

The International Year of Astronomy 2009

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International Year of Astronomy 2009
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Summary

The International Astronomical Union (IAU) has launched 2009 as the International Year of Astronomy (IYA2009) under the theme "The Universe, yours to discover". IYA2009 marks the four hundredth anniversary of Galileo Galilei's first astronomical observation through a telescope. It will be a global celebration of astronomy and its contribution to society and culture, with a strong emphasis on education, public engagement and the involvement of young people, with events at national, regional, and global levels throughout the whole of 2009. IYA2009 has been endorsed by UNESCO, which has recommended it for adoption by the United Nations. The UN General Assembly will vote in late 2007 to endorse 2009 as the International Year of Astronomy.

Vision and Goals of the International Year of Astronomy 2009

Vision

The vision of the International Year of Astronomy 2009 is to help people rediscover their place in the Universe through the sky, and thereby engage a personal sense of wonder and discovery. Everyone should realize the impact of astronomy and other fundamental science on our daily lives, and understand how scientific knowledge can contribute to a more equitable and peaceful society.

The IYA2009 will be a global celebration of astronomy and its contributions to society and culture, highlighted by the 400th anniversary of the first use of an astronomical telescope by Galileo Galilei. The aim of the Year is to stimulate worldwide interest, especially among young people, in astronomy and science under the central theme "The Universe, Yours to Discover".

IYA2009 activities will take place locally, regionally and nationally. National Nodes have been

formed in each country to prepare activities for 2009. These nodes will establish collaborations between professional and amateur astronomers, science centres and science communicators in preparing activities for 2009. More than 90 countries are already involved, with well over 140 expected. To help coordinate this huge global programme, and to provide an important resource for the participating countries, the IAU has established a central Secretariat and an IYA2009 website (www.astronomy2009.org) as the principal IYA resource for public, professionals and media alike.



Figure 1. The International Year of Astronomy 2009 Logo.

Goals To:	Objectives To:	Evaluation estimator
<p>1. Increase scientific awareness among the general public through the communication of scientific results in astronomy and related fields, as well as the process of research and critical thinking that leads to these results.</p>	<ul style="list-style-type: none"> • Make astronomical breakthroughs more visible in the daily lives of billions of people through all available means of communication (TV/radio documentaries, newspapers, web pages, exhibitions, stamps, blogs, web portals, advertising campaigns etc). • Facilitate individual astronomical observing opportunities. 	<p>The number of people "touched":</p> <ul style="list-style-type: none"> • Number of press clippings and readership. • Number of people visiting national, regional and global web-pages (webstats). • Number of activities. • Number of new products etc.
<p>2. Promote widespread access to the universal knowledge of fundamental science through the excitement of astronomy and sky-observing experiences.</p>	<ul style="list-style-type: none"> • Enable as many laypeople as possible, especially children, to look at the sky through a telescope and gain a basic understanding of the Universe. 	<ul style="list-style-type: none"> • Number of laypeople, especially young people and children, viewing the Universe through a telescope at street astronomy events, star parties, professional observatory webcasts etc. • Number of cheap new telescope kits produced, assembled and distributed.
<p>3. Empower astronomical communities in developing countries through the initiation and stimulation of international collaborations.</p>	<ul style="list-style-type: none"> • Involve astronomical communities of the developing nations in the Year, thereby providing examples of how outreach and education is carried out in different parts of the world. 	<ul style="list-style-type: none"> • Number of participating developing nations as measured by the establishment of National IYA Nodes. • Number of new international partnerships and joint programs formed. • Number of people reached by new initiatives.
<p>4. Support and improve formal and informal science education in schools as well as through science centres, planetariums and museums.</p>	<ul style="list-style-type: none"> • Develop formal and informal educational material and distribute all over the world. • Conduct focused training of event leaders and presenters. 	<ul style="list-style-type: none"> • Number of participating teachers and schools. • Number of educational materials distributed. • Number of new event leaders and presenters trained.
<p>5. Provide a modern image of science and scientists to reinforce the links between science education and science careers, and thereby stimulate a long-term increase in student enrolment in the fields of science and technology, and an appreciation for lifelong learning.</p>	<ul style="list-style-type: none"> • Popular talks by scientists of all ages, genders and races. • Facilitate portraits — on TV, in web blogs, biographies — of scientists that break with the traditional "lab coat view" of scientists, showing the excitement of scientific discovery, the international aspect of scientific collaborations and portraying the social sides of scientists. 	<ul style="list-style-type: none"> • Number of popular talks. • Number of scientist portraits. • Public response questionnaires. • Evidence for penetration of astronomy into popular culture (media, web, TV, radio talk shows...)
<p>6. Facilitate new, and strengthen existing, networks by connecting amateur astronomers, educators, scientists and communication professionals through local, regional, national and international activities.</p>	<ul style="list-style-type: none"> • Connect as many individuals (named "IYA ambassadors") as well as organizations (amateur and professional) in networks; for instance, by creating of new internal and external electronic communication infrastructures. These networks will become part of the heritage of IYA2009. 	<ul style="list-style-type: none"> • Number of National IYA Nodes. • Number of new networks and partnerships formed.
<p>7. Improve the gender-balanced representation of scientists at all levels and promote greater involvement by underrepresented minorities in scientific and engineering careers.</p>	<ul style="list-style-type: none"> • Provide access to excellent role models and mentors, formally and informally, and publicize them. • Provide information about the female "dual-career" problem and possible solutions. 	<ul style="list-style-type: none"> • Number of active new role models and mentors. • Number of new international partnerships, projects and activities.
<p>8. Facilitate the preservation and protection of the world's cultural and natural heritage of dark skies in places such as urban oases, national parks and astronomical sites, through the awareness of the importance and preservation of the dark skies and astronomical sites for the natural environment and human heritage.</p>	<ul style="list-style-type: none"> • Involve the dark-sky community in IYA2009. • Collaborate in the implementation of the UNESCO and IAU "Astronomical and World Heritage" initiative. • Lobby organizations, institutions, and local, regional and national governments to approve preservation laws for dark skies and historical astronomical sites. • Put the issues of natural environment and energy preservation on the agenda of decision makers. 	<ul style="list-style-type: none"> • Number of activities and events related with night-sky protection • Number of countries/cities with laws or guidelines for dark sky preservation. • Areas protected by dark sky laws • Number of historical astronomical sites identified and protected under the UNESCO's World Heritage Convention

The Team behind the Scenes

IAU

The International Astronomical Union (IAU, www.iau.org) is the initiator and international leader of IYA2009. It was founded in 1919 with the mission of promoting and safeguarding the science of astronomy through international co-operation and maintains a small secretariat in Paris. Its individual members are professional astronomers active in research and education in astronomy all over the world. It is a “bottom-up” organization run by its members for the benefit of astronomy worldwide and maintains friendly relations with organizations that include amateur astronomers in their membership.

Currently the IAU has nearly 10,000 individual members in 87 countries worldwide. In addition to arranging scientific meetings, the IAU promotes astronomical education and research in developing countries through its International Schools for Young Astronomers, Teaching for Astronomy Development, and World Wide Development of Astronomy programmes, and through joint educational activities with UNESCO and other bodies.

The IAU acts as a catalyst and coordinator for IYA2009 at the global level, largely, but not exclusively through the IYA2009 website and Secretariat. The IAU will organize a small number of international events such as the global astronomy web-portal, global image exhibitions and the Galileoscope project. The IAU will be the primary interface with bodies such as UNESCO and the United Nations.

The next triennial General Assembly of the IAU takes place in Rio de Janeiro in August 2009. Some 2500 astronomers from all over the world will attend. Considerable media attention is always given to the General Assemblies, with regular briefings and news releases provided. Naturally, the programme of the General Assembly will be closely linked to the themes and activities of IYA2009, and this will provide a further opportunity for the Global Sponsors of IYA2009 to promote their activities through displays and speakers at dedicated sessions, particularly those devoted to communication and education.

The IAU IYA2009 Secretariat

The central hub of the IAU activities for IYA2009 is the Secretariat established by the IAU to coordinate activities during the planning, execution and evaluation of the Year. The Secretariat will liaise continuously with the Single Points of Contact, Task Groups, Global Official Partners, Global Sponsors and Organizational Associates, the media and the general public to ensure the progress of IYA2009 at all levels. A website (www.astronomy2009.org) has been set up and more than 90 member countries have established national committees and appointed “Single Points of Contact”. The Secretariat and website are the most important coordination and resource centres for all the

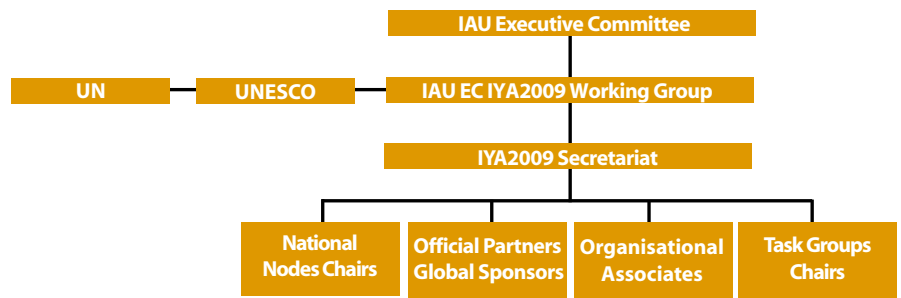


Figure 2. IYA2009 Organisational Structure.

countries taking part, but most particularly for those developing countries that lack the national resources to mount major events alone.

IYA2009 Global Cornerstone Projects

24 Hours of Astronomy

This is a round-the-clock, round-the-globe event, including 24 hours of live webcasts, observing events and other activities connecting large observatories around the world. One of the key goals is to allow as many people as possible to look through a telescope, and see what Galileo saw — the four Galilean moons around Jupiter. The 24 Hours of Astronomy might coincide with a “Dark Sky Event” with a controlled reduction of city illumination in a Wave of Darkness around the globe to raise awareness that the dark sky is a majestic, but often overlooked, cultural resource for everyone (security and safety issues to be considered).

The Galileoscope

Who doesn’t remember the first time they looked at the Moon through a telescope and were amazed by the details of the mountains and craters? The same is true for Jupiter’s cloud belts and its fascinating Galilean moons, Saturn’s rings and a sparkling star cluster.

Observing through a telescope for the first time is a unique experience that shapes our view of the sky and Universe. The IYA2009 programme wants to share this observational and personal experience with as many people as possible across the world and is collaborating with the US IYA2009 National Node to develop a simple, accessible, easy-to-assemble and easy-to-use telescope that can be distributed by the millions. Ideally, every participant in an IYA2009 event should be able to take home one of these little telescopes.

This simple telescope enables people to build and observe with a telescope that is similar to Galileo’s. Sharing these observations and making people think about their importance is one of the main goals of IYA2009: Promote widespread access to new knowledge and observing experiences. A do-it-yourself Galileoscope could be the key of pursuing an interest in astronomy beyond IYA2009, especially for people who cannot afford to buy a commercial telescope.

We aim to give 10 million people their first look through an astronomical telescope in 2009. This is achievable if, for example, 100,000 amateur observers each show the sky to 100 people. Millions of small telescopes are sold every year, but anecdotal evidence suggests that most are rarely used for astronomy. A worldwide Telescope Amnesty programme will invite people to bring their little-used telescopes to IYA2009 events, where astronomers will teach them how to use them and offer advice on repairs, improvements, and/or replacements, encouraging more people to stay involved in the hobby.

We encourage the organizers of IYA2009 celebrations in all countries to promote similar activities, with a common goal of giving 10 million people worldwide their first look through an astronomical telescope.

Cosmic Diary

This project is not just about astronomy; it is more about being an astronomer. Professional astronomers will blog in text and images about their life, families, friends, hobbies, and interests, as well as their work — their latest research findings and the challenges that face them in their research. The Cosmic Diary aims to put a human face on astronomy. The bloggers represent a vibrant cross-section of female and male working astronomers from around the world. They will write in many different languages and come from five different continents. Outside the observatories, labs and offices, they are musicians, parents, photographers, athletes, amateur astronomers. At work, they are managers, observers, graduate students, grant proposers, instrument builders and data analysts.

The Portal to the Universe

The science of astronomy is extremely fast moving, and delivers new results on a daily basis, often in the form of spectacular news, images of forms and shapes not seen anywhere else, enhanced by illustrations and animations. Public astronomy communication has to develop apace with the other players in the mass market for electronic information such as the gaming and entertainment industries. The problem today is not so much the availability of excellent astronomy multimedia resources for use in education, outreach and the like, but rather finding and accessing these materials. The public requires better access to information, images, videos of planets, stars, galax-

ies or other astronomical phenomena. Press, educators, scientists, laypeople need a single point of entry into all the discoveries that take place on a daily basis — a global one-stop portal for astronomy-related resources. Modern technology (especially RSS feeds and the VAMP — Virtual Astronomy Multimedia Project) has made it possible to link all the suppliers of such information together with a single, almost self-updating portal. The Portal to the Universe will feature a comprehensive directory of observatories, facilities, astronomical societies, amateur astronomy societies, space artists, science communication universities, as well as a news-, image- and video-aggregators and Web 2.0 collaborative tools for astronomy multimedia interconnectivity. The global astronomy web portal will enable innovative access to, and vastly multiply the use of, astronomy multimedia resources — including news, images, illustrations, animations, movies, podcasts and vodcasts.

She Is an Astronomer

IYA2009 has the aim of contributing to four of the UN Millennium Development Goals, one of which is to 'promote gender equality and empower women.' Approximately a quarter of professional astronomers are women, and the field continues to attract women and benefit from their participation. However, there is a wide geographical diversity, with some countries having none, and others having more than 50% female professional astronomers. Also, the very high level of female dropouts shows that circumstances do not favour female scientists. Gender equality is of a major concern to the whole scientific community regardless of geographic location. The problems and difficulties are different in all regions and continents. IYA2009's She is an Astronomer programme will offer platforms that address some of these problems. She is an Astronomer will contain the following components:

- The Portal to the Universe global web portal will provide a collection of links to all the existing regional and national programmes, associations, international organizations, non-governmental organizations, grants and fellowships supporting female scientists.
- Part of the programme will appear in the Cosmic Diary featuring the work and family lives of female researchers.
- The project intends to seek cooperation agreement with prestigious already running initiatives, to provide fellowships to female scientists to support their career prospects.
- A Woman Astronomer Ambassador programme will be established to reach girls at school and university level with the messages of the programme.

Dark Skies Awareness

It is now more urgent than ever to encourage the preservation and protection of the world's cultural and natural heritage of dark night skies in places such as urban oases, national parks and astronomical sites, as well as to support

UNESCO's goals of preserving historical astronomical sites for posterity. For this cornerstone project, the IAU will collaborate with the US National Optical Astronomy Observatory, International Dark-Sky Association and other national and international partners in dark sky and environmental education on several related themes, including worldwide measurements of local dark skies by thousands of citizen-scientists using both unaided eyes and digital sky-quality meters (as in the successful GLOBE at Night programme), star parties, new lighting technologies, arts and storytelling, and health and ecosystems.

IAU/UNESCO Astronomy and World Heritage

UNESCO and the IAU are working together to implement a research and education collaboration as part of UNESCO's Astronomy and World Heritage project. This initiative aims at the recognition and promotion of achievements in science through the nomination of architectural properties, sites or landscape forms related to the observation of the sky through the history of mankind or connected with astronomy in some other way. The proposed lines of action are: identification, safeguarding and promotion of these properties. This programme provides an opportunity to identify properties related to astronomy located around the world, to preserve their memory and save them from progressive deterioration. Support from the international community through IYA2009 is needed to develop this activity, which will allow us to help preserve this sometimes very fragile heritage.

Galileo Teacher Training Programme

There is an almost unfathomable amount of rich and very useful astronomy educational resources available today — mostly in digital form, freely available via the Internet. However, experienced educators and communicators have identified a major "missing link": the training of the educators to understand the resources and enable them to use it in their own syllabuses. To sustain the legacy of the International Year of Astronomy 2009, the IAU — in collaboration the National Nodes and leaders in the field such as the Global Hands-On Universe project, the US National Optical Astronomy Observatory and the Astronomical Society of the Pacific — is embarking on a unique global effort to empower teachers by developing the Galileo Teacher Training Programme. The Galileo Teacher Training Programme goal is to create by 2012 a world-wide network of certified Galileo Ambassadors, Master Teachers and Teachers. Included in the programme is the use of workshops and on-line training tools to teach the topics of robotic optical and radio telescopes, web cams, astronomy exercises, cross-disciplinary resources, image processing, and digital universes (web and desktop planetariums).

Universe Awareness

Universe Awareness (UNAWE) will be an international outreach activity that aims to inspire young disadvantaged children with the beau-



Figure 3. *The Universe from the Earth — An Exhibit of Astronomical Images.*

ty and grandeur of the universe. UNAWE will broaden children's minds, will awaken their curiosity in science and will stimulate internationalism and tolerance. Games, songs, hands-on activities, cartoons and live internet exchanges are devised in partnership with UNAWE communities throughout the world for children from the age of four onwards. UNAWE will enable the exchange of ideas and materials through networking and interdisciplinary workshops. Universe Awareness is imagination, excitement and fun in the Universe for the very young.

The Universe from the Earth — An Exhibit of Astronomical Images

Cosmic images are captivating and have incredibly inspirational power. Astronomy touches on the largest philosophical questions facing the human race: Where do we come from? Where will we end? How did life arise? Is there life elsewhere in the Universe?

Space is one of the greatest adventures in the history of mankind: an all-action, violent arena with exotic phenomena that are counter-intuitive, spectacular, mystifying, intriguing and fascinating. The fantastic images of the Universe are largely responsible for the magical appeal that astronomy has on lay people. Indeed, popular images of the cosmos can engage the general public not only in the aesthetics of the visual realm, but also in the science of the knowledge and understanding behind them. IYA2009 is an unprecedented opportunity to present astronomy to the global community in a way that has never been done before. The Universe from the Earth is an exhibition arranged by the IYA2009 project that will bring these images to a wider audience in non-traditional venues, like art museums, public galleries, shopping malls and public gardens.

The IYA2009 and the UN Millennium Development Goals

IYA2009 is, first and foremost, an activity for everyone around the world. It aims to convey the excitement of personal discovery, the pleasure of sharing fundamental knowledge about the Universe and our place in it. The UN Millennium Development goals form a blue-

print agreed by every country and the entire world's leading development institutions. The inspirational aspects of the International Year of Astronomy embody an invaluable resource for humankind and aim to contribute to four of the UN Millennium Development goals.

Help to Achieve Universal Primary Education

IYA2009 intends to add to the quality of primary education by providing access to basic astronomy to teachers and pupils all over the world. The night sky displays its wonders equally above all nations. We just have to provide the guides to understand what we see and discover. Providing equal chances to access knowledge will result in the development of international cooperation in scientific research and relevant applications, and in its broader effect will assist the developing world to match the developed world.

Help to Eradicate Extreme Poverty and Hunger

An increase in scientific wealth has been shown to be associated with an increase in economic wealth in developing countries, thereby contributing to fighting poverty, building capacity and good governance. The IYA2009 programme aims to empower astronomical communities in developing countries through the initiation and stimulation of international collaborations. These small steps can contribute to increasing the scientific and technological knowledge, and economic wealth in developing countries.

Promote Gender Equality and Empower Women

One of the IYA2009 goals is to improve the gender-balanced representation of scientists at all levels and promote greater involvement by underrepresented minorities in scientific and engineering careers. Gender equality is a priority concern of the whole scientific community regardless of geographic location. The problems and difficulties are different in all regions and continents, so IYA2009 has initiated special programmes to meet local needs.

Develop a Global Partnership for Development

Development relies on several factors, including the use of basic science to develop and use practical applications adequately. IYA2009 will connect networks of professional and amateur astronomers and astrophysicists from all over the world, providing an opportunity to share all the valuable sources of knowledge they have. The aim of the Year is to channel the information obtained into the right development projects and applications.

Make it Happen!

How can I participate in the International Year of Astronomy?

One of the International Year of Astronomy goals is to enable as many people as possible to experience the excitement of personal discovery that Galileo felt when he spied lunar craters and mountains, the moons of Jupiter, and other cosmic wonders. It is also meant to encourage citizens to think about how new observations force us to reconsider our understanding of the natural world.

If you're a newbie or an astronomy enthusiast...

If you are a beginner and would like to get some advice, the best you can do is to contact a local astronomy club, planetarium or science museum. A list of organizations worldwide can be found on <http://skytonight.com/community/organizations> or on <http://www.astronomyclubs.com/>

If you're an amateur astronomer...

For every professional astronomer, there are at least 20 amateur astronomers. The IAU is encouraging amateur astronomers to play a major role in the organization of astronomy outreach activities. As an amateur astronomer, you can join a local astronomy club and plan some cool astronomy outreach activities. Lots of ideas can be "lifted" from the IYA activities pages, don't be afraid of replicating and adapting them according to your own country's history and culture. Get in touch with science teachers in the local schools and propose some practical activities for the students involving the observation of the sky.

If you're a professional astronomer...

You can do all the above, and contact your country's Single Point of Contact for getting advice and new ideas on what can be done in order to promote astronomy in your region. You can coordinate activities together with amateur astronomers, help them to publish your results and contribute to science.

I have an idea for an activity that's not listed in the activities pages. How can I submit it?

If you have a new idea and you are sure it is not listed in the national, regional and global activities, pages, you should contact the Single Point of Contact from your own country and propose your ideas to him or her. To contact the Single Point of Contact, please check www.astronomy2009.org, where you will find a list of countries and their national pages.

Bios

Pedro Russo is the IAU Coordinator for IYA2009. He is a member of the Venus Monitoring Camera/Venus Express Scientific Team and has been working with Europlanet, IAU Commission 55: Communicating Astronomy with the Public and EGU Earth and Space Science Informatics Division.

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