and the start of the implementation of the IAU's Strategic Development Plan. In this Bulletin, we announce the appointment of a Director for the OAD hosted by the South African Astronomical Observatory in Cape Town and look forward to a rapid development of the OAD programme.

Our collaboration with UNESCO, so important in the IYA, continues and we are in active discussions with UNESCO on cooperation on education and development. We hope some new initiatives can be announced soon.

The full report on IYA2009 has been released and it confirmed that IYA2009 was the largest and most successful science education and public outreach event in history. It is estimated that over 800 million people were reached by IYA: a truly staggering number and testament to the lively public and media interest in astronomy. The IYA Secretariat, so crucially important to the success of IYA, has ended its job and the IYA Coordinator, Pedro Russo, moves to new responsibilities. We thank him, his team, and everybody connected with IYA for their efforts in making this a milestone event in the history of the IAU.

We have extended the "World Heritage" MoU with the UNESCO World Heritage Centre, and our Commission 41 Working Group is following up its recently published "Thematic Study on Heritage Sites of Astronomy and Archaeoastronomy in the context of the UNESCO World Heritage Convention" with further evaluation of a small number of selected sites.

One of the major activities in the first six months of 2011 will be the selection of the symposia, joint discussions and special session for GA2012. We have received 57 Proposals and, as always, the goal will be to assemble a scientifically broad and topical programme, with something for everyone, including the general public. This will all come to a head at the meeting of the Executive Committee and Division Presidents in Prague in May this year, where preparations for the GA will really start in earnest.

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

*Ian Corbett
General Secretary
Paris, January 2011*

EVENTS AND DEADLINES

2011

- 5-14 Jan **IAU S278, *Archaeoastronomy and Ethnoastronomy: Building Bridges between Cultures*, Lima, Peru**
- 24-26 Jan Officers' Meeting 2011
- 10-1) April **2nd Middle East Africa Regional IAU Meeting (MEARIM 2011), Cape Town, South Africa**
- 18-22 April **IAU S279, *Death of Massive Stars: Supernovae and Gamma-Ray Bursts*, Nikko, Japan**
- 24-26 May EC89 with Division Presidents, Prague, Czech Republic
- 29 May-3 June **IAU S280, *The Molecular Universe*, Toledo, Spain**
- 4-8 July **IAU S281, *Binary Paths to the Explosions of type Ia Supernovae*, Padova, Italy**
- 18-22 July **IAU S282, *From Interacting Binaries to Exoplanets: Essential Modeling Tools*, Tatranska Lomnica, Slovak Republic**
- 25-29 July **IAU S283, *Planetary Nebulae: an Eye to the Future*, Puerto de la Cruz, Tenerife, Spain**
- 26-29 July **XI Asian-Pacific Regional IAU Meeting (APRIM 2011), Chiang Mai, Thailand**
- 5-9 Sept **IAU S284, *The spectral energy distribution of galaxies (SED2011)*, Preston, UK**
- 15 Sept **Deadline for Letters of Intent for Symposia in 2013**
- 19-23 Sept **IAU S285, *New Horizons in Time Domain Astronomy*, Oxford, UK**
- 3-7 Oct **IAU S286, *Comparative magnetic minima: characterizing quiet times in the Sun and stars*, in Mendoza, Argentina**
- 1 Nov **Deadline for submitting Letter of Intent to host the XXXth GA in 2018**
- 30 Nov **Due date for applications for the Peter and Patricia Gruber Foundation Fellowships 2012**
- 15 Dec **Deadline for Proposals for symposia in 2013**
- 15 Dec **Deadline for nominations for the Peter and Patricia Gruber Foundation Cosmology Prize 2012**

2012

- 1 April **Deadline for Proposals to host the XXXth GA in 2018**
- 20-31 Aug **IAU XXVIIIth General Assembly, Beijing, China**

2015

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

1. IAU EXECUTIVE COMMITTEE

1.1 Officers' Meeting, Paris, France, 24-26 January 2011

1.2 89th EC Meeting, Prague, Czech Republic, 24-26 May 2011

2. IAU GENERAL ASSEMBLIES

2.1 XXVIIIth IAU GA, 20-31 August 2012, Beijing, China

The National and the Local Organising Committees have been officially formed:

National Organising Committee (NOC):

CHEN, Li (Beijing Normal University); CUI, Xiangqun (Co-Chair, Nanjing Institute of Astronomical Optics and Technology, NAOC); DAI, Zigao (Nanjing University); DING, Mingde (Nanjing University); DONG, Guoxuan (National Natural Science Foundation of China); FAN, Junhui (Guangzhou University); HAN, Jinlin (National Astronomical Observatories, Chinese Academy of Sciences); HAN, Zhanwen (Yunnan Astronomical Observatory, NAOC); HAO, Jinxin (NAOC - National Astronomical Observatories, Chinese Academy of Sciences); HONG, Xiaoyu (Shanghai Observatory, Chinese Academy of Sciences); GAN, Weiqun (Purple Mountain Observatory, Chinese Academy of Sciences); GUO, Ji (National Time Service Center, NAOC); JI, Peiwen (National Natural Science Foundation of China); LI, Xiangdong (Nanjing University); LI, Yan (Yunnan Astronomical Observatory, NAOC); LIAO, Xinhao (Shanghai Observatory, Chinese Academy of Sciences); LU, Chunlin (Purple Mountain Observatory, Chinese Academy of Sciences); LU, Jufu (Xiamen University); SUN, Xiaochun (The Institute of the History of Natural Science, Chinese Academy of Sciences); WANG, Na (Urumqi Observatory, NAOC); WU, Xuebing (Peking University); YAN, Jun (NAOC); YAN, Yihua (NAOC); YANG, Ji (Purple Mountain Observatory, Chinese Academy of Sciences); YUAN, Yefei (University of Science and Technology of China); ZHANG, Shuangnan (Institute of High Energy Physics, Chinese Academy of Sciences); ZHAO, Gang (Co-Chair, NAOC); ZHAO, Yongheng (NAOC); ZHENG, Xiaonian (NAOC); ZHU, Jin (Beijing Planetarium); ZHU, Yongtian (Nanjing Institute of Astronomical Optics and Technology, NAOC); ZHU, Zonghong (Beijing Normal University).

Local Organising Committee (LOC):

YAN, Jun (Co-Chair); ZHAO, Gang (Co-Chair); CHEN, Yue; CUI, Chenzhou; GAO, Frankie; HEI, Qili; LI, Haining; LIANG, Yanchun; LIU, Nancy; LIU, Yujuan; LU, Ye; PODT, Michael; QIAN, Raymond; WANG, Junjie; XU, Ang; XUE, Suijian; YANG, Deteng; YUN, Xiaoshan; ZHANG, Isabella; ZHAO, Bing.

Progress has been made in negotiations with the China National Conference Center (CNCC) concerning the schedule and reservation. An official contract is planned to be signed by early 2011. Other preparations are underway according to plan.

Contacts

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 Other matters: Haining Li <lhn@bao.ac.cn>
 URL: <<http://www.astronomy2012.com/>>

3. IAU SCIENTIFIC MEETINGS

3.1 Post-Meeting Reports 2010

The post-meeting reports for 2010 will be published in IB108 and will be available at <http://www.iau.org/static/scientific_meetings/postmr10.pdf>.

3.2 IAU Symposia in 2011

IAU S278 **Archaeoastronomy and Ethnoastronomy:
 Building Bridges between Cultures**

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

Coordinating Division: XII - Union-Wide Activities

Chair of SOC: Clive Ruggles (United Kingdom)

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

Chairs of LOC: Clive Ruggles (United Kingdom), Ivan Ghezzi (Peru)

Members of LOC: Maria Elena Herrera (Peru), Flávia Pedroza (Brazil),
 Alejandro Martín López (Argentina)

Editor of Proceedings: Clive Ruggles (United Kingdom)

Topics

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

Contact: Ray Norris <ray.norris@csiro.au>
 URL: <http://www.archaeoastronomy.org/>

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

Date and Place: 18-22 April, 2011, in Nikko, Japan

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

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

Chair of LOC: Keiichi Maeda (Japan)
 Members of LOC: Katsuaki Asano, Masaomi Tanaka (Japan)
 Editors of Proceedings: Peter Roming (USA), Nobuyuki Kawai (Japan),
 Elena Pian (Italy)

Topics

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

Contact: Pete Roming <proming@swri.edu>
 URL: <http://www.hp.phys.titech.ac.jp/iau279/>

IAU S280 **The Molecular Universe**

Date and Place: 29 May-3 June, 2011, in Toledo, Spain

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

Members of SOC: Y. Aikawa (Japan), J. Black (Sweden), G. A. Blake (USA),
 P. Caselli (United Kingdom), J. Cernicharo (Spain), G. Garay (Chile), M. Guelin
 (France), U. Jorgensen (Denmark), S. Kwok (China Nanjing), J. Maier

(Switzerland), K. Menten (Germany), T. Millar (United Kingdom), F. Salama (USA), I. Sims (France), A. Sternberg (Israel)

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

Topics

- 1 - Star-forming regions
- 2 - Protoplanetary disks
- 3 - Extragalactic astrochemistry
- 4 - Exoplanets and their atmospheres
- 5 - Solar system objects
- 6 - Evolved stars
- 7 - Diffuse clouds and PDR's
- 8 - Basic molecular sciences
- 9 - Tools for the analysis of spectral data
- 10 - Hot topics from Herschel

Contact: Eric Herbst <ericherb@gmail.com>
 URL: http://cab.inta-csic.es/molecular_universe/

IAU S281 Binary Paths to the Explosions of type Ia Supernovae

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

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

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

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

Topics

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

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

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

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

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

Coordinating Division: V - Variable Stars

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

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

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

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

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

Topics

- 1 - Multiwavelength photometry and spectroscopy of interacting binaries (compact & non-compact binaries, CVs, Algols, contact binaries, binaries in external galaxies)
- 2 - Observations and analysis of exoplanets and brown dwarfs in binaries

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- 3 - Imaging techniques: adaptive optics, interferometry, polarimetry, tomography
- 4 - Model atmospheres of stars, interacting binaries, disks, exoplanets, and brown dwarfs
- 5 - Synthetic light curves, velocity curves, and spectra of binary stars and accretion disks
- 6 - Spectral disentangling techniques for interacting binaries, brown dwarfs, and exoplanets
- 7 - Formation and evolution of binary stars, brown dwarfs, and planets
- 8 - Hydrodynamic simulations of exoplanets and mass transfer in interacting binaries

Contact: Mercedes Richards <mrichards@astro.psu.edu>
URL: <http://www.astro.sk/IB2E/>

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

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

Members of SOC: Mike Barlow (United Kingdom), Romano Corradi (Spain), You-Hua Chu (USA), Shuji Deguchi (Japan), Adam Frank (USA), George Jacoby (USA), Sun Kwok (China Nanjing), Alberto López (Mexico), Walter Maciel (Brazil), Roberto Méndez (USA), Quentin Parker (Australia), Detlef Schoenberner (Germany), Albert Zijlstra (United Kingdom)

Chair of LOC: Arturo Manchado (Spain)
Members of LOC: Romano Corradi, Anibal Garcia-Hernandez,
Miguel Santander, Eva Bejarano, Judith Araoz,
Tnaja Karthaus (Spain)
Editors of Proceedings: Arturo Manchado (Spain), Letizia Stanghellini (USA),
Detlef Schoenberner (Germany)

Topics

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

Contact: Arturo Manchado Torres <amt@iac.es>
URL: www.iac.es/congreso/iaus283/

**IAU S284 The spectral energy distribution of galaxies
(SED2011)**

Place and Date: 5-9 September, 2011, in Preston, UK

Coordinating Division: VIII - Galaxies & the Universe

Chairs of SOC: Cristina C. Popescu (United Kingdom),
Richard J. Tuffs (Germany)

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

Chairs of LOC: Gordon Bromage, Cristina C. Popescu (United
Kingdom), Richard J. Tuffs (Germany)

Members of LOC: Emma Kelly, Dmitrij Semionov, Catherine Pennington
(United Kingdom), Meiert Grootes, Ellen Simmat,
Gabi Wiese (Germany)

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

Topics

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

subtopics. Examples are the radio-IR correlation, gamma rays as a probe of molecular gas content, and constraints on inverse Compton gamma-ray emission from interstellar radiation fields inferred from dust emission measurements.

Contact: Cristina Popescu <cpopescu@uclan.ac.uk>
 URL: <http://www.mpi-hd.mpg.de/sed2011/>

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

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

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

Members of SOC: Conny Aerts (Belgium), Dipankar Bhattacharya (India), Jianning Fu (China Nanjing), Arne Henden (USA), Keith Horne (United Kingdom), Aris Karastergiou (United Kingdom), Katrien Kolenberg (Austria), Dante Minniti (Chile), Guy Monnet (France), Tara Murphy (Australia), Masatoshi Ohishi (Japan), Rob Seaman (USA), Alicia Soderberg (USA), Mark Sullivan (United Kingdom), Patricia Whitelock (South Africa)

Chairs of LOC: Aris Karastergiou, Mark Sullivan (United Kingdom)
 Members of LOC: Vanessa Ferraro-Wood, Sarah Blake, Tom Evans, Ian Heywood, Kate Maguire, Amy McQuillan, Yen-Chen Pan, Kimon Zagkouris (United Kingdom)

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

Topics

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

Contact: Elizabeth Griffin <elizabeth.griffin@hia-ihp.nrc-cnrc.gc.ca>
 URL: <http://www.physics.ox.ac.uk/IAUS285/>

IAU S286 **Comparative magnetic minima: characterizing quiet times in the Sun and stars**

Date and Place: 3-7 October, 2011, in Mendoza, Argentina

Coordinating Division: II - Sun & Heliosphere

Chairs of SOC: Sarah Gibson (USA), Hebe Cremades (Argentina)

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

Chair of LOC: Cristina Mandrini (Argentina)

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

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

Topics

- 1 - Solar and stellar minimum definition; is there a “ground state” of the heliosphere?
- 2 - Origins of solar and stellar variability: magnetic dynamo and flux transport processes
- 3 - Surface magnetic flux differences between cycle minima
- 4 - Total and spectral irradiance differences between cycle minima
- 5 - Coronal and heliospheric structure and activity differences between minima
- 6 - Cosmic rays at the Earth differences between minima
- 7 - Earth’s space environment and upper atmosphere differences between minima
- 8 - Historical and cosmogenic records of solar minimum differences
- 9 - Solar and stellar grand minima: origins
- 10 - Solar and stellar grand minima: implications for planetary space environments and climates

Contact: Sarah Gibson <sgibson@ucar.edu>

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

3.3 Regional Meetings 2011

MEARIM 2: **2nd Middle-East Africa IAU Regional Meeting**

Date and Place: 10-15 April, 2011, in Cape Town, South Africa

Coordinating Division: XII - Union-Wide Activities
 Chair of SOC: Phil Charles (South Africa)

Members of SOC: Paul Baki (Kenya), Bruce Bassett (South Africa), Noah Brosch (Israel), David Buckley, Catherine Cress, Chris Engelbrecht, Kevin Govender, Amanda Bulbis, Justin Jonas, Edward Jurua, Renée Kraan-Korteweg, Thebe Medupe, Davi Moodley, Patricia Whitelock, Patrick Woudt (South Africa)

Chair of LOC: Shireen Davis
 Members of LOC: Sudhanshu Barway, Phil Charles, Bonita de Swardt, Ed Elson, Andreas Faltenbacher, Simon Fishley, Christian Hettlage, Marissa Kotze, Rudi Kuhn, Thembela Mantuangwa, Nazli Mohamed, Enrico Olivier, Glenda Snowball

Topics: All areas in Astronomy and Astrophysics.

Contact: Phil Charles <pac@sao.ac.za>
 URL : <http://mearim2.sao.ac.za>

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

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

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

Chair of LOC: Saran Poshyachinda (Thailand)
 Members of LOC: Patarawat Arj-ong, Suparerk Aukkaravittayapun, Pimwan Chaikamwang, Siriporn Chaisri, Pratchaya Chatuphian, Wichan Insiri, Praphond Issariyakul, Jullada Kaosa-ard, Siramas Komonjinda, Wichean Kraiwattanawong, Watcharawuth Krittainathan,

Apichat Leckngam, Patcharintorn Leckngam,
 Julin Likasiri, Chalida Niparak, Warin Pattanayota,
 Saran Poshyachinda, Chanpen Silawongsawas,
 Korakamon Sriboonrueng, Kritsada Srisuk,
 Thana Thancharoenporn, Kanlaya Thapiang,
 Sodchuen Wiboolsake,

Topics: All areas in Astronomy and Astrophysics.

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

3.4 Co-sponsored meetings in 2011 and 2012

COSPAR Capacity Building Workshop on Remote Sensing of Atmospheric Aerosols and Their Impacts

2-16 January, 2011, Sharda University, Greater Noida, India
 URL: www.sharda.ac.in/cospar/index.html

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

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

COSPAR 39th Scientific Assembly and Associated Events

14-22 July, 2012, in Mysore, India
 Scientific Program Chair: U.R. Rao, Department of Space, India
 URL: <http://www.cospar-assembly.org>

3.5 Other meetings of astrophysical interest

4th Chaotic Modeling and Simulation International Conference (CHAOS2011), Agios Nikolaos, Crete, Greece, May 31 - June 3, 2011

Topics:

Chaos and Nonlinear Dynamics, Stochastic Chaos, Chemical Chaos, Data Analysis and Chaos, Hydrodynamics, Turbulence and Plasmas, Optics and Chaos, Chaotic Oscillations and Circuits, Chaos in Climate Dynamics, Geophysical Flows, Biology and Chaos, Neurophysiology and Chaos, Hamiltonian Systems, Chaos in Astronomy and Astrophysics, Chaos and Solitons, Micro- and Nano- Electro-Mechanical Systems, Neural Networks and Chaos, Ecology and Economy.

The publications of the conference will include:

- 1 - The Book of Abstracts in electronic and in paper form
- 2 - Electronic proceedings on a CD and on a permanent web website
- 3 - A book including selected papers presented in the conference

Contact: Conference Secretariat <secretariat@cmsim.org>

URL: <http://www.cmsim.org>

European Week of Astronomy and Space Science – JENAM 2011

Saint-Petersburg, Russia, 4 - 8 July, 2011

Contact: Elias Brinks <e.brinks@herts.ac.uk>

URL: <http://www.jenam2011.org/conf/>

4. IAU PUBLICATIONS

4.1 IAU *Highlights of Astronomy*

XXVIIth General Assembly - Highlights of Astronomy Vol. 15

As presented at the XXVIIth General Assembly of the IAU

Rio de Janeiro, Brazil, August 03-14, 2009

Ed. Ian F. Corbett, Cambridge University Press

ISBN 9781-107-00533-4

4.2 IAU *Transactions*

Transactions of the International Astronomical Union Volume XXVIIB

Proceedings of the Twenty Seventh General Assembly Rio De Janeiro

2009. Ed. Ian F. Corbett.

Cambridge University Press ISBN: 9780-521-76831-3

Transactions XXVIII A will be published by CUP in 2012.

4.3 IAU *Symposium Proceedings* published in 2010

published to date:

IAUS 261 *Relativity in Fundamental Astronomy*

27 April - 1 May 2009, Virginia Beach, USA

Ed. S. Klioner, K. Seidelmann, M. Soffel

Cambridge University Press ISBN: 9780-521-76481-0

IAUS 262 *Stellar Populations – Planning for the Next Decade*

3 - 7 August 2009, Rio de Janeiro, Brazil

Eds. G. Bruzual & S. Charlot

Cambridge University Press ISBN: 9780-521-76484-1

IAUS 263 Icy Bodies in the Solar System

3 - 7 August 2009, Rio de Janeiro, Brazil

Eds: J. Fernandez, D. Lazzaro, D. Prialnik-Kovetz

Cambridge University Press ISBN: 9780-521-76488-9

IAUS 264 Solar and Stellar Variability – Impact on Earth and Planets

3 - 7 August 2009, Rio de Janeiro, Brazil

Eds. A. Andrei, A. Kosovichev, J-P Rozelot

Cambridge University Press ISBN: 9780-521-76492-6

IAUS 265 Chemical Abundances in the Universe – Connecting First Stars to Planets

10 - 14 August 2009, Rio de Janeiro, Brazil

Eds. K. Cunha, M. Spite, B. Barbuy

Cambridge University Press ISBN: 9780-521-76495-7

IAUS 266 Star Clusters – Basic Galactic Building Blocks throughout Time and Space

10 - 14 August 2009, Rio de Janeiro, Brazil

Eds. R. de Grijs, J. R. D. Lépine

Cambridge University Press ISBN: 9780-521-76499-5

IAUS 267 Co-evolution of Central Black Holes and Galaxies

10 - 14 August 2009, Rio de Janeiro, Brazil

Eds. B. Peterson, R. Somerville, T. Storchi-Bergmann

Cambridge University Press ISBN: 9780-521-76502-2

IAUS 268 Light Elements in the Universe

9 - 13 November 2009, Geneva, Switzerland

Eds. C. Charbonnel, M. Tosi, F. Primas, C. Chiappini

Cambridge University Press ISBN: 9780-521-76506-0

IAUS 269 Galileo's Medicean Moons: their impact on 400 years of discovery

6 - 9 January, 2010, Padova, Italy

Eds. Cesare Barbieri, Marcello Coradini, Supriya Chakrabarti

Cambridge University Press ISBN: 9780-521-19556-0

still to be published:**IAUS 260 The Role of Astronomy in Society and Culture**

19-23 January 2009, Paris, France

Eds. David Valls-Gabaud & A. Boksenberg

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

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

For a complete list of IAU Symposium and Colloquium Proceedings, see:

<<http://www.iau.org/science/publications/iau/symposium/list/>><<http://www.iau.org/science/publications/iau/colloquium/list/>>

5 PRIZES & AWARDS

5.1 The Peter & Patrica Gruber Cosmology Prize

The 2010 Cosmology Prize 2010 of The Peter and Patricia Gruber Foundation was awarded to Charles Steidel, the Lee A. DuBridge Professor of Astronomy at the California Institute of Technology, in recognition of his revolutionary studies of the most distant galaxies in the universe. IAU vice-president Martha Haynes attended the ceremony, held in Chicago on 15 October, on behalf of the IAU.

Link to press release:

<www.eurekalert.org/pub_releases/2010-06/rla-ccs060110.php>

5.2 KAVLI Prize 2010

Roger Angel, of the University of Arizona, Tucson, Jerry Nelson of the University of California, Santa Cruz, and Ray Wilson, formerly of Imperial College London and the European Southern Observatory, shared the KAVLI astrophysics prize for their respective innovations in the field of telescope design that have enabled glimpses of ever more distant and ancient objects and events in the remote corners of the Universe.

IAU President Robert Williams attended the prize ceremonies in Oslo and Tromsø on behalf of the IAU and gave two presentations on the collaboration among KAVLI, the Norwegian Academy of Sciences and the IAU in organising the International Schools for Young Astronomers.

5.3 L'Oréal-UNESCO Award for Women in Science

IAU Member and former Vice-President Professor Silvia Torres-Peimbert wins the L'Oréal-UNESCO Award for Women in Science.

The L'Oréal-UNESCO prizes "For Women in Science" are awarded each year, successively in different fields of science, to five women scientists of the five continents: Africa and Arab States, Asia-Pacific, Europe, Latin America, and North America.

The Latin American laureate of the 13th Annual L'Oréal-UNESCO 2011 "For Women in Science Awards" is Professor Emeritus Silvia Torres-Peimbert from the Institute of Astronomy, Mexico City University (UNAM), Mexico. She was awarded the prize for her work on the chemical composition of nebulae, which is fundamental to our understanding of the origin of the universe.

A native of Mexico, Silvia Torres-Peimbert obtained her PhD at the University of California Berkeley, USA. She then became Professor in the Faculty of Sciences and the Institute of Astronomy at UNAM. Since 2009, she has been

Coordinator of Physical, Mathematical and Engineering Sciences at the university. Silvia Torres-Peimbert is a member of the American Astronomical Society and the Academy of Sciences of the Developing World.

The award ceremony is scheduled for 3 March, 2011 at the UNESCO Headquarters in Paris. See: <<http://www.loreal.com>>.

5.4 Victor Ambartsumian Prize

The Viktor Ambartsumian International Prize 2010 was awarded to the astrophysicist Michel Mayor of the University of Geneva and his collaborators Garik Israelian, Astrophysical Institute of the Canary Islands and Nuno Santos, Centro de Astrofísica da Universidade do Porto. The ceremony was held in Yerevan, Armenia, in September, 2010.

5.5 International Union of Pure and Applied Physics – IUPAC Young Physicists’ Prize

Commission 19 (Astrophysics) of the International Union of Pure and Applied Physics announced that its Young Physicists’ Prizes for 2009 would be presented Thomas Schweizer of MPI Munich for his work on MAGIC, and the 2010 award would go to Poonam Chandra of the Royal Military College, Canada, for radio detections of gamma ray bursts and supernovae, including the most distant GRB to date. They received their awards at the 25th Texas Symposium on Relativistic Astrophysics in Heidelberg the week of 6-10 December 2010.

6. REPORTS OF IAU DIVISIONS, COMMISSIONS & WORKING GROUPS

6.1 WG Near Earth Objects

Overview based on a paper by Karel A van der Hucht that was considered by the Executive Committee in May 2010

INTRODUCTION

The on-line document “Near Earth Asteroids (NEAs). A Chronology of Milestones” <www.iau.org/public/nea/> was triggered by discussions on Near Earth Objects in the annual meetings of the United Nations *Committee on the Peaceful Uses of Outer Space* (UN-COPUOS), concerned with Hazards of Near Earth Objects.

Near Earth Objects (NEOs) combine *comets* and *asteroids* with trajectories which bring them within 0.3 AU of the Earth orbit. Those with diameter $D > 140$ m

and orbits that approach the Earth's orbit to within 0.05 AU are labeled *Potentially Hazardous Objects* (PHOs; in case of asteroids: PHAs). Since asteroids outnumber comets by 100 to 1 in the inner solar system, the Near Earth Asteroids (NEAs), rather than Near Earth Comets, represent the majority of the nearer-term cosmic threat to our planet.

- *Every day*, Earth is bombarded with more than 100 tons of dust and sand-sized particles spewed off by asteroids and comets, causing *meteors*.
- Roughly *once a day*, a basketball-sized object strikes the Earth's atmosphere and burns up.
- *A few times each year*, an automobile-sized asteroid hits the Earth's atmosphere, creates an impressive *fireball*, and burns up before reaching the surface. Asteroids smaller than ~ 25 m will most likely burn up as they enter the Earth's atmosphere and cause little or no damage.
- Fragments more sizable than ~ 25 m survive their fiery passage through Earth's atmosphere and hit the surface, becoming *meteorites*. The present estimate of the initial size of the assumed asteroid causing the 1908 Tunguska Event is $D \approx 30 - 50$ m, exploding with $E \approx 10 - 15$ megaton TNT in an airburst at an altitude of ~ 8.5 km (Boslough & Crawford, 2008) and flattening ~ 2000 km² of Siberian forest. Tunguska-type events could occur *every few centuries*.
- *Every 200 years* on average, Earth will be struck by a ~ 25 m $< D < \sim 1000$ m diameter object and will likely suffer significant damage at the impact area.
- *Once every few million years*, an object with $D > \sim 1000$ m, large enough to threaten the entire Earth's civilization, comes along. Impact craters on Earth, the moon and other planetary bodies are evidence of such occurrences. The largest known PHA, asteroid 4179 Toutatis (1989 AC), has dimensions $4.6 \times 2.4 \times 1.9$ km. Presently 149 PHAs with $D > 1000$ m are known.

An important aspect of the size-frequency inventory given below is the break-up of larger objects to produce meteorite showers. The most famous recent examples include the Tagish Lake fall, 18 Jan 2000, and the 2008 TC3 Sudan fall, 6 October, 2008 (see www.iau.org/public/nea/). It is believed that most meteorites originate from atmospheric fragmentation of larger objects.

At the very least, the potential consequences of impact are large enough to cause concern. The NEO/NEA hazard is the only natural hazard which in principle can be predicted and, when predicted, in principle can be prevented. While the latter issue is beyond the influence of the IAU, helping to realize the former should be a key issue for the world's astronomical community and thus the IAU, as the least we can do for the world's tax payers who allow us to be astronomers. While mitigation, as said, is beyond the influence of us astronomers, by far the most important requirement of a successful mitigation campaign is a warning time sufficient to carry out the mitigation mission. As a result, an essen-

tial aspect of mitigation is detecting and tracking hazardous objects as long as possible in advance, i.e., the astronomers' task.

The present involvement of the IAU in the field of detection and monitoring of asteroids is (a) a small annual subvention to the Minor Planet Center; (b) the work of the IAU EC Advisory Committee on *Hazards of Near-Planetary Objects*; (c) maintaining a web page that gives an overview of Near Earth Asteroid research and lists close encounters within 1 LD (see <www.iau.org/public/nea/>).

The IAU Minor Planet Center

The Minor Planet Center – MPC <www.cfa.harvard.edu/iau/mpc.html> is the world's central clearinghouse for observations of minor planets. It operates at the Smithsonian Astrophysical Observatory – SAO (Cambridge, Mass., USA), under the auspices of the IAU. The MPC derives its operating budget from a three-year NASA grant through the NASA NEO Observations Program at NASA Jet Propulsion Laboratory.

The MPC is responsible for the efficient collection, computation, checking and dissemination of astrometric observations and orbits for minor planets and comets. As of April 2010, the MPC database contains over 68,000,000 observations and over 475,000 orbits for minor planets. NEO observations are identified and processed on receipt in near-real-time. The MPC makes its data public so that anyone can use the data for interpretation. Users are JPL-SENTRY (<neo.jpl.nasa.gov/>, <adsabs.harvard.edu/abs/2001DPS....33.4108C>), Pisa University-NEODyS (<newton.dm.unipi.it/neodys/>), and many amateur and professional astronomers who report back with follow-up astrometric observations.

Institutional contributors to the MPC are: the Tamkin Foundation; the Brinson Foundation; the TABASGO Foundation; the Steven and Michele Kirsch Foundation; major annual support from the NASA NEO Observations Program; and a modest annual subvention from the IAU.

JPL SENTRY and Pisa NEODyS

In 1998, the NASA NEO Observations Program was established at NASA Jet Propulsion Laboratory to coordinate NASA-sponsored efforts to detect, track and characterize potentially hazardous asteroids and comets that could approach the Earth. The primary computational activities of the NASA NEO Observations Program involve the continuous (and largely automatic) use of new data, coming from the MPC, to update the orbits of NEOs so that their future orbital paths can be examined for close Earth approaches. A parallel and independent effort is performed at the University of Pisa (Italy) at the Near-Earth Objects Dynamic Site NEODyS.

If the possibility of a future close Earth approach arises, impact probabilities are computed and the circumstances of the Earth approach are noted on the

SENTRY (Impact Risk) region of the JPL NEO website <neo.jpl.nasa.gov> and the Pisa NEODys website <newton.dm.unipi.it/neodys/>. When the possibility of a particularly close Earth approach is identified, SENTRY and NEODys computations are compared. Once verified, these events are immediately posted on the SENTRY and NEODyS pages.

At any given time, there will be several dozen Near Earth Objects on the SENTRY and NEODyS pages for which a future Earth impact cannot yet be ruled out. But with additional data to improve calculation of their orbits, the vast majority of Near Earth Objects will eventually be removed from the SENTRY and NEODyS Risk Pages. At the same time, newly discovered objects with orbits that require more observations will be added to the SENTRY and NEODyS pages, so there will always be objects on the Risk Pages.

Mitigation

Because of the wide range of possible sizes, trajectories and warning times for Earth-threatening asteroids, there will be a corresponding wide range in the levels of challenge in providing an appropriate response. Unless there are a few decades of warning time, hazardous asteroids larger than a few hundred meters in diameter will require enormous energies to deflect or fragment. For the far more numerous asteroids that are smaller than a few hundred meters in diameter, and if there is adequate early warning time of several years to a decade, robotic spacecraft could be targeted to rendezvous or collide with such asteroids, in order to modify their velocities to nudge the trajectories just enough that Earth impacts would be avoided. The spacecraft navigation technology for rendezvous-ing with an asteroid was successfully demonstrated by, e.g., the JAXA *Hayabusa* mission to asteroid Itokawa in November of 2005 <www.isas.jaxa.jp/e/enterp/missions/hayabusa/index.shtml>. The spacecraft technology for colliding with a small comet was successfully demonstrated by the NASA *Deep Impact* mission to comet Tempel 1, July 2005 (see <impact.arc.nasa.gov/news_detail.cfm?ID=159>, <impact.arc.nasa.gov/news_detail.cfm?ID=160>).

An alternative for mitigation would be just to compute the impact point on Earth in time for evacuation of populations, and take the hit.

Involved astronomical surveys for NEO detection

Several astronomical observatories, at one time or another, have carried out NEO search programs: Lincoln Near-Earth Asteroid Research (LINEAR), USA; Near-Earth Asteroid Tracking (NEAT), USA; Spacewatch, USA; Lowell Observatory Near-Earth Object Search (LONEOS), USA; Catalina Sky Survey (CSS), USA; Japanese Spaceguard Association (JSGA); European NEA Search Observatories (EUNEASO); and La Sagra Sky Survey (LSSS), Spain. Currently the vast majority of NEA discoveries are being made by the Catalina Sky Survey near Tucson (AZ, USA) and the LINEAR survey near Socorro (NM, USA).

In 1998, NASA accepted the goal of discovering and tracking over 90% of all NEOs with diameter $D > 1000$ m before the end of 2008, as its part of the “Spaceguard” effort. As of 19 April 2010, 806 NEAs with diameter $D > 1000$ m are known, i.e., 86% of the estimated total of 940.

In 2005, NASA was charged to detect, track, catalogue, and characterise the physical characteristics of NEAs with diameter $D > 140$ m (estimated number 25,000), and to achieve 90% completion of this survey within 15 years after enactment of the 2005 NASA Authorization Act. In its response, NASA decided that the goal of the survey program should be interpreted as to detect, track, catalogue, and characterize, by the end of 2020, 90% of all Potentially Hazardous Objects (PHOs) with diameters $D > 140$ m (i.e., $H < 22$ mag), whose orbits pass within 0.05 AU of the Earth’s orbit (as opposed to surveying for all NEOs). This is obviously a major enterprise, requiring dedicated surveys with large automated, wide-field telescopes. Additional international participation would greatly facilitate the achievements of these goals.

About 10% of the asteroids with $D > 140$ m have been discovered to date, and less than 1% of the asteroids with $D > 25$ m (i.e., $H < 26$ mag). If the current planning for existing and new surveys (e.g., Pan-Starrs <pan-starrs.ifa.hawaii.edu/public/> and LSST <www.lsst.org/lsst>) will materialize, the 90% goal for the $D > 140$ m NEAs will potentially be met between 2025 and 2030. In that process, the completion of detection of $D > 25$ m objects will rise to ~15%. Given the much larger population of these smaller NEAs, the ~15% completion of the objects with $D > 25$ m equates to ~1.7 million actual objects in the data base being actively tracked.

Space-based observatories contributing to the field are *WISE* (NASA, 2010), *NEOSat* (Canada, 2011), *GALIA* (ESA, 2012), and *AstroidFinder* (Germany, 2013), see <www.iau.org/public/nea>.

The next logical step will be to monitor the full sky continually and more deeply, searching for these smaller objects to provide sufficient time for successful mitigation and for evacuation if necessary. This requires a considerably increase of the world wide network of qualified ground-based and space-based observatories dedicated to NEA detection and research. Obviously, the huge volume of images to be produced by any deep asteroid survey will provide valuable data for many other fields of astronomy. Ref: <neo.jpl.nasa.gov/neo/report2007.html>.

The Role of the IAU

The former IAU Division I-III Working Group on Near Earth Objects

From August 1994 to August 2006, the IAU had an Inter-Division I-III Working Group on *Near Earth Objects* (WG-NEO). Its web site, last updated in 2004, is still available at <<http://web.mit.edu/rpb/wgneo/>>. Its charge was: (a) liai-

son with the SpaceGuard Foundation; (b) advise on coordination of NEO activities worldwide; (c) advise on reporting of NEO hazards; (d) advise on research relevant to NEOs.

At the IAU XXVI General Assembly in Prague, 2006, the Division I-III WG-NEO was replaced by the EC Advisory Committee on *Hazards of Near Earth Objects*. Because of the collision of disintegrated comet Shoemaker-Levy 9 with Jupiter, 16-22 July 1994, and a near-collision of asteroid 2007 WD5 with Mars on 30 January, 2008 (see <www.jpl.nasa.gov/news/news.cfm?release=2007-152>), its task was extended in January 2009 and its name altered to EC Advisory Committee on *Hazards of Near Planetary Objects*.

New IAU Division I-III Working Group on Near Earth Objects

A new Division III WG on *Near Earth Objects* was formed in October, 2010. See: <http://www.iau.org/science/scientific_bodies/working_groups/171/>.

The IAU EC Advisory Committee on Hazards of Near Planetary Objects

<http://www.iau.org/science/scientific_bodies/working_groups/125/>

Near-Earth asteroids and comets (NEOs) and their potential to collide with the Earth and other planets are a topic of interest to the media, the public, and a variety of governmental and international organisations. The IAU has been, and will continue to be, the primary international scientific organization with expertise on this subject. Accordingly, the Executive Committee of the IAU establishes an EC Advisory Committee on Near-Planetary Objects (AC-NPO), including Near-Earth Objects (NEOs), to advise the IAU Officers on the status of NPOs and their impact potential.

The EC AC-NPO consists of 5 – 7 individuals with expertise concerning the nature of NPOs, their orbits, and appropriate ways to communicate information concerning the NPO impact hazard to the public and the media. The members of this group are appointed by the EC for three-year terms. As required in formulating its advice and recommendations, the EC AC-NPO will consult with the broader community of experts on NPOs and related fields.

The EC AC-NPO has three primary functions:

- 1) The AC provides timely information and advice to the IAU General Secretary and the IAU President whenever objects meriting particular attention are detected or questions are raised by the media.
- 2) As required, the AC is authorized to respond to the media on behalf of the IAU on topics related to NPOs and the impact hazard, and to provide input on NPO-related statements posted on the IAU website.
- 3) The AC shall keep the IAU General Secretary and the IAU President informed on the general status of NPO surveys, orbital projections and other topics related to the impact hazard issue, including next-generation surveys and access to telescopes for follow-up observations.

6.2 IAU Minor Planet Center – MPC

We are sad to report that Brian G. Marsden, emeritus Director of the Minor Planet Center, died on 18 November, 2010. A tribute is published in Section 9 of this Bulletin.

*Report by Dr. Timothy B. Spahr, Director, LAU Minor Planet Center,
Harvard Smithsonian Center for Astrophysics*

The Minor Planet Center (MPC) had a busy 2010. The NASA *Wide-field Infrared Survey Explorer (WISE)* began routine operations searching for minor planets in the infrared, with great success. The MPC also received the first data from the Pan-STARRS survey project, and expects this soon to swell to many thousands of observations per year as this project matures. All of this activity was handled while the current surveys (the Catalina Sky Survey; the Lincoln Near-Earth Asteroid Research survey; the Spacewatch Telescope survey; the La Sagra Sky Survey; and other surveys) increased their productivity. As of September 2010, the MPC archive contains:

- Nearly 80,000,000 observations of minor planets and comets (20% increase in 1 year).
- Orbits for 550,000 minor planets and comets (20% increase in 1 year).
- So far about 530 NEOs have been discovered for the year, including 53 PHAs, those objects larger than about 140 meters in size that can come within 0.05 AU of the Earth's orbit. Note that 116 – or nearly 20% – of the NEOs discovered through September 2010 were discovered by the *WISE* spacecraft.
- The MPC NEO catalog currently (as of 14 September, 2010) contains 7184 NEOs. As of this writing, the NASA goal of finding 90% of the 1-km size NEOs is nearly finished. It is now a fairly rare event to find an NEO larger than 1-km; the most recent discovery in this category was 2010 RO82, perhaps 2-km in size, discovered by the Siding Spring Survey on 10 September.

Two small NEOs, 2010 RF12 and 2010 RX30, passed within the Moon's orbit on 8 September. While not an exceptionally rare event, this did receive a lot of press coverage around the world. It also shows how good current surveys are at discovering objects in the vicinity of the Earth.

It should be noted that the MPC has acquired a much improved and powerful cluster of computers that should be increasing productivity and processing capability in the coming year.

6.3 C41 Astronomy and World Heritage

The ICOMOS–IAU Thematic Study

<http://www.astronomicalheritage.org/index.php?option=com_content&view=article&id=26&Itemid=31>

The ICOMOS–IAU Thematic Study, published in June 2010, was conceived in 2008 following a period of intensive activity relating to Astronomy and World Heritage, driven mainly by the UNESCO World Heritage Centre (WHC) and by the International Astronomical Union.

The study presents a global survey of heritage sites relating to astronomy and archaeo-astronomy that might have the potential to demonstrate outstanding universal value (OUV) – the term of recognition for the value properties need to manifest in order to be inscribed on the World Heritage List. The Astronomy and World Heritage Initiative benefited initially from the creation of a database of sites and properties connected with astronomy, supported financially by the Royal Astronomical Society (UK) and hosted on the website of the World Heritage Centre.

In 2008, the IAU and UNESCO signed a MoU committing them to work together to implement and progress the Astronomy and World Heritage Initiative. Shortly afterwards, the IAU created a Working Group on Astronomy and World Heritage in order to discharge its responsibilities under the Memorandum. The decision by both UNESCO and the IAU to proclaim 2009 as the International Year of Astronomy served to raise the public profile of the initiative.

The Thematic Study sets out to undertake a wide-ranging survey of astronomical heritage, i.e. the material evidence relating to astronomy and to social uses and representations of astronomy. It has been produced in order to support possible nominations to the World Heritage List by summarizing the available documentation in a specific field. It aims to highlight the potential of all regions to contribute to the World Heritage List, especially in association with the global strategy for a ‘balanced, representative and credible List.’ It does not aim to identify OUV in individual sites, as this might compromise the subsequent process. However, the list of themes proposed provides a short and clear overview of the recognised evidence relating to astronomical heritage, defines the main fields now well recognised by the international community and encourages State Parties to the World Heritage Convention to identify potential astronomical and scientific sites in their Tentative Lists. The case studies aim to help State Parties identify potential sites and undertake comparative studies.

This Thematic Study was well received by UNESCO WHC and in November it was decided to extend the IAU-UNESCO MoU to the end of October 2012. In order to promote the “Astronomy and World Heritage” Thematic Initiative the

Commission 41 Working Group will use the Thematic Study as a starting point to continue to develop generic themes and a broad range of case studies, including some in particular detail. It will work, wherever possible, with the World Heritage Centre to develop direct contacts with State Parties to encourage them to promote specific astronomical sites within their territory, as endorsed by the IAU, within the framework of the World Heritage Convention and specifically through the implementation of the Initiative. In co-ordination with the World Heritage Centre and Starlight Initiative it will collaborate with Space Agencies in order to prepare and ultimately sign a project agreement on the protection of Space Technological Heritage.

The UNESCO WHC and the Commission 41 Working Group have developed common working methods based on regular communications between the Chair of the AWH WG and the Coordinator of the AWH Initiative within UNESCO, backed up by working meetings, and information exchanges. The expectation is that there will be dedicated meetings sponsored by States Parties to the WH Convention at which the Initiative is presented and discussed, and relevant inputs sought, and sessions within wider international meetings at which the Initiative is presented and discussed, and relevant inputs sought.

It was agreed at a recent meeting with UNESCO that the IAU-UNESCO co-operation MoU would be extended to the end of October 2012 and that the IAU Commission 41 (chaired by Clive Ruggles) would seek to develop outline dossiers on a few selected sites as possible candidates for World Heritage recognition. These dossiers should be completed by the end of 2011. The IAU and UNESCO will be monitoring progress, and a full report will be given at the 2012 IAU General Assembly.

6.4 The International Year of Astronomy – IYA2009

The International Year of Astronomy 2009 (IYA2009) Secretariat ended its activities on 31 December, 2010, after three and a half years of preparation, organisation and evaluation. The Year was a huge success, involving 148 countries around the world, promoting hundreds of thousands of individual activities, and reaching hundreds of millions of people.

During 2010, the IYA2009 Secretariat has been supporting the continuation of various projects – under the umbrella title “Beyond International Year of Astronomy” – and communicating the impact of the Year in publications and at conferences. Recently, the IYA2009 Secretariat has released a 1450-page IYA-2009 Final Report and a 24-page Final Report Summary.

Feedback on IYA2009 has been extremely positive. Its impact on the scientific literacy of the general public will take time to assess, but positive results are

already evident. In Sweden, for example, a recent public poll demonstrated a noticeable change in the appreciation for astronomy: interest in astronomy increased from 53% in 2008 to 67% in 2009.

While our thanks go to all the many organisations and individuals who devoted their time, effort and money towards making this event an unprecedented success, special recognition is due to IYA2009 Coordinator Pedro Russo and the team at ESO ePOD. Pedro is taking up a new position at Leiden University in the Netherlands, where he will be the International Project Manager of the educational project Universe Awareness, an IYA2009 Cornerstone project.

The IAU remains committed to promoting education and public outreach throughout the world. Plans are underway to establish the permanent position of Public Outreach Coordinator to encourage, facilitate and oversee the continuation of global activities and projects launched under IYA2009. The IAU is also implementing a decade-long plan for the global development of astronomy: The Strategic Plan – Astronomy for the Developing World. (See Sections 7.1 and 7.2 below.)

7. IAU EDUCATIONAL ACTIVITIES

7.1 Office for Astronomy Development – OAD

Kevindran Govender, Manager of the SALT Collateral Benefits Programme at the South African Astronomical Observatory, Cape Town, has been appointed Director of the IAU Office for Astronomy Development. Kevin has built the SCBD into a visible and successful group, using astronomy for development and for advancing the economy, technology, and society of Africa. He played an important role in several global IYA activities and was a major contributor in the development of the IAU Decadal Strategic Plan “Astronomy for the Developing World,” which the OAD is responsible for leading and coordinating.

The Office will begin its work on 1 March, 2011. For more information, see http://www.saa.ac.za/no_cache/publicinfo/news/news/article/189/16/.

7.2 Public Outreach Coordinator – POC

The IAU has received a number of pledges to help finance the position of Public Outreach Coordinator, who will be responsible for maintaining and developing the legacy of the IYA2009.

7.3 IAU Comm. 46 Program Group of Network for Astronomy School Education (NASE)

<<http://www.iaucomm46.org/>>

Activities in 2010

Latin America and the Caribbean

In 2010, the NASE PG organised five courses for primary and secondary school teachers in Latin America and the Caribbean, with plans to organise follow-up courses on an annual basis. Ideally, each course will spawn a series of regional astronomy schools. To this end, a small group of teachers is assembled after each course. In coordination with the NASE Programme Group, they have the task of organising future annual courses in their region.

NASE produced the Proceedings for each of the courses held in 2010. Complementary material was produced for secondary and primary school levels – the latter, in cooperation with the Spanish UNawe site. The courses, aimed at Spanish-speaking secondary and primary school teachers, comprised 4 lectures, 9 workshops and 3 working groups:

Lectures	Solar System	Magda Stavinsky (Romania)
	Stellar Evolution	John Percy (Canada)
	History of Astronomy	Jay Pasachoff (USA)
	Cosmology	Julietta Fierro (Mexico)
Workshops	Local horizons and Sundials	Rosa M. Ros (Spain)
	Stellar, solar and lunar demonstrators	Rosa M. Ros (Spain)
	Earth-Moon-Sun System: Phases & Eclipses	Rosa M. Ros (Spain)
	Planets and exoplanets	Rosa M. Ros (Spain)
	Solar Spectrum and Sunspots	Alexandre Costa (Portugal), Beatriz García (Argentina), Ricardo Moreno (Spain)
	The life of stars	Alexandre Costa (Portugal), Beatriz García (Argentina)
	Astronomy outside the visible	Beatriz García (Argentina), Ricardo Moreno (Spain)
	The Universe Expansion	Ricardo Moreno (Spain)
	Young astronomer briefcase	Rosa M. Ros (Spain)
Working Groups	WG1 - Preparing Observations: Moon Map, Telescopes and Planispheres. Software free of charge.	
	WG2 - Astronomy in the city or Archaeo-astronomy.	
	WG3 - Discussion about astronomy teaching in the host country. Poster session to show the experience of teacher participants. Exhibition of astronomy books.	

The five courses held in 2010 were:

- ***Barranquilla, Colombia, 6-9 July, 2010***

This course, with 51 participants, was held in cooperation with the Secretaría de Educación del Departamento del Atlántico and the Asociación de Clubes de Astronomía del Departamento del Atlántico, ERIDANO.

The NASE members who visited Barranquilla were: Beatriz García (Argentina), Ricardo Moreno and Rosa M. Ros (Spain).

The NASE Working Group Colombia-Atlántico was composed of: Luis Arjona, Jose D. Florez, Alfonso Hiram, Orlando Méndez, Mario Solarte and Erquinio Taborda y Carlos Torres.

See <http://www.iaucomm46.org/web_nase/barranquilla2.html>.

- ***Managua, Nicaragua, 12-16 July, 2010***

This course, with 56 participants, was held in cooperation with the Universidad Nacional Autónoma de Managua, the Ministerio de Educación de Nicaragua and Observatorio de la Universidad de Managua.

The NASE members who visited Managua were: Beatriz García (Argentina), Ricardo Moreno and Rosa M. Ros (Spain).

The NASE Working Group Nicaragua members were: Lúgia Arenas, Humberto García, Javier Pichardo and Noel Zelaya.

See <http://www.iaucomm46.org/web_nase/managua2.html>.

- ***Lima, Perú, 17 - 20 July, 2010***

This course, with 34 participants, was held in cooperation with the Facultad de Educación and the Facultad de Ciencias Físicas of the Universidad Nacional Mayor de San Marcos.

The NASE members who visited Managua were: Beatriz García (Argentina) and Rosa M. Ros (Spain).

The NASE Working Group Perú members were: M. Luisa Aguilar, Rafael E. Carlos, Jorge Rivera, Teófilo Vargas, Jhon Joel Yana and Juan P. Villanueva. See <http://www.iaucomm46.org/web_nase/lima2.html>.

- ***Rosario, Argentina, 12-15 October, 2010***

This course, with 27 participants, was held in cooperation with the Ministerio de Educación de la Provincia de Santa Fe, Secretaría de Estado de Ciencia, Tecnología e Innovación de Santa Fe and CONICET. All expenses were born by regional institutions and organisations.

The NASE members who visited Rosario were: Roberto Aquilano and Beatriz García (Argentina) and Rosa M. Ros (Spain).

The NASE Working Group Santa Fe members were: Roberto Arquilano, Jorge Coghlan, Néstor Marinozzi, Daniel Mendicini, Hugo Missio, Silvia Morales, Juan Olivero, Claudia Romagnoli, Vivian Sebbena and Diego Sevilla. See <http://www.iaucomm46.org/web_nase/rosario2.html>.

- ***Cañada de Gómez, Argentina, 13-15 October, 2010***

This course, with 59 participants, was held in cooperation with the Ministerio de Educacion de la Provincia de Santa Fe, the Secretaría de Estado de Ciencia, Tecnología e Innovación de Santa Fe and CONICET. Again, all expenses were born by regional institutions and organisations.

The NASE members who visited Rosario were: Ricardo Aquilano and Beatriz García (Argentina), Ricardo Moreno and Rosa M. Ros (Spain)

The NASE Working Group Santa Fe members were: Roberto Arquilano, Jorge Coghlan, Néstor Marinozzi, Daniel Mendicini, Hugo Missio, Silvia Morales, Juan Olivero, Claudia Romagnoli, Vivian Sebbena and Diego Sevilla. See <http://www.iaucomm46.org/web_nase/canada2.html>.

Europe

- ***Varna, Bulgaria, 1-5 September, 2010***

NASE organised this course, conducted in English, in cooperation with the European Association for Astronomy Education (EAAE), which is also participating in the production materials for the secondary school level.

- ***preparatory work***

NASE has established contacts with CLEA in France and NUCLIO in Portugal with a view towards cooperating to produce and organise courses in French and Portuguese.

North and West Africa

- ***Ouagadougou, Burkina Faso, 12-14 December, 2010***

NASE ran two workshops in French in cooperation with the IAU C46 Programme Group TAD. See section on TAD, below.

- ***preparatory work***

In April 2010, the NASE team visited La Cite de la Science in Tunisia in order to arrange for the translation of its course and set up a website with supplementary materials in Arabic.

7.4 Div. XII/Comm. 46/PG International Schools for Young Astronomers – ISYA

The 32nd ISYA, at Byurakan Observatory, Armenia, 12 Sept. - 3 Oct. 2010

Excerpt from a report by Jean-Pierre De Greve, Chairman PG ISYA

Introduction

The 32nd ISYA 2010, held at Byurakan Observatory, Armenia, was characterised by a very large number of applicants (more than 100) from a large number of

countries from 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, it was decided also to accept a few students from these countries in order to enlarge the international character of the student body.

The following organisations sponsored the ISYA programme: Armenian Astronomical Society (ArAS), Armenian National Academy of Sciences (NAS RA), Armenian State Committee for Science (SCS), Byurakan Astrophysical Observatory (BAO), German Academic Exchange Service (Deutscher Akademischer Austausch Dienst, DAAD), International Astronomical Union (IAU), Norwegian Academy of Science and Letters (NASL), United Nations Educational, Scientific and Cultural Organization (UNESCO).

The IAU allocated funds provided by the NASL to cover the travel expenses of the participants (visa, insurance, and air fare, local transport, and cultural trips). BAO, ArAS, NAS RA, SCS, and UNESCO provided accommodation for students at the observatory hotel and for lecturers in Yerevan hotels, meals and coffee breaks during the school, as well as other expenses (social events, participants' kits, administration expenses). DAAD provided travel grants for three German students.

Location

The Byurakan Observatory is one of the main observational centers of the former Soviet Union and an important observatory with modern facilities in the Middle East region. It was founded in 1946 by V.A. Ambartsunian and is well known for its large spectroscopic surveys: the First and Second Byurakan Surveys (FBS and SBS). The student accommodation was in a hotel on the observatory domain. Breakfast, lunch and dinner were provided in the restaurant of the observatory. Except for the ISYA director, Jean-Pierre De Greve, who had a room in the hotel with the students, all other professors were housed at the Academy of Sciences in Yerevan, approximately 40 minutes from the campus. The lecturers were transported to and from campus on a daily basis.

Students

Out of 104 candidates, 48 were selected for participation including the Armenian students. There were in total students from 21 countries participating, including several from outside the region (France, Germany, India). The gender distribution was 56% female, 44% male.

Opening reception of the ISYA.

The Opening Ceremony, on Monday, 13 September, was attended by representatives of the Academy of Sciences (co-organiser of the School), UNESCO (as one of the important sponsors) and the Ministry of Education. National televi-

sion was present to record the event for the news. A welcome dinner was held in the evening.

Programme

In total, there were 18 lecturers from 11 countries. A special guest lecture was given by Prof. Gennady Bisnovaty-Kogan, one of the members of the international jury of the Ambartsunian Prize.

Lectures started at 9:30 am and finished at 6:00 pm. Several lectures were also followed by labs to exercise the presented material. Each lecture or lab lasted 90 minutes. There were two teaching slots in the morning, and two in the afternoon, each separated by a coffee/tea break of 30 minutes. The lunch break lasted from 1:00 pm till 2:30 pm.

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 appreciated support of Paul Roche). Unfortunately, due to weather conditions, maintenance, and extra-curricular school activities, only one 1:30 hour slot out of the four that were scheduled could be used on FTN. As extra support, we were also allowed to use the Australian back-up for that night, adding an extra hour on FTS.

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 Amir-khanian, Head of small telescopes), and in the last week, using also the 2.6 m telescope.

In the last week, students could give a talk, either individually or in group, in two dedicated slots of 1:30 hours. Several of the students consulted Jean-Pierre De Greve for the content of their powerpoint presentation. The presentations took place on 2 slots of 1.5 hours on Thursday 30 Sept. and Friday 1 Oct. For each student, 15 minutes were foreseen for the presentation and the discussion. Additionally, two students from Turkey, Hüsne Dereli and Evrin Kiran, gave a presentation of their research on Monday 27 Sept. The lecturers agreed that the presentations were well prepared and of high quality.

A special seminar was given on 2 topics related to the scientific career: “How to write and publish a research paper,” and “Applying for a position” (J.P. De Greve, Belgium)

Closing and evaluation

On the last day, students completed a 4 page evaluation sheet. A selection of the best photos taken by the students, composed by one of the students, was shown. In the following closing ceremony, the students received their certificate of participation in the ISYA-2010. Many prizes were also awarded for special

actions: most active student, winner of the quiz, winning team in the sport competition, best presentation, best photograph

Social programme

The social programme included a tour of the Byurakan Astrophysical Observatory (Monday, 13 Sept., 16:30-18:30), the welcome dinner (Monday, 13 Sept., 19:00-21:00), the Viktor Ambartsumian International Prize Award Ceremony in Yerevan (Saturday, 18 Sept., 11:00-12:00), the ISYA-2010 banquet (Thursday, 30 Sept., 19:00-22:00), Armenian sightseeing excursions (two weekends, 18-19 and 25-26 Sept.), as well as sports games and competitions.

The tours organised for the weekends were the following:

YEREVAN CITY TOUR (Saturday, 18 Sept.).

LAKE SEVAN (Sunday, 19 Sept.). Lake Sevan, the gem of Armenia, is a wonder of nature, located 60 km from Yerevan up a highway which cuts northward through mountains and rocks, at 2000 m above sea level.

GARNI and GEGHARD (morning of Saturday, 25 Sept.). The Sun Temple of Garni (built in the Roman style, very like the Greek Parthenon) is 28 km from Yerevan. There is an architectural complex of the 3rd century B.C. The temple itself was built in the 1st century A.D. by the Armenian King Tiridates. 6 km from Garni, there is a fantastic example of medieval Armenian architecture, the Geghard Cave Monastery. Its first mention is found in the 4th century, but the main cathedral was built in 1215.

ECHMIATZIN and ZVARTNOTS (afternoon of Saturday, 25 Sept.). This excursion explored the old city of Echmiatzin, the former capital of the Kingdom of Armenia (in the II-IV centuries). Echmiatzin is 20 km from Yerevan, in the Ararat Valley - the granary of Armenia. The Cathedral is Echmiatzin's main attraction. Echmiatzin is the centre of the Armenian Apostolic Church and all the Armenian eparchies.

AMBERD, TEGHER, and ORGOV (Sunday, 26 Sept.). There are wonderful sightseeings in the Ashtarak District, around Byurakan. There is the famous picturesque *Amberd* fortress. In 10-11 centuries it was a well-built settlement and one of the important military strong points of the Armenian Bagratouni kings. Here in 1026, the *St. Astvatzatzin* church was built. Amberd is at a height of 2,300 metres above sea level. The Institute of Radiometric Measurements is located in Orgov. Its main instrument is a 54 m Spherical Radio telescope, which is correlated with a 2.6 m optical telescope, working as a radio-optical telescope (ROT). The institute has also a 16 m radio dish, time service, etc.

7.5 Div. XII/Comm. 46/PG Towards Astronomy Development – TAD

7.5.1 TAD Workshop

12-14 December, 2010, Ouagadougou, Burkina Faso

The IAU PG “Towards Astronomy Development” sponsored the delivery of 78 “Galileoscopes” to Burkina Faso in conjunction with IAU Symposium 277 *Tracing the ancestry of galaxies (on the land of our ancestors)*, held in Ouagadougou from 13-17 December, 2010.

The organiser of the Symposium, Claude Carignan (Université de Montréal), set up a 2.5 day Workshop for approximately 50 high school science teachers from all provinces of the country. Held in French, the workshop was run by Michele Gerbaldi (IAP), Jean-Pierre de Grève and Edward Guinan and Katrien Kolenberg (IAU/TAD), and Rosa Maria Ros (IAU/NASE).

The teachers were shown how to use the Galileo telescopes and invited to take them back to their hometowns and villages, thereby reaching every school district in Burkina Faso. With each teacher reaching over 100 students, approximately 5000 students will benefit. The remaining Galileoscopes were distributed to astronomers and teachers attending Symposium 277 from other parts of Africa for use in their home countries.

Katrien Kolenberg accompanied two Ph.D students in nuclear astrophysics, Modou Mbaye and Salma Sylla, from Dakar to Ouagadougou to participate at IAU Symposium 277 and the discussions on founding the African Astronomical Society. (Cf. extract of the report submitted by K Kolenberg published in IB106. The constitution and by-laws of the AfAS were duly created and signed during the parallel meeting of the Working Group in Ouagadougou, and the official inauguration has been scheduled to take place at the MEARIM II meeting in Cape Town, 10-15 April 2011.)

7.5.2 TAD Vietnam Astronomy/Astrophysics School

January 2011, Hue City and Hanoi

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

7.6 Div. XII/Comm. 46/PG World Wide Development of Astronomy – WWDA

7.6.1 Tajikistan

John Hearnshaw, University of Canterbury, New Zealand, visited Tajikistan (5-19 June, 2010) within the framework of the IAU Commission 46 Program Group for the World-wide Development of Astronomy (PGWWDA). The purpose of the visit was to assess the current situation concerning astronomical teaching and research in Tajikistan and to make appropriate recommendations to the IAU on possible future development of astronomy.

Extracted from John Hearnshaw's report:

John Hearnshaw's visit to Tajikistan was sponsored by the IAU and hosted by the Institute of Astrophysics in Dushanbe, the capital city of Tajikistan. The institute is a part of the Tajik Academy of Sciences – a member of the IAU since 1993.

Three astronomical observatories were established in the Soviet era, and all of these are now in the control of the Institute of Astrophysics. John Hearnshaw visited all three and as well as three universities, where astronomy is taught: in Dushanbe, in Khujand and in Khorog. A visit was also made to the Khujand Planetarium and talks on astronomy presented in all of these universities and at the planetarium.

On the basis of this visit, John Hearnshaw recommends that IAU Commission 46 organise an astrophysics school in Dushanbe within the next two years with the support of the TAD programme group.

Institute of Astrophysics, Dushanbe

Astronomy in Tajikistan is centred at the Institute of Astrophysics in Dushanbe, founded in 1932 under another name. Meteor astronomy, comets and asteroids, and variable stars were the three original departments, and these have remained strong research interests throughout the institute's history. Departments have since been added for ionospheric studies, for the structure and dynamics of stellar systems, for experimental laboratory astrophysics and for astrometry.

There are three observational field stations within the institute: the Hissar Observatory (1963-71), the Sanglokh Observatory (1980) and, lastly, the Pamir Observatory, which originally belonged to the Pulkovo Observatory in St. Petersburg and was acquired by the institute after independence in 1991.

The institute is located on a spacious and leafy site near the centre of Dushanbe. There are currently some 60 employees, half of whom are scientists or engi-

neers. Of the approximately 20 astronomers, four have higher doctorates (DSc) and eight have PhDs. There are currently five individual IAU members in Tajikistan: Pulat Babazhanov, Khursand Ibadinov, Gulchehra Kokhirova, Nasridin Minikulov, Firuz Sahibov. All work at the Institute of Astrophysics; a sixth IAU member from Tajikistan, Subhon Ibadov, now works permanently in Moscow.

The astronomers in the Institute are still quite isolated in terms of international contacts and collaborations. For example, neighbouring Uzbekistan, which is not an IAU member country, still has considerably easier international access and a greater range of international collaborations in astronomy than does Tajikistan. The fact that relations between Uzbekistan and Tajikistan are currently strained at government level means that there are no direct flights between the two countries, and this also means that there is minimal scientific collaboration involving Tajik and Uzbek astronomers. During the time of the civil war (1992-97) the Institute of Astrophysics continued to operate, but staff was not always paid, and some staff positions were lost.

Tajik National University

The Tajik National University in Dushanbe created a Department of Astronomy in 1999 on the initiative of the Institute of Astrophysics. The university also has a new campus on the edge of the city. The physical sciences building houses a dome with a small telescope for student observations. About 20 students a year are accepted into the astronomy programme and graduate in astronomy after taking courses in astronomy, mathematics and the natural sciences.

John Hearnshaw visited the Tajik National University in central Dushanbe on the afternoon of Tuesday 8 June and presented a seminar to about 50 students and physics and astronomy staff on astronomy at Mt John University Observatory in New Zealand. The lecture was simultaneously translated into Russian by Prof. Ibadinov.

Khujand State University and Khujand Planetarium

Accompanied by Prof. Ibadinov, John Hearnshaw visited Khujand, the second largest city in Tajikistan. They were welcomed by two professors from Khujand State University, including Prof. Khurshed Abdullozoda (who specializes in the history of astronomy), and driven to the university campus on a new site just across the Syrdarya River. A power cut at the university prevented John from giving his powerpoint presentation, but he gave an improvised talk to about 80 students that was translated into Tajik by Prof. Ibadinov and showed printed HST images, which were handed out and discussed.

The next day, John Hearnshaw visited the Khujand Planetarium, a fairly small facility with an old Zeiss projector in the centre of town, and presented a lecture on measuring the ages of objects in the universe (again translated into Tajik by

Prof. Ibadinov) before a dozen secondary school teachers. After the talk in the morning, the director of the planetarium, Dilbar Raupova, invited the two guests to lunch in her office at the planetarium. They returned to Dushanbe by air that evening.

Hissar and Sanglokh observatories

The Institute of Astrophysics operates two astronomical observatories within easy reach of Dushanbe in western Tajikistan. The older observatory is the Hissar Observatory, established in 1963-71 and at an altitude of 730 m. John Hearnshaw visited on Sunday, 6 June, accompanied by Prof. Ibadinov, Dr. Gulchehra Kokhirova (IoA deputy director) and Aziz Mullo-Abdolov, an employee of the Institute. They were joined by Makhmud Gulyamov, a staff astronomer from the Institute who is head of the astrometry group.

The visitors viewed the 70-cm reflector of Russian manufacture, with a CCD at the Newtonian focus and a photoelectric polarimeter at the Cassegrain focus; a 40-cm Zeiss astrograph used for observations of comets, asteroids and variable stars (also equipped with a CCD to replace photographic plates); and a 20-cm refractor for student use. They also inspected a number of wide-field cameras used for observations of meteors and fireballs. The Hissar t also has a fast and high precision astronomical camera of 1-metre aperture that was originally used for artificial Earth satellite tracking as well as comet and meteor photographic observations but is no longer in use. It was not possible to inspect it, as the building was locked.

Again in the company of Dr Gulchehra Kokhirova and Aziz Mullo-Abdolov, John Hearnshaw visited the Sanglokh Astronomical Observatory, situated about 100 km south-east of Dushanbe at an altitude of 2300m. The observatory was established by the Institute in 1980 and the instrumentation includes a 1-m Zeiss Ritchey-Chrétien telescope and a 60-cm Zeiss telescope, as well as a number of all-sky fireball and digital cameras for meteor observations. The 1-m telescope is in a high tower building and the telescope is about 25 m above ground level.

In the Tajik civil war the electronic control system of the 1-m telescope was completely destroyed, with the result that the telescope has been unusable since the mid-1990s. There are plans to restore this telescope so once again it can make useful observations, especially on asteroids, comets and variable stars. The 60-cm telescope also suffered damage in the civil war. This severely damaged the secondary mirror and the dome has numerous bullet holes. The telescope was converted for prime focus imaging as a result of the loss of the secondary mirror. At the time of the visit the whole instrument was wrapped in plastic sheets, so evidently it had not been in recent use.

Meteor observations by all-sky fireball digital cameras with CCDs are continuing at Sanglokh. The site is certainly a good one and reasonably accessible from

Dushanbe (the trip takes about three hours each way). There is an accommodation building, but the lack of running water is a problem (water has to be taken by road). The weather conditions at Sanglokh are good for astronomy, with very good median seeing (0.54 arc seconds) and 1700 clear night-time hours a year.

While at Sanglokh, John Hearnshaw was able to meet other staff members, notably Dr Nasridin Minikulov, who is head of the variable star section at the Institute and an IAU member. He works on T Tauri stars and Herbig Ae and Be stars in young stellar associations.

Pamir Observatory

The Institute of Astrophysics acquired control of the Pamir High-altitude Observatory on the country's independence in 1991. The observatory is located at an altitude of 4350 m in eastern Tajikistan on the Pamir plateau, about one hour's drive south-east of the town of Murgab, which is the main town of the Gorno-Badakhshan Autonomous Region (which means Mountainous Badakhshan Autonomous Region). This part of Tajikistan is very remote and sparsely populated. The journey of about 950 km from Dushanbe takes about two and a half days over very difficult mountain roads. John Hearnshaw made the trip in a rented 4WD vehicle, accompanied by Gulchehra Kokhirova and Aziz Mullo-Abdolv from the institute.

The observatory was built in the 1980s as an outstation of the Pulkovo Observatory in St. Petersburg. It is equipped with a 70-cm Cassegrain reflector and a small solar telescope. The climate here is exceptionally good for astronomy, with median seeing reported to be 0.54 arc seconds (the same as Sanglokh) and 1820 clear night-time hours per year. The sky is extremely dark and the average wind speed is no more than 6 m/s. The precipitation is less than 100 mm per year.

Unfortunately the Institute has been unable to make use of this excellent site for observations since 1991, as the costs of operating the site and of travelling there from Dushanbe are considerable. Moreover, electrical power, previously provided by diesel generators, is currently not available. Nevertheless, security personnel are employed around the clock to protect the site.

Khorog State University

Finally, John visited Khorog State University, where he met with the Head of the Physics Department, Prof. Shirinbek Nekkadamov, and the Deputy Rector of the university, Prof. Imomjor Kalandarbekov. The university offers some courses in astronomy as part of the programme for physics students. John gave a general talk on astronomy and extrasolar planets to about 50 students and staff, which was translated into Russian by Dr Kokhirova.

Contacts in Tajikistan

Institute of Astrophysics, Dushanbe

- Prof. Khursand Ibadinov, Director of the Institute of Astrophysics and Corresponding member of the Tajik Academy of Sciences
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- Firuza Rahmatullaeva, Learning Secretary of the Institute, astronomer
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- Aziz Mullo-Abdolov, Institute employee

Tajik National University, Dushanbe

- Prof. Tagoymurod Salihov, Theoretical physics
- Abdurasul Rahmonov, Senior lecturer in astrophysics

Khujand State University

- Prof. Khurshed Abdullozoda, Professor of the history of astronomy

Khujand Planetarium

- Dilbar Raupova, Planetarium director

Khorog State University

- Prof. Shirinbek Nekkadamov, Head of the Department of Physics
- Prof. Imomjor Kalandarbekov, Deputy rector of the Khorog State University

7.6.2 Panama and Costa Rica

Hugo Levato, Instituto de Ciencias Astronómicas, de la Tierra y del Espacio (ICATE), San Juan, Argentina, visited Panama (15-21 August, 2010) and Costa Rica (22-28 August, 2010) within the framework of the IAU Commission 46 Program Group for the World-wide Development of Astronomy (PGWDA). The purpose of the visits was to assess the current situation concerning astronomical teaching and research in both countries and to make appropriate recommendations to the IAU on possible future development of astronomy.

Extracted from Hugo Levato's reports:

Panama, August 2010

Hugo Levato's visit to Panama was sponsored by the IAU and hosted by the Facultad de Ciencias Exactas, Naturales y Tecnología (FACENT) of the Universidad de Panamá (UP). Panama is an interim member of the IAU, and the UP/-

FACENT serves as the link with the IAU and pays the dues contribution. Astronomy is not firmly established at UP yet.

Arising from this visit, several recommendations are made to the IAU for developing astronomical teaching and research in Panamá.

- Visits of external scientists through some of the IAU programs, especially NASE (Comm. 46 program group Network for Astronomy School Educators) are essential as a first step.
- Next, it is necessary to investigate means of helping to develop the field of astronomy at the Physics School of the University of Panama and draw students of Physics into astronomy.

Education: background information

School attendance in Panama is compulsory for children of both sexes from ages six through fifteen years, or until the completion of primary school. Following the six-year primary cycle, students can choose between an academic and a vocational secondary school programme. Admission to the university normally requires the *bachillerato*, awarded on completion of the upper cycle of the academic course of studies at the secondary level.

Universidad Nacional de Panamá (UP)

There are other several national universities in Panamá, but by far the largest being the Universidad de Panamá (UP) followed by the Universidad Tecnológica. UP has today about 40,000 students and 6000 teachers, with regional centers spread over the country in Azuero Bocas del Toro, Coclé, Colón, Los Santos, Panamá Oeste, San Miguelito and Veraguas.

The main university is located on a large and spacious campus 10.5 km from the capital city of Panamá. The university has 18 faculties and operates on a two-semester academic year: from March to July, and from August to November.

Programme of the visit

Sunday, 15th August

Arrival; greeting by Vicente Forrero, who teaches a course on Space Sciences at UP. He received his Masters in Astronomy from the UNAM in México and is the only UP staff member with a higher degree in the field.

Monday, 16th August

a.m.: Visit to the School of Physics on UP campus, accompanied by FACENT Prof. em. Etelevina Medina. Meeting with Dr. Carlos Caballero, Director of the School of Physics, and Dr. Bolaños Director of the Department of Physics. In-depth discussion of the work of the IAU.

p.m.: Talk before approx. 40 FACENT students on “The Evolution of the Cosmos.”

Tuesday, 17th August

p.m.: Talk entitled “What have we learnt from space exploration of our solar system?” before high school students, including a group of students from the interior of Panama, at the UP Auditorio José Dolores Moscote. The high school URRACA from Veraguas (west of Panama City) has a small telescope under installation at present time.

Wednesday, 18th August

a.m.: Visit to the Canal and to the historic Panama City, accompanied by Prof. em. Etelvina Medina.

p.m.: Further touring of historic city, accompanied by Professor Vicente Forrero and Professor Eduardo Chung, who studied physics at the Atomic Energy Commission in Argentina. Dinner offered by the Asociación Panameña de Aficionados a la Astronomía (Panamanian Association of Astronomy Amateurs) – APAA.

Tuesday, 19th August

p.m.: Appointment with the Vice-Minister of Education, Mirna Vallejos de Crespo. Hugo Levato gave an extensive presentation of the IAU Programmes for education in astronomy, and the Ministry expressed interest in the NASE activities. Talk before the students of Professorship in Sciences: Physics, Chemistry, Mathematics. Meeting with Dr. Gustavo García de Paredes, Dean of the University de Panamá. Talk before approx. 30 members of APAA.

Friday, 20th August

a.m.: Interview for a Panama City radio programme, followed by a meeting at the Secretary of Science and Technology (SENACYT) of the Government of Panamá. Hugo Levato was accompanied by Prof. Bolaños, Prof. Forrero and Prof. Chung. SENACYT Project Coordinator Ing. Francisco García C. expressed keen interest in boosting astronomy research in Panama. A plan was outlined to request SENACYT support for the installation of a small observatory at the University. SENACYT also agreed to pay the IAU dues for Panama membership.

p.m.: Interview for a TV channel.

Evaluation & Recommendations

Astronomy in Panamá is still in a relatively undeveloped state, and Astronomy is at present an optional subject in Panamanian high schools, but the International Year of Astronomy has obviously made a huge impact upon astronomy education and research at UP. To make further progress, astronomy in Panamá would benefit from IAU support.

Now would be a good time to plan a school for high-school astronomy teachers under Commission 46’s program group, NASE. The Vice-Ministry of education considered that a week-long NASE workshop in Panamá could attract about

forty participants. The possibility of a NASE course was discussed on several occasions with various authorities, who all agreed that a NASE school would be the best way of promoting astronomy in Panamá in the near future. It is hoped that such a school can be organised for 2012.

Visits of scientists for relatively long terms (some months) to lecture on astrophysics subjects at the UP and to encourage students of Physics to pursue astronomy-oriented subjects should also be considered.

Panama plans to hire 8 to 10 astronomers in the next decade. During this period and after revising the success of this plan, a TAD should be considered.

Contacts in Panama

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- Etelvina Medina, Professor at the FACENT, now retired
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- Dr. Alberto Caballero, Director of the School of Physics, FACENT, UP
<alcaba99@yahoo.com>
- Dr. Bolaños, Director of the Department of Physics at the FCEN
- Mirna Vallejos de Crespo, Vice Ministry of Education
<m Crespo@meduca.gob.pa>
- Francisco García, Project Coordinator at SENACYT
<fgarcia@senacyt.gob.pa>
- Cap. Luis Velazquez President of the Asociación Panameña de Aficionados a la Astronomía – APAA

Costa Rica, August 2010

Hugo Levato's visit to Costa Rica was sponsored by the IAU and hosted by the The Universidad de Costa Rica (UCR) School of Physics. Costa Rica is an interim member of the IAU, and the UCR serves as the link with the IAU and pays the dues contribution. The School of Physics has a section on Astronomy and Astrophysics with scientists working on Solar Physics and theoretical and computational astronomy.

Arising from this visit, several recommendations are made to the IAU for developing astronomical teaching and research in Costa Rica.

- Scientists currently working at the Universidad de Costa Rica should be nominated to become individual members of the IAU.
- Follow-up activities by other C46 Program Groups in Costa Rica should be encouraged:

- There are good opportunities for the TAD programme group to increase and strengthen some of the research areas in astronomy at the School of Physics.
- It would also be useful to hold a NASE programme astronomy training school for astronomy high school teachers within the next year or two.
- An ISYA could be considered in the next three years.

Education: background information

Costa Ricans has a quota of 96% literacy in citizens 15 years or older. Primary schools (six years) and secondary schools (five years) are found in virtually every community, and are free of charge. The final examination is the *Bachillerato*, which is required to graduate from high school and gain admission to the Universities. In addition, most universities impose an entrance examination.

Costa Rica has four state-funded universities. The University of Costa Rica, the largest and oldest university, enrolls some 35,000 students, mostly on scholarships, even though full tuition rarely surpasses \$200 a semester. The National University in Heredia, offers a variety of liberal arts, sciences, and professional studies to 13,000 students. The Technological Institute in Cartago specializes in science and technology, and trains people for agriculture, industry and mining. The State Correspondence University, founded in 1978, is modelled after the United Kingdom's Open University, with 32 regional centres offering 15 degree courses in health, education, business administration, and the liberal arts.

Apart from these public universities, there are smaller private ones whose number has increased dramatically (from 11 in 1992 to 41 in 1998), due to the difficulty of admission to state-funded, more prestigious universities. These institutions offer a faster track, since most of them do not require the liberal arts courses that are obligatory in public universities. Most are located in or near San Jose, where most of the wealth and population lie.

The country has achieved net rates of 92.6 percent in 2001 for primary education attendance; however grade repetition and drop-outs remain serious problems. Three out of every 10 children leave school before completing basic general education, and eight of them do not complete secondary studies within the allotted time frame.

The Universidad de Costa Rica

The University of Costa Rica UCR is a public university. Its main campus, Ciudad Universitaria Rodrigo Facio, is located in San Pedro, in the province of San José. It is the oldest, largest, and most prestigious institution of higher learning in Costa Rica. Approximately 50,000 students attend UCR throughout the year 2010. The government structure of the university is composed by a Legislative Body (*Asamblea General*), Board of Directors (*Consejo Universitario*), Presidency (*Rectoría*), and the Offices (*Vicerrectorías*) of Extension (*Acción Social*),

Administrative Affairs (*Administración*), Academic Affairs (*Docencia*), Research (*Investigación*) and Student Affairs (*Vida Estudiantil*).

The UCR is divided into six major academic areas: Agricultural Sciences, Arts & Letters, Basic Sciences, Engineering, Health and Social Sciences. These areas are divided into Colleges, Schools and Departments, Research Centers and Institutes. The Graduate Studies System offers master and doctorate degrees in a variety of academic fields. Each particular science has a different school.

The School of Physics has a section devoted to Astronomy and Astrophysics. The University offers Masters and PhD study programmes in Astrophysics: gravitational lenses, solar physics, relativity, solar radioastronomy and astrophysical plasmas. The University manages 26 research institutes. The CINESPA (Centro de Investigaciones Espaciales – Space Research Center) operates inside the School of Physics.

The CINESPA currently has 7 PhD and one Master in Science on its staff. The research subjects currently center on quantum chaos, cosmology, plasma physics, radio astronomy and general relativity. The staff are eager to expand the activities to physics of the stars, stellar models etc. They have a new cluster of computers for parallel processing.

There are currently 4 students taking the courses for a Masters degree in Astrophysics and one student, Heidy Gutiérrez, enrolled in the PhD programme in Astrophysics.

Programme of the visit

Sunday, 22nd August

Arrival; greeting by Lela Taliashvili, a former physicist from Georgia, who became to Costa Rica with a status of refugee. She is professor at the UCR and coordinator of the Planetarium.

Monday, 23rd August

a.m.: Meeting with the Dean of Science, Dr. Virginia Solis, who has a PhD. in Biology, and the Director of the School of Physics, Dr. Rodrigo Carboni, who has a PhD from the Max Planck Institute in Germany. Hugo Levato presented extracts of John Hearnshaw's power point, "Why all countries should support astronomy and how the IAU can help," which he had translated into Spanish.

p.m.: Meeting with the Director of CINESPA (Centro de Investigaciones Espaciales), Dr. Francisco Frutos, who has a PhD from the Max Planck Institute in Germany.

During all these meetings slides of the IAU programmes for developing astronomy all over the world were presented.

Tuesday, 24th August

a.m.: Visit to the Planetarium of the UCR, accompanied by Lela Taliashvili. The Planetarium was donated by The Japanese Agency for International Collaboration. Meeting with Dr. Jorge Paez Portuguez, who was the first astrophysicist at the School of Physics and is the advisor of several undergraduate students in their master studies.

p.m.: Talk before the members of the Amateurs Astronomers in Costa Rica ACODEA.

Wednesday, 25th August

a.m.: Talk to scientific personnel working in Physics and Astronomy

p.m.: Talk to the general public.

Thursday, 26th August

a.m.: Talk to high school students.

p.m.: Meeting with Minister of Science and Technology, Clotilde Fonseca. Discussion of the work of the IAU; exploration of the possibility of a NASE event in Costa Rica. Development of a strategy to be presented at the Ministry. Dr. Francisco Frutos will coordinate with the Ministry towards implementing IAU programmes.

Friday, 27th August

a.m.: Visit to the Parque Nacional del Volcán Irazú, accompanied by: Francisco Frutos, Carolina Salas (a Masters student in Astrophysics, working on Solar Radioastronomy and Space Weather), and Marco Barrantes (a staff member of CINESPA).

Evaluation & Recommendations

Astronomy in Costa Rica is in relatively well-developed. The country is in an outstanding position to foster astronomy at UCR and CINESPA. Assistance is required to expand the areas of interest and to create a stronger PhD programme.

A TAD activity would help towards establishing a strong programme on astrophysics at the UCR. Visiting scientists are essential, as is helping students to travel. A NASE could also benefit astronomy in Costa Rica to foster astronomy programmes at school level. The possibility of a NASE course was discussed on several occasions to the astronomers at UCR. In a few years, it may be of interest to hold an ISYA serving all Central America countries in Costa Rica.

Contacts in Costa Rica

- Dr. Francisco Frutos-Alfaro, Director of CINESPA (Centro de Investigaciones Espaciales – Center for Space Research)
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- Dr. Lela Taliashvili, Ph.D, research field: Sun and Global Change
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- Clotilde Fonseca, Minister of Science and Technology
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8. REPRESENTATIVES TO OTHER ORGANISATIONS

8.1 UN-COPUOS

Karel A van der Hucht, the IAU representative to UN-COPUOS, will participate at the 48th Session of the UN-COPUOS Scientific and Technical Subcommittee, 7-18 February 2011, on behalf of the IAU.

8.2 The International Space Weather Initiative (ISWI)

Report for the LAU by David Webb, LAU Representative for the ISWI

The International Heliophysical Year (IHY) 2007 was an international programme of scientific collaboration involving thousands of scientists from more than 70 countries, which ended in February 2009. Along with programmes devoted to research, outreach and the commemoration of International Geophysical Year 1957, activities of the IHY included the deployment of new instrument arrays, especially in developing countries, and an extensive education and public outreach component.

It was recognized early in the planning of IHY that the understanding of the global ionosphere and its linkage to the near-Earth space environment was limi-

ted by the lack of observations in key geographical areas. To address this need, a series of workshops was held to facilitate collaboration between research scientists in scientifically interesting geographic locations and researchers in countries with expertise in building scientific instrumentation. Science teams were put together, each led by a scientist who provided the instruments or fabrication plans for instruments in the array. Support for local scientists, facilities and data acquisition was provided by the host nation. As a result of the IHY programme, scientists from many countries now participate in instrument operation, data collection and analysis, and publication of scientific results, working at the forefront of scientific research.

The instrument deployment program was one of the major successes of the IHY. Arrays of small instruments such as magnetometers to measure the Earth's magnetic field, radio antennas to observe solar coronal mass ejections, GPS receivers, very low frequency radio receivers, all-sky cameras to observe the ionosphere, and muon detectors to observe energetic particles were installed around the world. These arrays continue to provide global measurements of heliospheric phenomena. An interesting side benefit of the instrument program was the seeding of new heliophysics research groups in universities, and the strengthening of existing research groups where new instruments were installed.

Building on this concept, and to continue coordinated heliophysics research, in February 2009, the International Space Weather Initiative (ISWI) was proposed as a new agenda item for the Scientific and Technical Subcommittee of the United Nations' Committee on the Peaceful Uses of Outer Space. The agenda item was endorsed by the Committee in June 2009 and by the UN General Assembly in December 2009, and involves a 3-year work plan through 2012. Through the ISWI, coordinated international research is continuing on universal processes in the solar system that affect the interplanetary and terrestrial environments, and there will be continued coordination on the deployment and operation of new and existing instrument arrays. The main focus of ISWI is aimed at understanding and predicting the impacts of space weather on the Earth and the near-Earth environment. Participation in the ISWI is open to scientists from all countries as either instrument hosts or instrument providers.

The ISWI Secretariat is directed by Joseph Davila and Nat Gopalswamy of the U.S. and Hans Haubold of the UN Office for Outer Space Affairs in Vienna. It is governed by a Steering Committee of 16 members, which meets once a year to assess progress and provide prioritization for the upcoming year. There are currently National Coordinators from 81 countries that help coordinate ISWI activities in each country. Details and information archives for ISWI are at: <http://www.iswi-secretariat.org/>. Within the IAU, coordination of ISWI activities is within the Solar and Heliosphere Division (II). ISWI activities are coordinated in the Division II working group on International Collaboration on

Space Weather chaired by David Webb. He also was the IAU representative to the IHY and is currently the representative for the ISWI.

The objectives of the ISWI are to help to develop the scientific insight necessary to understand the physical relationships inherent in space weather, to reconstruct and forecast near-Earth space weather and to communicate this knowledge to scientists and to the general public. This will be accomplished by (a) continuing to deploy new instrumentation, (b) developing data analysis processes, (c) developing predictive models using ISWI data from the instrument arrays to improve scientific knowledge and to enable future space weather prediction services and (d) continuing to promote knowledge of heliophysics through education and public outreach.

ISWI currently has 14 instrument arrays in deployment or under development. These are located in many countries and coordinated by scientists from the United States, France, Africa, Switzerland, Japan and Armenia. The first international ISWI workshop will be held in Helwan, Egypt, November 6-10, 2010 and is for the Western Asia region. The 2009 UN/ESA/NASA/JAXA Workshop on Basic Space Science and the International Heliophysical Year 2007, held in the Republic of Korea in 2009, started implementing ISWI as put forth by UN-COPUOS.

During the IHY, space science schools in Brazil, China, India, Nigeria and the United States provided related training to hundreds of graduate students and new researchers. The ISWI is continuing to provide support for space science schools and to promote space science and the inclusion of space science curricula in universities and graduate schools. The ISWI also supports public outreach projects. It is essential to communicate the excitement and the relevance of heliophysical research to scientists from other disciplines, and to the public at large. Through the Initiative, public outreach materials unique to the Initiative will continue to be developed, and their distribution will be coordinated through individual contacts and outreach workshops.

8.3 ISI Astrostatistics Network

The International Statistical Institute (ISI) Astrostatistics Committee and Network was formally created by action of the ISI Council in December, 2009. The ISI is to statistics as the IAU is to astronomy/astrophysics. The Network is the first global association of astrostatisticians, currently having over one hundred members from 26 nations and all populated continents. Nearly all of the major figures in the discipline are members. The Network is on track to become the International Association of Astrostatistics by the end of 2011, or perhaps in early 2012.

The Network is an association of researchers whose members all share an interest in the statistical analysis of astronomical data. Currently some two-thirds of the members are astronomers, one-third are statisticians, and a few particle physicists and computer designers. The primary goal of the Network is to foster collaboration between astronomers and statisticians with the aim of developing new and enhanced statistical tools appropriate for a better understanding of current and future astronomical/cosmological data. Other goals of the network are:

- the promotion of continuing educational workshops, courses, and seminars in astrostatistics;
- supporting the ongoing efforts of present centers, collaborations, and endeavors related to astrostatistics;
- the encouragement of joint astrostatistics programs sponsored by departments of statistics and astronomy/astrophysics at major universities throughout the world;
- disseminating information related to astrostatistical activities to the membership;
- organise invited, special topics, and contributed paper sessions at the foremost statistical and astronomical conventions;
- establish working relationships with statistical and astronomical associations;
- serving as the primary interdisciplinary association for the discipline of astrostatistics, and as the professional society of researchers identifying themselves as astrostatisticians.

Wiley and BePress have both offered to publish a *Journal of Astrostatistics* when the executive board believes that it can be sustained. There is currently no single journal devoted to astrostatistical research. As membership grows, however, and new astrostatistically related conferences are conducted, such a journal may become feasible.

The Network was awarded an invited papers session and two invited special topics sessions for the upcoming ISI World Statistics Congress, to be held in Dublin this coming August 2011. The Network also has the strong support of the American Statistical Association and Royal Statistical Society, whose president, David Hand, is a Network vice-chair. Other members have been instrumental in proposing an IAU Astrostatistics Working Group, which can serve as an intermediary between the two organizations.

As the Network evolves into an international association, we will be continuing to define the scope of astrostatistics as both a profession and as a discipline of interest. The profession is in its infancy, but as graduates emerge from interdisciplinary astrostatistics degree programs, it will grow into a viable entity. As a discipline and interest, advances in astrostatistics will entail the collaborative development of new statistical techniques for the evaluation of astronomical data.

IAU members who have an interest in statistics are invited to join the Network. They can choose simply to use their membership to keep apprised of advances in the area, or they may wish to contribute actively to the development of the discipline, and profession. There are no membership dues. The web site is currently accessible through ISI at <http://isi-web.org/com/ast>. A new interactive site is under development. For queries regarding membership or the network in general, please contact Joseph Hilbe at hilbe@asu.edu or j.m.hilbe@gmail.com.

Joseph M. Hilbe
Chair, ISI Astrostatistics Committee and Network

8.4 International Council for Science - ICSU

Report by Ian Corbett, IAU representative to ICSU

ICSU has issued a Draft Report from the *ad Hoc* Review Panel on Science Education, and the IAU has responded by welcoming much of the report but suggesting that some prominence should be given to the successes of the IYA and the plans of the IAU as set out in the Strategic Plan “Astronomy for the Developing World,” the establishment of the OAD and the appointment of its Director. The Report will be revised in the light of comments and made public early in 2011.

In line with its strategic priorities, ICSU has produced a draft concept paper for the “Earth System Research for Global Sustainability: A New 10-Year Research Initiative.” The goals of the Initiative are to:

- deliver at global and regional scales the knowledge that societies need to respond effectively to global change while meeting economic and social goals;
- coordinate and focus international scientific research to address the Grand Challenges and Belmont Challenge in sustainability;
- engage a new generation of researchers in the social, economic, natural, health, and engineering sciences in global sustainability research.

Although of only limited direct interest to the IAU, this is a matter of great importance to all the ICSU unions and of indirect significance to the IAU. We will be watching developments carefully.

The draft ICSU Science Plan “Health and Wellbeing in the changing Urban Environment: A Systems Analysis Approach” is available for comments.

In preparation for the ICSU General Assembly, to be held in Rome, 24 Sept. – 1 Oct., 2011, ICSU has called for nominations to positions on the Executive Board. Further details are available from Ian Corbett at icorbett@eso.org.

The ICSU Newsletter, December 2010, vol 8, n°3, is now available at http://www.icsu.org/3_mediacentre/INSIGHT_12_2010.html.

9. IAU MEMBERSHIP

9.1 Deceased Members

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

Ralph B. **BALDWIN** (1912 - 2010), United States, 13 October 2010
 Adriaan **BLAAUW** (1914 - 2010), Netherlands, 1 December 2010
 Fernando **COLOMB** (1939 - 2008), Argentina, 5 May 2008
 J.M. Anthony **DANBY** (1929 - 2009), United States, 8 December 2009
 Audouin **DOLLFUS** (1924 - 2010), France, 1 October 2010
 Daniel **ENARD** (1939 - 2008), France, 2 August 2008
 Aleksej M. **FRIDMAN** (1941 - 2010), Russian Federation, 29 October 2010
 Georgij B. **GELFREIKH** (1933 - 2010), Russian Federation, 4 June 2010
 Irina N. **GLUSHNEVA** (1934 - 2010), Russian Federation, 5 December 2010
 Anne-Marie **GONTIER** (1966 - 2010), France, 24 September 2010
 Carlos A. **HERNANDEZ** (1920 - 2007), Argentina, 6 September 2007
 Jan **HERS** (1915 - 2010), South Africa, 24 August 2010
 John **HUCHRA** (1948 - 2010), United States, 8 October 2010
 Grigorij M. **IDLIS** (1927 - 2010), Russian Federation, 29 March 2010
 Yuriy P. **ILYASOV** (1933 - 2010), Russian Federation, 8 October 2010
 Henning E. **JØRGENSEN** (1938 - 2010), Denmark, 23 November 2010
 Robert **KOCH** (1929 - 2010), United States, 11 October 2010
 Mukul R. **KUNDU** (1930 - 2010), United States, 16 June 2010
 Bertil Anders **LINDBLAD** (1921 - 2010), Sweden, 9 October 2010
 Rodolfo J. **MARABINI** (1938-), Argentina
 Brian G. **MARSDEN** (1937 - 2010), England, 18 November 2010
 Masaki **MORIMOTO** (1932 - 2010), Japan, 16 November 2010
 Ernst **RAIMOND** (1932 - 2010), Netherlands, 3 September 2010
 Alla **SANDAGE** (1927 - 2010), United States, 13 November 2010
 Kevin V. **SHERIDAN** (1918 - 2010), Australia, 22 September 2010
 Vladimir **SHKODROV** (1930 - 2010), Bulgaria, 31 August 2010
 Titus A. Th. **SPOELSTRA** (1945 - 2010), Netherlands, 30 April 2010
 George **STANILA** (1928 - 2010), Romania, 2010
 Leena **TÄHTINEN** (1955 - 2009), Finland, 15 November 2009
 Jaap **TINBERGEN** (1934 - 2010), Netherlands, 20 June 2010
 Ioan **TODORAN** (1927 - 2010), Romania, 29 August 2010
 P. C. **VAIDYA** (1918 - 2010), India, 12 March 2010

9.2. Obituaries

Adriaan Blaauw, 12 April, 1914 – 1 December, 2010

Born in Amsterdam, Adriaan Blaauw completed his PhD (cum laude) in Groningen in 1946 with a study of the Scorpio Centaurus Cluster. After teaching in Leiden, he became an associate professor at Chicago's Yerkes Observatory in 1953. Returning to the Netherlands in 1957 as director of the Kapteyn Institute in Groningen, he was closely involved in the foundation of ESO, the European Southern Observatory. In 1970, he left Groningen to become the second Director-General of ESO and oversaw the completion of the 3.6m telescope on La Silla. When his term at ESO ended in 1974, he became a full professor in Leiden – a position he held until his retirement in 1981.

Adriaan Blaauw served as President of the IAU from 1976 to 1979 – a term which notably saw China rejoin the Union. Reminiscing about the negotiation process, Blaauw remarked upon the “fortunate circumstance” that in the late 1940's, he and Chang Yu-Che, leader of the Chinese delegation had simultaneously spent several months at Yerkes Observatory. “It was, therefore, in a way, also a meeting of old acquaintances.”

After his retirement, Adriaan Blaauw devoted much of his time to his great passion: history. His book *History of the IAU – The Birth and First Half-Century of the International Astronomical Union*, published in 1994, remains the definitive reference work on this subject.

John Peter Huchra, 23 December, 1948 – 8 October, 2010

John Huchra, Professor of Cosmology and the senior adviser to the provost for research policy at Harvard, passed away on 8 October 2010. The *Harvard Gazette* writes: “Among his many accomplishments, Huchra was perhaps best known for his leadership, with his collaborator Margaret Geller, of the CfA Redshift Survey – a pioneering effort to map the large-scale structure of the universe. The survey uncovered a ‘Great Wall’ of galaxies extending across 500 million light-years of space. This survey and others showed that we live in a ‘soap bubble’ universe with galaxies clustering as though on the surfaces of giant bubbles separated by huge voids. Huchra made a number of other very important contributions to astronomy, including measurements of the Hubble constant and the discovery of Huchra’s Lens, one of the most dramatic early examples of gravitational lensing.”

In the course of his career, John Huchra worked in many areas of astronomy, but he especially loved teaching and observing “and just about anything that gets me onto a mountain top.” IAU President Robert Williams knew John since

he first started observing on Mount Hopkins in Arizona in the 1970's. He recalls: "John was one of the most positive persons I ever met in a professional context, with indomitable enthusiasm, yet with clear understanding and very perceptive. He had a unique mixture of qualities. His acceptance of all individuals, regardless of rank, and his willingness to listen to them was one of his trademarks. His knowledge and understanding of what was going in science, technical development, and science politics was legendary. It still escapes me how he kept abreast of so many different spheres of activity."

John Huchra was President of the American Astronomical Society from 2008 to 2010 and Chair of the U.S. IAU National Committee for Astronomy in 2009. He was a member of IAU Commissions 28, 30 and 47.

Brian Geoffrey Marsden, 5 August, 1937 – 18 November, 2010

The life work of Brian Marsden was closely tied to the International Astronomical Union for over half a century. In 1965, after studying at Oxford and Yale, he joined the staff of the Smithsonian Astrophysical Observatory – the home of the office of the IAU Central Bureau for Astronomical Telegrams, an organisation established by the International Astronomical Union soon after its own foundation in 1920. The CBAT is responsible for disseminating information worldwide about the discoveries of comets, novae, supernovae and other objects of generally transient astronomical interest. Brian succeeded Owen Gingerich as the CBAT director in 1968 and held this position until Daniel Green became director in 2000.

In 1978, the IAU asked Brian also to assume the direction of the MPC, the official organisation for attending to discoveries of asteroids. In this capacity, Brian was instrumental in raising awareness of the possible implications of Near Earth Objects. An important development was the creation, in 1996, of the Internet "Near-Earth Object Confirmation Page," which draws attention to candidate earth-approaching objects in need of follow-up observations as soon as they have been reported to the MPC. Brian derived an ingenious method for estimating the uncertainty of the prediction by automatically computing a series of orbits that represent just the first and the last observations. Similar uncertainty computations are now routinely performed for all near-earth objects as they are announced.

One series of astronomical discoveries that greatly interested Brian were "trans-neptunian objects." He was among the first to suggest that four such objects, discovered in 1992 and 1993, were exactly like Pluto in the sense that they all orbit the sun twice while Neptune orbits it thrice. This recognition led him to propose a redefinition of Pluto. At its triennial General Assembly in 2006 in Prague, the IAU voted to designate Pluto, Eris (discovered in 2005), Makemake

and Haumea, as well as the largest asteroid, Ceres, as members of a new class of “dwarf planets.”

It was also at the IAU General Assembly in Prague that Brian stepped down as MPC director, and he was quite entertained by the thought that both he and Pluto had been retired on the same day. While he remained working at the MPC (and also the CBAT) in an emeritus capacity, the directorship was passed to Dr. Timothy Spahr, whom he had brought to the MPC in 2000.

Brian served as an associate director of the Harvard-Smithsonian Center for Astrophysics for nearly sixteen years, beginning in 1987 (the longest tenure for any of the Center’s associate directors). He was chair of the Division of Dynamical Astronomy of the American Astronomical Society during 1976-1978. He served terms as president of IAU Commission 6 (Astronomical Telegrams) and Commission 20 (Positions & Motions of Minor Planets, Comets & Satellites) commissions that oversaw the operation of the Minor Planet Center (1976-1979) and the Central Bureau for Astronomical Telegrams (2000-2003). He also served as Secretary of the IAU Division III Working Group on Small Bodies Nomenclature and remained active in the Working Group on Planetary System Nomenclature.

Drawn from Gareth V. Williams, M.P.E.C. 2010-W10, issued 18 Nov. 2010.

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INTERNATIONAL ASTRONOMICAL UNION UNION ASTRONOMIQUE INTERNATIONALE

The International Astronomical Union (IAU) was founded in 1919 to promote and safeguard the science of astronomy in all its aspects through international cooperation. Operating through its scientific bodies - 12 Divisions, 40 Commissions and some 75 Working and Programme Groups, the IAU covers the whole spectrum of astronomy. The IAU currently has over 10,000 individual members distributed over 91 countries, of which 68 are National Members. The IAU is member of the International Council for Science (ICSU).

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

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

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

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

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Cover picture:

Cerro Tololo is the site of the first major, international observatory in Chile. The wide-field, 4-m Blanco telescope was the largest optical telescope in the southern hemisphere from 1975 to 1997. The clear, dark skies were crucial to its selection by the two groups who used it to discover the acceleration of the Universe. Attracted by the pristine night skies, the world's astronomers have made northern Chile the primary centre for major astronomy research observatories in the southern hemisphere.

Excerpted from a text by Malcolm Smith, "Case Study 16.3: AURA Observatory, Chile," in: *Heritage Sites of Astronomy and Archaeoastronomy in the Context of the UNESCO World Heritage Convention – A Thematic Study*. <http://www.historyofastronomy.org/>

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