COMMISSION 46
ASTRONOMY EDUCATION AND DEVELOPMENT
Education et Développement de l'Astronomie

Newsletter 82 – December 2015

Commission 46 seeks to further the development and improvement of astronomical education at all levels throughout the world.

This is the final Newsletter of Commission 46, so no further contributions are solicited.

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EDITORIAL

Welcome to IAU Commission 46 Newsletter 82, the last to be published under the old commission structure of the IAU, which was superseded by the new Division C following action at the IAU General Assembly in Honolulu, August 2015. This newsletter contains some final reports from various national liaisons, and a few notices of interest to the educational community. We are happy, as usual, to have two book reviews by Naomi Pasachoff.

As always, comments and contributions are both needed and welcome. Thanks to everyone who has made a contribution to this edition of the Newsletter. Please note the text in this Editorial highlighted in RED.

Since this is our last issue under the previous division structure, we are not including further instructions for submissions. A new newsletter, under the new Division C structure, should make its appearance in the future, and we will solicit submissions once that newsletter is authorized and organized. As editor of the C46 newsletter, I thank you for your support in the past and for your efforts in furthering astronomy education.

Larry Marschall
For further information, see my personal web page:
http://public.gettysburg.edu/~marschal/clea/lam.html
(for contact details see the list of Program Group Chairs and Vice Chairs at the end of this newsletter)

FINAL REPORTS FROM NATIONAL LIASONS

AUSTRIA REPORT

---Thomas Lebzelter

Work has continued in the past three years on a similar level as in the years before. Austrian professional astronomers as well as several amateur astronomer organizations continue their education programs for schools.

However, a few new initiatives have appeared: The Austrian Science Fund FWF, the main funding agency for basic science in Austria, released a program supporting visits of scientists in school with a strong contribution from astronomers. The Austrian Society for Astronomy and Astrophysics formed a new working group named "Astronomy for Education". The goal of this group is to provide teaching material and teacher training, but also to act as a platform for networking.

Planetaria and public observatories continued their school programs. Austrian astronomers have also been involved in various European initiatives to provide online educational content. The interest in astronomy is still on the rise among the young people in Austria. Recently, the University of Vienna reported a new record high for the number of students starting to study astronomy.

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BRAZIL REPORT

--- Jane Gregorio-Hetem

Overview

Adopting the same procedure of our previous reports, the educational activities developed in Brazil are summarized here based on the abstracts of talks and poster contributions presented during the meetings of the Brazilian Astronomical Society (*Sociedade Astronômica Brasileira*, SAB). The references to the abstracts are given as a function of the year of the SAB's meeting and the page number in the corresponding Bulletins, which are related to the 37th (2012), 38th (2014), and 39th (2015) annual meetings and can be found in http://www.sab-astro.org.br by selecting "*Eventos*" then "*Reuniões Anuais*".

In 2013, the 14th Latin American Regional IAU Meeting (LARIM) was hosted in Florianópolis (SC, Brazil), where the SAB Annual Assembly also took place. In this case, the description of our educational activities is based on the LARIM Proceedings published by *Revista Mexicana de Astronomia y Astrofísica* (v. 44, *Serie de Conferencias*).

College and University

The number of Masters degree (MsC) projects devoted to astronomy and/or physics education has largely increased due to the recent creation of new courses. For instance, at USP (*Universidade de São Paulo*) the MPEA (*Mestrado Profissional de Ensino de Astronomia*) has diverse education products developed by professional teachers. Costa & Cypriano (2015, p.6) made available a wiki page providing open resources on astronomy teaching, which were tested by teachers from Ituiutaba (MG). Resende & Picazzio (2015, p.5) performed a statistical analysis of published articles related to the use of Planetarium exhibits for basic education. Rodrigues & Teixeira (2015, p.8) propose a simple language document to present the historical development on the concept of space and the ability in determining dimensions through astronomical observations.

The projects of UNICSUL (Universidade Cruzeiro do Sul), in São Paulo (SP) were presented by Macedo and Voelzke (2013, p. 214) about interactive materials for teaching of astronomy, while Araújo & Voelzke (2014, p. 12) analyze a hundred Facebook posts related to Comet Ison, using these data to infer the efficiency of social networks in teaching astronomy. In 2014 (p. 14) these authors reported a study of the astronomical contents in the curricula applied in graduate courses of Physics, Mathematics and Biology. Bisch (2014, p. 14) discusses promising efforts for the improvement of physics education, based on MsC developed by professional teachers in UFES (*Universidade Federal do Espirito Santo*)

Cabral et al. (2013, p. 212) described a PhD project related to a web framework for a community science project with VVV (Vista Variables in the Via Lactea Survey). The benefits of having graduate students in a course in observational astrophysics visit important observatories in Chile (ESO, SOAR, Gemini, CTIO), especially benefits to the development of their interest and ability to do research, were reported by Ferreira et al. (2012, p.3).

The trans-disciplinary context of astronomy was discussed by Friaça & Janot-Pacheco (2013, p. 127), based on the results of several years offering the Astrobiology undergraduate discipline at USP.

Fernandes & Barbosa (2014, p. 14) reported the results of a project developed at UNIVAP (*Universidade do Vale do Paraíba*) in São José dos Campos (SP) under the PIBID/Capes Program (*Programa Institucional de Iniciação à Docência*), specially designed for undergraduate teachers to improve the teaching of physics.

An engineering student from UFABC (*Universidade Federal do ABC*) in Santo André (SP) developed a data acquisition system for cheap classroom spectroscopes in order to implement a method for calibrating data acquired by using a CD for a grating (Almeida & Hetem 2013, p. 211).

Rojas et al. (2013, p. 215) discuss the Brazilian participation in the International Astronomical Search Collaboration that aims to enroll high school and college students in monitoring NEOs (Near Earth Objects).

Secondary and Elementary schools

The results of the participation of UFRGS (*Universidade Federal do Rio Grande do Sul*) on Teacher Training Programs like OEI, GTTP and "Adventures of the Universe" were described by Pavani, Saraiva and Dottori (2013, p. 215). OEI (*Observatório Educativo Itinerante*) is also dedicated to outreach among secondary and fundamental schools (Pavani et al. 2014, p. 12), while the goal of the project "Adventures of the Universe" is teaching astronomy for undergraduate physics teachers (Pavani et al. 2012, p. 1).

Langhi and Villaça (2013, p. 213) report recent results on teacher training programs related to the project "Erastótenes no Brasil".

In UFG (*Universidade Federal de Goiás*) Sobreira (2015, p. 8) developed animations for planetarium sessions showing the simulation of changes on the inclination of Earth rotation axis. The goal of these animations is to demonstrate, for graduate and undergraduate students in geography courses, the effects of axis inclination on glaciations.

The Astronomy group at UFS (*Universidade Federal de Sergipe*) developed several experiments for teaching basic concepts of astronomy that were applied in two public schools in Aracajú (SE), as reported by Mittaraquis et al. (2014, p. 15).

Bretones (2014, p.4) noted the importance of educational games in stimulating the learning of astronomy, considering the lack of attractive educational material. Fagundes et al. (2013, p. 212) presented a learning evaluation based on Moon's synchronous rotation. The apparent movements of the Sun and shadows of objects, according the conceptions of elementary school teachers, were analyzed by Machado (2013, p. 214).

Observatories and Planetaria

Since 2012, the Johannes Kepler Planetarium has been developing educational activities in Santo André that have been presented by Calil et al. (2012, p. 2), Faria et al. (2013, p. 213; 2014, p. 13) and Faria & Calil (2015, p. 6).

The use of mobile planetarium in the region of Vale do Taquari (RS) was reported by Gonzatti et al. (2015, p.7).

During an exhibit celebrating the 40 years of the Observatory "Abrahão de Moraes", the activities of the USP Astrobiology Lab were presented to the visitors (Rodrigues et al. 2012, p.3).

Other Public events

Spinelli (2013, p.128) described the GalilieoMobile program that promotes cultural interaction around the world since 2009, acting in areas with scarce or non-existent outreach projects (http://galileo-mobile.org.br).

Aiming to investigate the main causes for the relatively low number of articles on outreach and teaching, Bretones, Jafelice and Horvath (2013, p. 211) analyzed 59 papers published in 15 issues of RELEA (Latin American Journal of Astronomy Education). They pointed to the need for a greater dissemination of the journal. Bretones (2015, p.5) also discusses the role of

press releases related to eclipses and compare the resulting publications from journalists with the outreach events.

Zucolotto (2015, p. 9) described the achievements of the *Setor de Meteorítica do Museu Nacional* that has enlarged new meteorites discoveries in Brazil.

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MALTA REPORT

---Alexei Pace

Astronomy activities in Malta have been going on over the past year with the local involvement of teachers in schools. A course in basic astronomy has been organised at Stella Maris College which attracted a good number of participants. Moreover I have been coordinating and lecturing another course in astronomy at the recently-formed Centre for the Liberal Arts and Sciences at the University of Malta. A number of observing sessions were organised as well. The most recent event was the 'Science in the City' festival where hundreds of people had the opportunity to look through a telescope for the first time. The near-full Moon was the target, only a few days before the total lunar eclipse which took place on 28 September.

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NETHERLANDS REPORT

--- Peter Barthel

The Netherlands Research School for Astronomy (NOVA), incorporating the astronomy departments of the universities in Amsterdam, Groningen, Leiden, and Nijmegen, together with the Netherlands Astronomical Society (NAC) are actively engaged in promoting astronomy in primary as well as secondary education. NOVA is also responsible for the national outreach, operating the national Dutch astronomy outreach center NIC (NOVA Information Center), which employs both an education officer and a general outreach/press officer. The NOVA Outreach website (www.astronomie.nl) has an ever increasing popularity. Target groups are primary and secondary schools, the press, and the general public. Lots of educational materials for primary and secondary education are available through this website. There's also an image bank, games, posters, and information about the university astronomy education. Teachers can subscribe to the NOVA electronic Newsletter. Social media are gradually becoming more important. All NIC activities are overseen by the national Minnaert Committee, consisting of several EPO-knowledgeable representatives of the Dutch astronomy

departments. Excellent contacts exist with the Outreach and Education officers at the Netherlands Institute for Radio Astronomy, ASTRON, in Dwingeloo, the Netherlands Institute for Space Research, SRON, in Utrecht, the national Dutch ESA/ESERO education at the NEMO Science Center in Amsterdam, and the Dutch UNAWE (Universe Awareness) effort in Leiden. Also amateur groups and observatories are in the loop.

Each year the national Dutch Astronomy Olympiad for high school students is organized, by one of the astronomy departments. The winner usually gets a free trip to the La Palma observatory, to carry out an observing project.

A team from Leiden Observatory won a national science communication and education contest in 2012; they have developed a simple polarimetry device for iPhone's which can measure sky polarization and small particle pollution. That winning project was carried out in summer 2013.

NOVA/NIC, Leiden Observatory, and the Groningen Kapteyn Institute operate (traveling) mobile planetaria, for school visits, science weekends, etcetera. These planetaria are a major success. The Blaauw observatory, operated by Kapteyn Institute astronomers since 2010, offers monthly public viewing nights, sun activities on Sundays, and other events for the general public in the northern Netherlands. Nijmegen, Leiden and Amsterdam also offer public viewing events. Summer 2014 saw the opening of Infoversum, a full-dome 3D-theatre/planetarium in Groningen.

A committee involved in a major revision of the high school physics curriculum finished its work; since 2014 astrophysics and geophysics are new topics in the Dutch high school curriculum. NOVA/NIC is involved in revision of the curriculum books and materials and in teacher CPD. The Groningen Kapteyn Institute offers interactive astronomy webclasses in Dutch and English, which can be taken by interested high school students. NOVA has produced astronomy lessons for classroom digiboards as well as an educative iPad-game.

The Dutch government and the Royal Netherlands Academy of Arts and Sciences are continuously investing into the quality and quantity of science education at all levels, from preschool to university. Teacher CPD and Inquiry Based Learning are important elements in these efforts, including general science for elementary education. All major universities offer science hubs supporting elementary education, since 2010. Several Dutch staff astronomers are actively engaged in these efforts.

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SERBIA REPORT

--- Olga Atanacković

Overview

During the past three years, many attempts have been made to reintroduce astronomy as a separate and compulsory subject in the secondary schools, but so far without success. In 2014 the students of the Department of Astronomy of the Faculty of Mathematics, University of Belgrade, organized the first School of Astronomy intended mainly for secondary school students. The participants (secondary school students) of the Program of Astronomy in Petnica Science Center realized 35 individual research projects. Serbian teams continued to successfully participate in the IOAA (International Olympiad on Astronomy and Astrophysics). In the past three years they won three gold, three silver and three bronze medals in total, as well as six recognitions.

Astronomy courses are taught at five state universities in Serbia (the University of Belgrade, the University of Novi Sad, the University of Niš, the University of Kragujevac and the University of Priština in Kosovska Mitrovica). The University of Belgrade offers studies in astronomy at all three (undergraduate, master and PhD) levels. In 2013, a new university textbook "Stellar Astronomy" by Trajko Angelov was published (edited by the Faculty of Mathematics, Belgrade). The students of the Department of Astronomy have received training in observations and data reduction at the Ondrejov Observatory (Czech Republic) since 2007. Since 2012 they also used the facilities (Astro Optic 60cm reflector) at the Astronomical Station on the mountain Vidojevica (southern Serbia) at three summer programs lasting 3-5 days. Since 2011/2012 the Faculty of Mathematics of the University of Belgrade has participated in "AstroMundus", a 2-year European Erasmus Mundus Joint Master program in astronomy and astrophysics sponsored by 5 universities: Innsbruck (coordinator), Rome 2, Padova, Gottingen and Belgrade.

Interest in astronomy is steadily increasing among the general public. Public astronomy education in Serbia was realized through various activities of 23 amateur astronomical societies. In the past three years, three amateur societies were founded ("Vega" in Surdulica, "Kraljevo" in Kraljevo, and "Tycho Brahe" in Belgrade).

Elementary (primary) school

In the elementary school curricula astronomy topics are taught as part of courses in Natural History (IV), Geography (V) and Physics (VII and VIII year). Apart from the obligatory program, additional astronomical topics are taught in some primary schools as activities of astronomy clubs organized by the enthusiastic teachers of physics, mathematics or geography.

Secondary school

It is worth recalling that after 25 years (from 1969 to 1994) of being a separate fourth year, one hour per week course, in 1990 astronomy topics became incorporated as part of the final (fourth) year physics courses. Since then, and especially during the past three years, attempts have been made to reintroduce astronomy as a separate and compulsory subject, so far without success.

The first School of Astronomy organized by the students of the Department of Astronomy of the Faculty of Mathematics in Belgrade was held in May and June 2014 (twice per week). It is intended for the young people (from 15 to 25 of age) and mainly for the secondary school students. In the 2014/2015 academic year lectures were given during both semesters.

Petnica Science Center

Petnica Science Center (PSC) is the largest and the oldest independent and non-profit organization (founded in 1982) for extracurricular (informal) scientific education in the South Eastern Europe. The majority of programs are dedicated to secondary school students, but there are the programs for elementary school pupils, undergraduate students and high school teachers as well (for more details see http://www.psc.ac.rs).

In the past three years the Program of Astronomy in PSC included 17 seminars for secondary school students interested in astronomy and involved a total of 150 participants. About 35 researchers from the University, Belgrade Astronomical Observatory and other institutes, as well as students of astronomy, took part in these activities. About 35 individual research projects were realized by the participants of the seminars that belong to the most advanced group. Twenty one of them were presented at the annual conferences "A step into science" and published in four volumes of "Petnica notebooks".

The first summer school for students, "Petnica Summer Institute", was held in August 2013. It was devoted to Cosmology. In 2014 the summer school was dedicated to Particle Physics. About 40 students participated, while 15 lecturers from SISSA, ETH, AOB and Petnica took part. The 9th and 10th Petnica International Science Summer Schools were held in August 2013 and 2014. Participants from Japan, Russia, Poland, Romania, Spain, Bosnia and Hercegovina, Turkey, Greece and Serbia worked on 6 different scientific student projects in the fields of astronomy, physics & computer science, biology & chemistry and anthropology.

International Astronomy Olympiad (IAO)

In the past three years Serbian teams participated at the IOAA (International Olympiad on Astronomy and Astrophysics) and won three gold, three silver and three bronze medals in total, as well as six recognitions. Since 2002 Serbian teams won 9 gold, 17 silver and 25 bronze medals in total, as well as 2 special prizes and 10 recognitions.

University

Astronomy courses are taught at five state universities in Serbia (theUniversity of Belgrade, the University of Novi Sad, the University of Niš, the University of Kragujevac and the University of Priština in Kosovska Mitrovica). The Universities of Belgrade and Novi Sad offer graduate studies in astronomy.

The University of Belgrade is still the only university in Serbia with the Department of Astronomy (at the Faculty of Mathematics). Students can major in astronomy from the first study year. The studies were performed according to the programs accredited in 2009/2010.

The study program "Astronomy and astrophysics" consisted of 3 modules (Computational mechanics and astrodynamics, Astrophysics, Astroinformatics) at undergraduate (4 years) level, 2 modules (Astronomy, Astrophysics) at Master level and one module (Astronomy and Astrophysics) at PhD level. New study programs were accredited at the end of 2014, and were introduced in 2015/2016. The study program "Astronomy and astrophysics" will consist of 2 modules (Astrophysics, Astroinformatics) at undergraduate and Master levels, and will be one module at PhD level as before. Moreover, within the study program "Mathematics" there will be one module "Astronomy" at undergraduate level, and one module "Astronomy and Mechanics" at Master level. In the past three years, 13 students graduated, 13 students got Masters and 9 received PhD degrees.

Since 2011/2012 the Faculty of Mathematics of the University of Belgrade participates in "AstroMundus", a 2-year European Erasmus Mundus Joint Master program in astronomy and astrophysics of 5 universities: Innsbruck (coordinator), Rome 2, Padova, Gottingen and Belgrade (see website www.astromundus.eu). The University of Belgrade (Faculty of Mathematics) offers the 3rd and the 4th semester of the Master program. Twenty students in total visited and were enrolled at the Faculty of Mathematics from all over the world (16 countries), out of which 3 students defended the Master thesis in Belgrade. Additionally, there were 4 joint Master theses, two theses defended at the University of Innsbruck and two at the University of Goettingen.

The students of the Department of Astronomy have training in observations and data reduction at the Ondrejov Observatory (Czech Republic) since 2007. Since 2012 they used the facilities (Astro Optic 60cm reflector) at the Astronomical Station on the mountain Vidojevica (southern Serbia) at three summer programs lasting 3 to 5 days.

At the University of Belgrade astronomy courses are also taught: (1) at the Faculty of Mathematics – a compulsory course "Introduction to Astronomy" (3rd study year) for the students of L division (mathematics and informatics teachers), an elective course "Selected Topics in Astronomy" (4th year) for all modules of the study program "Mathematics" and two elective courses "Stellar Astronomy" and "Ephemeris Astronomy" (1st/2nd year) for the students of Informatics; (2) at the Faculty of Physics - a compulsory one-semester course "Fundamentals of Astrophysics" at the 1st year of master studies for physics teachers division, and an elective one-semester course under the same name for the students of the 1st year of theoretical division and for the students of the 2nd or the 3rd year of general division; (3) at the Faculty of Civil Engineering - a compulsory course "Geodetic Astronomy" (4th year), and (4) at the Faculty of Geography, basic astronomical topics are taught within the first-year course "Mathematical Geography".

Forty three seminars on different topics in astronomy have been held in this triennial period at the Department of Astronomy. Eighteen seminars were also held in the same period at the Astronomical Observatory of Belgrade.

The Astronomy Students Workshops have been organized since 2007 by the Department of Astronomy in Belgrade, the Department of Physics in Novi Sad and Astronomical Observatory of Belgrade, aimed at improving contacts between the students of astronomy from Belgrade and Novi Sad.

In the past three years 23 students enrolled astronomy studies at the Department of Physics of the Faculty of Natural Sciences (FNS) at the University of Novi Sad. Six students graduated and four students received the Master degree.

Many of the disciplines of astronomy and astrophysics are taught within one-semester elective courses to the students of other study programs at the Department of Physics. At the Department of Geography of the FNS in Novi Sad, a course "Mathematical Geography with Fundamentals of Astronomy" is taught in the first study year.

At the Institute of Physics of the Faculty of Natural Sciences of the University of Kragujevac there is one-semester elective course, "Astrophysics and Astronomy", for the 5th-year students of Physics. The students use a Carl Zeiss Telescope 150/2250 and a 200/1000 Newton telescope at the Astronomical Observatory that belongs to the Faculty.

At the Department of Physics at the Faculty of Natural Sciences of the University of Niš, an elective course "Introduction to Cosmology" is taught (3rd year) at undergraduate studies. At Master studies, a compulsory course "Fundamentals of Astrophysics" (2nd year) for the students of General Physics is taught. The same course is elective for the master students (1st year) of Physics - Informatics. At the PhD level, there are two elective courses: "Cosmic Plasma" and "Fundamentals of Cosmology". At the Department of Biology, an optional course "Fundamentals of Astrophysics with Astrobiology" is taught at the first study year of Master studies. At the Department of Geography, an elective course "Astronomy" is offered to the first-year master students. The other courses (Physical and Mathematical Geography) include some basic astronomical topics. Thanks to the Project "Armchair Astronomy" a dome is installed on the roof of the Faculty, Lunt telescope LS60T with Hα filter for the solar observations and the Mead Color CCD camera are bought for the students' exercises and popularization of astronomy.

At the University of Priština in Kosovska Mitrovica a one-semester course "Fundamentals of Astronomy and Astrophysics" is taught to the second year students of Physics. At the Department of Geography a course "Mathematical Geography" includes some astronomical topics.

In 2013, a new university textbook "Stellar Astronomy" by Trajko Angelov was published (edited by the Faculty of Mathematics, Belgrade).

Education conferences

A regular section dedicated to astronomy education is included in the National Conferences of Astronomers (NCAS) jointly organized by the Belgrade Astronomical Observatory and the Department of Astronomy at the University of Belgrade. The Society of Physicists of Serbia organized annual meetings of physics and astronomy teachers where teachers can learn about advances in astronomy. Due attention should be paid to numerous popular lectures that are often given at “Kolarac” Foundation in Belgrade on the latest news in astronomy. Many lectures have been also given in Dom omladine and in the Students' Cultural Center in Belgrade.

Observatories and Planetariums

In 2012 the Astronomical Observatory in Belgrade, the oldest scientific institution in Serbia, celebrated its 125th anniversary. The first phase of building of a new astronomical station of the Belgrade Astronomical Observatory on the mountain Vidojevica near Prokuplje at an altitude of 1155 m is completed, including the installation of 60cm Astro Optik telescope which is fully operational and started with regular observing programs.

There are also several small public observatories that belong to amateur astronomical societies in Belgrade, Novi Sad and Kragujevac. The planetariums in Belgrade (since 1970) and Novi Sad (since 2001) are used for lectures to secondary school students and the general public.

Public outreach and amateur astronomy

Public astronomy education in Serbia was realized mainly through various activities of 23 amateur astronomical societies (three in Belgrade, two in Novi Sad, Valjevo, Niš, Zrenjanin, Vršac, two in Bor, Prokuplje, Knjaževac, Novi Pazar, Bačka Palanka, Ivanjica, Pančevo, Kragujevac, Kruševac, Leskovac, Vlasotinci, Surdulica, Kraljevo). In the past three years, three amateur societies were founded ("Vega" in Surdulica, "Kraljevo" in Kraljevo, and "Tycho Brahe" in Belgrade). All the societies offer educational programmes for the general public, ranging from star parties to public lectures.

Many societies have collaborations with schools and other institutions in their cities and many contacts with other astronomical societies in Serbia and in neighboring countries.

A nice example of an intensive collaboration among the amateur astronomical societies in Serbia and professional astronomers is the international astronomical camp "Letenka", one of the biggest camps for the popularization of astronomy in Europe. It has been organized since 2001 every year in July (lasting four days) on the mountain of Fruška gora. This camp includes lectures, observation competition, and astronomy related documentaries. About 200 people (mostly secondary school and university students) take part in "Letenka". Also, the AS "Lira", AS "Univerzum" and AS "Novi Sad" organize the observation competition in the Messier marathon every year (early in spring) at Letenka.

More information on the activities of the astronomical societies can be found on their websites, as well as on the Astronomical Magazine website (www.astronomija.co.rs), the largest astronomical web site in the country.

Since 2011 the AS "Univerzum", Bačka Palanka, has operated an automated astronomical observatory they built by themselves. They have observed many variable stars and have detected 96 transits of extrasolar planets that are registered in the "Extrasolar transit database".

Astronomical societies continued their usual activities. "Astronomy courses for beginners" (one at each autumn and spring), Belgrade astronomical weekends (BAW), Summer Schools of Astronomy, as well as a special topical meetings "Summer Astronomical Meetings" have been organized by AS "Rudjer Bošković", Astronomical Meetings of Vršac (AMV) by the Astronomical group within the Natural History Society "Gea", Autumn and Spring Schools of Astronomy by the AS "Andromeda" (Knjaževac), and astronomical camps

in Sivčina by the AS "Orion" (Ivanjica). In the past five years (2009-2014) Astronomical Society "Rudjer Boskovic" and Society of Astronomers of Serbia used the mobile planetarium as a tool for astronomy communication. Most of the societies participated in special events (Night of Museums, Book Fair, Festival of Science, Night of Researchers, etc.).

In 2014 the AS "Rudjer Bošković" of Belgrade, the largest and the oldest (1934) society of amateur astronomers in Serbia, celebrated 80 years of the Society, 60 years of the Public Observatory and 45 years of the Planetarium. The AS "Novi Sad" (ADNOS) celebrated 40 years of its foundation.

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USA REPORT

---Jay Pasachoff

As National Liaison for the United States, I spread word of the Commission 46 Newsletter, sometimes from the website Newsletter of the American Astronomical Society, and I provided information about solar eclipses in the United States, most recently the annular solar eclipse of 20 May 2012 and now looking forward to the total solar eclipse of 21 August 2017. I participated in the colloquia, hosting the one 1998 to celebrate the sesquicentennial of our Hopkins Observatory, the oldest extant astronomical Observatory in the U.S., and was a co-editor of the proceedings for most of them (1990 and 2005 with John Percy and 2008 with Rosa Ros and Naomi Pasachoff).

A sample notice from the American Astronomical Society Newsletter was "Latest IAU Education Newsletter Now Available ; Monday, March 25, 2013; The Spring 2013 edition of the newsletter (Number 77) of the IAU Commission on Education and Development is available at the Commission 46 website. It is in PDF format and can be downloaded, along with past newsletters. The new editor of the newsletter, which is distributed worldwide, is Larry Marschall of Gettysburg College."

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BOOK REVIEWS

WE COULD NOT FAIL: THE FIRST AFRICAN AMERICANS IN THE SPACE PROGRAM

Richard Paul and Steven Moss, *We Could Not Fail: The First African Americans in the Space Program* (Austin: University of Texas Press, 2015). 300+xii pages. HB $30.00. ISBN 978-0-292-77249-6.

This interesting book is an important contribution to the histories of the space program and of race relations in the United States. At the same time, it is not nearly as well written as it might be, and from that point of view is a disappointment. It is worth mentioning that neither author is a historian of science nor a professional writer, but both have relevant credentials, and they have clearly done their homework. Their sources include both the national and the African American (spelled with no hyphen in this book) press of the post-Sputnik era, documents from the Kennedy and Johnson administrations, and numerous personal interviews. The main problem is the book has a split personality, and the whole, sadly, is considerably less than the sum of its parts.

Given the subtitle of the book, a reader could be forgiven for assuming that *We Could Not Fail* is a collective biography of the first black Americans to be hired by NASA or its contractors in the space program. Indeed, the table of contents identifies ten African American men by name who are the putative protagonists of a majority of the nine chapters. But instead of offering richly detailed portraits of these individuals, what we get is more of a hasty and sometimes even sloppy sketch. I am an attentive reader, but in reviewing the ten names as I write the review, I find myself remembering little about any of the men, whether regarding their personal or professional lives. I often found myself Googling the names to find out their dates and accomplishments, and not all of the ten have any presence on the Internet at all to assist the inquiring reader in getting more information than the authors themselves offer.

As the author of several biographies for young adults, I know how important it is to clearly place one's biographical subjects within the context of their times. While Paul and Moss do a better job at describing the era during which their African American space-age pioneers did their pathbreaking than at defining their specific roles, they do not do a good job at embedding the men in the period. Rather, most chapters divide into two unequal parts, with fewer pages describing the men's struggles and achievements and more pages describing how the Kennedy and Johnson administrations sought, not entirely for altruistic reasons, to make use of the space program for social engineering. "Kennedy chose to rely on federal hiring and contracting because he doubted Congress would give him the power to do anything greater through legislation." Once Johnson was elevated from the vice presidency to the presidency as a result of the assassination of President Kennedy, he spoke openly about his intention of using NASA as a tool to turn his Great Society aspirations into reality by using federal funds to transform southern communities and achieve racial integration.

Sloppy, confused, and inconsistent writing is exemplified in Chapter 9's coverage of the so-called "Water Walkers"—the name given by the first black recruiter hired by a federal agency to locate African Americans qualified for what we today call STEM positions. The recruiter, Charles Smoot, used this appellation as shorthand for those individuals who would be at the top of their field irrespective of their race. The two Water Walkers who are supposed

to be the main subjects of this chapter are Morgan Watson and George Bourda. In captions in the photo insert between pages 154 and 157, Watson is identified as the first African American engineer at NASA. Somewhat confusingly, in a photo caption on p. 156, Bourda is identified as "one of **six** [emphasis mine] students from Southern University-Baton Rouge who in 1964 became NASA's first African American engineers in the South." Then, on p. 188, in the opening paragraph of Chapter 9, we learn that Johnson's plan for jobs in the South "came to rest firmly on the shoulders of **seven** [emphasis mine] young engineers from Baton Rouge, Louisiana," whose names are listed. Further confusion arises on p. 194 when we learn that the so-called Water Walkers included not only Watson and Bourda but also **four** others—so which of the seven was not a true Water Walker? And on the following page we read that "Watson, Bourda, Dubone, Winfield, and Williams became the first African Americans ever to work as engineers at NASA in the South" when they joined the professional cadres at Marshall Space Flight Center. So what happened to heroes number six and seven?

Chapter 9 also exemplifies the book's split identity. Only the first 14 pages and the last page and a half of the 52-page chapter half-heartedly focus on the Water Walkers, however many of them there might actually have been. The bulk of the chapter swerves to what was going on regarding attempts at promoting racial equality at NASA headquarters, under the agency's second Administrator (from February 1961 to October 1968), James E. Webb, and at Marshall Space Flight Center, under its first director, the former Nazi space engineer Wernher von Braun.

I was much more impressed by the book's coverage of these two space age administrative giants, which significantly deepened my understanding of their achievements, than by the supposed primary purpose of the book to highlight the contributions to the space age of ten unsung African Americans. We learn, for example, of the tension between James Webb's interest in dismantling segregation at NASA, even though it was something (as he wrote to von Braun in April 1963) "which may not seem to contribute immediately and directly to our program schedule," and the interests of the engineers and scientists who managed and directed the NASA centers, whose aim was solely "to perform feats of technical engineering." It is also interesting to learn of the suspicion with which people in the Kennedy administration regarded Webb, whom they thought of as "one of Lyndon Johnson's guys," and of the derisive nicknames used by JFK's "guys" to refer to LBJ behind his back, such as "Rufus Cornpone."

The texture of the authors' treatment of von Braun is even more layered. Describing the former Nazi as "to say the least, an odd partner" for NASA in overcoming "the legacy of slavery in Alabama," the authors add: "The word 'ironic' does not begin to capture what it meant that a man tasked with implementing a program of racial equality" had availed himself of "the slave labor of concentration camp inmates to build the V2 rockets that fell on London and elsewhere." Nonetheless, Paul and Moss assert that, under von Braun's direction, "The actions taken on race relations by the Marshall Space Flight Center would go above and beyond anything done elsewhere by NASA in the South," and that "When von Braun spoke against segregation, he did so as a federal executive and, more importantly, as a respected neighbor with a long record of civic activities."

I was also interested in the authors' summary attempt to yoke their bifurcated coverage of individual and institutional efforts to overcome deeply ingrained Southern prejudices and practices: "NASA as an agency and its contractors as corporations did not cover themselves with glory when it came to hiring or promoting African Americans, but the African

Americans who went to work for both were able to assist in redefining racial identity in late twentieth-century America." Among the points the authors make perhaps too often is that the African American space age pioneers did not participate in the civil disobedience of their era but "kept their noses firmly to the grindstone."

While I believe *We Could Not Fail* could have been a much better book, I am not sorry I took the time to read it. For one thing, the authors demonstrate that the issues of social inequality and technology have been joined at the hip for over a half century. I find a striking parallel between LBJ's hope in 1958 that the space program would help eradicate poverty and racial inequality in the US and the new set of global goals set at the United Nations by world leaders in September 2015, with one suggestion being widening Internet access to everyone worldwide as a means to secure better living conditions for all.

One of the best lines in *We Could Not Fail* reads: "Working to bring racial equality to America was going to be a dream just as hard to achieve and maybe just as elusive as going to the Moon." No human being has ventured to the Moon since Eugene Cernan in December 1972, and the issue of race in America remains as vexed today as it was then. In this era, which turns out not to be the "post-racial" one some announced after President Obama's election in 2008, there are still things for NASA to be proud of, including the appointment of Charles Bolden as NASA's first African American Administrator in 2009.

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THE ASTRONAUT WIVES CLUB

Lily Koppel, *The Astronaut Wives Club* (New York: Grand Central Publishing, 2014). 304+xvi pages. PB $17.00. ISBN 978-1-4555-0324-7.

The authors of *We Could Not Fail* note in passing in the penultimate chapter that the difficulties experienced by the first African American professionals at NASA in the mid-1960s “would crop up again fourteen years later, when NASA first allowed women into the astronaut corps….women, like blacks fourteen years earlier, simply did not belong. NASA was accustomed to always doing things the same way. Change did not come easily.” Even before women were admitted to the astronaut training program in 1978, NASA had other “ladies’ business” to deal with: managing the wives of the astronauts. Lily Koppel’s book sheds light on what these wives had to face at a time when women who aspired to independent careers on terra firma, much less space, were considered unconventional at best, rebellious at worst. *The Astronaut Wives Club* covers more or less the same period in the history of the space race and of the Cold War as *We Could Not Fail,* but the focus shifts from one significant social issue of the period, the struggle for racial equality, to that for what came to be known as “women’s lib.” (In Chapter 11, we learn in passing that the first official meeting of the Astronaut Wives Club was held at about the same time in summer 1966 that the National Organization for Women—NOW—was formed.)

If Paul and Moss do a less-than-effective job in profiling the ten African Americans they have selected to represent the first blacks to participate in the space race in professional roles, Koppel—a 2003 graduate of Barnard College, the women's undergraduate institution of Columbia University—is considerably more successful in presenting the stories of the 49 "Astrowives" whose husbands were chosen as astronauts from 1959 through 1966. The women's stories shed light on the early years of feminism in the United States, as women began to feel the need to identify themselves as individuals with roles and responsibilities beyond those of dutiful wife and mother. Nonetheless, it is hard for the reader to keep the 49 women in individual focus, and the Astrowives whose struggles I remember most clearly are five of the original seven—and those because I watched each of the ten episodes of the television series based on Koppel's book that aired in summer 2015.

Koppel also mentions several interesting facts about NASA that complement the coverage in *We Could Not Fail*. Before James Webb, a recurring character in the latter book, became NASA's second Administrator, he was preceded by T. Keith Glennan. Koppel describes Glennan as a "natural-born showman who had previously worked at Paramount and Samuel Goldwyn," two major American film companies. (She doesn't note, however, the significant roles Glennan played in World War II war research and in university administration.)

More pertinent to Koppel's topic, she notes that before making the final selection of the Mercury Seven—the first astronaut class—"NASA looked into the backgrounds of not only the men but also their wives." Did the women, for example, drink too much? Did they have any Communist connections? At the official introduction of America's first astronauts to the public, the press corps focused their attention on the wives, asking questions like "What kind of woman would actually let her husband be blasted into space on a rocket?" The women, formerly unexceptional housewives on military bases, found themselves abruptly thrust into the public eye, becoming "instant celebrities," and needing to speak and act guardedly at all times. They were on their own in terra incognita: "NASA didn't provide the wives any instructions. No NASA public relations spokesmen contacted them with tips on how to deal with the press…." Marge Slayton—wife of Coordinator of Astronaut Activities Deke, and soon to become known as Mother Marge in her role as unelected head of the "Astronaut Wives Club," figured out on her own how important it was to keep hidden from NASA the fact that she was a divorcée. "Divorce was taboo at the space agency, which believed that stable home lives were essential for success in orbit. One of the first among NASA's many unofficial rules was: if you don't have a happy marriage, you won't have a spaceflight." If an astronaut, after all, was unable to "handle his wife on Earth," how could he be expected to "handle the pressures of getting shot in the heavens"? For its part, "NASA expected the wives to do as they were told," and balked on the occasions when the women dug in their feet. The only orientation NASA gave each new class of astronaut wives dealt with their wifely duties: "Feed him well. Praise his efforts. Create a place of refuge….And for God's sake, keep the astronaut away from stress. He should never have to worry about the plumbing, or the dental bills, and he should never be nagged about his lack of initiative in the bedroom."

The wives whose struggles most resonated with me are two from the first astronaut class, Rene (which she pronounced to rhyme with "keen") Carpenter, wife of Scott, and Trudy Cooper, wife of Gordon. Rene, seemingly the most intellectual of the group, and Trudy, the only astronaut wife with a pilot's license of her own, had professional aspirations

of their own. Rene, whose marriage ended in divorce in 1972, became a successful print and television journalist.

Even before NASA began in January 1959 to vet candidates for the first class of astronauts, Trudy had left Gordo after 12 years of marriage, in response to his marital infidelities. Having impressed NASA as he went through the vetting process, however—"all that was left for him to succeed was to produce a loving wife"—Gordo talked Trudy into putting up the façade of a happy home life so that his appointment would go through.

The Coopers also divorced in 1972. (Gordon went on to three more marriages and two more divorces.) Trudy never made it into space, but she did run her own plane courier business (something I learned not from reading the book but from watching the TV series). In the end, we learn that, out of the first three classes of astronaut couples, totaling 30 marriages, "only seven couples would stay together."

Perhaps not surprisingly, at one point Koppel's narrative of the astronauts' wives touches on the world of *We Could Not Fail*, if only fleetingly. We learn that when the first astronaut class and their families were moved in July 1962 to Texas, where NASA's Manned Spacecraft Center (later the Lyndon B. Johnson Space Center) was being set up, the astronauts were less than thrilled at the thought of the free homes, fully furnished and decorated, they were being offered. Why would they want to live in Sharpstown, a newly developed community in Houston, named for the real estate developer Frank Sharp? It was too close to a ghetto for comfort and too far away from the center itself. Several of the men profiled in *We Could Not Fail* talk about NASA's failure to provide them with housing within easy commuting distance of MSFC and about the system of segregated housing that made it impossible for them to live closer to work. By contrast, the astronauts—all white until Guy Bluford became the first African American to go into space in 1983—had more control over where they would live.

Although *The Astronaut Wives Club* makes for easy reading and hardly needs to be on any astronomer's Must Read list, I recommend it for its success in broadening the focus of early space-age history. Both it and *We Could Not Fail* are examples of the current trend to write "people's history" or "social history." No longer content telling simply the story of great men and their deeds, many contemporary historians take serious note of the effects of world events on forgotten people—often victims, women, and minorities—or their participation in those events. The two books reviewed in this issue make modest but worthy contributions to a people's history of an era important to anyone who teaches or communicates astronomy.

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MISCELLANEOUS EDUCATIONAL NOTICES

FIRST NOTICE OF IAU SYMPOSIUM 326
RESEARCH IN ASTRONOMY EDUCATION: FAR REACHING IMPACTS AND FUTURE DIRECTIONS

RESEARCH IN ASTRONOMY EDUCATION: FAR REACHING IMPACTS AND FUTURE DIRECTIONS, to be held in Heidelberg, Germany, October 4-7, 2016.

The primary goal of this IAU Symposium is to bring together astronomy education experts to plot a 'next steps' roadmap and a global astronomy education research agenda for the next 10 years, while honoring the research results from the past. This Symposium will feature key speakers who are international leaders in discipline-based education research in astronomy and the planetary science via Invited Talks. Contributed Talks will be solicited from astronomy educators, astronomers, and other researchers who have conducted astronomy education research studies, with a particular emphasis on how developing an understanding of the underlying mental mechanisms learners use when engaging in astronomy with respect to how this influences teaching innovation. This Symposium will be especially valuable to those interested in the further development of the field of research in astronomy education.

Key Topics:
- State-of-the-art of astronomy education research in countries and continents on papers/dissertations/meetings/dissemination
- Meta-analysis of astronomy education research on contents/school grade levels/focus on education cross studies, including surveys of astronomy misconceptions across the globe, culture and history studies
- Innovations in research methodologies and instrumentation, including in museums and planetarium leering
- Use of experiments and results by teachers and museum educators
- Research into the value and influence of astronomy education in other disciplines
- Interplay of students' worldviews with the worldview of science in a globalizing world
- Impact research on leveraging new media and information systems for teaching and learning
- Analyses of well succeeded practices, materials, and programs
- Research results on impact of 2015 International Year of Light
- Looking forward to the future of Astronomy Education Research

Details about transportation, hotels, agenda, and calls for papers are still in preparation. To get updates as details become available, please sign up at
www.caperteam.com/iaus326

SOC Co-Chairs:

Paulo S. Bretones (Brazil) Universidade Federal de São Carlos São Carlos 13565-905, Brazil paulo@caperteam.com bretones@ufscar.br	Timothy F. Slater (USA) University of Wyoming Laramie, WY 82071 USA tim@caperteam.com

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EXPECTATIONS AND VISIONS FOR WG3 OF C.C1: *ASTRONOMY FOR EQUITY, INCLUSION AND DIVERSITY*

---Amelia Ortiz Gil

This WG seeks to build new strategies, tools and resources in Astronomy that will facilitate the access to Astronomical resources and careers for people with special educational or physical needs, or those who might be excluded for their particular race or gender.

After reflecting on the tools and resources already existing, the WG will work on new strategies following the Universal Design of Learning, a framework to develop methods and tools accessible to all, ensuring a real inclusion for everyone. We expect to have lively discussions among the WG3 members to identify the key topics that need to be addressed first and the best strategies to accomplish these goals. The new activities proposed by the WG3 will be submitted to IAU's AstroEDU to be refereed and included in the AstroEDU resources too.

On equity, the WG3 will gather what is being done in the field and will identify the individuals and organizations that are working on these issues. We will ask the IAU to carry out a full study of the situation in the astronomical communities around the world in order to point out the problems, solutions and strategies that have been successfully applied or to identify the need for new ones.

To deal with diversity the WG3 will work closely with the Office for Astronomy Development which pays special attention to this topic. A group of astronomy educators coming from different cultures will point out the problems and conflicts between cultural heritage and scientific notions and find ways to communicate the science while acknowledging heritage as the cultural treasure it is.

A formal declaration on this topic of equity, inclusion and diversity will be proposed to the WG3 members. The goal of this declaration is to show to the rest of the community the need of commitment from everyone to achieve real and enduring results. This declaration will be submitted to the IAU for its official endorsement.

The more immediate steps that the WG3 is going to take are the following:

1. Invite members of the community with expertise in astronomy, education, disability, cultural heritage and gender and minorities equity.

2. Organize the WG into subgroups according to the particular expertise of each member. Each subgroup will have its own coordinator.

3. Identify the existing tools, resources and activities in Astronomy for different disabilities to create a database that will show what has been already accomplished in the field.

4. Create a website that will contain the database of resources and all the information about the WG3 (members, activities, results, news, etc.)

5. To support the OAD's TF3 project on a Global Dictionary of Sign Language. The Dictionary will be available at the WG3 website.

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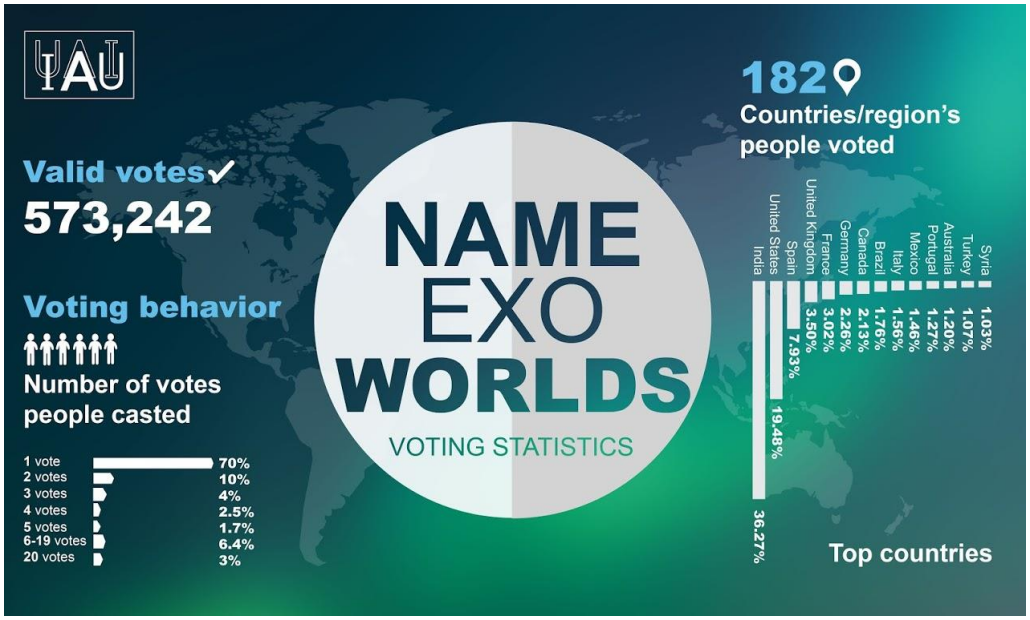
FINAL RESULTS OF NAMEEXOWORLDS PUBLIC VOTE RELEASED

The votes are in — the names of 19 "ExoWorlds" (14 stars and 31 exoplanets orbiting around them) have been chosen by public vote in the NameExoWorlds contest, and accepted by the IAU. Reflecting the truly international interest in astronomy, over half a million votes from 182 countries and territories contributed to the new official designations of the alien worlds.

Although people have been naming celestial objects for millennia, the International Astronomical Union (IAU) is the authority responsible for assigning official names to celestial bodies. The NameExoWorlds contest provided the first opportunity for the public to name exoplanets, and their stars. The winning names are to be used freely in parallel with the existing scientific nomenclature, with due credit to the clubs or organisations that proposed them.

With voting concluding on 31 October 2015, a total of 573 242 votes from the public have contributed to the naming of 31 exoplanets and 14 "host stars" beyond our own. Proposers of the winning names are to be awarded a plaque commemorating their contribution to astronomy and they will be given the exciting opportunity to name a minor planet.

The public voted on the 274 proposed ExoWorld names submitted by a wide variety of astronomy organisations from 45 countries all over the world (iau1511) — these included amateur astronomy groups, schools, universities and planetariums. The successful entries were received from across the globe — 4 were received from North America (USA, Canada), 1 from Latin America (Mexico), 2 from the Middle East & Africa (Morocco, Syria), 6 from Europe (France, Italy, Netherlands, Spain, Switzerland), and 6 from Asia-Pacific (Australia, Japan, Thailand).



The IAU Executive Committee Working Group on the Public Naming of Planets and Planetary Satellites (http://www.iau.org/science/scientific_bodies/working_groups/209/members/) validated all individual cases of the winning names from the vote, as stipulated in the guidelines (http://www.iau.org/public/themes/naming_exoplanets/), and made appropriate modifications to the original proposals where necessary, in full agreement with the proposers.

However, after extensive deliberation, the Committee decided to annul the vote for one particular ExoWorld — tau Boötis — as the winning name was judged not to conform with the IAU rules for naming exoplanets. To this end, the IAU will organise a new contest to decide the name of tau Boötis in the future.

The newly adopted names take the form of different mythological figures from a wide variety of cultures from across history, as well as famous scientists, fictional characters, ancient cities and words selected from bygone languages:

Star	14 Andromedae	Veritate
Planet	14 Andromedae b	Spe
Star	18 Delphini	Musica
Planet	18 Delphini b	Arion
Star	42 Draconis	Fafnir
Planet	42 Draconis b	Orbitar
Star	47 Ursae Majoris	Chalawan

Planet	47 Ursae Majoris b	TaphaoThong
Planet	47 Ursae Majoris c	Taphao Kaew
Star	51 Pegasi	Helvetios
Planet	51 Pegasi b	Dimidium
Star	55 Cancri	Copernicus
Planet	55 Cancri b	Galileo
Planet	55 Cancri c	Brahe
Planet	55 Cancri d	Lippershey
Planet	55 Cancri e	Janssen
Planet	55 Cancri f	Harriot
Planet	Ain b (epsilon Tauri b)	Amateru
Planet	Edasich b (iota Draconis b)	Hypatia
Star	epsilon Eridani	Ran
Planet	epsilon Eridani b	AEgir
Planet	Errai b (gamma Cephei b)	Tadmor
Planet	Fomalhaut b (alpha Piscis Austrini b)	Dagon
Star	HD 104985	Tonatiuh
Planet	HD 104985 b	Meztli
Star	HD 149026	Ogma
Planet	HD 149026 b	Smertrios
Star	HD 81688	Intercrus
Planet	HD 81688 b	Arkas
Star	mu Arae	Cervantes
Planet	mu Arae b	Quijote
Planet	mu Arae c	Dulcinea
Planet	mu Arae d	Rocinante
Planet	mu Arae e	Sancho
Planet	Pollux b (beta Geminorum b)	Thestias
Star	PSR 1257+12	Lich
Planet	PSR 1257+12 b	Draugr
Planet	PSR 1257+12 c	Poltergeist
Planet	PSR 1257+12 d	Phobetor
Star	upsilon Andromedae	Titawin
Planet	upsilon Andromedae b	Saffar
Planet	upsilon Andromedae c	Samh
Planet	upsilon Andromedae d	Majriti
Star	xi Aquilae	Libertas
Planet	xi Aquilae b	Fortitudo

The complete list of the results, including vote counts, proposers, and citations is published on the IAU NameExoWorlds website. (http://nameexoworlds.iau.org/)

Links

- IAU NameExoWorlds website: http://nameexoworlds.iau.org/
- IAU Naming Theme: https://www.iau.org/public/themes/naming/
- Naming of Exoplanets: http://www.iau.org/public/themes/naming_exoplanets/

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USEFUL WEBSITES FOR INFORMATION ON ASTRONOMY EDUCATION AND OUTREACH MEETINGS

The following websites contain information on future (and recent) meetings and conferences on, or very relevant to, astronomy education and development. In compiling this short list I am well aware of a strong European bias. **Please send me URLs by email for relevant websites in other areas of the world.**

WORLDWIDE

IAU Office of Astronomy for Development (OAD)	http://www.astro4dev.org/
IAU Office of Astronomy Outreach (OAO)	http://www.iau.org/public/

UK

The Association for Astronomy Education	http://www.aae.org.uk
The British Association of Planetaria	http://www.planetaria.org.uk/
The National Schools Observatory	http://www.schoolsobservatory.org.uk

Europe

The European Association for Astronomy Education	http://www.eaae-astro.org
The European Astronomical Society	http://eas.unige.ch/
The European Southern Observatory	http://www.eso.org/outreach/eduoff

USA
(among several other good sites)

The Astronomical Society of the Pacific	http://www.astrosociety.org

OTHER EDUCATIONAL RESOURCE WEBSITES

Project CLEA—Research Simulations in Astrophysics
http://public.gettysburg.edu/~marschal/clea/CLEAhome.html
The Nebraska Astronomy Applet Project -----Online Labs for Introductory Level Astronomy
http://astro.unl.edu/naap/

INFORMATION THAT WILL BE FOUND ON THE IAU C46 WEBSITE

Among the information that will be contained on the IAU C46 website http://www.iaucomm46.org/ is the following

- Overviews (of C46, in English, French, and Spanish)
- Guidelines (including Programme Groups)
- Resolutions
- Newsletters (including OAO newsletters and triennial reports from National Liaisons)
- Organizing committee
- National contacts (liaisons)
- Links
- News

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