



IAU 100th Anniversary Celebrations

Final Report



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Ayoub Cave in Iran. This image was awarded second place in
the “Night Sky and Natural Heritage” category for the IAU100
Special Project International Night Sky Photography Contest
“The Heritage of the Sky; Over the Plateau of Iran”.
Credit: Mortezo Salehi.

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Foreword





Ewine van Dishoeck

IAU President

The International Astronomical Union (IAU), founded in 1919 in Brussels, reached its 100th anniversary in 2019. This presented a wonderful opportunity to celebrate globally the major achievements of astronomy over the past century and what it has brought to society in terms of science, technology, culture and education. The IAU100 theme 'Under One Sky' was chosen to emphasize the worldwide nature of our field and the role that the IAU has played in bringing people together and uniting them to explore the Universe.

Astronomy is a special field. It embodies a unique combination of science and technology and is deeply rooted in our cultures and history. The inspiration that astronomy brings, the common heritage of the sky as well as its cultural and historical significance, all place astronomy in a privileged position for engaging with the public and helping us to realise how much society has evolved. Scientifically, there has been huge progress. For example, 100 years ago we knew of only one galaxy, our own Milky Way, and only eight planets – all in our own solar system. We did not know where the elements in our body came from. Today we know that the Universe is composed of billions of galaxies and that mysterious dark matter and dark energy make up the bulk of it. A new era of multi-messenger astronomy is emerging with great excitement triggered by the gravitational wave detections. Planets may well outnumber stars, with the exploration of the composition of their atmospheres just beginning. Most notably, we may be the first generation of humans that has the technological capability to answer scientifically one of the biggest questions: are we alone? All of these discoveries have been made possible thanks to crucial technological advancements, increasingly powerful telescopes and satellites, sophisticated software and computing, and international collaboration.

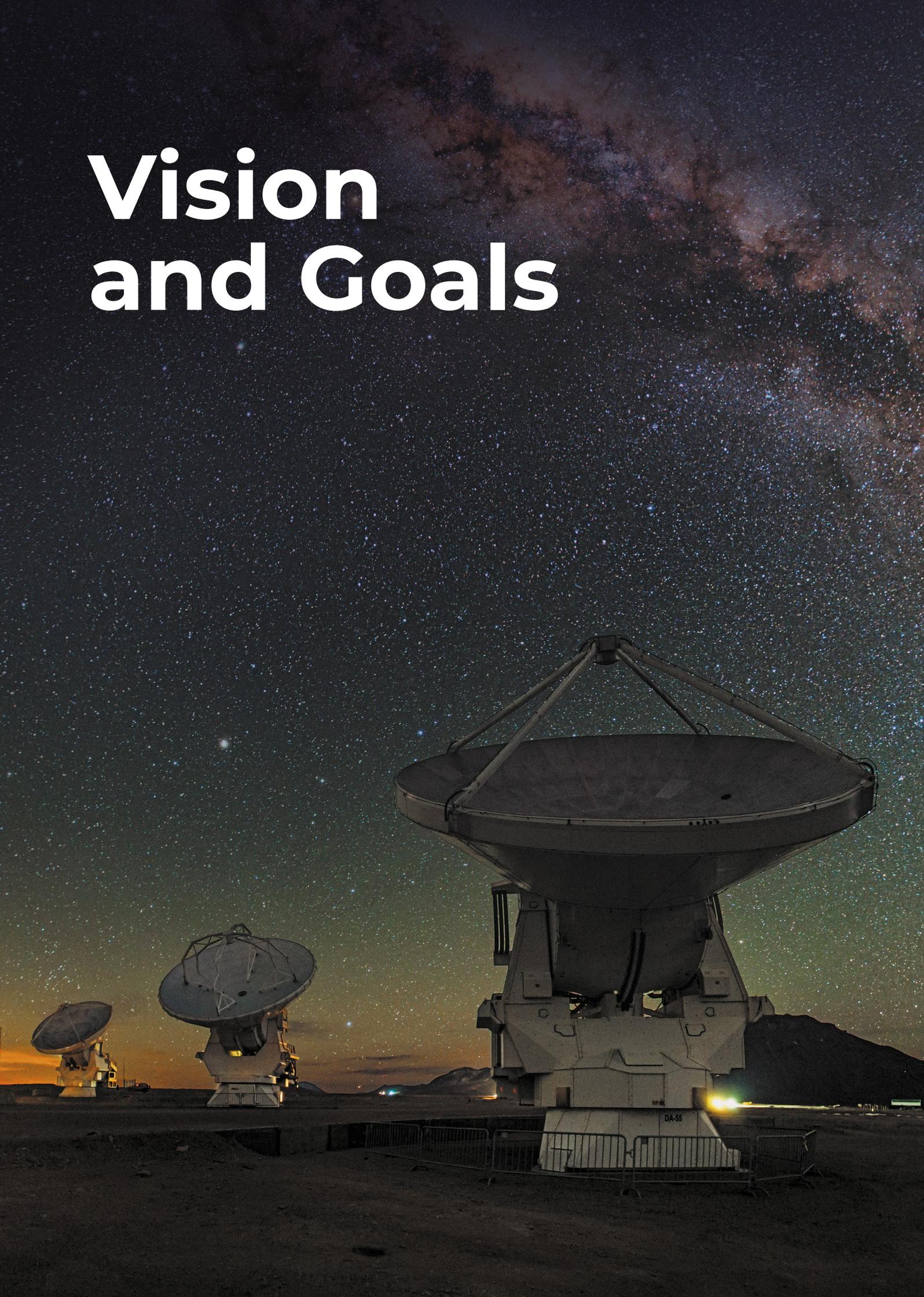
The aim of IAU100 was to increase awareness of these key astronomical discoveries while highlighting the importance of astronomy as a tool for education, outreach, development and diplomacy. A number of Flagship Global Projects were identified, and smaller grassroots projects at national and local levels were also stimulated. IAU100 reached out to the global astronomical community, national science organizations and societies, policy makers, students, families and the general public.

IAU100 came 10 years after the remarkable success of the United Nations International Year of Astronomy 2009 (IYA2009), and was an excellent opportunity to revitalize the worldwide networks that were built then. At the same time, when planning for IAU100 started in 2017, we knew that we could not hope to match the scale of IYA2009 in terms of resources and impact, but we felt that we could still do 'something nice'. Looking back, the IAU100 team worldwide has well exceeded these modest expectations, with more than 5,000 activities in 143 countries that involved direct participation of 5-10 million people and reached an estimated >100 million people.

This success of IAU100 is due to the thousands of volunteers that worked so hard and enthusiastically for more than a year to enable all of these projects. They were steered and stimulated by the IAU100 secretariat, the IAU Office for Astronomy Outreach (OAO), the IAU National Outreach Coordinators and the National IAU100 Committees. The IAU is most grateful to all of them and to the IAU100 sponsors who made this possible financially.

IAU100 ended in February 2020 by celebrating the iconic Pale Blue Dot image taken by the Voyager 1 spacecraft 30 years ago that looked back at our own Earth from space. Through this image, IAU100 wanted to highlight the fragility of our own planet and drive home the message that humankind needs to take well care of its environment. Little did we know then that just a month later our world would be turned upside down by the COVID-19 pandemic that was already beginning to evolve. However, even in this crisis, looking up on a lonely evening to the Moon and constellations, the IAU100 message that we are all world citizens under the same beautiful starry sky remains as strong and relevant as ever.

Vision and Goals



The major goals of the IAU100 celebrations were:

1

Promote widespread access to astronomy knowledge and observing experiences.

2

Support and improve the use of astronomy as a tool for education, development and diplomacy.

3

Facilitate the preservation and protection of the world's cultural and natural heritage of dark and quiet skies.

4

Increase awareness of progress and excitement in astronomy over the past century, in particular:

- The importance of the collaborative enterprise of astronomy as a whole,
- The importance of technology development for astronomical progress,
- The coordinating role of the IAU fostering communication and exchange of ideas for the global astronomical community.

5

Support and improve an inclusive, egalitarian and diverse astronomy community.

6

Raise awareness and discuss prospective new exciting developments in the next 100 years of astronomy.

Governance



Various structures in the IAU100 global organisation ensured that the activities ran smoothly, and facilitated the effective sharing of resources, ideas, and best practices.

IAU100 Task Force

The strategic coordination of IAU100 was conducted through its Steering Committee that provided overall direction and guidance for IAU100 activities.

The IAU100 Task Force Members were:

Piero Benvenuti

Former IAU General Secretary, Italy

Lina Canas

IAU International Outreach Coordinator,
OAO, Japan

Sze-leung Cheung

Former IAU International Outreach Coordinator,
Hong Kong China

Lars Lindberg Christensen

IAU Press Officer, Denmark – ESO/AURA

Rosaria D'Antonio

IAU Head of Administration, Italy

Ewine van Dishoeck

IAU President, the Netherlands (Chair)

Debra Elmegreen

IAU President-Elect, USA

Jorge Rivero González

IAU100 Coordinator, Spain

Kevin Govender

IAU OAD Director, South Africa

Maria Teresa Lago

IAU General Secretary, Portugal

Silvia Torres-Peimbert

Former IAU President, Mexico

Ian Robson

Former IAU Assistant General Secretary,
United Kingdom

Pedro Russo

Former IYA2009 Coordinator and
Former IAU C2 President, Portugal

Robert Williams

Former IAU President, USA



◀ Director-General, Department of Science and Technology, South Africa, Phil Mjwara at the IAU 1919-2019 100 Years Under One Sky Celebration Flagship Ceremony in Brussels, Belgium. Credit: Iris Ma.

▲ From left to right: Lars Lindberg Christensen, Maria Teresa Lago, Ewine van Dishoeck, Rosaria D'Antonio, Jorge Rivero González and Sze-leung Cheung at the IAU100 Kick-off Meeting at ESO headquarters in October 2017. Credit: Sze-leung Cheung.

IAU100 Secretariat

The central hub for IAU100 was the Secretariat located at Leiden Observatory, the Netherlands. The IAU100 Secretariat coordinated activities during the planning, implementation, and evaluation of the initiative. The IAU100 Secretariat liaised continuously with the IAU Paris Office, the IAU OAO, IAU100 National Committees, IAU100 Partners, the media, and the general public to ensure the progress of IAU100 activities at all levels.

Its members were:

Jorge Rivero González	IAU100 Global Coordinator
Lina Canas	IAU International Outreach Coordinator
Bethany Downer	IAU100 Communications Officer
Aneta Margraf-Druc	Graphic Designer
Pedro Russo	Former IYA2009 Coordinator and Former IAU C2 President
Ewine van Dishoeck	IAU President

IAU100 National Committees

Building on the successful experience of IYA2009, IAU100 relied on an international network of National Committees to coordinate, implement and disseminate the IAU100 activities, taking into account the needs and characteristics of different regions around the world.

The first step was to (re-)establish an IAU National Outreach Coordinator (NOC) in each country, which was coordinated by the OAO in 2017. IAU100 then used this NOC network to set up a hub in each country that could lead the activities nationally. Each node established a National Committee that included a wide range of different partner representatives and ensured collaborations between major national and local communities.

The 123 National Committees listed on the next page were indispensable for the success of the entire project.

Albania	Germany	Norway
Algeria	Ghana	Pakistan
Andorra	Greece	Palestine
Argentina	Guatemala	Panamá
Armenia	Haiti	Paraguay
Aruba	Honduras	Peru
Australia	Hungary	Philippines
Austria	Iceland	Poland
Azerbaijan	India	Portugal
Bangladesh	Indonesia	Puerto Rico
Belgium	Iran	Republic of Korea
Bhutan	Iraq	Romania
Bolivia	Ireland	Russian Federation
Bosnia and Herzegovina	Israel	Rwanda
Brazil	Italy	São Tomé and Príncipe
Brunei	Ivory Coast	Saudi Arabia
Bulgaria	Jamaica	Senegal
Burkina Faso	Japan	Serbia
Cambodia	Jordan	Singapore
Canada	Kenya	Slovakia
Cape Verde	Latvia	Slovenia
Chile	Lebanon	South Africa
China Hong Kong	Liechtenstein	Spain
China Nanjing	Lithuania	Sri Lanka
China Taipei	Luxembourg	Sweden
Colombia	Madagascar	Switzerland
Costa Rica	Malawi	Tajikistan
Croatia	Malaysia	Syria
Cuba	Malta	Tanzania
Cyprus	Mauritius	Thailand
Czech Republic	Mexico	Togo
Denmark	Mongolia	Tunisia
Dominican Republic	Morocco	Turkey
Ecuador	Mozambique	Ukraine
Egypt	Myanmar	United Arab Emirates
El Salvador	Namibia	United Kingdom
Estonia	Nepal	United Republic of Tanzania
Ethiopia	Netherlands	United States of America
Finland	New Zealand	Uruguay
France	Nicaragua	Venezuela
Gabon	Nigeria	Zambia

Planning and Implementation



The initial plans of organising a year-long celebration of the IAU 100th anniversary began in 2017 with the creation of the IAU100 Task Force, the establishment of the IAU100 Secretariat at Leiden Observatory, and the appointment of the IAU100 Global Coordinator.

As for IYA2009 and other similar actions such as the UN International Year of Light and Light-based Technologies 2015, IAU100 developed a mixed approach comprising a strong central coordination, with the encouragement of grassroots actions. The IAU100 Secretariat developed a programme of 11 IAU100 Global Projects that covered the IAU100 goals and were each implemented and disseminated by the IAU100 National Committees in their respective countries. The strong coordination by the IAU100 Secretariat together with the OAO ensured the successful implementation of these

projects. Furthermore, IAU100 encouraged anyone organising astronomical activities that followed the IAU100 Goals to register their events as part of the anniversary celebrations.

The preparations for IAU100 began to thoroughly take place in 2018 leading up to the official opening of IAU100 at the IAU General Assembly in Vienna (Austria) in August 2018. The focus that year was to develop the IAU100 Global projects, the preparation of resources, strengthening of the network of IAU100 National Committees, and on fundraising actions.



◀ Children participating at IAU100 Astronomy Day in Schools activity in Brazil. Credit: ClayTom G. Santos, IGTA Instituto Gunstar Team de Astronomia Cultural, Brazil.

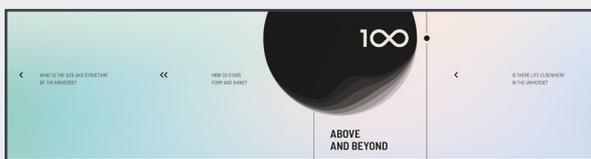
▲ IAU100 official launch at the IAU General Assembly in Vienna, Austria. Credit: IAU/M. Zamani.

IAU100 Global Projects

IAU Above and Beyond Exhibition

Developed by the IAU & ScienceNow Studio

Open-source exhibition showcasing the fascinating past century of astronomy that was present in **75 countries**.

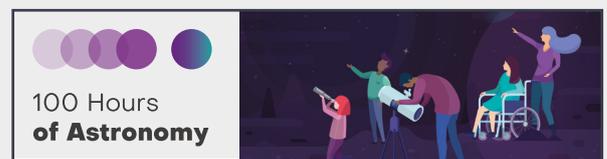


<http://100exhibit.iau.org/>

IAU100 100 Hours of Astronomy

Coordinated by Bethany Downer (IAU100 Secretariat)

1,200 astronomy activities took place on 10-13 January 2019 across **86 countries** and regions, with the direct involvement of roughly **500,000 people**.



<https://www.100hoursofastronomy.org/>

IAU100 Open Astronomy Schools

Coordinated by Rosa Doran and Gustavo Rojas (NUCLIO, Portugal)

830 teachers participated in **20 teacher training sessions** in **20 countries**. The project also distributed **250 educational telescopes** for the organisation of **26 teacher training** in **22 countries**.



<https://open-astronomy-schools.org/>

IAU100 Women and Girls in Astronomy Events

Coordinated by Hannah Harris (IAU100 Secretariat)

Over **300 events** organized in **70 countries** to discuss gender equity, the role of women in science, the importance of role models and encourage the participation of girls in STEM careers.



<https://www.inclusiveastronomy.org/>

IAU100 Dark Skies

Coordinated by Sze-leung Cheung (NARIT, Thailand) and Constance Walker (NSF's National Optical-Infrared Astronomy Research Laboratory, USA)

A network of **123 ambassadors** organised **197 activities** in **30 countries** throughout 2019 to raise awareness about light pollution. In addition, **54 educational kits** were distributed in **41 countries**.

<https://darks skies4all.org/>



IAU100 Moon Landing 50

Coordinated by Bethany Downer (IAU100 Secretariat)

The IAU100 Moon Landing 50 project was the largest coordinated action in the world celebrating the Moon Landing 50th anniversary with more than **1 million people** actively participating in over **1,000 events** in **128 countries and regions**.



<https://www.moonlanding50.org/>

IAU100 Astronomy Day in Schools

Conceived by Paulo S. Bretones (Universidade Federal de São Carlos, Brazil) and coordinated by Bethany Downer (IAU100 Secretariat)

Over **500 events** and activities were organized in **70 countries** around the world for this education-focused global project in November 2019.



<https://www.iau-100.org/astro-day-schools>

IAU100 Pale Blue Dot

Coordinated by Bethany Downer (IAU100 Secretariat)

This project celebrated the 30th anniversary of the iconic Pale Blue Dot image with **over 500 activities** conducted in **51 countries** worldwide on 13-20 February 2020.



<https://www.iau-100.org/pale-blue-dot>

IAU100 Einstein Schools

Coordinated by Stephen Pompea (NSF's National Optical-Infrared Astronomy Research Laboratory, USA)

Around **200 schools** in **45 countries** learned and communicated about gravity throughout 2019



<https://www.einsteinschools.org/>

IAU100 NameExoWorlds

Coordinated by Eric Mamajek (JPL-Caltech, USA), Alain Lecavalier des Etangs (Institut d'Astrophysique de Paris, France) and Eduardo Penteado (IAU100 Secretariat)

More than **780,000 people** participated in **113 national campaigns** to select names of **113 sets of exoplanets and host stars**.



<http://www.nameexoworlds.iau.org/>

Inspiring Stars

Coordinated by Lina Canas (IAU OAO, Japan), Wanda S. Diaz Merced (IAU OAD) and Rosaria D'Antonio (IAU Secretariat, France)

Itinerant international exhibition to highlight world initiatives that address the concept of inclusion that organised **17 activities** in **10 countries**, reaching over **5,000 people**.



<https://sites.google.com/oao.iau.org/inspiringstars>

IAU100 Communications

The IAU100 communication strategy consisted of a multi-partner approach, including centrally coordinated actions through the main website (www.iau-100.org) and IAU-related social media channels, as well as further dissemination through the IAU100 National Committees that translated and replicated their information through their national channels.

News items were published by both IAU100 and IAU. On the IAU100 website, a total of 89 news items were published as of February 2020, consisting of announcements and updates about all IAU100 activities. These were shared on the IAU OAO and IAU social media pages, in addition to some promotion from the IAU OAD channels. The IAU website also published 11 press releases and 11 announcements dedicated to various IAU100 activities.

The IAU100 website had over 260,000 page visits from more than 65,000 visitors from 187 countries from August 2018 to March 2020.

The IAU-related channels included the IAU and OAO Social Media (Twitter, Facebook, Flickr and Youtube) and the IAU Astronomy Outreach Newsletter. Communication consisted of answering public enquiries and requests for dissemination of the IAU100-related celebrations, allowing IAU100 to build a dedicated dialogue with the public by using direct channels such as emailing, messaging, commenting, tweeting and retweeting. There were six IAU Outreach Newsletters dedicated to the IAU100 throughout the year, reaching 5,200 subscribers.

Social media was a strong engagement tool throughout the celebrations. As of February 2020, the IAU OAO Facebook page increased its following by 96% to a total of over 5,300 people and the IAU page grew by over 34% to a total of 17,000 followers. This reflects an increased awareness and engagement with IAU as a result of the IAU100 activities. Hashtags were also used to stimulate the sharing of updates and photos from IAU100 activities worldwide, particularly during global events. Throughout 2019, #IAU100 was used roughly 14,700 times across Facebook, Twitter and Instagram. #100HoursofAstronomy and #NameExoWorlds were particularly popular on Twitter during their respective events. Together, these tags were used approximately 10,000 times. The most popular hashtag was #MoonLanding50, which was used roughly 38,000 times on Social Media and was used commonly with the NASA tag #Apollo50.

The events organized as part of IAU100, particularly the global events, were also well represented in the media. As of January 2020, roughly 1,000 individual online news articles were published worldwide (in various languages) about specific activities. IAU100 has also been mentioned in online news, TV and radio on over 4,000 occasions. In particular, the 100 Hours of Astronomy and NameExoWorlds initiatives were of interest to the media.

IAU100 Finances

IAU100 was financed by the IAU (47%) and fundraising (53%) for a total budget of €645,000. Following lessons learned from IYA2009, a multi-tier sponsorship model was used, and support was sought from scientific institutions and other societies, universities and similar organisations, philanthropic foundations, as well as the private sector. Sponsorship contributions ranged from €800 to €80,000. By the end of 2019, IAU100 had received financial support from 25 sponsors yielding a total of €346,000. In addition, in-kind contributions are estimated in the order of €200,000, and contributing to a total of 31 IAU100 Partners.

An indicative breakdown of expenditure from the IAU100 budget is as follows: Human resources for the IAU100 Secretariat (30%); IAU100 Global Projects (28%); IAU100 Flagship Event in Brussels (18%); IAU100 Special Projects Grassroots Call (7%); IAU100 Anniversary Book and Video (7%); IAU100 OAD Projects (5%); Travel (3%); Other (2%). The largest fraction of the budget was dedicated to supporting the outreach, education, and development of IAU100 actions worldwide.

The IAU100 Secretariat Budget, however, was only a fraction of the total budget for IAU100 actions worldwide. Estimates provided by partners for fundraising by National Committees, as well as in-kind contributions and volunteer time, suggest a total cost of IAU100 exceeding €1 million.

IAU100 Global Partners



IAU100 Patron Sponsors



IAU100 Organisational Associates



IAU100 Impact Numbers





The IAU100 initiative exceeded initial expectations with over

5000

registered activities



Events registered in

143

countries



IAU100 facilitated the direct involvement of

5 – 10 million

people



The estimated reach through media actions is over

100 million

people



Distribution of materials

Various telescopes and educational materials were distributed as part of the Global Projects.

270 educational telescopes

from the National Astronomical Observatory of Japan (NAOJ) were distributed for the implementation of teacher trainings in 23 countries. This was supported by generous donations from the NAOJ.

20 LightSound

devices were distributed in Argentina and Chile for those who are visually impaired and auditorily oriented to experience the variation of light intensity during the *Solar Eclipse* of 2 July 2019 through sound.

54 Laser Classroom Dark Skies kits

were distributed to 41 countries in the framework of the *Dark Skies for All* project to organise events that raise awareness about light pollution.

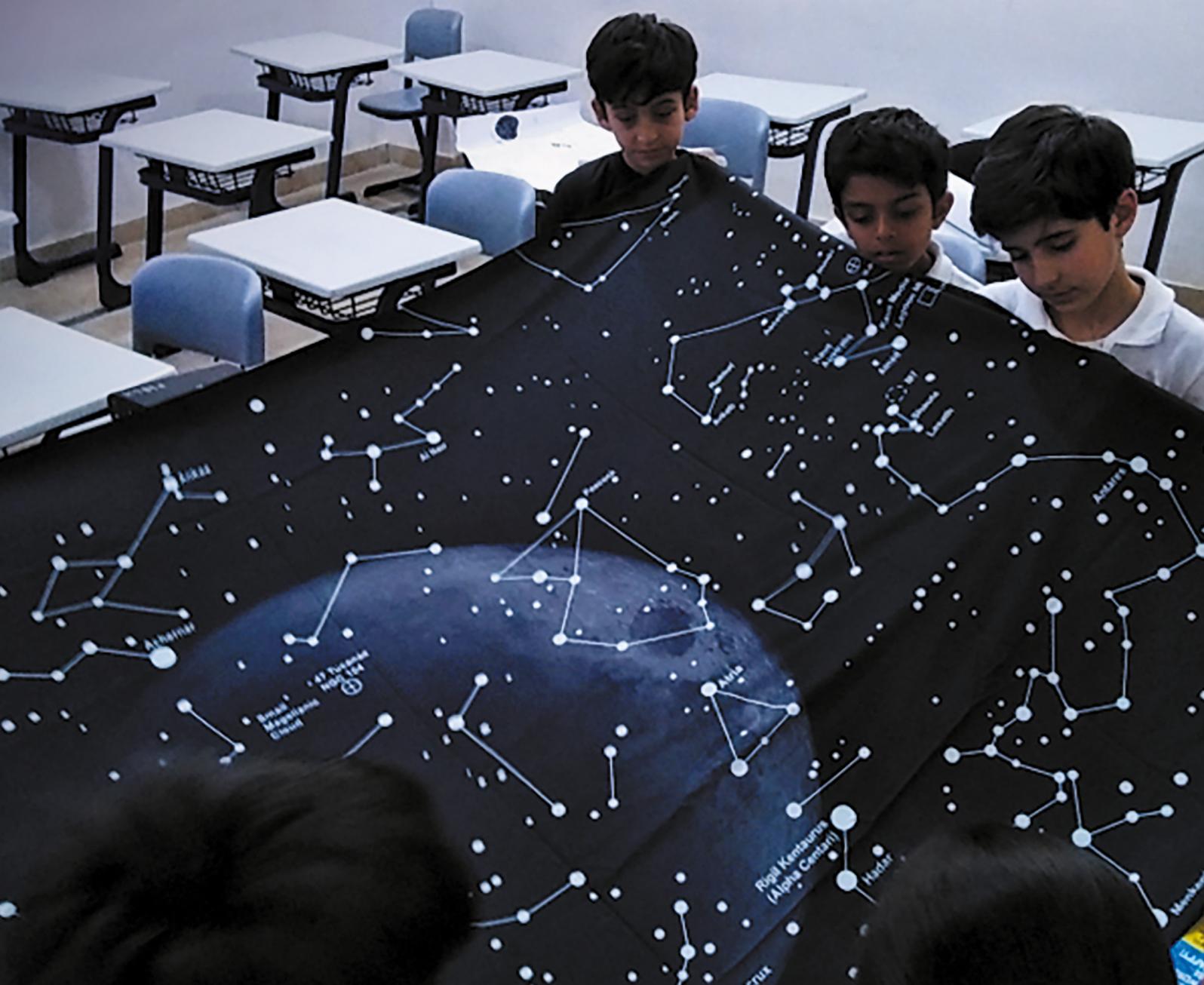
31 Bresser Refractor telescopes

signed by various astronauts and the IAU President were generously provided by the Sterren Schitteren voor Iedereen (SSVI – “Stars Shine for Everyone”) project (Gent, Belgium) and distributed to organisers of events for the *100 Hours of Astronomy*, *Moon Landing 50* and the *IAU100 Astronomy Day in Schools* Global Projects.

300 sets of 12 A0 posters

of the *IAU Above and Beyond exhibition* were distributed to recipients in 75 countries.

IAU100 Activities Highlights



Many events and activities were conducted throughout the IAU100 celebrations. To illustrate the diversity and variation in conducted activities, the following provides insight to the type of IAU100 actions that took place worldwide in 2019.

IAU100 NameExoWorlds

The project with the greatest worldwide impact was the **IAU100 NameExoWorlds** initiative that gave countries around the world the opportunity to organize national campaigns to name a star and an exoplanet. Its aim was to make people think about our place in the Universe and to install a sense of Cosmic Citizenship. Each country's designated star is visible from that country and sufficiently bright to be observed with a small telescope. After much anticipation and widespread global commitment, the results of the IAU100 NameExoWorlds campaigns were announced in December 2019. More than 780,000 people selected the names of 113 sets of exoplanets and host stars. The collection of winning names reflects the diversity and cultural richness of our global society. The IAU100 NameExoworlds initiative will have a lasting impact in the coming years, as the winning names will be used in parallel with the existing scientific designations.



Names associated with prominent rivers of Burkina Faso in local languages. Star Mouhoun (left) also called "Black Volta," the largest river; it plays an important role in the lives of the people in its areas (The star is in the river constellation Eridanus). Exoplanet Nakanbé (right) is also called "White Volta," the second largest river. Credit: Marco Schmidt (left) and Sean Moran (right).

Children participating in IAU100 Pale Blue Dot activity in Pakistan. Credit: Ahmad Kamal Janjua.

NameExoWorld

National Campaigns **113**

Total Participation **780 000** people

Albania	Latvia
Andorra	Liechtenstein
Austria	Lithuania
Belgium	Luxembourg
Bosnia and Herzegovina	Malta
Bulgaria	Netherlands
Croatia	Norway
Cyprus	Poland
Czech Republic	Portugal
Denmark	Romania
Estonia	Russia
Finland	Serbia
France	Slovakia
Germany	Slovenia
Greece	Spain
Hungary	Sweden
Iceland	Switzerland
Ireland	Ukraine
Italy	United Kingdom

Argentina	Haiti
Aruba	Honduras
Bolivia	Mexico
Brazil	Nicaragua
Canada	Panama
Chile	Paraguay
Colombia	Peru
Costa Rica	Puerto Rico
Cuba	Trinidad and Tobago
Dominican Republic	United States of America
Ecuador	Uruguay
El Salvador	
Guatemala	

24
Americas and the Caribbean

+

3
Eur

18
Afri



+
38
Europe

+
29
Asia

+
3
Africa

+
4
Oceania

- Azerbaijan
- Bangladesh
- Bhutan
- Brunei
- China Hong Kong
- China Nanjing
- China Taipei
- India
- Indonesia
- Iran
- Iraq
- Israel
- Japan
- Jordan
- Lebanon
- Malaysia
- Mongolia
- Myanmar
- Nepal
- Pakistan
- Palestine
- Philippines
- Singapore
- South Korea
- Sri Lanka
- Syria
- Thailand
- Turkey
- United Arab Emirates

- Algeria
- Burkina Faso
- Ethiopia
- Gabon
- Ghana
- Ivory Coast
- Kenya
- Madagascar
- Mauritius
- Morocco
- Mozambique
- Nigeria
- Senegal
- South Africa
- Tanzania
- Togo
- Tunisia
- Zambia

- Australia
- Cook Islands
- New Zealand
- Pitcairn Islands

The IAU 1919-2019 100 Years Under One Sky Celebration Flagship Ceremony

On 11-12 April 2019, the IAU 1919-2019: 100 Years Under One Sky Celebration Flagship Ceremony took place at the Palace of the Academies in Brussels (Belgium). This is the very same place where the IAU was born, and IAU100 brought together 250 participants from 67 different countries to reflect about the past century in astronomy and to discuss what will come next. The event was streamed for anyone around the world to follow the program's talks and panels.

The theme of the IAU100 Flagship event was Astronomy with and for Society. The programme consisted of the relation of astronomy to other sciences, technology, culture, development, education, inclusion and diplomacy. Notable speakers at the event included Nobel Prize Laureates Brian Schmidt (Australian

National University) and Ben Feringa (Center for Systems Chemistry, University of Groningen), Chiaki Mukai (JAXA Astronaut and Vice President of the Tokyo University of Science), John Grunsfeld (NASA Astronaut), Phil Mjwara (Director General of the Department of Science and Technology of South Africa), Maria Popova (author, BrainPickings.org) and Anne Glover (Univ. of Strathclyde and former EC Chief Scientific Adviser).

The celebration concluded with the first IAU event for amateur astronomers on 13 April 2019. Through presentations by both professional and amateur astronomers, this meeting aimed to further strengthen the relationship between the IAU and amateur astronomers and their organisations.



Group photo from the 100 Years Under One Sky Celebration Flagship Ceremony. Credit: Babak Tafreshi.

IAU100 Moon Landing 50

Around 20-21 July 2019, the celebration of the **50th Anniversary of the Moon Landing** marked a special milestone. The IAU100 Moon Landing 50 project was the largest coordinated action in the world with more than 1 million people actively participating in over 1,000 events in 128 countries and regions. For this particular global project, the participation of amateur astronomer organizations was vital, as they conducted outreach activities involving direct observations of the Moon. A global art contest was also launched to inspire the next generation of astronomers, which welcomed artistic creations from those aged 5 to 12 from all countries. Hundreds of artwork pieces were received from 28 countries and all submissions were compiled into a special album on the IAU OAO Flickr page. Scientifically, the IAU Division F Planetary Systems and Astrobiology produced a summary of what the Moon landing missions have taught us about its formation for use in public talks.



IAU100 100 Hours of Astronomy



Another highlight was **IAU100 100 Hours of Astronomy** on 10-13 January 2019, which established meaningful collaborations with the worldwide amateur astronomy at the start of IAU100 activities. It consisted of over 1,200 astronomy activities that took place across 86 countries and regions, with the direct involvement of roughly 500,000 people. Throughout these 100 hours, astronomers, communicators, scientists and the general public came together to mark the kick-off of the first IAU100 global project with various astronomy outreach and educational activities. From star parties to lectures and music, this initiative served to reactivate the community and to build awareness for subsequent IAU100 activities, with several event organizers continuing to participate in future Global Projects.

Activity in Ethiopia in the framework of 100 Hours of Astronomy Global Project. Credit: Mekbebe Tamrat, Ethiopia.

Children in Nepal showing the drawings of the Moon phases at a IAU100 Moon Landing 50 activity. Credit: Swaraj Sagar Pradhan, Nepal.

IAU100 Special Projects

Following an open call launched in March 2018, IAU100 supported a total of 22 IAU100 Special Projects.

Each of the supported Special projects was awarded a micro-grant of up to €2,500 to organise national and local initiatives that follow the goals of the IAU100 celebrations. Oversubscription was greater than a factor of 5, demonstrating many good ideas in the community. These IAU100 projects were comprised of various actions that focused on: gender equity; dark skies awareness; astronomy rock concerts; outreach actions in both urban and remote areas; teacher training; outreach activities with elderly people; conferences; star parties; educational activities for refugee communities; providing access to solar eclipses for those who are visually impaired; and an astrophotography competition.

Among the highlights: the “*LightSound Eclipse*” project distributed 20 devices in Argentina and Chile for those who are visually impaired and auditorily oriented to experience through sound the variation of light intensity during the solar eclipse on 2 July 2019; the “*Amanar: Under the Same Sky*” initiative visited the Sahrawi refugee camps to share astronomy with local communities; the “*UNIPAMPA mobile planetarium*” reached 15,000 students in South Brazil; the “*ArAS Astronomy Teacher Training Program*” provided over 60 Palestinian secondary and high school science teachers with training in astronomy teaching.



IAU Above and Beyond exhibition

Another primary IAU100 action was the development of the **IAU Above and Beyond exhibition**. The open-source exhibition takes the visitor on a chronological journey through the past century, highlighting the main astronomical discoveries in each decade together with the main technological and cultural developments in that period. The story line is along three main questions: What is the size and structure of the Universe? How do stars form and shine? Is there life elsewhere in the Universe? Since its opening in August 2018 at the IAU General Assembly in Vienna, the traveling exhibition has been present in Austria, Slovakia, Czech Republic, Belgium, Ireland and Italy. In addition, there have been several localized and translated versions of the exhibition implemented in the Netherlands, Japan, Algeria and Uruguay, and more. The IAU100 Secretariat also released a reduced version consisting of 12 A0 posters. As a result of the free distribution of 300 sets of these posters, this exhibition has been presented in 75 countries to date.



^ Opening of the IAU Above and Beyond exhibition at the IAU General Assembly in Vienna, Austria. Credit: IAU/M. Zamani.

^ Opening of the Dutch version of the IAU Above and Beyond exhibition in Leiden, the Netherlands. Credit: M. Shaw / Leiden University.

IAU100 OAD Projects

IAU100 supported 3 projects from the IAU Office of Astronomy Development (OAD) that were selected as best practices on different topics to both give continuity to the projects and to explore possibilities for implementation on a larger scale:



The Development of AstroTourism Globally project is expanding the development of AstroTourism in the South West and Central Asia region and also exploring the feasibility to expand the outcomes of the project through the 11 Regional OAD Offices worldwide.

The *Columba-Hypatia: Astronomy for Peace* project takes place on the divided island of Cyprus and aims to inspire children to be curious about science and the cosmos, while promoting a feeling of global citizenship and a culture of peace and non-violence. IAU100 supported the activities in 2019 and earlier, as well as actions to expand the “Astronomy for Peace” theme globally.

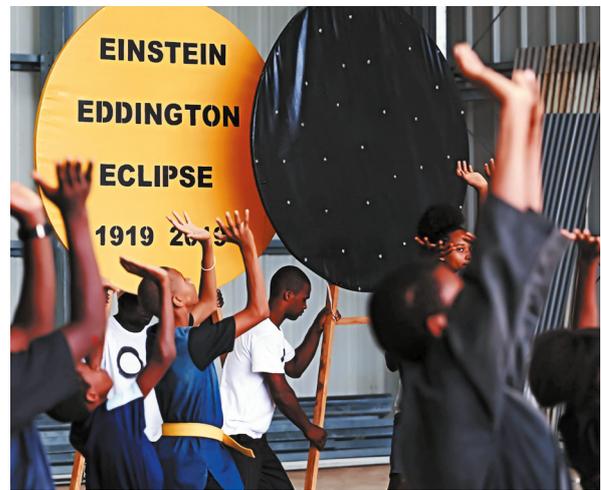
The *Global Techno Apps Challenge* project, to be carried out in 2020, aims for students in Palestine to develop products for web/virtual applications on the theme of *Astronomy for Peace*. The winning ideas will be developed into products with the assistance of international experts. The project will also publish a roadmap document for expanding this challenge to other regions.

Centenary of the 1919 Solar Eclipse

The *Centenary of the 1919 Solar Eclipse* observations that validated Einstein's Theory of General Relativity was another important milestone. For this 100th anniversary, several actions were supported around the world:

- The project *Eddington@Sundy: 100 Years Later* celebrated the anniversary of the 1919 eclipse by promoting educational activities, conferences and other initiatives on a global scale. Its main goal was to support the local community to create a historic and scientific legacy in São Tomé and Príncipe, especially at the Roça Sundy site, where Eddington carried out the historic measurements in 1919.
- *The Centenary of Solar Eclipse of 1919 — Sobral* initiative included many celebratory activities in Brazil through scientific, educational and public outreach events. Additionally, the International Meeting of the Centennial of the Eclipse of Sobral (1919–2019) took place on 28–30 May, including the issue of a commemorative stamp by the Brazilian post office and the re-opening of the Eclipse Museum in Sobral.

– *The Arthur S. Eddington: From Physics to Philosophy and Back Again* Conference was held on 27–29 May 2019 at the Institut d'Astrophysique de Paris (France) to bring together astronomers, physicists, philosophers and historians to review Eddington's lasting influence.



IAU100 Einstein Schools



In addition to commemorative actions, the *IAU100 Einstein Schools* Global Project created a network of schools encouraging the understanding of the essential role of gravity in modern astronomy through exciting astronomical topics. Around 200 schools in 45 countries participated in this initiative throughout 2019 reaching around 6,000 students. A highlight includes a project from a team of students in Chile that conducted observations of the July 2nd 2019 eclipse at Cerro Tololo Inter-American Observatory in northern Chile to repeat the Eddington 1919 Eclipse experiment. The project also established a successful mentoring programme for astronomers to interact with students.

The IAU Symposium 358 “Astronomy for Equity, Diversity and Inclusion – a roadmap to action within the framework of the IAU centennial anniversary”

The IAU Symposium – co-organised by the National Astronomical Observatory of Japan (NAOJ) and the Korea Astronomy and Space Science Institute (KASI) – aimed to create a people-centred strategy for action to improve diversity in astronomy. The meeting welcomed 124 participants from 31 different countries to lay grounds for the Mitaka Resolutions on Astronomy for Equity, Diversity and Inclusion.

These resolutions will be followed by a “Springboard to Action”, in alignment with the new IAU Strategic Plan 2020-2030, and with recommendations for specific measures for different organizations (countries, institutes, organizations, individuals) to be made in direct collaboration with the IAU Working Groups dedicated to diversity and inclusion.



^ Group picture at the IAU Symposium 358 “Astronomy for Equity, Diversity and Inclusion – a roadmap to action within the framework of the IAU centennial anniversary” Credit: IAU OAO / NAOJ.

An important focus of all IAU100 actions was the support and improvement of an inclusive, egalitarian and diverse astronomy community.

The Inspiring Stars

The **Inspiring Stars** project is an itinerant international exhibition to highlight world initiatives that address the concept of inclusion in outreach, didactic, and professional aspects, using astronomy. The project, which began in 2017 as a collaboration between OAD, OAO and the IAU Office, organised 17 activities in 10 countries, reaching out to over 5000 people. Visitors to the Inspiring Stars exhibition were able to engage with interactive displays that showcased various resources for multisensorial exploration in astronomy from around the world. These include tactile planets, books, and posters, a multisensorial optical telescope, a tactile telescope model, software that translates astronomical data into audio, and many more. In addition, some of the conducted events included a programme of talks and panel discussions that allowed invited speakers to share their experiences as scientists with disabilities or impairments with the participants and members of the public. Other panels discussed the value of research in making science more accessible for the greater community, debates about the current state of inclusion in science, and dialogue that charted the paths to follow.



^ Inspiring Stars exhibition at the General Assembly of the International Astronomical Union (IAU) in Vienna, Austria. Credit: IAU/M. Zamani.

IAU100 Women and Girls in Astronomy

The **IAU100 Women and Girls in Astronomy** events were held in alignment with the United Nations International Day of Women and Girls in Science on 11 February 2019. Within this framework, more than 300 events were organized in 70 countries to discuss gender equity, the role of women in science, and the importance of role models, while encouraging the participation of girls in STEM careers. Many inspiring events took place worldwide, including the winner of the IAU100 Women & Girls in Astronomy Contest for the most inspiring action: the *Astro Molo Mhlaba* project. This initiative engaged more than one hundred girls from underserved communities of Cape Town, South Africa through fun, inclusive and interactive astronomy outreach activities. The event involved active discussions with 13 female astronomers as well as the participation of NASA Astronaut Ellen Baker, and IAU OAD office representatives. The prize of the competition was the support for one person involved in the project to attend the *IAU Symposium 358 on "Astronomy for Equity, Diversity and Inclusion"* in November 2019 in Mitaka, Japan.



^ Girls Day at the Museum of Astronomy and Related Sciences in Rio de Janeiro in the framework of the IAU100 Women and Girls in Astronomy initiative. Credit: Patrícia Figueiró Spinelli and Claudia Sá Rego Matos, Brazil.

International Year of the Periodic Table of the Elements 2019

The year 2019 also marked the 150th Anniversary of the Periodic Table.

To celebrate its importance the United Nations proclaimed it the International Year of the Periodic Table of the Elements 2019 (IYPT2019). Within the framework of IAU100, professional and amateur astronomers were encouraged to participate in IYPT2019 by organising events that explore the origin and study of the elements in the Universe.

Event highlights include the participation of the IAU President in the IYPT2019 Opening

Ceremony at UNESCO headquarters in Paris (France) and the Mendeleev150: 4th International Conference in St. Petersburg (Russia) which featured a dedicated symposium on the The Periodic Table across Space and Time. Also of interest was the Periodic Table rockolla project, which included a periodic table devoted to light and music organised in Argentina; and many talks about the cosmic origins of the chemical elements by astronomers around the world.



IAU100 Dark Skies for All

The *IAU100 Dark Skies for All* project established a network of 123 ambassadors in 45 countries that organised 197 activities in 30 countries throughout 2019 to raise awareness about light pollution. In particular, May 2019 was a peak month for organizing events by the ambassadors network with the observance of the International Day of Light around 16 May 2019. The distribution of 54 educational kits in 41 countries ensures that the network can continue to organise activities to raise awareness about the problems of light pollution in the years to come.

✓ Amateur astronomers organise a star party in Croatia. Credit: Astronomska sekcija – Fizikalno društvo Split, Tamara Rom.



IAU100 Events that were Attended by High-level Representatives

The Dutch Astronomy Gala organised in Leiden, the Netherlands, in December 2019 to mark IAU100 and the 20th anniversary of the Netherlands Research School for Astronomy (NOVA) was attended by King Willem-Alexander of the Netherlands.

The *Eddington@Sundy* event in Principe commemorating the 100th anniversary of the 1919 Eclipse on 29 May 2019 was marked by the presence of the President of Portugal, Marcelo Rebelo de Sousa, the President of São Tomé and Príncipe, Evaristo do Espírito Santo Carvalho, the President of the Regional Government of Príncipe, José Cardoso Cassandra, as well as

delegations from the Prime Minister of São Tomé and Príncipe and from the Minister of Foreign Affairs of Equatorial Guinea.

The *Inspiring Stars exhibition* was presented at the United Nations Committee on the Peaceful Uses of Outer Space 2019 Congress organised at the United Nations Office in Vienna in June 2019. For two weeks, UN Delegates from all parts of the world experienced the inclusive exhibition. The exhibit was also visited by schools and general visitors twice daily. The success of this action opened the future possibility of having a permanent Inspiring Stars exhibition at the United Nations Office in Vienna.



^ IAU President Ewine van Dishoeck and astronomer Jake Noel-Storr discuss the Inspiring Stars exhibition materials with King Willem-Alexander of the Netherlands. Credit: Bob Bronshoff/NOVA.

Education actions were a key focus of the IAU100 initiative.

IAU100 Open Astronomy Schools

The *IAU100 Open Astronomy Schools* project organised two teacher training calls. The first was held in early 2019 with great success, as 20 teacher training sessions were funded in 20 countries, and yielded the participation of 830 teachers. A second call was opened at the end of 2019 for the organisation of teacher trainings in 2020. This call distributed 250 educational telescopes for the organisation of 26 teacher training in 22 countries, kindly offered by the National Astronomical Observatory of Japan (NAOJ).

IAU100 Astronomy Day in Schools

The *IAU100 Astronomy Day in Schools* initiative was held on 10-17 November 2019. The project encouraged astronomers, scientists and communicators to visit schools in their respective communities to conduct sky observations and practical astronomy activities with students. Over 500 events and activities were organized in 70 countries around the world for this education-focused global project. Over 110 000 students were engaged through this global initiative.



‘Under One Sky’ Short Story Competition

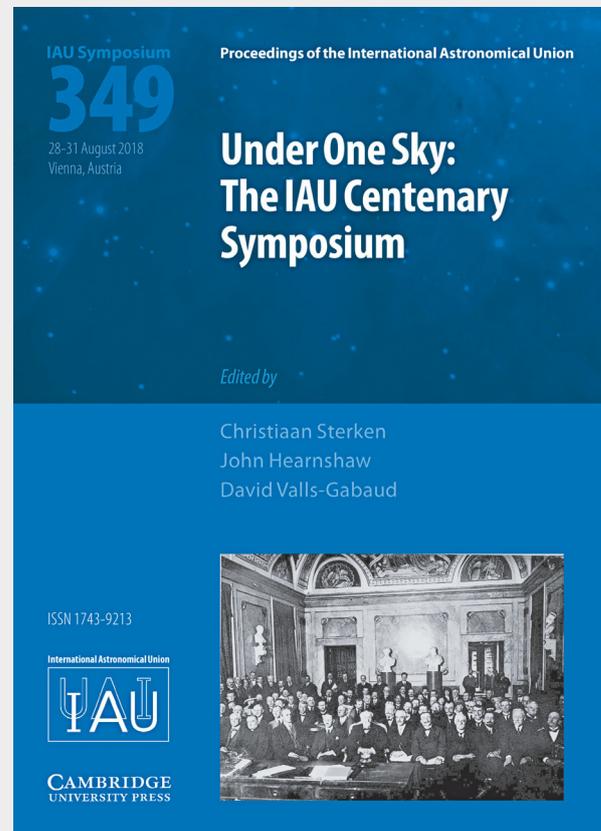
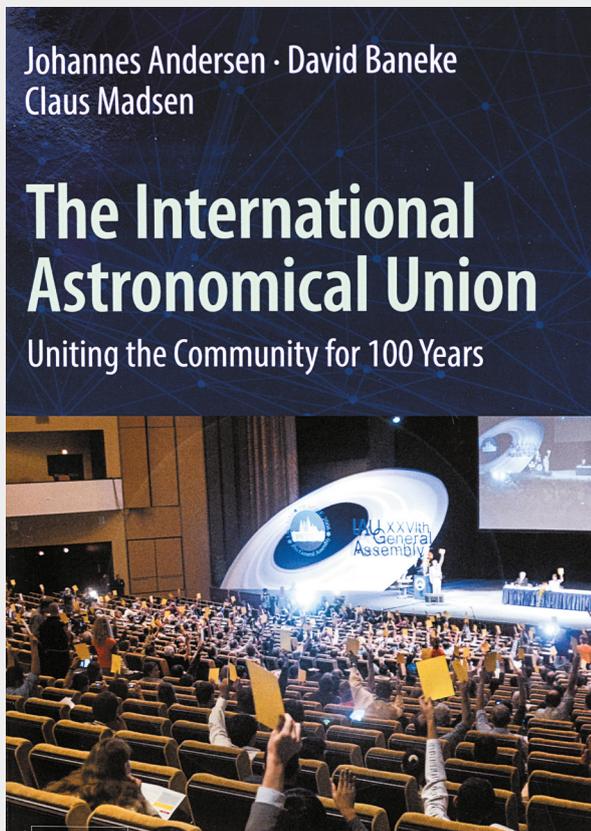
As the IAU values the engagement of young scientists in its activities, the *‘Under One Sky’ Short Story Competition* was launched in November 2018. Submissions related to the themes ‘Under One Sky’ and ‘Inspiring Stars’ were open to bachelor students of any field, Masters students in Astronomy, and PhD students in Astronomy. More than one hundred entries were received, including personal stories, short sci-fi tales, fables, anecdotes, essays, and short dialogues. Five winners were selected from each category, and the two first place winners read their winning entries aloud at the IAU100 Flagship Event in Brussels, Belgium.

IAU 100th Anniversary Commemorative Books

*In April 2019, two IAU 100th anniversary
commemorative books were published:*

The International Astronomical Union: Uniting the Community for 100 Years by Johannes Andersen, David Baneke and Claus Madsen (Springer), describing the history of the IAU in the context of the development of modern astronomy and featuring interviews with most past IAU Presidents, General Secretaries and other key IAU members that were still alive.

Under One Sky: The IAU Centenary Symposium. Editors: Christian Sterken, John Hearnshaw and David Valls-Gabaud (Cambridge University Press). This volume comprises the proceedings of the IAU 100 Years symposium held during the IAU General Assembly in Vienna (Austria) in August 2018.



IAU100 Pale Blue Dot

The IAU100 Global actions concluded with the **IAU100 Pale Blue Dot** Global Project. After one year of looking back at one hundred years of astronomy with IAU100, this initiative encouraged everyone to look back at us, Planet Earth. With the themes of environmental awareness and global citizenship in mind, this project celebrated the 30th anniversary of the iconic Pale Blue Dot image with over 500 activities conducted in 51 countries worldwide on 13-20 February 2020.

- ✓ Participants of IAU100 Pale Blue Dot activity in Indonesia planting trees to celebrate our planet. Credit: FOKALIS JATIM & Pasuruan Space and Atmospheric Observatory, Indonesia.



Under One Sky

Astronomy around the World video series

Launched in October 2019, the IAU100 Secretariat produced a video series that provides a glimpse into the diverse worldwide astronomical community.

Each video is presented through the eyes of the IAU National Outreach Coordinators, showcasing the local history of astronomy, the country's current research efforts in space science, and how astronomy is celebrated in each region. These videos have been regularly shared by the IAU OAO and IAU social media channels and the IAU will continue its publication through 2020.



Students in South Africa showing the galaxy drawing made during IAU100 activity. Credit: Erika Hajburger, South Africa.

From Medicine to Wi-Fi

*Technical Applications of Astronomy
to Society Booklet*

A special booklet was published in April 2019 detailing developments in astronomy that have permeated throughout modern-day life. It highlights some of the technical applications that have been supported and driven by astronomy research and development. This booklet was used toward policy makers and science foundations to illustrate the contributions of astronomy to society, as well as an educational resource for event organizers for various IAU100 activities.



IAU100 Legacies



The success of IAU100 can be measured by the feedback from everyone involved in the organisation and preparation, from the evaluation reports of the organisers of the IAU100 Global and Special Projects and from those who took part in the events, both directly and through the evaluation forms. The IAU100 long-term impact can only be truly assessed if many of the actions launched for the anniversary celebrations are continued over time. The National Outreach Coordinators network established by the OAO, which acted as the backbone for the celebrations, will be the primary vehicle responsible for maintaining the momentum generated from and during IAU100.

The main legacy of IAU100 is its impact on the IAU NOCs Network, both by the increase in number of countries involved (from 80 countries in spring 2018 to 127 countries as February 2020) and the increased engagement level (from 80 active members at the end of 2018 to 120 active members as February 2020).



Participants of the IAU100 Flagship Event in Brussels, Belgium, looking through the NAOJ educational telescope. Credit: Luis Calçada.

Panel discussion about collaborations between Professional and Amateur Astronomers in the framework of the International Astronomical Union during the IAU Amateur Astronomers Day held at the Palais of the Academies in Brussels, Belgium. Credit: Iris Ma.

In addition, it is clear that the IAU100 Global Projects mobilised the astronomical community to work on coordinated trans-national actions.

The IAU OAO will establish a similar framework with the IAU Global Outreach Events, in which will organise global actions with a central coordinating role of the NOCs in terms of national implementation and dissemination. The Global Projects are the continuation of the following IAU100 actions: Dark and Quiet Skies Awareness, with a highlight on the International Day of Light; Inspiring Stars Programme, with a focus on bridging the existing expertise in the IAU to support the outreach community, and Meet the IAU Astronomer! (a spin-off of Astronomy Day in Schools). As the world struggles to contain the spread of COVID-19, the IAU outreach team adapted the legacy programs to a fully online framework, doing whatever the IAU can to help tackle the pandemic as well as its collateral effects on society. The IAU is encouraging outreach professionals, educators, amateur and professional astronomers, and astronomy enthusiasts to organise online events using astronomy as an engagement tool to connect

online with their communities. In addition, the collaboration with the Belgian Stars Shine for Everyone project and Leiden University/ Universe Awareness (UNAWA) will continue under Telescopes for All programme, providing telescopes to underserved communities around the world.

Another important IAU100 legacy has been establishing a central platform for people around the world that organise astronomy public engagement events to showcase their events for further dissemination and for inspiring others. The IAU OAO will continue the maintenance of this event calendar.



The IAU100 actions have also been positive for the interaction with the worldwide amateur astronomical communities. The IAU100 Global actions, such as the 100 Hours of Astronomy and Moon Landing 50, owed their success to the engagement of amateur astronomical societies around the world. It was clear from the outcomes of the IAU100 Amateur Astronomy Event held in Brussels as part of the IAU100 Flagship Event, that establishing platforms for continued interaction between professional and amateur astronomers is something needed by the community, and will be explored in the near future by the IAU.

Educational actions were a key focus of IAU100. The IAU100 teacher training actions and the materials distributed in schools will impact thousands of students in the years to come. The IAU100 Einstein School programme created a network of schools that continue learning and communicating about gravity. This initiative may also be supported in the future by the newly established IAU Office of Astronomy for Education.

IAU100 actions had a strong focus to foster more diverse, inclusive and egalitarian actions. The success of initiatives around the world such as the IAU Women and Girls in Astronomy events, the establishment of the Inclusive Astronomy website that compiled guidelines and best practices, and the Inspiring Stars exhibition will continue, as similar actions are still being planned in the near future.

It should be noted that many of the most important legacies of activities are difficult to quantify. The value of looking through a telescope for the first time, participating in an inclusive action or activity, being exposed to role-models, learning about the power of astronomy for development, giving your first outreach talk in the framework of a worldwide initiative, etc., are all experiences that have long-lasting impact in the astronomical community and the general public.



The network behind the implementation of the IAU100 actions aimed to keep the flame that was lit worldwide by the IAU during IYA2009 burning high. Let the celebrations of astronomy be Under One Sky for the next 100 years to come.



INTERNATIONAL ASTRONOMICAL UNION

100th Anniversary Celebrations

Final Report





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