

INTERNATIONAL YEAR OF ASTRONOMY 2009



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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 the first astronomical observation through a telescope

by Galileo Galilei. It will be a global celebration of astronomy and its contributions to society and culture, with a strong emphasis on education, public engagement and involvement of young people, with events at national, regional, and global levels throughout the whole of 2009. IYA2009 has been endorsed by UNESCO, which recommended it for adoption by the United Nations. It is the intention to propose a resolution to the vote of the UN General Assembly at the end of 2007.

Astronomy is one of the oldest basic sciences. It continues to have a profound impact on our culture and is a powerful expression of the human intellect. Huge progress has been made in the last few decades. One hundred years ago we barely knew of the existence of our own Milky Way. Today we know that many billions of galaxies make up our Universe, and that it originated approximately 13.7 billion years ago. One hundred years ago we had no means to tell whether there were other solar systems in the Universe. Today we know of more than 200 planets around other stars in our galaxy, the Milky Way, and we are moving towards an understanding of

how life might have first appeared. One hundred years ago we studied the sky using only optical telescopes and photographic plates. Today we observe the Universe from Earth and from space, from radio waves to gamma rays, using cutting edge technology. Media and public interest in astronomy has never been higher, and major discoveries are front page news throughout the world. IYA2009 will meet the public demand for both information and involvement.

There are unique opportunities to participate in the IAU IYA2009 events. This brochure outlines some of the events planned at the global level – thousands of national and regional activities will be offered in addition.

Our Organisational Associates and I wish everyone a happy celebration of the International Year of Astronomy 2009 rich in astronomical experiences!

*Catherine Cesarsky
IAU President*

VISION & GOALS OF THE INTERNATIONAL YEAR OF ASTRONOMY 2009

Vision

The vision of the International Year of Astronomy 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 realise 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.

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.

Goals

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.
2. Promote **widespread access to the universal knowledge of fundamental science** through the excitement of astronomy and sky-observing experiences.
3. Empower **astronomical communities in developing countries** through the initiation and stimulation of international collaborations.
4. Support and **improve formal and informal science education** in schools as well as through science centres, planetariums and museums.
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.
6. Facilitate new, and **strengthen** existing, **networks** by connecting amateur astronomers, educators, scientists and communication professionals through local, regional, national and international activities.
7. Improve **the gender-balanced representation of scientists** at all levels and promote greater involvement by underrepresented minorities in scientific and engineering careers.
8. Facilitate **the preservation and protection of our world cultural and natural heritage of dark skies and historical astronomical sites**, through the awareness of the importance and preservation of the dark skies and astronomical sites for the natural environment and humanity heritage.

THE TEAM BEHIND THE SCENES

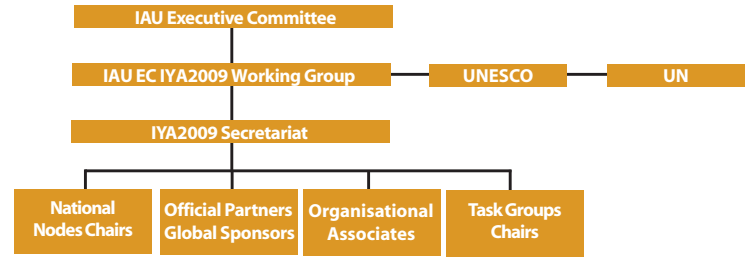
The International Astronomical Union



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 cooperation, 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' organisation run by its members for the benefit of astronomy worldwide and maintains friendly relations with organisations 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 organise 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 Organisational Associates, the



media and the general public to ensure the progress of IYA2009 at all levels.

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

Organisational Associates



The European Organisation for Astronomical Research in the Southern Hemisphere



American Astronomical Society



Institut National des Sciences de l'Univers



Swiss Academy of Sciences
Akademie der Naturwissenschaften
Accademia di scienze naturali
Académie des sciences naturelles

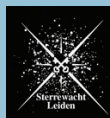
Swiss Academy of Sciences



Canadian Astronomical Society



The Natural Sciences and Engineering Research Council of Canada



Sterrewacht Leiden



Science & Technology
Facilities Council

Science & Technology Facilities Council



Nederlandse Onderzoekschool Voor Astronomie

IYA2009 ROADMAP

At the IAU General Assembly in Sydney, Australia, in July 2003, the IAU voted unanimously in favour of a resolution asking the United Nations to declare the year 2009 as the International Year of Astronomy. In October 2005 UNESCO endorsed the Year and recommended to the General Assembly of the United Nations that 2009 be designated the International Year of Astronomy (IYA2009). It is the intention to vote on a resolution at the UN General Assembly in October 2007.

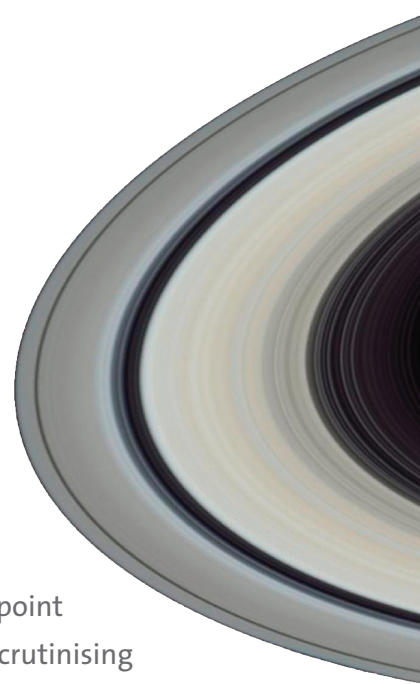
2008 will be spent on preparing the Year and all its activities, and 2009 will naturally be the focal point for all these activities. IYA2009 will however continue into 2010 when the organisation will be scrutinising performance at all levels and the public perception of the IYA2009 experience with the intention of answering the following questions: Were the objectives of IYA2009 met? Was the public appreciation of science changed as result of IYA2009? What were the unintended outcomes of IYA2009?

Inception

'03-'06

Planning

'07





'10

Evaluation

'09

Implementation

Preparation

'08

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* program will invite people to bring their little-used telescopes to IYA2009 events, where astronomers will teach 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 organisers 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 dif-

ferent continents. Outside the observatories, labs and offices, they are musicians, mothers, 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, galaxies 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 tie 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-aggregator 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, of which one 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 its 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 organisations, 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 chances.



- A Woman Astronomer Ambassador programme will be established to reach girls at high school and university level with the messages of the programme.

Dark Skies Awareness

It is now more urgent than ever to facilitate 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, IAU will collaborate with the U.S. 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 program), star parties, new lighting technologies, arts & 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. The 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 syllabi. 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 *Gali-*

leo 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 (UNAWWE) will be an international outreach activity that aims to inspire young disadvantaged children with the beauty and grandeur of the universe. *UNAWWE* 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 *UNAWWE* communities throughout the world for children from the age of 4 onwards. *UNAWWE* 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 incredible 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.





Locally

Regionally

Nationally

Internationally

INTERNATIONAL NETWORKS NOW AND IN THE FUTURE

IYA2009 will promote and facilitate the creation of international networks to foster a global appreciation of the role and value of science and astronomy as a unifying activity for humankind. IYA2009 will start up, connect and support the networks of professional and amateur astronomers and astrophysicists from all over the world, providing an opportunity to share their valuable sources of knowledge. The networks of hundreds, if not thousands of astronomical organisations, nationally and internationally, will be one of the heritages of IYA2009 that will last far beyond the year 2009.

The activities of IYA2009 will largely take place at national level: even after only nine months of real work, a significant network has been created. This network already has more than 90 countries involved, with well over 140 countries expected; with the potential to reach out to 97% of the world's population.

THE IYA2009 & 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 blueprint 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.

NASA/Mars Reconnaissance Orbiter

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 western 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 fight poverty, build 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, technological and economical wealth in developing countries.

Promote gender equality and empower women

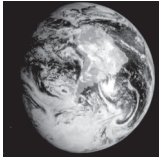
One of the IYA2009 goals is to improve the gender-balanced representation of scientists at all levels and promote greater involvement by underrepresented minorities in scientific and engineering careers. Gender equality is a priority concern of the whole scientific community regardless of its geographic 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 to the right development projects and applications.



MAKE IT HAPPEN! SUPPORT THE IYA2009



JPL

Are you fascinated by the Universe? Would you like to contribute to the International Year of Astronomy? One of the goals of the International Year of Astronomy is to enable as many people as possible to experience the excitement of personal discovery that Galileo felt when he for the first time saw lunar craters and mountains, the moons of Jupiter, and other cosmic wonders. The aim is to encourage us all to think about how observations of the cosmos around us force us to reconsider our understanding of the natural world.

If you are a newcomer 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 organisations worldwide can be found on: <http://skytonight.com/community/organizations> or on <http://www.astronomyclubs.com>.

If you are an amateur astronomer...

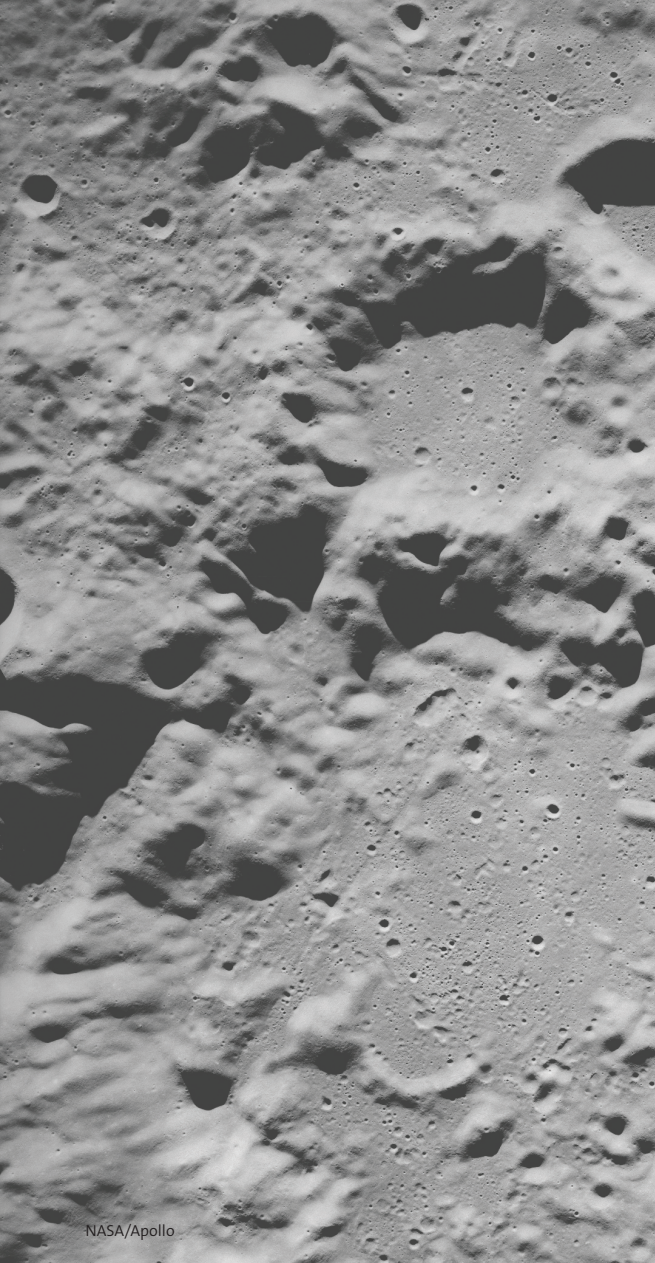
For every professional astronomer, there are at least 20 amateur astronomers. The IAU is encouraging amateur astronomers to play a major role in the organisation of astronomy outreach activities. As an amateur astronomer, you can join a local astronomy club and plan some cool astronomy outreach activities.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

If you are a professional astronomer...

You can do all the above, and contact your country's Single Point of Contact (see www.astronomy2009.org) or astronomical societies for advice and new ideas on what can be done to promote astronomy in your region. You can coordinate activities with amateur astronomers, help to publish results and contribute to science.

There are many countries and groups deeply involved in the IYA2009 project and also thousands of activities already happening. Please take some time to search the IYA2009 webpage and feel free to contact us if you are interested in a specific activity. If you would like to know more about IYA2009 activities taking place in your country, please contact your national Single Point of Contact.

If you have a new idea and it is not listed in the national, regional and global activities pages, contact the Single Point of Contact in your own country and propose your ideas. To contact the Single Point of Contact, please check the IYA2009 webpage: www.astronomy2009.org where you will find a list of countries and their national pages.



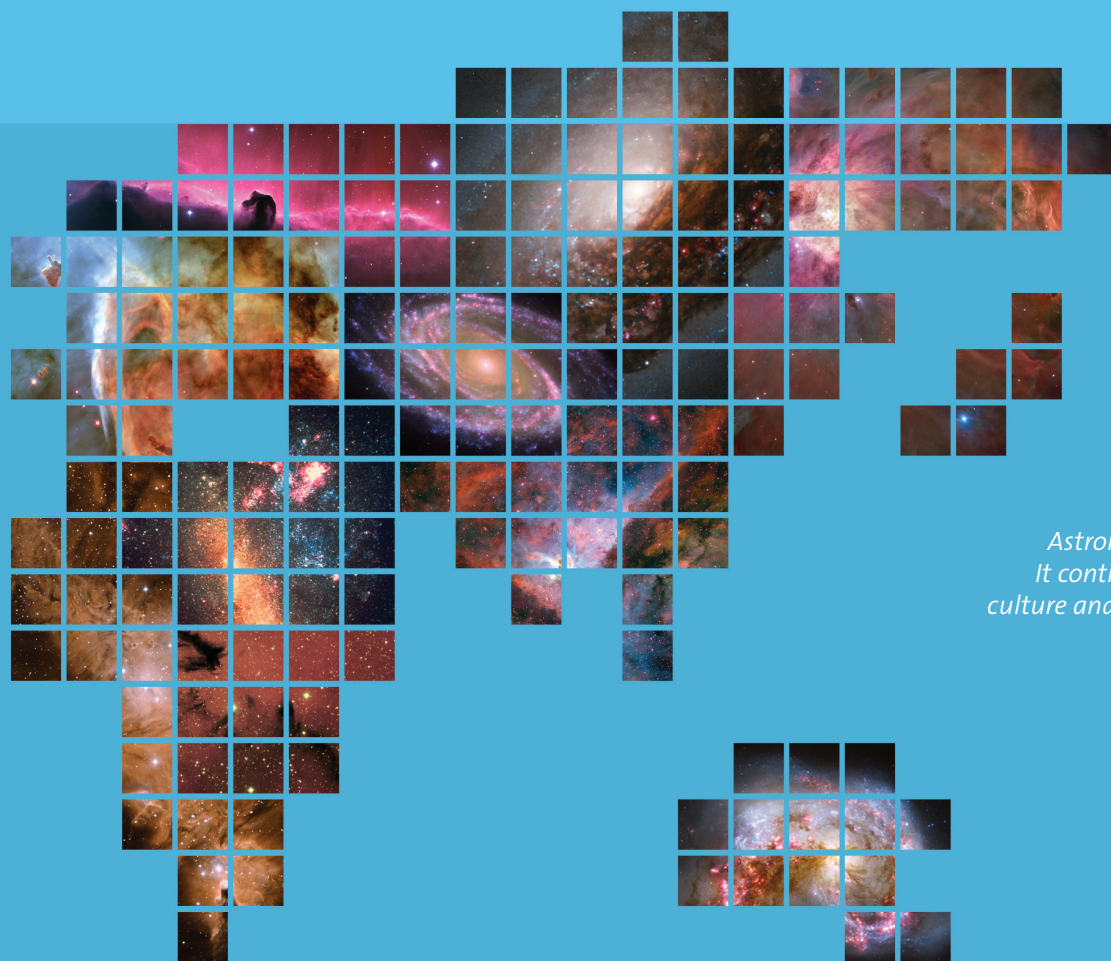
If you have an idea...

Check the IYA2009 webpage: www.astronomy2009.org

- Contact the national Single Point of Contact.
- Participate in (or propose the creation of) one of the Task Groups.
- Propose an Event, Activity or Project, and include with your proposal:
 - » Name of the activity
 - » Short description
 - » Is it a national, regional or global activity?
 - » If it is national: email of the National Node chair (Single Point of Contact)
 - » Date of the activity
 - » Contact person and email address
 - » Weblink
 - » Send to: iyasecretary@astronomy2009.org



The Universe: Yours to Discover



*Astronomy is one of the oldest basic sciences.
It continues to have a profound impact on our
culture and is a powerful expression of the human
intellect.*

*Catherine Cesarsky
IAU President*



www.astronomy2009.org

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